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Poster Presentations

P019

Randomized Trial to Evaluate Systemic Inflammatory Response After Laparoscopic Total Extraperitoneal Repair (TEP) and Laparoscopic Transabdominal Preperitoneal (TAPP) Repair for Inguinal Hernia

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Introduction: This study was conducted to compare the changes in systemic inflammatory response after Laparoscopic Total Extra peritoneal (TEP) and Laparoscopic Trans abdominal preperitoneal (TAPP) repair for inguinal hernia and to compare postoperative pain in both groups using visual analogue scale (VAS).
Methods and Procedures: Randomized comparative trial was conducted wherein 60 patients above 18 years of age with unilateral inguinal hernia undergoing laparoscopic TEP and TAPP repair were included. Serum TLC(Total leucocyte count) was measured by SYSMEX KX-21 Hematology Analyzer. Serum IL-6(Interleukin 6) and hsCRP(High-sensitivity C-reactive Protein) were measured by ELISA. The patients were randomized prior to surgery with Ćhttp://www.randomizer.org. By using block randomization method, they were allocated to undergo either TEP(n=30) or TAPP(n=30).A preoperative measurement of TLC,serum IL-6 and hsCRP was made from venous sample.Post-operative estimation of systemic inflammatory markers was made 24 h after surgery. Post-operative pain scoring after 24 h and 7 day was done using Visual analogue scale. Data was analyzed using SPSS version 20 software for Microsoft windows.Variables were analyzed using Mann Whitney test and Wilcoxon Signed Ranks test.
Results: Mean age in years for TEP and TAPP was 43.33 and 40.23 respectively. All 60 patients were male .A preoperative and postoperative measurement of values of serum TLC,hsCRP and IL-6 showed statistically significant (p=0.001) rise in postoperative period in both the groups. On comparing the pre-operative and post-operative difference in the values of TLC, hsCRP and IL-6 in between TEP and TAPP,the rise in TLC & hsCRP was not found to be statistically significant(TLC: p=0.651 & hsCRP: p=0.171) but the rise in the IL-6 was found to be statistically significant (p=0.002).On comparing the postoperative pain difference at 24 h and 7days between TEP and TAPP,the decrease in pain was found to be statistically significant (p =0.001). The pain values were significantly more in TAPP at 24 h (p= 0.001) and 7 days(p=0.015) after operation in comparison to TEP. There was no relation found between rise in inflammatory markers with post-operative pain (TLC: p=0.14, hsCRP: p=0.98, IL6: p=0.9).
Conclusions: There is significant rise in the postoperative systemic inflammatory markers after TEP and TAPP. As only IL6 out of TLC, hsCRP & IL6, was found to be significantly raised in TAPP as compared to TEP so it cannot be stated conclusively that TAPP is associated with more inflammatory response.Post-operative pain decreased on 7th day post surgery in both TEP & TAPP but the pain values were comparatively more in TAPP.

P020

Clinical and Economic Values of Outpatient Migration of Elective Ventral Hernia Repairs Among Obese Patients

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Objectives: Ventral hernia repairs have been widely preformed in both inpatient and outpatient setting. The aim of this study is to explore the clinical and economic benefits of outpatient elective ventral hernia repairs (EVHRs) compared with inpatient EVHRs for obese patients.

Methods: Obese (BMI≥30) Patient s with ICD-9-CM procedure codes (53.4x, 53.5x, 53.6x) were identified from Premier Perspective Database (Premier) from January 2013 to September 2015. Patients age≥18 having elective ventral repairs were included. Patients whose primary procedure were not ventral hernia repairs or had gastrointestinal tract resections were excluded. An 8-digitalto-4-digital Greedy propensity score matching (PSM) approach was used to compare outcomes between inpatient and outpatient. Patient socio-demographic, clinical characteristics, hospital level factors were applied to generate propensity score. Intraoperative complication and postoperative complication prior discharge, blood transfusion rate, conversion rate, patient controlled analgesia/PCA use and morphine equivalent dosage, length of stay, operation room(OR) time, and inflation adjusted total cost during hospitalization between inpatient and outpatient were assessed after matching.

Results: The study included 8537 outpatient EVHR cases and 6442 inpatient EVHR cases during January 2013-September 2015. Compared with outpatient cases, inpatient cases were older, with Medicare, with higher comorbidity score, more morbid obese, more likely to be female, and more likely to have gangrene or obstruction, adhesiolysis or myocutaneous flap. (P<.01)

A total of 2640 (16.4%) cases were matched by strict greedy PSM. No statistical difference was found between inpatient and outpatient cases among selected characteristics. Compared with inpatient cases, outpatient ventral hernia repairs were associated with significant lower complication rate, lower blood transfusion rate, conversion rate, shorter OR time, lower patient controlled analgesia(PCA) and PCA morphine equivalent dosage and lower total cost during hospitalization. Details were shown in Table 1.

Conclusion: Compared with inpatients, elective ventral hernia repairs in outpatients is associated with better clinical and economic outcomes among obese population. Additionally, the study found that the opportunity of potential shifting from inpatient to outpatient care exists, even for the obese patients to whom the ventral hernia repairs were relatively complex.

Table 1.The Propensity Score-matched Outcome Comparisons of Clinical Outcomes, Services Utilizations, and Costs: inpatient vs. outpatient elective ventral hernia repairs among obese patients

	Inpatient N/Mean(%/SD)	Outpatient N/Mean(%/S	P-Value
N of patients (Before/After PSM[1])	8537/1320	6442/1320	
Overall complication during hospitalization[2] N (%)	321 (24.3%)	25 (1.9%)	<.0001
Intraoperative complication N (%)	23(1.7%)	0 (0.0%)	<.0001
Postoperative cardiac complication N (%)	38 (2.9%)	1 (0.1%)	<.0001
Postoperative pulmonary complication N (%)	101 (7.7%)	0 (0.0%)	<.0001
Postoperative gastrointestinal complication N	123 (9.3%)	1 (0.1%)	<.0001
Postoperative genitourinary complication N (%)	86 (6.5%)	1 (0.1%)	<.0001
Postoperative wound complication N (%)	9 (0.7%)	0 (0.0%)	<.0001
Postoperative surgical site infection N (%)	7 (0.5%)	0 (0.0%)	0.008
Postoperative seroma/hematoma N (%)	18 (1.4%)	0 (0.0%)	<.0001
Blood transfusion N (%)	43 (3.3%)	7 (0.5%)	<.0001
Conversion N (%)	49 (3.7%)	3 (0.2%)	<.0001
PCA use (Yes/No)	189 (14.3%)	26 (2.0%)	<.0001
PCA Morphine Equivalent Dosage (mg, Mean (SD))	107 (103)	51 (37)	<.0001
Length of Stay (Days, Mean (SD))	3.8 (4.1)	N/A	
OR time (Mins, Mean (SD))	149 (87)	81 (46)	<.0001
Total Cost During Hospitalization ($, Mean (SD))	13154 (102281)	3544 (3899)	<.0001

Abbreviation: PSM, propensity score matching; PCA, patient controlled analgesia; OR, operation room

[1]Confounding factors to generate propensity score for matching: patient socio-demographic (age, gender, payer category), clinical characteristics (BMI>40, Charlson comorbidity index, lysis of adhesion, gangrene or obstruction, myocutaneous flap, and opioid dependence), hospital level factors (bed size, rural, teaching status, and region)

[2] Overall complication included intraoperatice complications (bleeding, injury), postoperative complications prior discharge(cardiovascular,neurological, pulmonary,gastroinstestinal, genitourinary and wound related complication, shock, surgical site infection, mortality and others).

[3] Total cost included direct cost and overhead cost during hospitalization and adjusted for inflation to 2015 US dollars.

P021

Functional 3DVR Imaging of Abdominal Wall Hernias

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Purpose: 3D Volume Rendering (3DVR) is a simple and widely available computer-based post-processing technique that can be used to generate photo-realistic panoramic images of the abdominal wall from computed tomography (CT) examinations either retrospectively or prospectively.

Methods: An illustrative series of clinical cases will be used to provide an introduction to the use of functional CT and pre-operative 3DVR for abdominal wall hernia assessment and the planning of an effective surgical repair.

Results: When coupled with a 'functional' approach to CT imaging of the abdominal wall, 3DVR can improve the surgeon's understanding of abdominal wall defects including hernias, dysfunctional bulges/eventrations, muscle atrophy or denervation, and any associated skeletal changes that may be relevant to surgical planning. This technique can demonstrate incidental hernias not previously apparent on physical examination or standard CT scans (e.g. spigelian hernias, port site hernias, parastomal hernias). For the patient, 3DVR provides an easy-to-grasp understanding of the relevant abdominal wall anatomy, the nature of the problem at hand & the scale of the surgical challenge. Images of this kind can help the surgeon to more effectively manage unrealistic patient expectations or to explain dysfunctional bulges that do not require surgery.

Conclusion: A functional 3DVR approach to pre-operative imaging can provide the surgeon with a more complete understanding of any hernia defect and the relevant functional status of the abdominal wall muscles. This can be useful in planning the most effective pre-operative and intra-operative approach with a focus on improving patient outcomes.

P022

Is Laparoscopic Transabdominal Preperitoneal Hernia Repair (TAPP) More Invasive Than Anterior Open Approach?

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Introduction: Tension-free anterior open (AO) repair, using mesh and/or a plug, is a popular surgical choice for inguinal hernia. Laparoscopic transabdominal preperitoneal repair (TAPP) is gradually increasing, however, TAPP is considered more invasive than AO repair. In general, the TAPP procedure has been considered to take longer and have a higher rate of post-operative complications. The purpose of this study was to compare the TAPP and AO procedures to determine if there is a significant difference in safety outcomes or in the practicability of the procedures themselves.

Methods and Procedures: A total of 104 patients with inguinal hernia were included in this study, of which 51 underwent TAPP and 53 underwent AO repair from April 2015 to August 2016 at Yamaguchi-ken Saiseikai Shimonoseki General Hospital. Patient characteristics (age, sex), surgery-related factors (hernia type, affected side, operation time), and postoperative factors (WBC or CRP values on Day 1 or Day 3 post-procedure, and post-surgical complications) were retrospectively analyzed and compared between the two groups.

Results: There were no significant differences in age, sex, hernia type, or affected side between the two groups. There were also no significant differences in the mean length of time required for the procedure (TAPP: 61.3±16.7 min, AO: 60.1±20.1 min). On Days 1 and 3 post-procedure, mean WBC values were 7749±2023 /μl and 6397±1787 /μl, respectively, in the TAPP group and 8174±1949 /μl and 6340±1531 /μl, respectively, in the AO group. No significant differences were observed. The mean Day 1 and Day 3 post-procedure CRP measurements were 1.12±0.81 mg/dl and 2.46±3.40 mg/dl, respectively, in the TAPP group and 2.22±1.88 mg/dl and 3.88±3.40 mg/dl, respectively, in the AO group. The mean Day 1 post-procedure CRP value was significantly lower in the TAPP group (p<0.01). No significant differences between the two groups were observed for mean length of post-operative stay (TAPP: 3.1±1.1 days, AO: 3.4±1.0 days) or for the rates of post-operative complications (TAPP: 6 [5 seroma, 1 wound infection]; AO: 6 [1 chronic pain, 1 recurrence, 2 seroma, 2 subcutaneous hematoma]).

Conclusions: Based on a retrospective evaluation of several key parameters, no significant differences were observed between the TAPP and AO procedures that would indicate that TAPP is a safe and feasible operation and it is also comparable in surgical stress to AO repair.

P023

Acute Postoperative Strangulated Ventral Hernia After a Video Assisted Lobectomy

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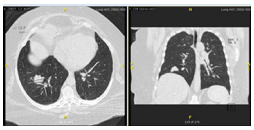
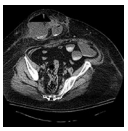
This is a case of a 56 year old female admitted for surgical treatment of right lower lobe pulmonary nodule (Fig. 1).



Her surgical history is remarkable for a vertical banded gastroplasty 33 years ago for obesity and multiple abdominal surgeries for small bowel obstruction and hernia repair. She underwent 13 years ago a conversion to Roux-en-Y gastric bypass at Cleveland Clinic Florida and two more hernias repairs with mesh.
In March 2015 she underwent Right VATS (Video Assisted Thoracic Surgery), Right Upper Lobe Wedge Resection, Right Lower Lobe Wedge Resection, Right Lower Lobectomy and Right Mediastinal Lymph Node Dissection. In POD 2 the patient got an episode of Acute Mental Status changes and abdominal pain with incarcerated ventral hernia. An abdominal CT scan shows a high grade small bowel obstruction with incarcerated hernia (Fig. 2)

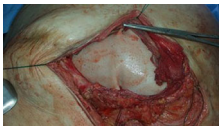


The patient was taken to the operating room after resuscitation (Fig. 3).

We founded multiple abdominal wall hernia defects, multiple adhesions, and strangulated cecum (Fig. 4).

We removed from the midline a chronic infected mesh (Fig. 5).

We performed an Exploratory Laparotomy, extensive Lysis of Adhesions, reduction of strangulated incisional hernia, Right hemicolectomy with end ileostomy by colorectal team, removal of old mesh and closure of abdominal wall with acellular porcine dermal graft (Fig. 6).



Patient got a long and slow recovery period in ICU and on POD 22 the patient was discharge home in a stable condition.

P024

A 3 MM Needlescopic Inguinal Hernia Repair Aiming at Day Surgery Center

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Introduction: In Japan, even hernia repair requires 3 days admission mainly due to the old fashion custom. We performed inguinal hernia repair with anterior open technique that assumes the short stay surgery. The anterior open technique is performed by a combination of local, intravenous and inhalation anesthesia and 29% were day surgeries last year in our institution. On the other hand, laparoscopic TAPP repair has several superiorities against the open approach, however, longer operative time and general anesthesia are the problems. For the day surgery based TAPP repair, reduction of the postoperative pain, shorter operative and anesthesia time are the important points.
We introduced the single port TAPP repair from July 2015 and performed for 20 lesions while 610 open and 159 hybrid techniques are done. Aim of this study is to compare the operative time and postoperative pain among 3 techniques, as well as introduce our recent needlescopic technique.
Results: Mean operative time was 60.3±11.3 min. in single port TAPP and was significantly longer ($p<0.01$) than open (23.8±5.9 min.) and hybrid technique (37.7±16.5 min.). Moreover, faces pain scale (FPS) at the end of operation and 1 h after the surgery were significantly higher than the open and hybrid (0.24 vs. 1.35, 0.53 vs. 1.63: $p<0.01$).
Therefore, We introduced the 3 mm needlescopic TAPP repair for the shorter operative time and reduction of postoperative pain.
3 mm needlescopic TAPP:
We use 3.3 mm scope (HOPKINS®II Telescope, KARL STORZ, Germany), 3.5 mm forceps (ERAGON nodular mini, RICHARD WOLF, Germany)and 5 mm instruments for the TAPP repair using lightweight mesh.
We started the 3 mm needlescopic TAPP in December 2015 and 36 lesions were performed. Mean operative time was 39±11.8 min. and there were no intraoperative complications. There were no differences between the hybrid technique and 3 mm needlescopic TAPP in postoperative FPS (0.24 vs. 0.72).
Conclusions: All patient was returned to home within 24 h. The wound cosmesis is quite good and pain control was easy with the 3 mm needlescopic TAPP repair. It was thought that the day surgery would become more popular in Japan by this procedure.

P025

Robotic-Assisted Versus Laparoscopic & Open Ventral Hernia Repair; Outcomes Comparison Based on National Inpatient Sample (NIS) Database

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Background: Laparoscopic and open ventral hernia repairs are widespread procedures in the United Satets, and although there is an ongoing debate between open and laparoscopic ventral hernia repairs, Robotic-assisted procedures may offer a new alternative practice over laparoscopic and open procedures for repair of a ventral hernia,. Our objective is to compare primary outcomes and associated surgical complications of robotic-assisted (RAVHR), laparoscopic (LVHR) and open (OVHR) ventral hernia repair.
Methods: A retrospective study using the national inpatient sample (NIS) database from 2008 to 2013. Patients undergoing robotic-assisted, laparoscopic and open procedures for ventral, incisional and umbilical hernia repair were identified using ICD 9 code. Patient demographics, the hospital length of stay (LOS), total hospital charges, inpatient mortality, and surgical complications were assessed.
Results: A total of 221,875 underwent surgical repair procedures. There were 3,590 RAVHR (65.8% male & 34.2% female), 39,684 LVHR (42.0% male & 58.0% female) and 178,601 OVHR (39.6% male & 60.4% female). The Mean age of patient for RAVHR 60.17 years, LVHR 57,16 years and OVHR 58,34 years ($p<0.001$). The median LOS for RAVHR was 2 days, LVHR 3 days, and OVHR 4 days ($p<0.001$).The Median total charges for RAVHR 46,100 $ vs. 34,128 $ vs. 36,691 $ ($p<0.001$). The total number of inpatient hospital mortality was 5 (0.1%) vs. 174 (0.4%) vs. 2254 (1.3%) for RAVHR, LVRH, and OVHR respectively.
Conclusions: RAVHR associated with a lower LOS, inpatient mortality, and postoperative complications, but higher total inpatient hospital charges compared to LVHR and OVHR.

P026

Our Experience with Laparoscopic Repair of Groin Hernia in Females in an Asian Cohort

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Introduction: Laparoscopy today seems an attractive approach for all inguinal hernias, particularly in females due to the greater prevalence of femoral hernia. In open repair these synchronous hernias are often missed.
Methods: Between Jan 2006 and July 2016, 66 consecutive female patients underwent laparoscopic repair for groin hernia. The patient demographics, operating time, type of hernia, conversion rate, intraoperative and postoperative complications and recurrence were measured. 52 patients had inguinal hernia, 6 femoral hernia, 2 inguinal with obturator and 6 both inguinal and femoral hernia. 57 patients underwent a totally extra-peritoneal (TEP) repair and 9 patients underwent a trans-abdominal pre-peritoneal (TAPP) repair. 1 patient in TAPP and 6 patients in TEP group underwent SILS.
Results: 62 patients had primary and 4 recurrent hernia. Of these 4 patients who presented with recurrence, one patient had a femoral recurrenceimmediately after a previous open repair of an inguinal hernia suggestive of a possible missed femoral hernia. One patient with was found to have a synchronous femoral hernia and 2 with obturator hernia along with an inguinal were not detected preoperatively. An inguinal with a synchronous occult hernia was only diagnosed during the laparoscopy. The overall mean operative duration was 62 min (range 34–112 min). One patient required conversion to open due to adhesions from previous surgery. Three patients developed seroma, one bruising around 10 mm port site and one hematoma postoperatively. No recurrences were recorded.
Conclusion: Laparoscopic repair offers accurate diagnosis and simultaneous treatment of both inguinal and femoral hernia with minimum morbidity and good clinical outcomes. Laparoscopic repair has become the procedure of choice for the treatment of the majority of groin hernia in women at our institution.

P027

Midline Versus Transverse Specimen Extraction Incision for Laparoscopic Colectomy: Short-Term Outcomes of a Randomized-Controlled Trial

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Introduction: Observational studies suggest a higher incidence of incisional hernia with the use of midline compared to transverse extraction incisions after laparoscopic colon surgery. We report short-term outcomes of a randomized trial comparing transverse and midline extraction incisions focused on risk factors for the development of incisional hernia.
Methods: Between 2011 and May 2016, consenting patients undergoing laparoscopic colon resection for benign or malignant disease were randomly assigned to midline or transverse (muscle-splitting, lateral to rectus) specimen extraction site incision, stratified by right- and left-sided resections. Primary short-term endpoints included 30-day surgical site infection (SSI), average pain scores on postoperative days 0–2 (visual analog scale, 1–10), operating time, length of hospital stay and 30-day morbidity. All patients were managed using a standardized Enhanced Recovery Program. Analysis was by intention-to-treat. (Trial registration: NCT01247389).
Results: A total of 165 patients were randomized to midline (n=86) or transverse (n=79). Overall, 7 patients of the midline and 5 patients of the transverse group were converted to open, while 10 patients randomized to transverse underwent midline incision, and 1 patient randomized to midline underwent transverse incision. Baseline characteristics were similar including age, gender, diabetes, use of immunosuppression, body mass index and current smoking. There was no significant difference in the incidence of overall SSI (midline 7.0% vs transverse 7.6%; p=0.879), superficial SSI (4.7% vs 5.1%; p=0.902), or organ space SSI (2.3% vs 2.5%; p=0.931). Average pain scores on POD0-2 as well as the pain score trajectory over time were similar between both groups. There were no differences in the complications (midline 16.3% vs transverse 19%; p=0.933) or median [IQR] length of stay (midline 3 days [3–4] vs transverse 3 days [2–4]; p=0.145) between the two groups. Per-protocol analysis did not change these results.
Conclusions: In the short-term, there were no advantages to either midline or transverse specimen extraction incisions for laparoscopic colon surgery.
Funding: Canadian Surgical Research Fund

P028

Inguinal Hernia Repair: Experience with Total Extra Peritoneal (TEP) Technique Using a Self-Fixation Mesh

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Introduction: Inguinal hernia repair is a very frequent operation around the world, usually practiced in a short stay or day surgery modality. Hernias may cause severe complications, being the most common the incarceration, with the risk of bowel necrosis. Multiple approaches have been described, both open and minimally invasive. Laparoscopic totally extraperitoneal repair technique (TEP) is becoming more frequent due to its low rate of post surgical complications. Different types of mesh and fixation methods are used. Pain can be a problem and is mostly related to the fixation devices employed, and measures must be taken to prevent it.
Objective: To describe post operative outcomes for patients undergoing laparoscopic TEP hernia repair with self-fixation mesh at a fourth level University Hospital in Bogotá, Colombia.
Methods: Case series report of a group of 74 consecutive patients with inguinal hernias who underwent an inguinal hernia repair with TEP technique and self-fixation mesh from January 2012 to January 2016. Inclusion criteria were: minimum follow-up of 3 months; patients over 16 years of age, complete clinical records available, and that all patients answered a phone questionnaire. Patients were examined to rule out reproduction and they were asked to score pain on the analog scale at six months and one, two and three years either during visit or by phone.
Results: A total of 74 patients underwent TEP operations using a self-fixating mesh. Of them, 14 have been followed-up for more that three years, 23 for more that 2, 30 for more than one and 7 for more than six months. Postoperative controls have shown satisfactory results in terms of pain resolution and control, and no reproduction of hernias has been documented. Additionally, there are no complications associated to the procedure and none have required a reoperation.
Conclusion: The use of a self-fixation mesh for inguinal hernia repair with TEP technique is safe and effective, with good results in terms of pain control and reproduction rates after a mid-term follow-up. Avoiding the use of fixation devices (tacks or tackers) may contribute to a reduction in postoperative pain.

P029

Short-Term Outcomes of Open and Robotic Abdominal Wall Reconstruction with Posterior Component Separation: A Matched Cohort Analysis

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Background: A minimally invasive approach to abdominal wall reconstruction with posterior component separation (AWR/PCS) may offer benefits compared to open procedures in select patients with ventral and incisional hernia. The use of robotics to facilitate AWR/PCS is growing in popularity with minimal data to support its adoption. The purpose of this study was to compare short-term outcomes of open and robotic AWR/PCS.
Methods: The study was performed as a retrospective, matched cohort analysis of all consecutive patients who underwent open or robotic AWR/PCS by a single surgeon in a university hospital from January 2015 to August 2016. Patients were matched for demographics and co-morbidities as well as hernia type and size. Data collected were patient demographics and hernia classification and size, perioperative factors, hospital length of stay (LOS), 30-day outcomes, and hernia-related readmission rates. Variables were compared using nonparametric tests.
Results: Ninety-two patients underwent open (n=75) or robotic (n=17) AWR/PCS. Matched cohorts had similar age, body mass index, co-morbidities, and hernia classification and size. Compared to open, patients who underwent robotic AWR/PCS had longer average operative time (open 288.8 vs. robotic 365.2 min, P=0.032) but shorter LOS (open 7.1 vs. robotic 4 days, P=0.045). Perioperative and 30-day outcomes were similar between cohorts, readmission rates (open 5.9% vs. robo 1%, P=0.27).
Conclusions: For surgeons experienced in AWR, a robot-assisted laparoscopic approach to ventral and incisional hernias may be a safe, feasible option for select patients who require PCS. One potential benefit of a minimally invasive approach may be shorter LOS.

P030

Incidence of Ventral Hernia Repair Following Open Abdominal Aortic Aneurysm and Open Aorto-Femoral or Iliac Bypass Surgery: An Analysis of 17,594 Patients in the State of New York

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Introduction: Ventral hernia repair (VHR) is a known complication of open abdominal surgery. As patients with aneurysmal disease have weak connective tissue and fascia due to the biological makeup of their collagen, we suspected that patients following open abdominal aortic aneurysm (AAA) procedures were at increased risk for hernia. The purpose of our study was to evaluate the rate of VHR following open AAA in New York State (NYS) compared to the rate of VHR following open abdominal aortic bypass procedures.
Methods: Using ICD-9 codes, the SPARCS database was queried for all AAA and bypass procedures performed between 2000–2010. Using a unique identifier, patients were followed for at least four years (up to 2014). Exclusion criteria include age <18 years, patients with multiple abdominal procedures, and missing data. Social security death index (SSDI) was used to identify patients who expired. Chi-square test was utilized to compare categorical variables between patients having AAA and those having bypass. The cause-specific Cox proportional hazard model for competing risk event was applied to compare the risk of having follow-up VHR between patients with AAA and bypass. Variables which were significant in the univariate models with p-value <0.05 were further included in a multivariable model to explore independent relationship with the risk of having follow-up ventral hernia after adjusting for
Results: There were 9,314 patients who underwent open AAA repair, 739 (7.93%) of which had subsequent VHR. Comparatively, 8280 patients underwent aortofemoral or aortoiliac bypass procedures, with 480 (5.8%) undergoing subsequent VHR between 2000–2014. The average time to VHR after initial surgery is 849.48 ± 927.66 days for patients with AAA procedure and 992.13 ± 988.56 days for patients with Bypass repair. The observed 1-year, 5-year, and 10-year VHR rates for AAA versus Bypass were 2.8% (229 out of 7970) vs 1.8% (122 out of 6876), 10.0% (528 out of 5257) vs 8.0% (341 out of 4241), 10.7% (185 out of 1732) vs 9.38% (124 out of 1322), respectively. After controlling for all other factors, patients undergoing AAA repair were more likely and elderly patients were less likely to undergo VHR ($p<0.0001$). Patients with serious co-morbid conditions such as valvular disease, DM, neurologic disorders, renal failure were less likely to undergo subsequent VHR controlling for other factors ($P<0.05$).
Conclusion: VHR following AAA procedures is significantly more common compared to bypass procedures. Given these findings, prophylactic mesh placement in this patient population with aneurysmal disease may prevent future interventions.

P031

Laparoscopic Intraperitoneal Onlay Mesh Technique with Endoscopic Component Separateon Method

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Background: Laparoscopic Ventral Hernia Repair (LVHR) is approved as an insurance adaptation technique from 2012 in Japan. In our institution, conventional three port LVHR had been performed as a regular surgical option. Furthermore, we recently add the endoscopic component separation method (ECS) to LVHR, in the case of large hernia and infectious wound.
Aim: We present a case of LVHR with ECS, and assessed the safety and efficacy of this technique compared with LVHR only.
Patients and Method: Patients who underwent the LVHR in our institute during 2004 and 2016 are included in this study. 38 patients undervent LVHR, and two patients were added ECS.
Case Presentation: The patient was 47 year-old female. Total hysterectomy was performed, and the incision occurred SSI. After then, the ventral hernia (13×8 cm orifice) was created. We planed LVHR with ECS for her ventral hernia. At first, a 12 mm balloon-tipped trocar was placed at the posterior space to the external oblique aponeurosis. A dissecting balloon was used to create that space head to tail. 5 mm trocar was placed to the space. The external oblique aponeurosis was divided overall with hook type electrocautery. The contralateral side was divided in the same manner. 12 mm trocar was inserted to the abdominal cavity. After creating pneumoperitoneum with carbon dioxide gas, a second 5 mm trocar and a third 5 mm trocar was inserted. At first hernia orifice was closured with non-absorbable surgical sutures. We choosed a mesh enough covering the hernia orifice, and put it into the abdominal cavity. The mesh was lifted the abdominal wall by two non-absorbable surgical sutures. After lifting the mesh, the mesh was fixed using the laparoscopic sbsorbable tacker.
Results: LVHR only was performed in 36 cases, and LVHR with ECS was in two cases. Between two groups, there was no significant differences in termes of operative time (LVHR : LVHR with ECS=122 : 156 min), blood loss, and hospital stay. There were no postoperative complications in each group.
Conclusion: LVHR with ECS would be acceptable procedure for large ventral hernia repair.

P032

Mesh Fixation Using N-Butyl Cyanoacrylate Glue in Laparoscopic TEP Hernioplasty

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Introduction: Laparoscopic repair ias has become an important tool in the treatment of groin hernias, with its proven advantages in terms of faster recovery, faster return to work and less chronic groin pain. Traditionally, in both the totally extra-peritoneal (TEP) approach and the transabdominal pre-peritoneal approach (TAPP), the mesh is fixed to Cooper's ligament and the lower abdominal musculature using disposable tackers, which add a significant cost increment to the surgery. We present a case series of laparoscopic TEP hernioplasties in which the mesh was fixed using a highly cost-effective device based on n-butly cyanoacrylate (NBCA) glue.
Methods: Patients undergoing laparscopic TEP hernioplasty between January 2009 and January 2015 were included in this series. After standard dissection using three ports, extraperitoneal space was created, sac dissected and reduced and mesh deployed. Thereafter, a 20 G disposable lumbar puncture spinal needle was introduced about 2–3 cms above the pubic symphysis, directed caudally. The mesh was fixed by spraying 0.5 ml of medical grade NBCA glue per mesh, over the pubic symphysis and Cooper's ligament, holding the mesh in position. Pressure was maintained on the mesh for about one and a half to two minutes, followed by controlled deflation.
Results: A total of 492 cases of laparoscopic TEP hernioplasty were performed, of which 313 were unilateral repair and 179 were bilateral repairs, making a total of 671 repairs. The operating time (mean ± 2 SD) was 44 ± 8.4 min for unilateral hernias and 62 ± 9.4 min for bilateral repair. Short-term morbidity and long-term morbidity was noted. There were no recurrences. Chronic groin pain was reported at 1 year in 4 patients.
Conclusion: NBCA glue fixation of the mesh is a effective option for laparoscopic TEP hernioplasty, providing advantage of reduced costs.

P033

Treatment of Type III and IV Diaphragmatic Hernia with no Mortality and Low Morbidity Using a Laparoscopic Approach

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Introduction: Large symptomatic diaphragmatic hernias can be technically challenging procedures in patients who often have significant medical problems. We reviewed our series of patients who underwent repair of Type III or Type IV symptomatic diaphragmatic hernias. We hypothesized that using a laparoscopic approach could produce low morbidity and mortality.
Methods: We retrospectively reviewed the electronic medical records at a single academic medical center dating from October 2009 through March 2016. A total of 80 patients with Type III (n=72) or IV (n=8) diaphragmatic hernia were surgically treated by two attending surgeons, with 75 being treated using a laparoscopic approach. Data gathered included operative details, patient age, comorbidities present, postoperative length of stay, complications, and recurrence rates.
Results: Most patients were female (n=63). The mean age was 64.6 years. 45 patients were ASA class II and 35 were class III. Eight patients had type IV diaphragmatic hernias, with all having at least colon in addition to stomach herniated into the mediastinum. Seventy-five elective and five emergent procedures were performed. A laparoscopic approach was used in 78 of 80 patients, and three patients were converted to open surgery intraoperatively. Mean operative time was 166 min (range 60 to 330 min). Length of stay was 2.6+2.3 days. There were 12 (15%) post-operative complications of Grade II or higher, with one reoperation for bleeding and one reoperation for dysphagia at two months postop. There was no mortality. Average duration of follow-up was 20 months (range 1–77 months). Multivariate analysis showed that an open approach and emergency surgery were independent risk factors for developing postoperative complications (p=0.04, p=0.03). Diagnosed recurrence rate for diaphragmatic hernia was 7 cases or 8.8%. Three cases (3.75%) were recurrent type III diaphragmatic hernias which required reoperation. Multivariate analysis showed that post-operative complications did not correlate with the development of a recurrent hernia.
Conclusion: Type III and IV diaphragmatic hernias can be successfully treated with relatively low morbidity and recurrence rates using a laparoscopic approach. Emergency surgery and an open approach appear to increase the potential for postoperative complications. However, postoperative complications do not seem to be important in determining hernia recurrence.

P034

Detection of Occult Hernias During Laparoscopic Inguinal Hernia Repair: A Prospective Study in an Asian Cohort

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Background: Laparoscopy by offering magnification and better vision provides us the opportunity for clear visualization of the myopectineal orifice. This gives the advantage to visualize presence of occult hernia. The aim of our study was to assess the potential of the laparoscopic approach for inguinal hernia repair in detecting occult hernias in an Asian population.
Methods: From January 2013 to April 2016 all patients who underwent an elective laparoscopic inguinal hernia repair were prospectively studied. Retrospective analysis of prospectively collected data was done. Parameters evaluated included patient demographic, operative technique used, operative time, type of groin hernia detected and postoperative complications.
Results: A total of 443 patients underwent laparoscopic inguinal hernia repair. This included 202 unilateral and 231 bilateral cases, with total of 664 groins hernias. Indirect hernias were the most common, followed by direct and then femoral hernias. There were 420 male and 23 female patients. In all 80 occult hernias were found: 1 spigelian hernia, 20 obturator hernias and 59 femoral hernias. 5 patients were converted to open repair due to failure to progress during surgery and difficult dissection. No major intra-operative complication was noted apart from one case of ileal perforation which was diagnosed 5 days later. Injury to inferior epigastric artery was noticed in 3 cases managed intra-operatively. 53 patients developed seroma, most were managed conservatively except 3 cases who needed aspiration and 1 patient excision. Peri-port bruising was noticed in 21 patients and 14 patients had hematoma all managed conservatively. 7 off these patients were on aspirin, clopidogrel or warfarin pre-operatively. Superficial wound infection documented in 9 patients. 3 patients had postoperative urinary retention. Only one patient developed chronic groin pain and is on medical management. No recurrence was documented till date.
Conclusions: The laparoscopic inguinal hernia repair by providing better vision and magnification gives us an opportunity to detect unexpected or occult hernias which can be repaired during the same setting and thereby reducing the chance of recurrence and possible need for second surgery.

P035

Complex and Infected Ventral Hernia Repair Using P4 HB (Poly-4-hydroxybutyrate) Meshes. Early Results

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Introduction: Biological meshes were thought to solve the problem of infected hernia situations and complex hernia in high risk patients. However, recent results were disappointing for the benefit of the use of these cost intensive and infection triggering materials. In vitro and animal studies have demonstrated an enhanced bacterial growth and late hydrolysis, after 15 to 18 months, for P4HB, and the remaining scar tissue of high strength.
Methods and Procedures: Between September 2015 and September 2016, 17 Patient were operated for complex infected hernia (9), large hernia after liver transplantation (6), complex ventral hernia in multi morbid high risk patients (2) (mainly cardiac, renal, endocrine, pulmonary risk factors).
The meshes were placed mainly in onlay position, in some cases in sublay or a supplemented enforcement onlay position when a permanent mesh was placed in sublay position (sandwich).
Results: All cases showed a primary healing tendency, no mesh has been explanted. The main complication was observed with 2 cases of seromas, one of them infected. 3 Patients were re-operated due to skin necrosis. The onlay meshes in these cases were kept in site and were observed with excellent granulation activity (picture documented). No hernia recurrence was seen in the first 12 months.
Conclusions: The use of P4 HB meshes showed to be an excellent plan B for very complicated and infected hernia cases that need repair. Onlay position of these meshes is not an additive risk factor also in complicated skin situation.

P036

Botulinum Toxin A (BTA) Assessment and Duration of Effect in the Lateral Oblique Muscles Relevant to Complex Ventral Hernia Surgery

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Introduction: BTA injection of the lateral obliques has been shown to produce a prolonged flaccid muscle elongation which enables closure of hernia defects under minimal tension. Post-operatively, this reduction in tension on the wound has been hypothesized to protect the repair during the critical initial phase of wound healing. This is particularly useful in patients with high risk of recurrence, and raises the question if BTA paralysis and the reduced wound tension is beneficial to post-operative healing. However, the duration of BTA effect in this setting remains unknown, and no data currently exists as to the timing of any subsequent BTA top-up injections intended to prolong the overall period of muscle paralysis. This prospective study aimed to examine the duration BTA effect administered in the setting of ventral hernia repair.
Methods and Procedures: Preoperative accurate ultrasound guided BTA infiltration of the lateral obliques occurred in 49 patients. All patients underwent serial abdominal CT imaging at baseline, post-BTA, and post-operative. Post-operative CT imaging is used to examine the integrity of hernia repair and to evaluate the residual paralysis at 3–4 months after initial BTA administration. CT imaging can demonstrate residual BTA effect by comparing muscle length and thickness with previous imaging. In 10 patients considered to be at high risk of recurrence, electromyography (EMG) assessment was also performed on the same day as their post-operative CT imaging. This cohort was composed of 8 males and 2 females, mean age of 63 years, and mean BMI=29.8 kg/m2. The mean interval between BTA injections and surgery was 16.5 days and the mean interval between BTA injection and EMG assessment was 143 days. EMG was performed under real time ultrasound, bilaterally, during rest and straining maneuvers, with the aim to quantitatively measure muscle activity in the lateral obliques.
Results: EMG studied individual muscle and demonstrated small to moderate voluntary activity in most muscle layers at the time of assessment. This is similar to CT changes that were noted at the same time, confirming a reduction in BTA induced paralysis. EMG performed during strain better demonstrated return of muscle activity from day 143, however it was evidenced muscle activity recovery from day 99.
Conclusions: EMG assessment can provide a more sensitive and reliable quantification of residual BTA paralysis and potentially guide the timing of post-operative BTA top-up doses, no later than 3 months, eliminating the use of CT for this purpose and thereby reducing radiation exposure.

P037

Repair of Giant Complicated Ventral Hernias with Component Separation Technique in Conjunction with Biological and Synthetic Mesh

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Introduction: Recurrent/ complicated ventral hernias with significant fascial defects are a surgical challenge. We are presenting a case of multiple recurrent hernia repairs and an enterocutaneous fistula, following multiple caesarean sections and recurrent umblical hernia repairs that was successfully managed with the component separation technique (CST) in conjuction with synthetic and biological mesh application.
Case Summary: A 62 years old multiparous lady, known hypertensive on treatment. She had undergone three caesarean sections and multiple recurrent umblical hernia repairs with mesh over a period of 36 years. Following her last repair, she developed an enterocutaneous fistula. On examination she had a hugely redundant ventral hernia containing small bowel and a midline discharging fistula. Her BMI was 35. The procedure was started with the excision of enterocutaneous small bowel fistula, resection and anastomosis of the small bowel, excision of excess redundant skin. The part of hernial sac was used to construct the inner layer of repair. The wide defect in the anterior abdominal wall was repaired, by reconstruction with CST in combination with the biological mesh sandwitched between the delayed-absorbable, poly-4-hydroxybutyrate (p4hb), knitted, fully resrobable monofilament mesh and non-absorbable polypropylene (Prolene) monofilament mesh. A closed drainage system was inserted subcutaneously. Postoperatively patient was shifted to ICU for mechanical ventilation for 24 h. After 48 h patient was shifted to surgical floor. Tazobactum/ Piperacillin intravenously was given for 2 weeks and Abdominal binder for 8 weeks.
Patient had a smooth recovery and was discharged after 2 weeks. About 2 weeks post-discharge she developed clear discharge from abdominal wound in the midline. She was readmitted and an ultrasound, followed by CT Scan revealed subcutaneous seroma collection. A successful CT-guided drainage was done and patient was discharged after a week.
Conclusion: Reconstruction of abdominal wall for the repair of recurrent ventral hernias with large defects can be accomplished by the component separation technique in conjunction with the use of biological, synthetic non-absorbable and delayed absorbable mesh. The presence of enterocutaneous fistula carries a higher risk of infection but is not a contraindication for using mesh in these cases.

P038

How to Dissect the Peritoneum Easily About Laparoscopic Transabdominal Preperitoneal Inguinal Hernia Repair? A Modified Tumescent TAPP

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Introduction: Inguinal hernia repair is one of the most frequently performed surgical procedures in general surgery. Especially, laparoscopic transabdominal preperitoneal inguinal hernia repair (TAPP) has a tendency to increase in Japan. TAPP offers less postoperative pain and faster return to work and normal presurgery lifestyle. However this procedure is technically challenging especially to dissect the preperitoneal space at the ventral side. Tokumura et al. reported new technique about dissection of the preperitoneal space called tumescent TAPP. Herein we report two cases performing modified tumescent TAPP.
Methods and Procedures: Under general anesthesia, the patient was placed on the supine position. A 12 mm trocar was inserted umbilicus and two 5 mm trocars were placed in the right side and the left side of the abdomen respectively. After identified hernia, we punctured the peritoneum for creating a preperitoneal space around hernia orifice using a needle catheter. 100 ml of diluted ropivacaine and 100 ml of CO2 gas were injected under the peritoneum. After injection, a peritoneal incision was made and the peritoneum was bluntly dissected from the preperitoneal fascia. Thereafter, we performed standard TAPP. After surgical procedure, ropivacaine peripheral nerve block was done by anesthesiologist for the management of post-operative pain.
Results: Both cases were right indirect hernia and the mean operating time was 138 min and estimated blood loss was miniscule. They were discharged 1 day post-op and they had no postoperative groin pain. One patient had a small seroma of right inguinal region after 1 month operation.
The noteworthy point of is the amount of CO2 gas and the content of local anesthesia. Our main purpose of injecting an anesthetic and CO2gas is to dissect the peritoneum easily, that is, local anesthetic solution is used to lift up the peritoneum with edematous and CO2 gas is used to dissect it clearly. As soon as CO2 gas injected, the peritoneum can separate from preperitoneal fascia such as peeling off the paper and we can bluntly dissect it easily with less bleeding. For this reason, our technique has less of tumescent solution than original procedure and more than it about CO2 gas. Furthermore our technique offers less perioperative pain by injecting diluted ropivacaine solution and adding peripheral nerve block compared to original technique.
Conclusion: Modified tumescent TAPP is feasible technique. CO2 gas is effective to dissect the peritoneum and preperitoneal fascia and it makes it possible to perform this procedure more easily.

P039

Total Management of Complex Ventral Hernia 1: Preoperative Patient Preparation

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Introduction: Despite recent advances in the operative management of complex ventral hernia, these remain a significant challenge for surgeons. Ten percent of hernias are 'complex', and although there is variation in what defines a complex hernia, they are invariably time consuming and technically challenging. Closure of large defects in the unprepared abdomen can have serious pathophysiological consequences due to chronic contraction and retraction of the lateral abdominal wall muscles. In certain clinical situations and patient populations, high rates of hernia recurrence remain problematic. Adequate preoperative preparation of patients is essential for an effective repair.
Methods: An illustrative series of clinical cases will be used to provide an introduction to the preoperative preparation of patients prior to repair of complex ventral hernia. The Hernia Program consists of a comprehensive program which can take up to six months to adequately prepare a patient for surgery. It utilizes a multidisciplinary team setting, consisting of surgeons, radiologists, nursing staff, counsellors, and microbiologists. Weight loss, smoking cessation, preoperative imaging, optimization of co-morbidities, and psychological assessment are all cornerstones of the Hernia Program. Preoperative ultrasound-guided Botulinum Toxin A (BTA) injections to the lateral abdominal wall muscles is a unique feature of this Program, as is the use of Preoperative Progressive Pneumoperitoneum (PPP) in select patients.
Results: Since 2013, 50 patients have progressed successfully through the Hernia Program. A thorough exploration of the preoperative preparation of patients will be presented, including a detailed examination of the BTA and PPP components of the Program. All 50 patients have undergone successful laparoscopic or laparoscopic-open-laparoscopic (hybrid) mesh hernia repair, including fascial closure. There have been no hernia recurrences to date.
Conclusion: The Hernia Institute Australia's comprehensive Program is a unique, effective, and successful program to preoperatively prepare patients for ventral hernia surgery for laparoscopic repair of complex ventral hernia. The Program's results thus far offer outstanding potential as a new standard of care for complex ventral hernia repair.

P040

Laparoscopic Inguinal Hernia Repair in the Elderly: A Single Centre Institutional Experience in an Asian Cohort

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Background: Elderly population comprises a major proportion of population in developed countries. This leads to an unprecedented impact on the health care system. Inguinal hernia repair is a commonly carried out operation in elderly population with significant health care cost. Advanced age today is no longer considered a contraindication for laparoscopy. In fact recent literature shows a reduced risk of surgical site infections with laparoscopic surgery in elderly patients in addition to established benefits of any minimal invasive approach.
Methods: From January 2013 to April 2016 all patients 65 years and above who underwent laparoscopic repair of inguinal hernia were prospectively studied. A retrospective review of prospectively collected data was done. Total 130 patients underwent laparoscopic repair. Data measured included patient demography, associated co-morbid conditions, operative technique and time, intra and postoperative complications, hospital stay and recovery.
Results: In all 130 (5 females and 125 males) patients underwent laparoscopic inguinal hernia repair. 73 patients had bilateral and 57 unilateral hernia. Mean patient age was 72.7 years (range 65–93 years). Most common co-morbid conditions were hypertension (50), hyperlipidemia(30), diabetes mellitus(19), ischaemic heart disease(13), cerebro-vascular disease(5), chronic kidney disease(4) and asthma(4). Average operative time was 64.61 min in unilateral and 90.08 min in bilateral hernias. 14 patients were operated on a day care basis. In the remaining 116 patients mean hospital stay was 1.24 days (range 1–9 days). Mean follow up was 7.69 months. There were no major intra-operative complications. Seroma (11 patients) was the most common post-operative complication, followed by bruising (5), hematoma (2) and superficial wound infection (1). Patients with hematoma formation were on aspirin/warfarin, both managed conservatively.
Conclusion: Laparoscopic inguinal hernia repair in experienced hands is a safe and feasible operation in elderly population who are fit to withstand general anesthesia. It offers all the well-established benefits of a minimally invasive approach, such as early recovery after surgery, shorter hospital stay, reduced pulmonary complications and risk of wound infection.

P041

Robotic Approach in Recurrent Laparoscopic Inguinal Hernias. Initial Experience

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Introduction: The goal of this study was expose our initial experience with robotic approach in recurrent inguinal hernias that had been previously operated laparoscopically. Robot-assisted surgery in general surgery is still a developing strategy, however, it has been rapidly expanded. There is expectation that robotic assistence could be specially useful in cases of groin hernia relapse after either transabdominal preperitoneal or extraperitoneal laparoscopic approach.
Methods and Procedures: We conducted a retrospective analysis of the 15 procedures performed by the same surgical team between July 2015 and September 2016 using Da Vinci SI® system. The parameters analyzed were gender, age, body mass index, type of hernia, surgical time and hospital stay.
Results: We performed 15 robot-assisted inguinal hernia repairs, 6 of those being cases of relapse after transabdominal preperitoneal laparoscopic technique: 2 bilateral and 4 unilateral.
All the patients were male, with a median age of 65 years of age (min 42 yo; max 72 yo), the mean body mass index was 27,15±7,80 Kg/m. The average procedure time was 125,33±30,21 min. The average hospital stay was 1 day, but 2 patients were discharged after 12 h of the procedure. There were no postoperative complications during hospital stay.
Conclusions: Robot assistance is safe and may improve outcomes of relapsed minimally invasive inguinal hernia repairs but should be reserved for endoscopically experienced surgeons. In this single-center observational case series, we found a significant reduction in the number of complications in the robot-assisted redo inguinal hernia, also hospital stay was shorter and in some cases day hospital stay, while patients reported a similar symptomatic outcome. We found the procedure significantly easier for a medial recurrence compared with a lateral recurrence.

P042

Surgical Strategies and Clinical Outcomes of the Tension-Free Repair Using Self-Fixating Mesh for Inguinal Hernia

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Background: Tension-free repair using synthetic meshes have been reported to have better results in terms of recurrence rates and patient QOL compared with conventional tissue repair and become common and considered the standard procedure. However, little is known about what types and fixation methods of mesh are optimal. Here, we show our recent surgical strategies and clinical outcomes of the tension-free repair using self-fixating mesh for inguinal hernia.
Methods: From January 2012 to December 2015, a total of 465 consecutive patients underwent inguinal hernia repair in our hospital. Basically, Lichtenstein repair was used for unilateral and TEP for bilateral cases. All the patients were treated under local anesthesia.
Results: TEP was used in 134 patients (29%). Significantly more female patients were treated with TEP (4.5% vs 16.4%, P=0.00004). Operating time (min) was 109 and 176, respectively. Post-operative median hospital stay was 1 day in both group. No severe complications (CD 3 or more) nor chronic pain after surgery were observed in this case series. Minor complications including hematomas (0.8% vs 1.0%), seromas (3.4% vs 3.9%) were treated conservatively. During medial follow-up of 36 months, we had 2 cases of recurrence (1 for each group).
Conclusions: Tension-free repair using self-fixating mesh for inguinal hernia had good clinical results. The cost for mesh fixation and general anesthesia is not required in both methods. Our strategy using self-fixating mesh may provide further minimally invasive surgical care for the patients with inguinal hernia.

P043

Comparison of Laparoscopic Total Extra Peritoneal (TEP) Techniques Versus Transabdominal Preperitoneal (TAPP) Technique for Inguinal Hernia Repair

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Background: To Compare laparoscopic total extra peritoneal (TEP)techniques with transabdominal preperitoneal (TAPP) technique for inguinal hernia repair.
Methods: In this randomized controlled trial 120 patients undergoing herniorraphy were divided into two groups .Sixty patients into Laparoscopic Total Extra Peritoneal (TEP)Techniques group and 60 into Transabdominal Preperitoneal (TAPP) Technique group. TAPP required access to the peritoneal cavity with placement of a mesh through a peritoneal incision. Mesh was placed in the preperitoneal space covering all potential hernias sites in inguinal region leaving it between the preperitoneal tissues and the abdominal wall where it becomes incorporated by fibrous tissue. In TAPP pneumoperitoneum was created by open technique, circular incision was given on peritoneum. Peritoneum was lifted, proline light weight mesh placed, and peritoneum was stitched with continued suture. In TEP, the peritoneal cavity was not entered, infraumbilical trocar was inserted in preperitoneal space, space was created with camera, and mesh was used to seal the hernia from outside the peritoneum. Both techniques were compared in terms of mean operative time, conversion to open procedure, post operative pain, length of hospital stay, port site infection, mesh infection, return to daily activity, deep infection and recurrence.All patients were followed for a period of 1 year.
Results: Mean operative time in TEP repair was 45.1±3.54 min, whereas in TAPP repair was 70±6.01 min (p=0.000). Five laparoscopic TEP were converted to open repair due to major breach in peritoneum. In TEP group 40 patients complained mild pain. In TAPP group 25 patients complained mild pain and 30 complained moderate pain(p=0.015). Average requirement of analgesia in TEP group was 2 doses of I/M dicloran whereas average requirement of analgesia in TAPP group was 3 doses. Length of hospital stay in both groups was one day. In TEP group no patient developed port site infection whereas 1 patient in TAPP group developed port site infection. One patient developed mesh infection in each group. In TEP group return to daily activity was 4 days, in TAPP group return to daily activity was 5 days. No patient developed deep site infection in both groups. No recurrence in one year follow up.
Conclusion: TEP has advantage of short operative time and less post operative pain and therefore less requirement of analgesia and early return to daily activity, where as TAPP is superior, there being less chance of conversion
Keywords: TEP, TAPP, laparoscopic complications.

P044

Endoscopic Single Port Anterior Component Separation for Complex Ventral Hernia Repair

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Purpose: Component Separation (CS) is a technique which mobilizes flaps of innervated, vascularized tissue, enabling closure of large ventral hernia defects using autologous tissue. Endoscopic component separation, as described by Rosen et al, requires 2 port access and insufflation, generally accompanied by extensive tissue dissection to create the advancement flaps used in defect closure. The tissue disruption that entails can result in significant post-operative skin and wound complications. We report on a new technique for endoscopic anterior component separation using a single incision, termed limited endoscopic 'central external oblique (EO) release' using the MicroAire® system designed for endoscopic carpal tunnel release.
Technique: This was a prospective study using a single fresh frozen cadaver and a series of 5 patients prior to laparoscopic complex ventral hernia repair. On each side of the abdomen, a 20 mm transverse incision was made midway between the tip of the tenth rib to a point just medial to the anterior superior iliac spine. The external oblique fascia was exposed and incised along the lines of its fibres, and a space developed between the external and internal oblique muscles. Under direct vision using a 3 mm endoscope, the MicroAire® system was introduced, the retractable blade triggered, and the external oblique muscle and fascia was incised as the blade is withdrawn. This process is repeated cranially and caudally, to achieve release along the entire length of the EO. This procedure has been performed in a series of 5 patients with massive ventral hernia, under general anaesthetic, immediately prior to elective laparoscopic hernia repair. Measurements were taken using real-time ultrasound before, during and after pneumoperitoneum, with subsequent follow-up imaging at 2, 3 and 4 weeks post-operatively.
Results: Endoscopic EO release achieved a maximum 37 mm gain of myofascial advancement per side above the umbilicus, and a maximum of 26 mm below the umbilicus (per side) on cadaveric studies. Similar gains were noted with the series of laparoscopic ventral hernia repair patients. To date, there have been no complications from the procedure.
Conclusion: Endoscopic single port external oblique release is simple and effective, and holds potential as an adjunct in the repair of large ventral hernia defects. It entails minimal disruption of tissue planes and vasculature and therefore maintains the integrity and functionality of the abdominal wall. Further quantification of potential advancement gains and morbidity from this technique are warranted.

P045

Short-Term Outcomes of Single-Incision Totally Extraperitoneal Inguinal Hernia Repair: Our Initial 26 Cases

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Purpose: To evaluate the feasibility and safety of single-incision laparoscopic surgery surgery for totally extraperitoneal repair (SILS-TEP) of our initial experience.
Patients and Methods:
Clinical Setting
We performed a retrospective analysis of 26 patients undergoing SILS-TEP from April 2016 to August 2016 at Kinki Central Hospital.
Exclusion Criteria
SILS-TEP was contraindicated for the following conditions in our hospital: a history of radical prostatectomy; a small indirect inguinal hernia in a young patient, and unsuitability for general anesthesia.
Surgical Procedure
A single, 2.5-cm, intraumbilical incision was made, followed by the dissection of the subcutaneous tissue down to the rectus abdominis sheath. The anterior sheath was opened, and blunt dissection using a finger or gauze was performed between the muscle and the posterior sheath to create a preperitoneal space. After placing a Lap-Protector Mini in this space, three 5-mm trocars (one for a 5-mm flexible scope and two for surgical devices) were inserted through a single-port access device. The preperitoneal space was dissected gradually, using conventional straight laparoscopic instruments without a dissection balloon. Mesh was placed in this preperitoneal space, covering the inguinal floor, and was fixed with three absorbable tacks: at the pubic bone, at Cooper's ligament, and above the iliopubic tract, respectively. After the completion of the operation, the preperitoneal space was deflated carefully deflated to avoid displacing the mesh. The anterior rectus sheath was closed with a 2−0 absorbable suture, and the skin was closed with a 4−0 polydioxanone suture.
Results: Twenty six patients (20 men, 6 women), including 20 with unilateral hernias and 6 with bilateral hernias underwent SILS-TEP. The mean age of patients was 70 years (range, 40–85 years), and mean BMI was 22.0 kg/m2 (range, 17.1–28.3 kg/m2). The median operative times were 102 min (range 52–204 min) for unilateral hernia and 165 min (range 83–173 min) for bilateral hernias, respectively. The median blood loss was minimal (range 0-177 ml). One case (1/26) was converted to mesh plug repair. The mean postoperative hospital stay was 1.5 days (range 1–2 days). Postoperative complications developed in 12% (3/26) of the patients. A seroma developed in 4% (1/26) of the patients. A hematoma developed in 4% (1/26) of the patients. A delirium developed in 4% (1/26) of the patients. These complications were managed conservatively. No other major complications or hernia recurrence were noted.
Conclusions: SILS-TEP, which offers good cosmetic results, could be safely introduced in our hospital.

P046

Laparoscopic Component Separation for Complex Ventral Hernia Repair: A Single Surgeon Experience

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Introduction: Open component separation (OCS) is a surgical technique used to repair large, complex ventral hernias, and has long been accepted as the gold standard. Laparoscopic component separation (LCS) is a newer technique, but the literature regarding its comparison to open is limited to a small number of studies with small cohorts. The primary aim of this study was to investigate the safety and efficacy of LCS with a larger cohort of patients than has been previously published. Secondary aims included a comparison of morbidity, recurrence, and operative outcomes in comparison to open component separation. We predicted that LCS is a safe and feasible technique in the repair of complex ventral and incisional hernias.
Methods and Procedures: We performed a retrospective review for all patients who underwent open and laparoscopic component separation by a single surgeon from January 2008 to February 2015 at a large academic medical center. Demographics, comorbidities, operative time, type and size of prosthetic mesh used, conversion to an open procedure, length of operative time, length of hospital stay, estimated blood loss, recurrence, complications, and 60-day readmissions were collected and analyzed. Summary and comparative statistics were performed using student's t-test and Fischer's exact test as appropriate.
Results: We identified 112 patients, 89 of whom had at least one LCS performed, and 23 who underwent at least one OCS. Patients in the LCS group were younger (LCS 53.16, OCS 59.43, $p<0.05$); otherwise, there were no statistical differences regarding demographics. There were no significant differences regarding estimated blood loss, length of surgery, and length of hospital stay. There were no significant differences regarding morbidity and mortality, including recurrence rate (LCS 11.2%, OCS 13.0%, p=0.73), infection (LCS 19.1%, OCS 34.8%, p=0.16), readmission within 60 days (LCS 15.7%, OCS 26.1%, p=0.36), and death (LCS 1.1%, OCS 4.3%, p=0.37).
Conclusion: The use of LCS results in similar patient outcomes when compared to the gold standard of OCS. In the correctly selected patient population, LCS can be as safe and effective as OCS in the repair of complex ventral hernias.

P047

Early Results of Robotic Trans-abdominal Pre-peritoneal (RTAPP) in Ventral Hernia Repair

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Background: To date, data on the use of mesh in the pre-peritoneal space between the posterior fascia and peritoneum in ventral hernia repair is limited. Here, we describe our initial experience and build a foundation for further research in regards to robotic trans-abdominal pre-peritoneal (rTAPP) ventral hernia repair.
Methods: A single-institution, retrospective review of prospectively collected data between 2014 and 2016 was performed on rTAPP ventral hernia repair with approval from the institutional review board (IRB). Data collected included patient demographics, operative details (including defect size, synthetic mesh size, and the ability to complete rTAPP), and postoperative complications during the first 90 days (surgical site occurrence, surgical site infection, hospital readmission, and hernia recurrence)
Results: 54 consecutive rTAPP ventral hernia repairs were performed utilizing the Intuitive Si daVinciTM robotic platform. With the exception of 2 emergent cases, all considered were elective with ASA scores ranging from 1 to 3. Indications included 42 primary ventral, 5 incisional, 2 lumbar, 2 spigelian, 1 recurrent incisional, 1 combined flank and inguinal and 1 combined primary ventral and inguinal. Demographics included: average BMI 32.1 (range 21–44), sex (male n=33, female n=21), and average age 50 years (range 22–78 years). Average operative time for all rTAPP cases was 73 min (range 25–217 min). The average hernia defect was 9.7 cm2 (range 2–80 cm2) whereas the average size of synthetic mesh used was 177.5 cm2 (range 81–450 cm2). 46 cases were completed through an rTAPP approach (85%) using non-composite mesh, whereas 9 were considered partial rTAPP due to inability to cover mesh completely thus a composite mesh was used. Average blood loss was only 5 mL (range 5–10 mL). Average hospital length of stay was 0 days (range 0–2 days). Complications included: symptomatic seroma requiring aspiration once in the office (n=1) and rectus sheath hematoma requiring hospital readmission and blood transfusion (n =1). No surgical site infection or hernia recurrence were encountered. All patients were seen at office for clinical evaluation at two weeks and three months follow-up.
Conclusion: Our early experience has demonstrated that robotic trans-abdominal pre-peritoneal ventral hernia repair (rTAPP) is a safe, feasible and reproducible approach for ventral hernia repair, allowing the surgeon to place mesh into the pre-peritoneal space utilizing a minimally invasive approach. Further studies aimed at assessing the clinical value of this approach are currently underway.

P048

Robotic Assisted Ventral/Umbilical/Incisional Hernia Repair with Mesh Combined with Endoscopic Component Separation Allows for Immediate Intervention and Reduced Complications in Obese Patients

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With the use of robotic assisted surgical technology combined with endoscopic component separation, it is possible to reduce recurrence and complication rates, and allow for immediate intervention in obese patients, in ventral/umbilical/incisional hernia repair by using the following techniques: robotic hernia repair with mesh, with endoscopic component separation. The repair of anterior abdominal wall defects is well documented in the literature. Regardless of the use of open or laparoscopic repair, it is fraught with high recurrence rates when performed in obese patients. By using this combined technique, ventral/umbilical/incisional hernia repair can be done safely on obese patients and result in excellent outcomes.

We conducted a retrospective chart review of ventral/incisional/umbilical hernia cases performed at a small community hospital by a single surgeon from March of 2014 through August of 2016, with statistical analysis of the following endpoints: recurrences, operative time (broken down into: total operative time, docking time, console time), conversion rates (to open surgery), 30 day morbidity and mortality, hospital readmissions and ED visits, SSI's, SSO's. Patients chosen for the study were those performed by the surgeon during this time period that had a BMI>30. Patients were followed postoperatively for a minimum of 3 months, range (3–32 months).

Our study group consisted of 30 ventral/incisional/umbilical hernia repairs. The mean BMI for this group was 37.04 (Range 30.3–80.1). The mean console time was 104.5 min. There was one complication in this group due to a port site hernia, as well as one SSO at a port site. One recurrence occurred in this group (3.33%). The average length of stay was 1.1 days (range 0–3). All cases were completed robotically.

Robotic laparoscopic repair of abdominal wall defects offers significant advantages. Allowing for easier primary defect closure, robotic ventral/incisional/umbilical hernia repair results in improved outcomes. This technique also results in decreased pain because of the avoidance of trans-fascial sutures. We have shown that this approach combining robotic assisted hernia repair with mesh and endoscopic component separation is an effective intervention in obese patients. This is a patient population with significant rates of recurrences with this procedure. The technique described in this study has shown superior recurrence rates of 3.33% to date. With this technique, it is not only safe to operate on an obese patient population, but recurrence rates are at or below those for the general population and thus patients can be operated on immediately with excellent outcomes.

P049

Ventral Hernia Associated to Diastasis Recti: Laparoscopic Approach

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Background: The presence of midline abdominal hernias associated with diastasis of the rectus abdominis muscles (DRA) leads to the treatment of both conditions in order to decrease recurrence rate. However, there is little evidence of laparoscopic approach for the combined repair of these parietal defects.

Objective: To describe feasibility and results of laparoscopic abdominoplasty with mesh reinforcement for midline hernia combined with DRA.

Materials and Methods: A retrospective review of consecutive patients underwent laparoscopic abdominoplasty with mesh reinforcement (parietal defect treatment and rectus abdominis plication) between January 2014 and March 2016 was performed. Patients with DRA but without hernia and those with less of 6 months of follow up were excluded. Demographic variables, surgical time, hospital stay, morbidity and mortality were analyzed. Postoperative pain (PP) was assessed with visual analogue scale (VAS) at 7 days, 1 month and at 6 months after surgery. The esthetic result, degree of satisfaction and time frame for the return to normal and sports activities were also evaluated.

Results: Ten patients were included, 8 (80%) were women. Average age was 49 (37–70) years. Average body mass index was: 23.4 +/- 3.2 kg/m2. The average interrectal distance was: 5.3 (4–6) cm. Ninety percent had supra- and infra-umbilical DRA and 90% referred pain at diagnosis. In all cases laparoscopic abdominoplasty was performed with continuous intracorporeal sutures with extracorporeal knot tying and intraperitoneal mesh reinforcement. The midline defects were: 4 umbilical hernias, 2 epigastric hernias, and 4 umbilical incisional hernias. The mean operative time was 110 (90–135) minutes. Hospital stay was 1 day for all cases. No postoperative complications were recorded. With an average follow-up of 15 (6–24) months, no recurrences were detected. At postoperative day 7, PP was 8 in 70% of patients, while no patient reported pain (PP=0) at 1 and 6 postoperative month evaluation ($p<0.05$). Ninety percent of patients were very satisfied with the results. The median time of return to normal activities was 19 (7–30) days and 10 weeks (8–16) for full physical activity.

Conclusions: Laparoscopic mesh abdominoplasty is a feasible and safe procedure. A minimally invasive approach for this group of patients would be a valid alternative with very good esthetic and overall results.

P050

Transabdominal Preperitoneal (TAPP) Inguinal Hernia Repair Using a Vertical Peritoneal Flap

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Background: Transabdominal preperitoneal (TAPP) inguinal hernia repair requires a 10 mm and two 5 mm trocars. When using a transverse peritoneal flap, a rather long incision is required. Tacks for MESH fixation and re-approximation of the flap may be associated with pain and are costly.

Patients and Methods: A two port technique was used replacing one 5 mm instrument with a Teleflex minigrasper whenever possible. The peritoneal flap was created from a 5-10cm vertical incision in the infraumbilical peritoneum and re-approximated with a running suture. Dissection of the inguinal region was done in a reduced size pocket. Progrip MESH was used to avoid tacks.

Results: Median age of the 21 men and four women was 65.3 (range 36.2–82) years; there were 19 unilateral and six bilateral inguinal hernias (including three recurrent hernias and five incarcerated hernias). Two patient had large inguinoscrotal hernias. The minigrasper was used in 20% in the first 10 and 67% in the last 15 cases. Tacks for the flap were used in 50% in the first 10 cases; in the last 15 cases the flap was sutured in 87%. Various techniques to suture the flap were tried out, the V-lock turned out to be the easiest option and was made standard. TAPP was done as outpatient procedure in 48% of cases, 36% of patient required 23 h extended recovery; only four patients with severe co-morbid conditions required admission. Complication included seroma (n=4), hematoma (n=1), bladder injury (n=1) and urinary retention (n=2); two patients with preexisting groin pain had ongoing symptoms post TAPP. No recurrence was observed during a median follow up of 379 (range 15–625) days.

Conclusions: Creation of the peritoneal flap from a midline incision and re-approximation using a running suture is technically feasible. The created preperitoneal pocket is smaller than in conventional TAPP but still allows good exposure. Avoiding tacks is cost saving and may reduce pain. In standard cases the procedure can be done with two 5 mm ports and the Teleflex minigrasper.

P051

Impact of Different Methods of Measuring Abdominal Wall Hernia Defect Size on Mesh Selection

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Introduction: Hernia defect size affects surgical technique, the size of mesh selected, and outcomes. Despite the importance of defect size, there is no standardized measurement technique, and little literature exists that assesses different methods of determining hernia area. Current strategies to measure defects include radiographic (CT) and intraoperative (with abdomen desufflated or insufflated, from the intra-abdominal or extra-abdominal aspects). Our aims were to determine 1) if any significant differences existed between different methods of measuring hernias and 2) the effect of these alternate methods of measurement on mesh size selection.
Methods and Procedures: A prospective study of all patients enrolled in a randomized trial assessing laparoscopic ventral hernia repair at a single institution from 3/2015 to 7/2016 were eligible for inclusion. Abdominal wall hernia defect size was determined by multiplying defect length and width obtained separately using each of 4 **Methods:** radiographic (CT), intraoperative with abdomen desufflated, intraoperative with abdomen insufflated (intra-abdominal aspect), and intraoperative with abdomen insufflated (extra-abdominal aspect). All measurements were determined by 2 faculty surgeons. Mesh size for each measurement was calculated based on the smallest mesh needed to achieve at least 5 cm of mesh overlap in all directions utilizing the following mesh size categories: 10×15 cm, 15×20 cm, 20×30 cm, and 25×30 cm. Two-way mixed-effect model was used to calculate the intraclass correlation between the 4 methods of measurement.
Results: Fifty-two patients met the inclusion criteria for assessment and the median (range) hernia defect areas measured by the 4 techniques were radiographic (CT) 19.9 (9.8–39.6) cm^2, intraoperative with abdomen desufflated 19.6 (11.3–43.5) cm^2, intraoperative with abdomen insufflated from the intra-abdominal aspect 20.0 (12.0–49.0) cm^2, and intraoperative with abdomen insufflated from the extra-abdominal aspect 26.0 (14.0–56.0) cm^2. The 4 different measurement methods had an intraclass correlation of 0.702 (0.581–0.806). Different measurements affected mesh selection in 28.9% of cases (Table 1).
Conclusion(s): The 4 methods of measuring abdominal wall hernia defect sizes are imperfectly correlated. Due to the impact of these differences in measurement on selected mesh size, additional studies are needed to determine which method results in optimally-sized abdominal wall prostheses and superior hernia repair. Further investigation is needed to identify a standardized method of assessing hernia size and to correlate the ratio of mesh size to hernia size and clinical outcomes.

Table 1: Proportion of cases in which a different-sized mesh would need to be selected based on variability in measured hernia defect

	CT (Radiographic) (n=46)	Abdomen Desufflated (n=52)	Abdomen Insufflated (Extra-Abdominal) (n=52)
Abdomen Desufflated (n=52)	12/46 (26.1%)		
Abdomen Insufflated (Extra-Abdominal) (n=52)	13/46 (28.3%)	3/52 (5.8%)	
Abdomen Insufflated (Intra-Abdominal) (n=52)	13/46 (28.3%)	5/52 (9.6%)	4/52 (7.7%)

P052

Minilaparoscopic Approach for Trans-Abdominal Preperitoneal Incarcerated Obturator Hernia Repair

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Aims: Recently, reduced port laparoscopic surgery using minilaparoscopic instruments has been widely adopted as innovative features in minimally invasive surgery. We previously reported that the application of newly developed 3 mm minilaparoscopic instruments with supra-pubic approach in combining conventional 5 mm trocar at umbilicus to trans-umbilical single port access laparoscopic appendectomy could be feasible with excellent cosmetic result. Thus we attempted to apply modified technique for trans-abdominal preperitoneal (TAPP) incarcerated obturator hernia repair using minilaparoscopic instruments.
Methods: From April of 2014 to August of 2016, 2 consecutive patients were assigned to undergo minilaparoscopic TAPP obturator hernia repair at our hospital. We conducted to study our modified technique using reusable metallic trocar (ENDOTIPTM, 3.3, 6 mm in diameter, KARL STORZ GmbH & Co. KG, Tuttlingen, Germany) as a working port, and VERSAPORTTM, 5 mm in diameter, COVIDIEN, INC., Mansfield, MA, USA, XCELTM, 5 mm in diameter, ETHICON ENDO-SURGERY, INC., Pittsburgh, PA, USA) as a camera port. Straight-type grasping forceps and dissecting forceps (3.3 mm in diameter) were used through the left lower abdominal quadrant port with the triangular co-axial setup. Ventralight STTM (BARD) was used in TAPP cases and SoftmeshTM (BARD), ProloopTM (ATRIUM) were used in open cases.
Results: Clinical records of 8 cases of open obturator hernia repair (From February of 2010 to August of 2016) were analyzed retrospectively in background factors, operative time and length of hospital stay. Of them, we had 2 cases with modified TAPP (female 2, average age of 86.0, range 86–86) as was 85.6 (f 8), 80–91 in the control group. The average operative time in the modified group was 98.0 min (62–134), same as that of 94.1 (51–162) in the control group. The median hospital stay in the modified group was 8.5 days (8–9), significantly shorter than that of 21.5 (9–63) in the control group. Postoperative complications were not observed in all cases.
Conclusions: We conclude that modified technique for TAPP incarcerated obturator hernia repair could be a promising option with safety and an attractive advantage of better cosmetic result in managing this condition.

P053

A Feasible Approach for Indirect Inguinal Hernia Sac in Totally Extra-Peritoneal (TEP) Laparoscopic Hernia Repair

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Background: One of the main reasons for the long learning curve associated with totally extraperitoneal (TEP) laparoscopic hernia repair lays in operational procedures for the hernia sac dissection in a narrow and limited preperitoneal space.
Objective: In this study, we investigated the effectiveness of our technique for the hernia sac dissection by a preperitoneal fascia-oriented approach.
Methods: We designed a randomized study of a single surgeon experience; 76 TEP repairs in adult males with unilateral, primary, EHS Classification L-2 inguinal hernia were included, which 24 were performed by non incision of the preperitoneal fascia (NI) and 27 were by incision of the preperitoneal fascia (FI). Patient characteristics and operative data were noted at surgery. Postoperative outcomes were assessed in both groups.
Results: Peritoneal injury occurred in two cases (8%) in NE group. The sac dissection time in NE group, 15.4 min was statistically longer compared with the time in FE group, 11.8 min ($p<0.05$). NE group required longer overall operative time with no statistical difference. The assessment of differences in postoperative pain, length of hospitalization, days required for return to work after the operation in both groups was considered statistically insignificant. There were no perioperative complications, except for two patients who developed a seroma and a subcutaneous bleeding, respectively in each group, which recovered after conservative treatment.
Conclusions: To gain more expertise in TEP repair, the importance of strategical incision of the preperitoneal fascia on the hernia sac must be appreciated. The preperitoneal fascia-oriented technique might facilitate the indirect hernia sac dissection in TEP repair.

P054

The Impact of Intraoperative Factors and Wound Complications on Outpatient Resource Utilization Following Ventral and Incisional Hernia Repair

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Introduction: Although the majority of patients experience no complications following open ventral and incisional hernia repair (VIHR), the incidence of postoperative surgical site infection (SSI) has been reported to be as high as 19–25%. Postoperative complications would be expected to be associated with an increased burden on outpatient resources, but little is known about the predictors of increased ambulatory costs following VIHR. The purpose of this study is to evaluate the financial impact of perioperative factors on outpatient resource utilization following VIHR.
Methods and Procedures: An IRB-approved retrospective review of clinical and cost data for patients that underwent VIHR was conducted. Surgery scheduling system query identified cases performed from October 1, 2011, through September 30, 2014; cases during which any concomitant procedures were performed with VIHR were excluded. A clinical and cost representation of cases was obtained by combining local National Surgical Quality Improvement Program (NSQIP) data and data from the hospital cost accounting and physician billing systems. Medical records for the 180 day postoperative time period were reviewed to identify complications and the number of ambulatory surgical office visits that occurred.
Results: Cost and clinical data was analyzed for 310 patients. Average patient age was 52 years (SD=13.3), and 56% of the patients were female. The number of outpatient visits to the surgical office during the 180 postoperative time period varied from 0 to 18 [median=2; interquartile range (IQR)=1–3]. No preoperative characteristic was noted to be associated with increased number of office visits. CDC Wound Class>1 was associated with increase of mean 1.4 visits (IQR: 0.5–2.3); p=.003. Intraoperative variables indicative of increased complexity of VHR such as component separation, longer duration of operation, and increased size of mesh utilized were also predictive of increased number of office visits (p<.001). Postoperative surgical site occurrences were associated with increased number of visits: infected seroma/seroma requiring drainage added a mean 2.3 visits (IQR: 1.3–3.3), p<.001; deep wound infection added a mean 3.9 visits (IQR: 1.9–5.9) p<.001.
Conclusions: Postoperative surgical site complications following VIHR add a significant burden for patients and to the outpatient surgical office. In an era in which improved quality and cost-efficiency has become imperative, measures to decrease risk of postoperative complications particularly for more complex VIHRs would be expected to decrease resource utilization and increase cost-effectiveness of care.

P055

Total Management of Complex Ventral Hernia 3: Operative Repair of the Complex Ventral Hernia

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Introduction: Despite recent advances in the operative management of complex ventral hernia, these remain a significant challenge for surgeons. Closure of large defects in the unprepared abdomen can have serious pathophysiological consequences due to chronic contraction and retraction of the lateral abdominal wall muscles. Certain features of complex ventral hernias make repair particularly technically challenging and time consuming, such as massive size of fascial defect, unusual hernia location, involvement of other abdominal wall structures, and previous tissue damage.
Methods: An illustrative series of clinical cases will be used to provide an introduction to the repair of complex ventral hernias. Utilizing three-dimensional volume rendering CT imaging techniques, a step-by-step guide to the operative repair of a variety of complex ventral hernias will be presented.
Results: Ventral hernias to be examined include traumatic hernias involving extensive tissue damage, massive ventral hernias with defects>20 cm in width, hernias requiring additional procedures such as wiring of ribs, and hernias in difficult locations such as flank hernias. Specific techniques such as individually tailoring mesh size, transfascial mesh fixation and transcutaneous fascial defect closure will be discussed. All hernias in this series have been repaired laparoscopically or laparoscopic-open-laparoscopic (LOL) with transcutaneous fascial closure and intra-peritoneal mesh placement. There have been no hernia recurrences to date.
Conclusion: This series aims to offer a guide to the operative repair of unusual and complex ventral hernias.

P056

A Comparison of External Oblique Release and Retrorectus Hernia Repair in Complex Abdominal Wall Reconstruction

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Introduction: Ventral hernia repairs using component separation techniques have gained momentum over the past decades due to their ability to cover large defects. An anterior approach where flaps are raised off the anterior rectus sheath with external oblique release (EOR) allows on-lay mesh re-enforcement. Alternatively, with the retrorectus repair (RRR), the rectus abdominis muscle is dissected from the underlying posterior rectus sheath with mesh placement in the retro-rectus space. The objective of the study is to evaluate differences in outcomes and complication rates between EOR and RRR approaches in abdominal hernia repair.
Methods: A retrospective cohort study in a single tertiary institute between 2013 and 2015 was reviewed. Inclusion criteria consisted of ventral hernia repair as the primary surgery, and bilateral muscle flap advancement with complete fascial and skin closure. Patients who were hospitalized for trauma or had an open abdomen in the same hospital stay were excluded. Categorical variables were identified with data analyzed using Fisher's exact test. Continuous variables between the two surgical techniques were evaluated using Wilcoxon test. Analysis was conducted using SAS software.
Results: 103 patients were initially identified. Of those, 49 met inclusion criteria. 28 patients received EOR while 21 had RRR. Hernia defect size was significantly larger for the EOR as compared to the RRR (mean defect size area of 202 cm^2 vs 100 cm^2) and had an increased mean number of intra-operative drains used (2.7 vs 1.1). Accordingly, EOR group also had a significantly increased median operative time (234 min vs 139 min, P<0.001), and a trend in increased number of patients with prior ventral hernia surgeries (79% vs 52%, p=0.07). Differences in demographics and preoperative risk factors were not statistically significant. The EOR compared to RRR had a trend in increased rate of superficial surgical site infections (SSI) (32% vs 9.5%, p=0.09), deep SSI (14% vs 4.8%, p=0.38), need for IR drainage (18% vs 4.8%, p=0.22), and overall 90-day complication rate (50% vs 33%, p=0.38). The recurrence rate between the two methods was similar (11% vs 7.1%, p=0.999).
Conclusions: This study shows no statistical difference in outcomes noted between EOR and RRR, supportive of surgeon preference for surgical approach. The trend for increased SSI rate in EOR is likely secondary to larger hernia defects in this cohort, and large fasciocutaneous flaps created, resulting in increased potential space for seromas and need for prolonged drainage. Further analysis in the form of prospective randomization is warranted.

P057

Contribution of Laparoscopy in the Treatment of Inguinal Hernias in the Military: About 100 Cases

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Introduction: The army needs a young and active population, to the accentuation of the inguinal hernia pathology in the military we have adopted the treatment of inguinal hernias laparoscopic view the postoperative advantages of this surgical approach .
Patients and Methods: We operated 100 patients for inguinal hernias on the age a period of 02 years, the age of our patients varies between 20 and 45 years, all of our patients are professional soldiers, 48% straight hernia, inguinal hernia 35% left, 13% inguinal hernias bilateral, 4% recurrent hernias.
Results: Our results was spectacular especially on the plan early resumption of activities in post-surgery all patients resumed their activities after 15 days of convalescence, our exit from hospital patients out one day postoperative .the post operative complications was 3 patients had a scrotal edema, a patient had a postoperative Serom no recurrence during the two years post opeatoires, 3 patients had chronic post operative pain for a period of 15 days and 32 days-limiting.
Conclusion: Lapport of laparoscopy in the treatment of groin hernias can be an alternative to traitementd of inguinal hernias in young Militiare view the many benefits of this surgical approach .

P058

TEP vs TAPP Repair of Groin Hernia: Experience of Over 1000 Cases at a Tertiary Care Centre

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Introduction: TEP and TAPP are the two standard techniques for laparoscopic repair of groin hernia. There have been many studies comparing TEP vs TAPP in terms of safety and efficacy, however there are conflicting reports of advantages of one over the other. The recent guidelines for laparoscopic groin hernia repair published by International Endo Hernia society (IEHS) also could not answer the question of which of the two techniques is better. We present our experience of more than 1000 TEP and TAPP cases.
Methodology: This study is retrospective analysis of prospectively maintained database of all patients with groin hernia underwent laparoscopic groin hernia repair in a single surgical unit between January 2004 and July 2016.Patient's demographic profile, hernia characteristics (duration, side, extent, content, reducibility) were noted in the pre-structured proforma. A written informed consent was taken from all patients before surgery. Clinical outcomes included the operation time, intraoperative and postoperative complications, length of postoperative hospital stay, hernia recurrence, chronic pain (defined as pain that persisted for more than 3 months),recurrence,seroma and wound infections. Patients were followed up in the outpatient clinic by the attending surgeons during the postoperative course.
Results: Over ten years duration, TEP repair was performed in 841 patients and TAPP on 542. Mean age of patients was 50.7 years (range 17–86 years). Both the techniques were comparable in terms of operative time, intraoperative complications and post operative outcomes. However there was a significantly higher pain scores (p value$<$0.05) at 24 h in the TAPP group. The incidence of seroma was higher in TEP and scrotal edema was more common after TAPP repair. Both the techniques were also comparable in terms of QoL, testicular function and sexual functions
Conclusion: In conclusions both TEP and TAPP repair are comparable and should be considered as complementary procedures.

P059

Ambulatory Robotic Ventral Hernia Repair in Morbidly Obese Patients Using Completely Bio-resorbable Mesh, A MIS Fellow's Experience with the First 100 Cases

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Introduction: Robotic ventral hernia repair with a Bio-resorbable mesh has an equal or lower recurrence rate compared with permanent mesh at 18 months with no life time risk of mesh infection. Incidences of mesh-related infection after hernia repair of up to 8% have been reported. The rate of infection is influenced considerably by underlying co-morbidity, and seems to be increased in patients with diabetes, immunosuppression or obesity. Almost a third of patient had their infections diagnosed a year after mesh implant.
Methods: We retrospectively collected data from our first 100 RVHR during the period of January 2015 to September 2016. All the robotic procedures were performed using the daVinci Si Surgical platform. Primary closure of the fascial defect and excision of hernia sac was performed in all cases. All patients received prophylactic IV antibiotics before surgery. Fixation of the mesh was performed with absorbable intra-corporeal sutures to the peritoneum only using intraperitoneal onlay mesh (IPOM) method.
Results: Patients were female in 43(43%) and male in 57(57%). Mean age was 54. mean ASA of 2.35. Mean BMI was 43 range (35–55). The following types of ventral hernia were found: incisional 37 (37%), Peri-umbilical 23(23%), epigastric 29 (29%), multiple fascial defect 11 (11%). Mean surgical time was 86 min range (70–107).Mean Console time 42 min range (35–53).PACU stay time range (120–175) minutes All Patients were discharge Home Same Day. Mean follow up was 10 months with range (4–18). Urine retention developed in 1 patient (1%) and surgical site infection (SSI) developed in 2 patient (2%) at the robotic trocar site. There was no mesh infection seen so far .No recurrences were seen. No perioperative myocardial infarction (MI), pulmonary embolism (PE) or deep venous thrombosis (DVT) was seen.
Conclusions: RVHR has the advantages of lower complication and lower recurrence rate. It eliminates the need for drains and narcotics with faster return to normal activity and work with no life time risk of infection due to complete resorption of the mesh after 18 month period.

P060

Single Incision Laparoscopic Transabdominal Preperitoneal Mesh Hernioplasty for Inguinal Hernia in 250 Japanese Patients

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Background: Inguinal hernia repair is the most common procedure in general and visceral surgery worldwide. Laparoscopic Transabdominal preperitoneal mesh hernioplasty (TAPP) has been also popular surgical method in Japan. Single incision laparoscopic surgery is one of the newest branches of advanced laparoscopy, and its indication has been spread to not only simple surgery such as cholecystectomy, but also complex surgery.We report our experience with single incision laparoscopic TAPP (S-TAPP) for Japanese patients with inguinal hernia.
Patients and Methods: A consecutive series of 250 patients (217 male, 33 female) who underwent S-TAPP during June 2010 to September 2016 in a single institution. Twenty five of the patients had bilateral inguinal hernia. The mean follow-up was 958 days. The average age of the patients was 61.2$\pm$16.5 years.
Establishment of the Ports: A 25-mm vertical intra-umbilical incision is made for port access. One 5-mm optical port and two 5-mm ports were placed side-by-side through the umbilical scar.
Surgical Procedure: The procedure was carried out in the conventional fashion with a wide incision in the peritoneum to achieve broad and clear access to the preperitoneal space, and an appropriate placement of polypropylene mesh (3DMaxTM light, Bard) with fixation using the tacking device (AbsorbaTack®, Covidien). The hernia sac is usually reduced by blunt dissection, or is ligated and transected with ultrasound activated device. The peritoneal flap is closed by one suture with 4−0 PDS and the 6–7 tacks using AbsorbaTack®.
Results: In one patient, we encountered a large sliding hernia on the right side having sigmoid colon as content of the sac, which required conversion to the conventional laparoscopic procedure. There were nine recurrence cases after surgery of laparoscopic or anterior approach, and two cases after prostatectomy. There was no intra-operative complication. The mean operative time was88.8$\pm$31.1 min, and blood loss was minimum in all cases. The average postoperative stay was 5.7$\pm$2.7 days. There was one recurrence case (0.4%) 16 months after the surgery. There was no severe complication after the surgery, but there were 14 seromas (5.4%) and one hematoma(0.4%). Two patients had blunt tactile sense in the area of the lateral femoral cutaneous nerve (0.8%), which improved in two months.
Discussion: Our results suggest that S-TAPP is a safe and feasible method without additional risk. Moreover, cosmetic benefit is clear. However, further evaluation for postoperative pain and long-term complications compared to standard laparoscopic TAPP mesh hernioplasty should be required.

P061

Laparoscopic Suppurative Appendectomy in Amyand's Hernia

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The management of Amyand's hernia is still a subject of debate and should be individualized depending on the operative findings and co-morbidity factors. The most widely accepted classification that epitomizes operative findings and management is the one by Losanoff and Basson which describes 4 distinct types.
In type 1, a normal appendix is found within an inguinal hernia. In this case hernia reduction with mesh repair and appendectomy (unless contraindicated) is the treatment of choice.
Type 2 includes an inflamed appendix within an inguinal hernia, without signs of peritonitis and abdominal sepsis. Appendectomy through herniotomy with primary repair of hernia with Bassini or Shouldice technique (no mesh) is proposed.
In type 3 where peritonitis and abdominal sepsis co-exist, a laparotomy, appendectomy and peritoneal lavage and subsequent hernia repair without mesh is indicated.
Finally in type 4, some other abdominal pathology exists simultaneously. A laparotomy in terms of identification and treatment of this pathology should be performed. Appendectomy and hernia repair without mesh should follow.
The aim of this report is to present a rare and very interesting case of a clinically acute appendicitis that turned out to be an inflamed perforated appendix in the right inguinal canal that has been discovered laparoscopically. Laparoscopic hernia repair without mesh resulted in no hernia recurrence on long term follow up.

P062

Feasibility and Reproducibility of Robotic Retromuscular Ventral Hernia (RRVH) Repair

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Background: There is limited data on the value of a robotic approach for complex abdominal wall reconstruction and the ability to reproduce these results among surgeons. We describe our initial experience and present a foundation for further research in regards to the reproducibility of such approach including perioperative outcomes.
Methods: A single-center, retrospective review of prospectively collected data between 2015 and 2016 was performed on robotic retromuscular ventral hernia (RRVH) repair with approval from the institutional review board (IRB). We utilized social media platforms (international hernia collaboration and robotic surgery collaboration) for continuous mentorship. Data collected included patient demographics, details related to the surgical procedure (including defect size, mesh size and fixation), the ability and technique used to close the fascia (including the need for component separation), conversion rate to an open procedure, perioperative outcomes (surgical site occurrence, surgical site infection, hospital readmission, and early hernia recurrence due to technical error). Routine postoperative follow-up was at 2 weeks and 3 months.
Results: A total of 26 consecutive RRVH were performed utilizing the Intuitive Si daVinciTM robotic platform, including 9 transversus abdominus release (TAR) component separation repairs. All cases were considered elective with ASA scores ranging between 2–3. Demographics included: average BMI 33.7 (range 28–42), sex (male n=16, female n=10) and average age 61.3 years (range 42–82 years). All cases were classified as clean, with the exception of 1, where an iatrogenic colostomy was encountered and repaired primarily without spillage. Operative times averaged168 (range 72–242) for RRVH without TAR and 295 min (range 234–335) for RRVH with TAR (average operative time for all cases was 212 min (range 72–335 min). The average hernia defect was 89 cm2 (range 24–300 cm2), whereas the average size of synthetic mesh used was 550 cm2 (range 192–1400 cm2). Conversion to an open procedure was required in 1 case (3.8%) due to an inability to close the anterior fascia. Average blood loss was 10 mL (range 5–50 mL) and average hospital length of stay was 1.08 days (range 0–5 days). Complications consisted of n (=1) symptomatic seroma requiring aspiration. No surgical site infection, early hernia recurrence, or hospital readmission were encountered. All 26 patients were seen at 2 weeks and 3 months.
Conclusion: Our early experience has demonstrated that RRVH repair with or without component separation is a safe, feasible and reproducible approach, which allows the surgeon to perform complex abdominal wall reconstruction via a minimally invasive approach.

P063

Laparoscopic Procedures in Patients with Cardiac Ventricular Assist Devices

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Purpose: Cardiac ventricular assist devices are becoming more common therapy for heart failure and more frequently encountered in our general surgery patients. Non-cardiac surgical care of these patients can be complex given the need for anticoagulation, perioperative monitoring and anatomical considerations due to the device itself. There are no guidelines or significant patient series reported to date for general surgery procedures in this population. We herein report techniques and outcomes for commonly performed laparoscopic procedures in these patients at our high volume cardiac ventricular assist device placement center.
Methods: All patients with ventricular assist device placement at our institution were retrospectively reviewed to identify patients who underwent laparoscopic abdominal surgery. Intraoperative and perioperative data were collected including transfusions, anticoagulation management and complications. Techniques and preoperative considerations from the surgeons were also compiled and described.
Results: Of the 374 patients who had placement of ventricular assist devices, 17 had a laparoscopic procedure: enteral access placement (n=7), cholecystectomy (n=6), hernia repair (n=2), small bowel resection (n=1) and splenectomy (n=1). Preoperative evaluation routinely included radiologic imaging to evaluate drive line location. Port placement was deliberate with relation to drive line. No extra ports were required in any cases due to positioning of the drive line. Various methods were used to enter the abdomen, but most common was a periumbilical open Hasson technique (11/17). No cases were converted to open. Overall, the average blood loss was 132±64mL and average operative time 1.8±0.3 h. Five of the 17 patients had intraoperative blood transfusion as per anesthesia discretion.
No patients had perioperative thrombus or LVAD complications secondary to holding anticoagulation. Anticoagulation was held an average of 4.1 days before surgery and restarted 1.8 days after surgery. Average preoperative INR was 1.7±0.1. In the immediate postoperative period seven patients had anemia that resolved with blood transfusions, this included one patient who had groin hematoma after inguinal hernia repair. Preoperative INR and platelet count did not appear predictive for patients with postoperative bleeding. No patients required interventions for bleeding complications. There were no mortalities related to the procedures.
Conclusions: Laparoscopic procedures such as enteral access, cholecystectomy and hernia repairs are safe in patients with ventricular assist devices. Although special consideration for bleeding risks, placement of ports and perioperative management is required, the presence of a ventricular assist device itself should not be a contraindication for laparoscopic surgery and may in fact be preferred for these patients.

P064

Management of Caustic Injuries

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Introduction: Caustic ingestion is a serious surgical pathology that requires a multidisciplinary management. Its prognosis depends on the nature of the ingested agent, the early maturing of the lesions and late complications. Our Purpose is to identify diagnostic, therapeutic and prognostic features of this pathology.
Methods: It is a retrospective study that included 100 patients whom were taken charge of at the General surgery department "A" at the Charles Nicolle Hospital of Tunis, Between 2005 and 2013 for a caustic injuries.
Results: The average age was 33, 11 years, the gender ratio was 1,2. The ingested agent was a strong base in 55.6% of the cases, a strong acid in 17.3% and an oxidizing in 27.2%. The found endoscopic lesions were a grade 4 both in esophagus and stomach in 1%, A third grade gastric in 33% and esophageal in 30% of cases. A grade 2a esophageal was found in 25% and gastric in 20%, and grade 2b was found in 26% in the esophagus and 19% in the stomach .A first grade oesohagual found in 18% and gastric in 27% of cases. 11% of patients had an emergency oesogastrectomy and 58.9% had a feeding jejunostomy .the risk factors of endoscopic severity in a univariate analysis were both strong base ingested agent and the oral lesions and only strong base ingested agent in multivariate analysis. The rate of mortality at the acute stage was 7, 1%. The risk factors of mortality in a univariate analysis were the advanced age, strong base ingested agent and elevated endoscopic grade, and both of advanced age, endoscopic grading in a multivariate analysis. In secondary outcomes esophageal and gastric strictures were found in 38.6% of cases. Endoscopic dilatation was attempt in 2.6% and 20% have a feeding jejunostomy. 66.6% esophageal and gastric strictures was found in the third outcomes endoscopic dilatation was attempted in 19% of cases. 73% of patients were operated:80% had coloplasty,13% gastroplasty .13% oesophagectomy and 6%gastrectomy. the risk factors of strictures was: the strong base ingested agent, elevated endoscopic grade and emergency surgery in univariate analysis.
Conclusion: The caustic injuries of the digestive tract have an important aftermath .The prevention and the education of the population has a primary role in the decrease of impact of this pathology.

P065

Laparoscopic Colonic Resection and Stoma for Colonic Perforation

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Introduction: Open colonic resection and stoma (CRS) without colonic anastomosis has traditionally and widely been used to treat patient with fecal peritonitis resulting from colon perforation. Recently, feasibility of the resection of the perforated colon with primary anastomosis (PA) in selected patients has been reported. In our institution, low risk patients with stable general condition were treated with open PA with intraoperative colonic lavage, and patients with unstable general condition or generalized peritonitis were treated with open CRS, and relatively high risk patients with stable general condition were treated with laparoscopic CRS since. The aim of the present study was to evaluate the surgical outcomes of laparoscopic CRS for selected patients with colon perforation.

Patients and Methods: Between January 2014 and July 2016, twenty-four patients with colonic perforation were treated in our institution. Of those, six patients underwent laparoscopic CRS, and the surgical outcomes are reviewed.

Results: All procedures were completed laparoscopically, and there was no perioperative mortality. There were 2 male and 4 female patients, with a median age of 76 (range: 53–84). The median duration of the operation was 202 min (range: 125–247 min) and the median estimated blood loss during surgery was 23 ml (range: 10–150 ml); no patients required intraoperative transfusion. Reasons for colonic perforation are diverticulitis in three, stercoral perforation in two, and rectal cancer perforation in one. The location of the perforation was rectum in three, sigmoid colon in two, and transverse colon in one. Irrigation of the whole abdominal cavity was performed with more than 10 L of saline laparoscopically, and three or four drainage tubes were inserted via the port site. No patient developed postoperative abdominal abscess or wound infection. However, median postoperative hospital stay was 16 days (12–25 days), and the longer hospital stay may be due to social factors such as differences in medical fees, medical insurance, and medical systems in Japan.

Conclusion: Laparoscopic CRS is a feasible and safe procedure for selected patients with colonic perforation.

P066

Comparison of Outcomes of Interval and Emergency Surgical Management for Appendicitis with Abscess

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Introduction: Surgery is often performed in the acute stages of an appendiceal abscess, but in such instances having a possibility of convert to an extended surgery or postoperative complications may be encountered. In order to avoid these problems, we performed laparoscopic interval appendectomy (LIA), a form of
laparoscopic appendectomy, with a interval of about 3 months after conservative treatment in abscess-forming appendicitis. The aim of study was to clarify the short term outcomes of LIA compared with emergency open appendectomy (EO) for the abscess-forming appendicitis.

Method and Procedures: A total of 711 patients underwent appendectomy from January 2003 to June 2015. Of those, 101 patients who had been admitted due to a periappendiceal abscess to Toho University Ohashi Medical Center, were enrolled into the study. These comprised 49 patients who underwent LIA and 33 patients who underwent EO. The outcomes of the two groups were retrospectively compared for patient characteristics, operative time, amount of bleeding, postoperative complication, length of hospital stay, medical expenditure.

Results: The mean operative time required in EO group was 100.7 min and that in LIA group was 106.0 min (P=0.758). The mean amount of bleeding required in EO group was 223.3 ml and that in LIA group was 10.9 ml (P<0.0001).
Appendectomy for surgical procedure was completed without extended surgeries including ileocecal resection in 21 patients (63.6%)in the EO group and 49 patients (100%) in the LIA group (P=0.0005). The overall ratio of complications was significantly less in the LIA group (2.0%) compared with EO group (57.6%) (P<0.001). A mean duration of hospital stay in the EO group was of 14.4 days and that in the LIA group was 15.7 days (P=0.073). Althogh, a mean postoperative duration of the LIA group (4.3 days) was shorter compared with that in the EO group (13.6 days), overall hospital durations were similar in both groups.

Conclusions: LIA was a safe and effective surgical procedure in appendectomy for abscess-forming appendicitis. LIA provided clinically beneficial advantages, including shorter postoperative hospital stay, lesser postoperative complication and amount of bleeding and no conversion to ileocecal resection over EO. LIA could be a standard treatment strategy as a minimally invasive surgery for appendicitis with abscess.

P067

A New Modality; Practical in Use, Predicting the Overall Morbidity and Mortality of Peptic Ulcus Perforation (PUP): A Retrospective Study

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Background: There are different modalities, or scoring systems defined such as; 'MPI (Mannheim Peritonitis Index), MOF (Multiple Organ Failure Score), Boey and PULP (Peptic Ulcus Perforation score) which are used in predicting morbidity and mortality rates for peptic ulcus perforation patients. But still, none of them has been accepted as the preferred approach over another. The aim of this study was to define an alternative modality which is practical in use based on the hospital database.

Methods: A total of 123 patients whom had a history of operation for perforation of peptic ulcus between years of 2010–2015 in Emergency Surgery Department of Istanbul Medical Faculty were included into the study. All the hospital database were evaluated retrospectively.

Results: Overall morbidity and mortality scores were 17% and 9% retrospectively. According to ASA scoring system; patients having ASA (score 3) had 5 times greater mortality rates than the ones below it (45% vs 9%). Patients having serum kreatinin levels above 1.50 mg/dl had %73 mortality (8/11) which was found 3 times greater than the ones below of that value. Also the mortality rates nearly doubled (36% vs. 64%) when the time past from the beginning of perforation till the admission was above 24 h. These parameters were systasically significant having ….(…% CI) value of AUC (Area under the curve).

Conclusion: These parameters are basic and easy in application which make them practicable in use when compared with other known modalities. Evaluating this with multicentral and higher population groups may give more satisfactory results.

P068

Our First 20 Cases of Gangrenous Laparoscopic Appendicectomy in Mauritius

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Introduction: We started performing laparoscopic appendicectomy in 2012, in a country where most cases are still done through open surgery.

Methods and Procedures: Through our first 115 cases of laparoscopic appendicectomy we selected 20 cases of gangrenous appendicitis. The results were compared with 20 cases of open gangrenous appendicectomy done previously in our hospital. Results were compared according to two list: 1st admission duration, surgery duration, wound infections, and 2nd bowel motility, oral alimentation and patient mobilization.

Results:

	Laparoscopy	Open
Admission duration (nights)	2	6
Surgery duration(minutes)	48	62
Wound infections	1	12

Measured on Postop day	Laparoscopy	Open
Alimentation Started	1	2
Bowel motility ascultation positive	1	2
Mobilisation out of bed	1	2

Conclusions:
Laparoscopic appendicectomy is feasible in gangrenous appendicitis, with no conversions in our small experience.
Results of laparoscopic appendicectomy is better when compared to open approach, despite we did not compare results according to BMI (as we have a small number of patients).

P069

Delayed Pneumothorax Following Laparoscopic Appendectomy

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A Previously healthy, young male presented to the hospital with complaints of excruciating lower abdominal pain with nausea, vomiting. Diagnosed to be suffering from appendicitis. Patient was subjected to Laparoscopic appendectomy, which remained uncomplicated. Patient discharged after 48 h of hospital stay over intravenous antibiotics. After 8 days, patient presented again to the hospital with difficulty in breathing and diffuse chest pain. Diagnosed to be suffering from Pneumothorax (right sided). Intercostal Chest tube placement along with supportive treatment. After 4 days, patient recovered completely and was discharged with follow up advice. On routine consultations, patient did not develop any further complications and his clinical status remained satisfactory.

P070

The Combination of Findings on Abdominal Computed Tomography is Helpful to Predict the Site of Gastrointestinal Perforation

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Introduction: Gastrointestinal (GI) perforation is one of acute abdomen and frequently results in fatal septic shock and multiple organ failure. As the choice of treatment (conservative or operative) depends on the site of perforation, the accurate diagnosis is absolutely important. The combination of three findings (concentration of extraluminal air bubbles, segmental bowel wall thickening, and focal defect of the bowel wall) on abdominal computed tomography are useful for predicting the precise location of perforation. The objectives of this study is to evaluate the sensitivities of these findings and the effect of computed tomography (CT) attenuation values of ascites on GI perforation site prediction.

Methods: The CT attenuation values of the ascites from 53 patients with GI perforations were assessed three findings and measured the CT attenuation values of ascites. The effect of the CT attenuation values of the ascites on perforation site prediction and postoperative complications was evaluated.

Results: Between April 2012 and March 2016, patients with gastrointestinal perforation were included. Of these, 53 could be preoperatively diagnosed. The sensitivity by the site of perforation is 88% in upper gastrointestinal tract, 83% in small intestine and 90% in large intestine, suggesting that three CT findings are helpful in the identification of the site of perforation. Of 21 patients with colorectal perforations, the CT attenuation values of ascites were significantly higher than those in patients with perforations at other sites [23.2 Hounsfield units (HU) vs 15.1 HU, respectively, P= 0.0002]. The prediction rate of colorectal perforation using attenuation values as an auxiliary diagnosis improved by 9.5% compared to that of CT findings alone (100.0% vs 90.5%).

From the data obtained by the 2D method, an ROC curve was drawn. The area under the curve was calculated as 0.82, which indicated strong abilities to predict perforation sites. A cut-off value of a perforation site was estimated at 17.3 HU. Using this cut-off value, the sensitivity of colorectal perforation prediction was 76.7% (23/30), whereas the specificity was 91.3% (21/23).

Conclusion: The combination of three CT findings is useful for predicting the precise location of perforation. The CT attenuation values of ascites could facilitate the prediction of perforation sites in GI perforations, particularly in cases in which the perforation sites are difficult to predict by CT findings alone.

P071

Risk Factors for Intra-Abdominal Abscess Following Appendectomy

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Introduction: Intra-abdominal abscess (IAA) following appendectomy results in increased hospital length of stay, readmissions, and drainage procedures. Perforated appendicitis and laparoscopic appendectomy have been associated with increased rates of IAA. The purpose of this study was to identify potential risk factors for IAA development following appendectomy.

Methods: A retrospective review was performed of all patients who underwent appendectomy at our institution from 2011 to 2013. Patient cohorts were divided into those who did and did not develop a postoperative IAA following an appendectomy. A Wilcoxon rank sum test and a chi-square test were used for continuous and categorical variables. A multivariable logistic regression model was used to identify predictors of postoperative IAA.

Results: During a 3-year period, 1148 patients underwent appendectomy. Seventy-six patients (7%) developed an IAA. On univariate analysis, patients who developed an IAA had a higher mean age, body mass index, number of days of pain prior to presentation, were more often male than female, and more likely to have diabetes mellitus type II (DM2; $p<.01$). Patients with an appendicolith on preoperative CT imaging had a higher incidence of IAA ($p<.001$). An intraoperative diagnosis of complicated appendicitis was more common in patients who developed an IAA versus those who did not (64% vs. 18%; $p<.001$). Twenty-two of 107 patients (21%) who underwent open appendectomy developed IAA vs. 5% who underwent laparoscopic appendectomy ($p<.001$). Overall, 553 of 1148 patients received at least one dose of postoperative antibiotics. Of those, 60 patients developed IAA vs. 16 who did not receive antibiotics. Mean postoperative antibiotic duration was 3.8 days in the IAA cohort. During initial multivariate analysis antibiotic duration was strongly associated with abscess formation. When removing antibiotic duration from the model, multivariate analysis revealed that male gender (OR 2.05; 95% CI, 1.11–3.78), DM2 (OR 2.31; 95% CI, 1.06–5.01), presence of an appendicolith on preoperative CT imaging (OR 1.88; 95% CI, 1.05–3.34), intraoperative diagnosis of complicated appendicitis (OR 6.11; 95% CI, 3.34–11.17) and open appendectomy (OR 2.27; 95% CI, 1.14–4.52) were associated with postoperative IAA formation.

Conclusion: Male gender, DM2, the presence of an appendicolith on preoperative imaging, intraoperative diagnosis of complicated appendicitis and open appendectomy were associated with IAA formation when antibiotic duration was removed from the analysis. Patients with these risk factors should be monitored more closely after appendectomy for the development of IAA.

P072

Partial Splenectomy in the Management of Blunt Splenic Trauma

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Background: A ruptured spleen caused by blunt abdominal injury was often treated by splenectomy. Overwhelming post-splenectomy infection occurs in 1.4% of all such cases and the mortality is about 50–80%. There is a hard evidence to support the concept that the immune function of the spleen is present after preservation of part of the splenic tissue.

Patients and Methods: The files of all patients treated by partial splenectomy for blunt splenic injury in Gastrointestinal Surgery Unit, Tanta University Hospital during the period from January 2009 to January 2012, were reviewed.

Results: Examination of the patient's files revealed that 83 patients had surgery for blunt splenic injury during the reported time, 25 of them (30%) had partial splenectomy and a total of 22 files were analyzed. The mean age was 27 years (range 9–43). Seventeen patients (77%) presented after road traffic accidents. At laparotomy, active bleeding from the spleen was found in 21 patients (95%). Associated intra-abdominal injuries were found in 9 patients (41%). The operative time of partial splenectomy ranged from 80 to 130 min with a mean of 110 min. None of the patients developed post-operative bleeding or other complications specific to the surgical procedure. Overall, postoperative complications were diagnosed in 6 patients. The hospital stay ranged from 7 to 21 days with a mean of 9.5 days. All of the tested patients showed normal platelet count and normal clearance of Howell-Jolly bodies. CT scan showed normal vascularized splenic remnant in tested patients.

Conclusion: in patients with blunt splenic injury, in the absence of other associated life threatening injuries, splenic salvage must always be attempted. Based on the anatomy of the injury, partial splenectomy with preservation of, at least, one third of the spleen is safe and maintains normal filtering function of the spleen. However, a longer follow-up period is needed to confirm these results at the long term.

P073

Treatment of the Appendiceal Abscess in Children-One Institution's Experience

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Background: The role of surgery in the initial management of appendiceal abscesses in children is unclear. The primary objective of this study was to compare outcomes of immediate appendectomy versus drainage and interval appendectomy. The secondary purpose was to evaluate abscess fluid for culture and susceptibility.
Methods: Patients less than 18 years with an appendiceal abscess were identified at a single tertiary children's hospital from 2006 to 2011. Retrospective data on age, gender, length of symptoms, antibiotic use, complications, length of stay, and readmission were collected.
Results: A total of 100 patients were identified (55M:45F). Fifty-six patients were treated with intravenous antibiotics and drainage when feasible. Median age was similar in both groups. Complications during the initial hospitalization were noted in 26% of patients. The immediate appendectomy group was more likely to have a complication when compared to the interval appendectomy group (38.6% vs. 16.1%. p=0.01). Escherichia coli was noted to be the most common gram negative organism isolated from abscess fluid cultures.
Conclusions: Complication rates in this study were higher in patients who had an appendectomy done at initial presentation for appendiceal abscess. Interval appendectomy should be considered in this patient population.

P075

Diagnostic and Prognostic Value of Circulating Tumor DNA in Gastric Cancer: A Meta-analysis

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Background: Circulating tumor DNA (ctDNA) has offered a minimally invasive approach for detection and measurement of gastric cancer (GC). However, its diagnostic and prognostic value in GC still remains unclear.
Methods: We searched Pubmed, Embase, Cochrane Library and Web of Science databases for literature published up until June 2016. Diagnostic accuracy variables were pooled by the Meta-Disc software. Engauge Digitizer and Stata software were applied for prognostic data extraction and analysis.
Results: A total of 15 studies comprising 1277 GC patients met our inclusion criteria. The pooled sensitivity and specificity were 0.58 (95% confidence intervals (CI) 0.55–0.61) and 0.94 (95%CI 0.92–0.96), respectively. The AUSROC (area under SROC) curve was 0.91 (95%CI 0.85–0.97). Moreover, there was also a statistically significant association between the presence of ctDNA and worse overall survival (HR 1.56, 95%CI 1.10–2.20, p=0.012), as well as disease-free survival (HR 6.221, 95%CI 2.486–15.567, p=0.000).
Conclusions: Our meta-analysis indicates the detection of ctDNA is significantly associated with poor prognosis of GC patients, with high specificity and relatively moderate sensitivity.

P076

Hydrogels and Fistulas: A Promising Liaison

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Motivation: Acute and chronic gastrointestinal (GI) fistula remain a challenging problem for both surgeons and gastroenterologists. Despite recent progress in interventional endoscopy GI fistula healing rate is still insufficient especially for complex fistula or large anastomotic leaks resulting in high morbidity and mortality. To date endoscopic sealant, alone or in combination with mechanical closure such as clips and SEMS have been evaluated with inconsistent success. This preliminary feasibility study aims to demonstrate the use of hydrogels (H) for fistula closure.
Background: Hydrogels are 3D water-swollen polymer networks that investigated for many biomedical applications, thanks to their similarities to native tissues. However, the successful medical use is still limited by the difficulties of injection. To overcome this problem, we optimized the synthesis of injectable polyamidoamines-based hydrogels, modified with catechol-containing moieties to improve their mucoadhesive properties. These hydrogels were selected for their proven biocompatibility and minimal response from the body's immune system.
Methods: To investigate the injectability and in vivo spontaneous formation, we prepared a set of pre-H solutions, by mixing the precursors at room temperature (RT). Hydrogels networks were formed via Michael polyaddition of a nucleophile (amine) to an α,β-unsaturated carbonyl, such as N,N'-methylene bisacrylamide.
The pre-H solutions proved to have sufficiently low viscosity for extrusion through a 25G hypodermic needle, without blocking the needle.
To study the gelation kinetic of the synthetized hydrogels, the pre-H solutions were injected into fistula models (FM) made of porcine intestine, in ex vivo and in vivo tissue settings. Intraluminal and submucosal injection were tried. FM, when ex vivo specimen were used, were kept at 37°C.
Results: The injectability of these materials enabled an effective space filling of FM, through molding of hydrogels shapes in situ by the neighboring tissue. 10 min post-injection complete gelation and adhesion to the mucosa were observed in six of the eight different tested samples (i.e. as expected hydrogels with lower cross-link degree did not show a complete gelation in the study conditions).
Conclusions: Here we show a spontaneous hydrogels network formation in physiological conditions, most likely favored by temperature increase. Strong adhesion to tissue mucosa was also detected. Such preliminary results suggest that optimized pre-H solutions can easily be injected and undergo gelation within short time in physiological conditions.
Overall, the proposed hydrogel proved to have great potential for fistula treatment.

P077

The Systemic Effect and the Absorption Rate of Aerosolized Intra-peritoneal Heparin with or without Hyaluronic Acid in the Prevention of Postoperative Abdominal Adhesion

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Introduction: Adhesions are a cause of morbidity following surgery. Multiple approaches have been evaluated to minimize them. Aerosolized heparin and hyaluronic acid is an effective method to prevent adhesions whether they were used independently or in synergism. However, the absorption rate of aerosolized intraperitoneal heparin alone or mixed with hyaluronic acid and its systemic effect never been evaluated. The aim was to evaluate the systemic effect and the absorption rate of heparin with or without hyaluronic acid in the prevention of abdominal adhesion.
Material and Methods: A randomized-controlled study was conducted comparing thirty rats divided into 3 groups. First group (n=10) received aerosolized intra-peritoneal heparin (IPH). Second group (n=10) received intra-peritoneal heparin mixed with hyaluronic acid (IPHHA). Intravenous heparin (IVH) was given to the third group (n=10) (Positive control). Serum heparin levels for each animal were measured and compared between the groups over at 30, 60, 90, and120 minute's period.
Results: None of the rats had intra-operative bleeding. Serum heparin in the aerosolized groups (IPH & IPHHA) were significantly lower than the control group (IVH) at all points of measurements with IPHHA showing the lowest absorption compared to IPH & IVH ($p < 0.0001$). The serum level of heparin of all groups peaked at 90 min. Area-under-the-curve 0-120 was significantly lower in the IPHHA group as compared to both IPH and IVH ($p < 0.0001$).
Conclusion: The aerosolized intra-peritoneal heparin alone or in combination with hyaluronic acid resulted in minimal systemic absorption rendering it safe for the use as method to prevent adhesions. Human studies are planed.

P078

Long Non-coding RNA AFAP1-AS1 Promotes the Proliferation, Migration and Invasion of Gastric Cancer Cells and is Associated with Patients' Poor Survival

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Background: Gastric cancer (GC) is the second leading cause of cancer-related death wordwide. AFAP1-AS1, a long noncoding RNA (lncRNA), is believed to promote an aggressive progress in cancer, but its role in gastric cancer remains largely unkonwn.
Method: The expression of AFAP1-AS1 in GC tissues and cell lines was measured via quantitative reverse-transcriptase polymerase chain reaction (qRT-PCR). The knock-down of AFAP1-AS1 was performed using a lentivirus vector. The proliferation of GC cells was measured by using CCK8 reagent. The migration and invasion of GC cells were analyzed via trans-well assays, respectively. The cut-off value of the expression of AFAP1-AS1 was evaluated by using receiver operating characteristics curve (ROC), and Kaplan-Meier was used to analyze the patients' survial.
Results: We found that the expression of AFAP1-AS1 was significantly increased in the primary tumor tissues of GC patients with lymphnode metastasis or tumor node metastasis (TNM) stage (III or IV). The analysis of ROC curve revealed that the expression of AFAP-AS1 with the cut-off value of 0.5040 could distinguished the GC tissues from the matched normal tissues, with the AUC of 0.8802, sensitivity of 81.25% and the specificity of 83.75%. The overexpression of AFAP1-AS1 was positively correlated with the poor survival rates of GC patients. Furthermore, the down-regulation of AFAP1-AS1 significantly inhibited proliferation, migration and invasion of GC cells in vitro.
Conclusion: Our study demonstrated that the expression signature of AFAP1-AS1 may serve as a biomarker for the diagnosis and prognosis of GC, and its overexpression can promote the aggressive progression of GC.

P079

Gram-Negative Bacterial Infection Enhances the Potential of Gastric Adenocarcinoma Peritoneal Metastasis via TNFR1 Dependent Manner

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Adenocarcinoma of the proximal stomach is the fastest rising malignancy in North America, and is associated with a high rate of recurrence to the peritoneum. As part of cancer treatment, the majority of patients undergo at least one invasive surgical procedure. Recent clinical data has linked postoperative infection complications with adverse oncologic outcomes; however, the underlying mechanisms are unclear. Emerging evidence suggests that the release of TNFa, a key inflammatory cytokine during infection facilitates cancer progression. The role and mechanisms the gram-negative bacterial infections play in facilitating the metastatic potential of gastric cancer to the peritoneum is entirely unknown. We hypothesized that incubation of gastric cancer cells and MC with heat-inactivated E. Coli or LPS can augment gastric cancer cell adhesion and invasion via TNFR1 signaling and increase the potential of peritoneal metastasis. Incubation of human gastric cancer cells or/and MC with heat inactivated E. coli, LPS or TNFa significantly increased in vitro adhesion 3–4 folds to MC and enhanced in vitro invasion. These enhanced cell adhesion and invasion phenotypes following incubation with LPS or E. coli were attenuated at three levels: inhibition of TLR4 (Eritoran), inhibition of TNFR1 (anti-TNFR1/isotype control antibodies) or p38 MAPK inhibitor (BIRB0796). TNFa treatment also increases CD54, CD44 and CD29 expression on cancer cells and MC. To further validate in vitro results, a novel ex-vivo murine peritoneal metastasis model is developed. We report that ex vivo gastric cancer cells adhesion to murine peritoneum is augmented by overnight LPS, E.Coli and TNFa treatments and this effect was abrogated when TNFR1-/- mouse peritoneum is used or in the presence of TNFR1 monoclonal or isotype control antibodies. These findings implicate TNFa in the process of gastric cancer metastasis to peritoneum in the context of systemic infection and identify TNFa as potential therapeutic targets.

P080

Fundamental Principles of Ancient Indian Surgery with a Special Emphasis on Plastic Surgery: A Review of Susrutha Samhita (800 BC)

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Susrutha (800 BC) is a legendary scholar of Indian surgical science and founding father of ancient surgery. 2600 years ago, Susrutha together with his colleagues had conducted a variety of complex surgeries such as caesareans, artificial limbs, cataract, urinary stones, fractures and most specially the plastic surgery. This treatise was later named as the Susrutha samhita, a well known ancient surgical sciences of India. His great findings have been an essential component of Indian culture.
The father of Susrutha samhita was the first person who had classified the surgical operations and explained the plastic surgery as well as its tools in his book of 120 chapters in 5 parts. He had described around 8 special operations for surgery, such as cutting, piercing, opening, scratching, inserting and stitching. He had excelled as both the practitioner and the teacher of surgery. His contribution towards the Indian traditional medicine in the ancient cultural heritage of India will always be precious. Susrutha samhita is the key reference book for all the Ayurvedic surgeons in India.
The Susrutha samhita has 2 parts, first one is known as Purva tantra(have 5 sections) and second one is known as Uttara tantra. These two parts together cover all other specialities such as the Medicine, Geriatrics, Paediatrics, E.N.T. & Ophthalmology, Aphrodisiacs, Toxicology and Psychiatry. Hence, the Susrutha samhita is an encyclopaedia of the medical learning for doctors with special importance on the Shalya (General surgery) and Shalakya (E.N.T. & Ophthalmology). He had described all the basic principles of plastic surgery by offering a set of preoperative procedures. The technique of the release of the skin in order to cover all the small defects, rotation of the flaps to heal the partial loss and the pedicle flaps to cover the entire loss of the skin from an area are well described by him. He has given various other methods together with the rotation graft, sliding graft, pedicle graft, rhinoplasty, labioplasty and others in his treatise. Thus, Susrutha is considered as the "Father of plastic surgery".
An attempt in this paper was made to elaborate of his teachings on anatomy, pathophysiology and therapeutic strategies were mentioned, especially considering the unparalleled surgical procedures of nasal reconstruction, rhinoplasty, labioplasty and others, which are still creative and upholds the basic fundamental principles of plastic surgery, which are proven documents of truth even today.

P081

Should Electrocautery be Used for Hemostasis of Sleeve Gastrectomy Staple Line or Not? This Study Concerns Histological Alteration of a Gastric Wall After Electrocauterization on Staple Line

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Introduction: Sleeve gastrectomy has become more popular in a surgical procedure to treat patients with morbid obesity. An essential part of the procedure is the hemostasis on the staple line. Electrocautery must be applied to staple line precisely. It is still a controversial issue whether postoperative leakage around the staple line would occur.
Method and Procedures: After sleeve gastrectomy was performed, the divided part of the stomach, which was used as a surgical specimen, was studied. Three specimens from three different patients were used in the study. Different spots on the staple line of each specimen were electrocauterized by a monopolar hook in a different period of time: spot cautery, one second, two seconds, three seconds, four seconds and five seconds. A systematic study was conducted; each electrocauterized spot on the staple line was studied in 3 dimensions: two lateral sides, two longitudinal sides and in-depth thermal injury to evaluate tissue injury on the staple line.
Results: Eighty-five pieces of tissue, five on each of seventeen slides, were studied macroscopically and microscopically. Macroscopically, the tissue injury did not exceed the staple line. Microscopically, submucosa, intramuscular hemorrhage and cellular swelling were found in both electrocauterized and non-electrocauterized areas; nevertheless, neither cell death nor structural change was found.
Conclusions: Precisely and carefully performed electrocautery on sleeve gastrectomy staple line is effective for hemostasis and as it has been proved to be safe in this histological study.

P083

Inflammatory Mediators and Signalling Cascades in Pathophysiology of Obesity Induced Insulin Resistance

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Introduction: Adipocyte induced pro-inflammatory cytokines and chemokines activates pathogenic inflammatory cells receptors and stimulates inflammatory signalling pathways that result in obesity induced insulin resistance. However, exact role of cell surface receptors and intracellular targets in inducing insulin resistance is unknown.
Methods and Procedures: We examined the mRNA expression by RT-PCR and protein expression by immunofluorescence for inflammatory mediators and receptors (TREM-1, TREM-2, DAP-12, HMGB-1, RAGE, TLRs) and total and phosphorylated intracellular signalling targets (p65 NFκB, IκB-α, JNK-1, PKCs and IRS-1) in omentum, subcutaneous and liver biopsy of obese diabetic (n=22) and non-diabetic subjects (n=24) and compared with non-obese non-diabetic controls (n=5).
Results: Obese diabetics showed significantly ($P<0.05$) increased expression levels of inflammatory cell receptors (TREM-1, DAP-12, HMGB-1, RAGE, TLR-4, TLR-2) and inflammatory signalling pathways (NFκB p65, p- NFκB p65, p-IκB-α, JNK-1, p-JNK-1, p-sIRS1, PKC-θ, δ and ε) in omentum, subcutaneous and liver biopsy tissues compared to obese non-diabetics. We also found a significant ($P<0.05$) decrease in TREM-2, IκB-α, IRS-1 and p-yIRS1 expression in obese diabetic subjects compared to obese non-diabetics (Table).
Conclusions: Obese diabetic patients had significantly increased levels of inflammatory receptors and inflammatory signalling cascades compared to obese non-diabetics and non-obese subjects. The cell surface targets like TREM-1 and TLRs can be a potential targets for developing therapeutic strategies to prevent insulin resistance.
Table. Expression of inflammatory cell receptors and inflammatory signalling pathways in obese non-diabetics (OND; N=24) and obese diabetics (OD; N=22) compared to non-obese subjects.

Target genes	Omentum			Subcutaneous			Liver		
	OND n(%)	OD n(%)	R; P value	OND n(%)	OD (%)	R; P value	OND n(%)	OD n(%)	R; P value
TREM1	22; 91.7%	22; 100%	NS	13; 54.2%	17; 77.3%	NS	12; 50%	22; 100%	R=0.569 P<0.0001
TLR4	23; 95.8%	22; 100%	NS	13; 54.2%	17; 77.3%	NS	7; 29.2%	22; 100%	R=0.733; p<0.0001
NFkB p65	22; 91.7%	22; 100%	NS	13; 54.2%	17; 77.3%	NS	12; 50%	22; 100%	R=0.569 P<0.0001
JNK	23; 95.8%	22; 100%	NS	13; 54.2%	17; 77.3%	NS	12; 50%	22; 100%	R=0.569 P<0.0001

P084

Anatomic Feasibility of Percutaneous or Endoscopic Cholecysto-Enteric Fistula Creation and Stent Insertion in Acute Cholecystitis

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Introduction: Lumen-apposing self-expandable cholecysto-enteric stents (LOSES) are increasingly placed as an alternative to cholecystectomy in high risk patients. The purpose of this study was to assess the prevalence of patients whose anatomy would allow either percutaneous or endoscopic ultrasound (EUS) guided stent insertion from a population of patients with acute cholecystitis.
Methods and Procedures: Contrast enhanced axial and coronal abdominal CT images in 100 consecutive patients with a diagnosis of acute cholecystitis were retrospectively reviewed. A determination of the feasibility of placing a LOSES via a percutaneous puncture or endoscopically with EUS guidance was made by the presence of a clear trajectory in any CT plane between the gallbladder and the gastric antrum or proximal duodenum measuring≤2 cm and free of intervening structures.
Results: The gallbladder was within 2 cm of the gastrointestinal (GI) tract without intervening structures in 95 of 100 patients (95%). Percutaneous LOSES was anatomically feasible in 90 of 100 patients (90%), 79 (87.8%) of which were feasible in both axial and coronal CT planes. Of the feasible cases, four (4.4%) were feasible in the coronal plane only. Mean shortest inner-inner wall distance between the gallbladder and the adjacent proximal GI tract was 1.20 ± 0.43 cm. The closest location for LOSES was between the gallbladder and duodenum in 87 of feasible cases (97%). The percutaneous approach was transhepatic in 89.5%, and extrahepatic in 10.5%. EUS guided LOSES appeared feasible in 95 of the 100 patients including 5 of the 10 percutaneously unfeasible cases. The other 5 patients appeared unfeasible endoscopically or percutaneously due to colonic interposition or large gaps of intervening fat.
Conclusion: LOSES is anatomically feasible percutaneously or by EUS in 90% and 95% of acute cholecystitis patients, respectively. Percutaneous LOSES may potentially represent an attractive replacement to external cholecystostomy tube drainage or as an alternative option to endoscopic placement.

P085

Pattern and Out Comes of Cholecystectomy in the First Three Years of Introduction of Laparascopic Cholecystectomy in Saint Paul Hospital Millenium Medical Collage, Addis Ababa, Ethiopia

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Introduction: This study is aimed to determine the pattern of cholecystectomy and to compare open and laparoscopic cholecystectomy in terms of operation time, post op hospital stay, morbidity and mortality in St. Paul Hospital Millennium Medical Collage, Addis Ababa. Unlike most of the western countries, laparoscopic cholecystectomy is only recently introduced and being practiced in few health institutions in Ethiopia. Data regarding the safety and outcome of this procedure in comparison to the routine open cholecystectomy is lacking in this set up.
Methods and Procedures: A comparative retrospective cross sectional study was conducted by reviewing medical records of patients who have undergone cholecystectomy in the first three years of introduction of laparoscopic cholecystectomy for gallstone disease in St. Paul Hospital Millennium Medical Collage. The association among the different variables was analyzed using an independent-samples T- test and comparison of proportions, considering a confidence interval of 95%, a P value <0.05 was considered significant.
Results: A total of 471 cholecystectomies were performed in the study period. The proportion of cholecystectomies which were done laparoscopically increased through the study period from15.6 to 41.9%. Based on independent-samples t-test, there was no significant difference between the operation time of the two groups ($t=1.849$, $P=0.066$). However the difference between the post op hospital stay was found to be significant ($t=4.615$, $P=0.000$). The morbidity and mortality rates of the two groups was analyzed by comparison of their proportions and it revealed no significant difference ($\alpha=0.012$ and $\alpha=0.0042$ respectively) (Table 1).
Conclusion: Based on the results of this study it can be concluded that laparoscopic cholecystectomy is a safe and effective procedure. Hence, it should be considered as the gold standard procedure for gall stone disease in the Ethiopian set up too.

Table 1 Outcomes of open and laparoscopic cholecystectomy

Outcome measure	Open cholecystectomy	Laparascopic cholecystectomy
Mean operation time	52.96 min	57.59 min
Mean post op hospital stay	3.42 days	2.45 days
Morbidity	1.57%	0
Mortality	1.25%	0.65%
Conversion		2.6%

P086

Gallstones and Reflux Disease: More Frequently Associated Than We Thought?

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Background: There have been surprisingly few studies assessing the relationship between gastroesophageal reflux and biliary disease, considering they overlap presenting symptoms and risk factors, particularly obesity. Published results to date have been conflicting. The goal of our study is to document the association of biliary disease in our reflux patient population and review the literature to discuss whether this should influence the pre-operative workup algorithm for patients being evaluated for anti-reflux surgery to include routine evaluation of cholelithiasis.
Methods: We performed a retrospective review of 30 patients that underwent laparoscopic fundoplications for reflux disease from June 2015 to August 2016. Surgery performed was either a Toupet or Nissen fundoplication (LF), and all were performed laparoscopically by a single surgeon. The need for concurrent cholecystecomy or previous cholecystectomy, history of Barrett's esophagus, history of PPI use, and demographic data were evaluated. All patients had imaging to evaluate for biliary disease.
Results: Of the 30 patients that underwent antireflux surgery, eight already had previous remote cholecystectomy for gallbladder disease. Of the 23 remaining patients, 10 underwent either concomitant or recent cholecystectomy for biliary symptoms. Half of patients undergoing concomitant cholecystectomy for biliary symptoms had a history of Barrett's esophagus, as did 62% of patients who had already undergone cholecystectomy. 3 of the 11 patients who underwent LF without cholecystectomy had documented BE. All patients who underwent cholecystectomy at any point were women.
Conclusions: The prevalence of gallbladder disease in our severe reflux population (62%) is much higher compared to that found in the general population, generally cited as 10–20% of Americans. Our patients with gallbladder disease also tended to be in patients with BE, and therefore more chronic and severe gastroesophageal reflux. There is overlap in symptomatology between the two disease processes and a question remains if there is a relationship in their development. Possible explanations are described in the literature that links gallbladder dysmotility to both BE and PPI use. When evaluating a patient for surgical management of gastroesophageal reflux disease, attention should also be paid to questions regarding gallbladder symptoms. It may be also beneficial to include gallbladder ultrasound to the pre-operative workup for reflux so concomitant cholecystectomy can be performed. This is data from patients undergoing surgery in the last 13 months with charts readily available in our office. We have 5–7 years of additional charts that we will review in order to improve the generalizability of our study.

P087

Cholecystectomies: A Comparison of the Acute Care Versus Non-acute Care Surgery Experience

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Introduction: The acute care surgery (ACS) model is a relatively new concept implemented in surgical departments to provide care to patients with urgent surgical needs. The objective of this study was to investigate the outcomes of those undergoing cholecystectomy by acute care surgeons compared to those performed by non-ACS general surgeons.
Methods: An IRB-approved, retrospective review was conducted of all non-cancer patients who underwent cholecystectomy between July 2012 and June 2015 in an academic health system. Data collected included service, demographics and history, operative details, post-operative complications, and costs. Data are presented as incidence (%) or mean $\pm$ SD, and a p-value of <0.05 was considered statistically significant.
Results: 2001 patients underwent cholecystectomy during the three-year time period. ACS performed 516 cholecystectomies, and 1485 were performed by non-ACS general surgeons. The two groups were similar in age, BMI, and history of previous laparotomy. Females comprised 53.9% of the ACS patients, but 72.6% of the non-ACS patients. The pre-operative diagnoses included more acute cholecystitis (41.2% vs. 12.1%; $p<0.01$), gallstone pancreatitis (11.37% vs. 4.66%; $p<0.01$) and choledocholithiasis (10.58% vs 4.78%; $p<0.01$) in the ACS group compared to the non-ACS group, respectively. There was a greater proportion of cases performed open (9.5% vs. 5.3%) or converted to open (14.3% vs 2.4%) for the ACS group, and longer operative times (1.79 h vs. 1.27 h; $p<0.001$). The rate of post-operative complications was 13.2% in the ACS group and 4.9% in the non-ACS group, including bile leaks (2.28% vs. 0.60%; $p<0.001$), common bile duct injuries (0.57% vs. 0.40%; $p=0.60$) and bleeding (3.41% vs. 0.74%; $p<0.001$) for ACS compared to non-ACS operations, respectively. Post-operative length of stay was 3.9 ± 5.8 days for the ACS group compared to 1.4 ± 3.7 days for the non-ACS group. Total charges for the index hospitalization was \$79,369 $\pm$ \$125,848 for the ACS group compared to \$40,866 $\pm$ \$64,011 for the non-ACS group ($p<0.0001$).
Conclusions: The acute care surgery model was adopted to meet a need for in-house emergency general surgery procedures. This study demonstrates that in the setting of cholecystectomy, compared to other general surgeons in a large academic health system, ACS performs a greater percentage of non-elective cases for acute gallbladder problems with a higher complication rate, longer operative times, longer length of stay, and at a greater cost, perhaps due to the higher acuity of patients and the gallbladder diseases encountered.

P088

Laparoscopic Resection of Solid Pseudopapillary Tumour of the Pancreas: A Case Series of 19 Consecutive Patients from a Tertiary Care Institute

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Background: Solid pseudopapillary tumour (SPT) of the pancreas, which predominantly affects young women, is a relatively indolent entity with favourable prognosis. The aim of this study is to describe laparoscopic surgical management of this rare disease in our institution.
Method: A retrospective study of clinical data from 19 consecutive patients with SPT managed in a tertiary academic centre between March 2009 and October 2015 was performed.
Result: The 19 cases included 17 female and 2 male patients, and the average age was 26.1 years (range 11 to 41). The most common presenting symptom was abdominal pain (10 patients). Tumors were incidentally found in 3 patients on computed tomography scans obtained for other reasons. One patient was diagnosed during an evaluation of trivial blunt trauma abdomen. Radiological pre operative diagnosis was confirmed in 13 patients while one patient had preoperative biopsy confirmation.. The neoplasm was localized in the pancreatic head/neck in 6 patients and in the body/tail in 13 patients.
The median diameter of these lesions was 7.5 cm (range 2 to 13). 4 patients underwent pancreaticoduodenectomy, 12 patients underwent distal pancreatectomy, 2 patients underwent central pancreatectomy and one enucleation, all were performed successfully by laparoscopy. One distal pancreatectomy procedure was converted to open for superior mesenteric vein reconstruction & 4 have undergone peripancreatic lymphadenectomy. Splenic artery involvement was seen in 5 patients. Median length of stay was 6.5 days (5–28 days).
Conclusion: SPT is a rare neoplasm with low malignant potential and has an excellent prognosis. In our experience, laparoscopic surgical resection is safe and feasible in SPT of pancreas.

P089

Outcomes of Laparoscopic-Assisted ERCP After Roux-En-Y Gastric Bypass: Safe and Effective for Management of Sphincter of Oddi Dysfunction

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Introduction: Biliary access following Roux-en-Y gastric bypass (RYGB) anatomy presents a significant challenge. Long term outcomes of Laparoscopic assisted trans-gastric ERCP (LAERCP) including Sphincter of Oddi Dysfunction (SOD) subtypes have not been examined. Our study aims to present our outcomes of trans-gastric LAERCP and examine a significant subgroup of patients with SOD after RYGB.
Methods and Procedures: A retrospective review of RYGB patients who underwent LAERCP between 2009 and 2016 identified 51 patients. A subgroup of 21 patients with SOD were examined and contacted by phone survey to determine long term symptom resolution.
Results: Post-procedure length of stay was 1.9 days (sd 3.0). Indications included choledocholithiasis (n=24), SOD (n=21) bile duct stricture (n=3), bile leak (n=1), recurrent pancreatitis (n=1), and diagnostic (n=1). There was one conversion from laparoscopic to open procedure. Selective cannulation rate was 100%. During a 14.6-month mean follow-up, there were 2 major operative complications (dislodged gastrostomy tube and transfusion) and 2 major ERCP related complications (repeat ERCP for hemobilia and a kinked stent). There were 5 (9.8%) wound infections. There were no deaths related to the intervention and no clinically significant pancreatitis. Within the SOD subgroup, 17 patients had biliary SOD (Type I=9, Type II=8). The remaining 4 had pancreatic SOD (Type I=1, Type II=3). SOD sub-group follow up was 21.4 months (SD 18.1). All patients with pancreatic SOD and Type I biliary SOD reported complete resolution of their symptoms.
Conclusions: Consistent with other published series, LAERCP appears to yield excellent cannulation rates after RYGB. The successful treatment of pancreatic and Type 1 biliary SOD suggests that there is significant benefit to treating this patient population with acceptable risks.

Sphincter of Oddi Dysfunction Outcomes

	n=21	Symptom Resolution	
		Complete	No Change
Biliary SOD	17 (81%)	12 (70.6%)	5 (29.4%)
Type 1	9 (43%)	9 (100%)	0
Type 2	8 (38%)	3 (37.5%)	5 (62.5%)
Pancreatic SOD	4 (19%)	4 (100%)	0
Type 1	1 (5%)	1 (100%)	0
Type 2	3 (14%)	3 (100%)	0

P090

When to Operate on Gallbladder Polyps in Chinese-Americans

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Background: The current teaching is that gallbladder polyps greater than 1 cm need to be resected via cholecystectomy. Many of these polypoid lesions are benign on final pathology and the benefit of the patient undergoing surgery is unclear.
The literature suggests that 6.9–15.8% of Chinese patients will have gallbladder polyps, with a predilection towards males and those with positive hepatitis B surface antigen (Lin et al., 2008). Of 40 patients studied by Zhang in 1991, 23 (57.5%) had cholesterol polyps, 5 (12.5%) inflammatory polyps, and 4 (10%) had adenocarcinomas (Zhang, 1991). However, these studies were done in China in the 1990s, and no recent study of the Chinese-American population exists.
Methods: This is a retrospective chart review designed to study the rate of gallbladder neoplasms in a 3-surgeon practice based in downtown Manhattan. Using our office electronic medical records, we searched for cases with the CPT code for laparoscopic or open cholecystectomy (47562, 47563). We then searched for patients with the ICD-9/ICD-10 code for gallbladder polyp (575.6, K82.1). These cases were entered into an Excel database and the results were studied with SPSS statistical software.
Results: There were a total of 185 cholecystectomies performed by our practice between 2012–2016. 176 were laparoscopic cholecystectomies and 9 were open or lap-converted-to-open cases. Of these, 33.5% (62/185) were performed for gallbladder polyps. Only 1 case (1.6%) was found to have adenocarcinoma on final pathology. Combining adenoma/adenocarcinoma, the incidence of neoplasm is 12.9% (8/62). The remainder had cholesterol polyps or chronic cholecystitis.
All the patients were Chinese. 59.7% were male. The mean age of the cohort was 50.5 years. The average BMI was 23.9. 19.4% were smokers. The polyp size on ultrasound ranged from 4 to 26mm, with the highest proportion (27.4%) being 10 mm. 12 patients were hepatitis B positive (19.4%); the majority did not have hepatitis.
The risk of having adenomatous disease was 24.9% for a male patient (OR 8.76, p=0.04) greater than 50 years old with a>16 mm polyp on initial ultrasound. The risk of the same patient having invasive adenocarcinoma was 0.02%. Overall, age>61, BMI>25 and size of polyp on imaging>20 mm was more predictive of invasive adenocarcinoma.
Conclusion: We propose a risk stratification system based on age, gender, BMI, polyp size and smoking status to determine whether a patient should undergo cholecystectomy for gallbladder polyps.

P091

Clipless Laparoscopic Cholecystectomy: Usefulness of Clinch Knot

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Introduction: Laparoscopic cholecystectomy is the gold standard operation for cholecystitis. It is an introductory operation of laparoscopic surgery. We typically use clips to divide the cystic duct. But sometimes it is difficult to clip because of severe inflammation. Cystic duct becomes hard and thick. We may use the linear stapler to divided cystic duct in these cases. Operative cost is to be expensive. On the other hand, to ligate the cystic duct intracorporeally is difficult. In this time, we used the Clinch knot that is one of slipknot techniques. To use this technique become easier to ligate cystic duct tightly.
Methods and Procedures: From October, 2014 to August, 2016, we performed 26 cases of clipless laparoscopic cholecystectomy for cholecystitis. Gender ratio was 12 females and 14 males. Mean age was 60.2 year old. All cases used three ports method or single incision. We performed so called dome-down technique. First we dissected gallbladder bed. Cystic artery was divided by ultrasonic cutting device. Finally cystic duct was ligated three times, and divided.
Results: Mean operative time was 104 min. Mean blood loss was 7 g. The postoperative hospitalization was 6.6 days. There was no complication due to cystic duct ligation. No case had bile leakage from cystic duct. One case was converted to open surgery because of bile duct injury. No other complication was observed.
Conclusion: Clipless laparoscopic cholecystectomy is feasible and safe. And this operation is economically. Clinch knot technique is easier to ligate the cystic duct tightly.

P092

Evaluation and Comparison of Gastrointestinal Quality of Life Following Laparoscopic Cholecystectomy

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Introduction: Laparoscopic cholecystectomy has shown an evolutionary improvement in quality of life. The study was aimed to objectively assess the same using a preliminary questionnaire focussed on physical and psychological status of the patient pre and post cholecystectomy.
Material and Methods: A prospective study was conducted on 100 patients admitted in Department of Surgery, Government Medical College and Hospital,
Patiala with symptomatic gall bladder stones. All the cases were performed by experienced laparoscopic surgeons. The patients were evaluated as per the GIQLI proforma which includes 36 questions in which for every question 0 (point) was taken as least desirable, 4 (point) was taken as most desirable and final score was calculated and analyzed statistically.
Results and Conclusions: 82% of patients in the study were females with maximum incidence in the age group of 31–50 years. The results were analyzed using wilcoxon test. There was noted a highly significant improvement in certain symptoms and significant deterioration in very few symptoms with improvement in overall score. Overall mean score for gastrointestinal quality of life before laparoscopic cholecystectomy was 102.95+/-2.73 which improved with highly significant increase in score post cholecystectomy to 119.46+/-2.15 at 2nd week and 135.61+/-1.65 at 4th week.
Our study has shown a simplistic approach to quantify the daily based distress associated with gastrointestinal symptoms and thus can serve as a standardized tool in order to compare the efficacy of various medical and surgical treatment options.

P093

Gauze Sign: A New Technique in Difficult Laparoscopic Cholecystectomy Cases

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Laparoscopic cholecystectomy has replaced open cholecystectomy as the standard of care for benign diseases of the gallbladder. Through the years, the contraindications of laparoscopic cholecystectomy have narrowed down, subsequently increasing the exposure of the laparoscopic surgeon to difficult cholecystectomy cases. This correlates to the increase in the number of biliary injuries. The study offers a new technique to avoid such complications using the gauze as a marker for the dissection at the most important area – the triangle of Calot. The use of gauze greatly aided in the development of the Critical View of Safety, an important step in laparoscopic cholecystectomy.

P094

Outcomes of Laparoscopic-Assisted ERCP After Roux-En-Y Gastric Bypass: Safe and Effective for Management of Sphincter of Oddi Dysfunction

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Introduction: Roux-en-Y gastric bypass (RYGB) anatomy presents a challenge should access to the biliary tree be required. In 2014 Grimes reported a series of 42 LAERCP patients, 36 of which were for suspected Sphincter of Oddi dysfunction (SOD). However, outcomes of this treatment for SOD with attention to SOD type and long term outcomes in the RYGB population have not been examined. Our study aims to present our outcomes of trans-gastric LAERCP and examine a significant subgroup of patients with SOD after RYGB.
Methods and Procedures: Retrospective review of RYGB patients who underwent LAERCP between 5/2009 and 8/2016. Fifty-one patients were identified and records reviewed for preoperative characteristics, perioperative and long term outcomes. A subgroup of 21 patients with SOD was examined and contacted by phone survey to determine long term symptom resolution.
Results: Fifty-one patients underwent LAERCPs. Post-procedure length of stay was 1.9 days (sd 3.0). Indications included choledocholithiasis (n=24), SOD (n=21) bile duct stricture (n=3), bile leak (n=1), recurrent pancreatitis (n=1), and diagnostic (n=1). There was one conversion from laparoscopic to open procedure. Selective cannulation rate was 100%. During a 14.6-month mean follow-up, there were 2 major complications. One patient required reoperation for a dislodged gastrostomy tube and one required blood transfusion. Two patients required repeat ERCP for hemobilia and a kinked bile duct stent. There were 5 (9.8%) wound infections, 1 of these required radiologic drainage. There were no deaths related to the intervention and no clinically significant episodes of pancreatitis. Within the SOD subgroup, 17 patients had biliary SOD (Type I=9, Type II=8). The remaining 4 had pancreatic SOD (Type I=1, Type II=3). SOD sub-group follow up was 21.4 months (SD 18.1). All patients with pancreatic SOD and Type I biliary SOD reported complete resolution of their symptoms, whereas only 5/8 (37.5%) of patients with Type II biliary SOD reported resolution of symptoms.
Conclusions: Consistent with other published series, LAERCP appears to yield excellent cannulation rate after RYGB. The successful treatment rate for biliary Type 1 SOD and pancreatic Type 1 and 2 SOD suggests that there is significant benefit to treating this patient population with an acceptable risk profile.

P095

Biliary Dyskinesia: A Myth or a Real Disease Entity One Surgeon's Experience in Mid Ohio Valley

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Increasingly, more patients with gallbladder and biliary dyskinesia are being recognized in United States. Although improved technology may be responsible for this increase, it is questionable whether this alone maybe responsible for the surge in the diagnosis.
Biliary dyskinesia is a diagnosis of exclusion, and the symptoms associated with functional gallbladder disorder may mimic symptoms seen in patients with various disorders, including peptic ulcer disease, ischemic heart disease, and functional dyspepsia.
This study aims at reviewing one surgeon's experience with this complex disease entity.
Methods: Between April 2014 and June 2016, all patients with right upper quadrant pain that occurs for at least 30 min at variable intervals in the absence of gallstones or other structural abnormalities and sufficient to warrant emergent room visit. Importantly, the patient's pain is not significantly relieved by bowel movements, acid suppression or postural changes. All patients had normal liver enzymes, conjugated bilirubin and lipase/amylase.
To qualify CCK-stimulated cholescintigraphy is used to estimate the gallbladder ejection fraction (GBEF).
In preparation, following an overnight fast, 99mTc-diisopropyl-iminodiacetic acid (DIS-IDA) or 99mTc-hepatic iminodiacetic acid (HIDA) is given as an intravenous bolus. After 45 to 90 min, baseline radioactivity from the region of the gallbladder is measured. When the radioactivity is maximal from the gallbladder and is minimal from the liver, a slow infusion of CCK is started to stimulate gallbladder contraction, which leads to expulsion of the radio labeled tracer (Sincalide 0.02mcg/kg given over 30 to 60 min).
A diagnosis of biliary dyskinesia is made if the GBEF was less than 40%
All these patients were offered laparoscopic cholecystectomy. Dataset was collected prospectively.
Results: Ninety-seven patients met the diagnostic criteria. All patients had negative transabdominal ultrasonographic and computed axial tomographic scans as well as upper gastrointestinal endoscopy. All patients were offered laparoscopic cholecystectomy and were followed for 6 months. During postoperative visits, the patients were asked specifically for resolution of their symptoms. Eighty-two patients have complete disease resolution, 10 patients continued to have persistent pain while 4 patients had persistent diarrhea. One patient was lost to follow up after 3 months.
Conclusions: Although more patients are presenting with biliary dyskinesia, some authorities have questioned the validity of such a disease entity; our study has shown that biliary dyskinesia is a true disease that is remediable by surgical intervention.

P096

Single Incision Laparoscopy Surgery (SILS) Cholecystectomy: How Do We Do It, Can It Be Standardized?

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Introduction: The limit of minimally invasive surgery is challenged constantly in todays world. After an era where conventional laparoscopic surgery was a challenge, today we are facing the same challenge with SILS.
Methods and Procedures: After training from Pelican hospital Romania under the guidance of Prof Maghiar I started performing SILS cholecystectomy in our hospital from 2012. We standardized our method in our hospital to make it easier for other colleagues to start practicing SILS, as the demand for SILS is increasing constantly. We use 2 ports through the umbilicus and 3 suspensory sutures.

Step 1: Opening the umbilicus
Step 2: Introducing the optic port
Step 3: Pneumoperitoneum and brief exploratory laparoscopy
Step 4: Introducing 2nd port
Step 5: Introduce a grasping forcep through 2nd port and check the gallbladder and other organs
Step 6: Table position- Anti-Trendelenburg with left tilt
Step 7: 1st suspensory suture- midclavicular line and between last 2 ribs
Step 8: 2nd suture medial clavicular line 10cms above umbilicus
Step 9: 3rd suture lateral clavicular line at umbilical level
Step 10: Visualize the infundibulum
Step 11: Dissect cystic duct and artery
Step 12: Achieve Strasberg critical view of safety
Step 13: Clip duct and artery
Step 14: Dissect Gallbladder from liver while retracting 2nd and 3rd sutures
Step 15: Before finishing the Gallbladder dissection- clean and verify hemostasis
Step 16: Complete Gallbladder dissection
Step 17: Remove Gallbladder
Step 18: Close umbilicus

Conclusion: Standardizing the method has proven it easier to be accepted by surgeons, as well as decreasing conversions to conventional laparoscopy

P097

Teaching Cholangiography in General Surgery Residency: A Five-Year Experience

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Objective: To evaluate the role of routine intraoperative cholangiography in a surgical residency program, and whether level of training correlates with technical proficiency and length of procedure.
Design: We retrospectively reviewed all patients undergoing laparoscopic cholecystectomy with intraoperative cholangiography by surgical residents (PGY 1–5) under the supervision of a single attending surgeon from April 2010 to October 2015. Cholangiogram duration and success rates, patient demographics, resident training level, procedural indications, and operative information were recorded, and factors associated with increased cholangiogram times were compared using ANOVA and X2; a p-value of <0.05 was considered significant.
Setting: Academic-affiliated community-based surgical residency program
Participants: 24 surgical residents, PGY 1–5.
Results: Laparoscopic cholecystectomy with intraoperative cholangiography was performed in 227 patients. The average patient age was 45.5 years; 71.7% were Caucasian and 70.4% were female. Cholangiography was successful in 96% of patients. The average time for cholangiograms performed by residents was 9 min (range, 7–24 min). Minor technical complications related to cholangiograms occurred in 32% of cases, with the most common being difficulty with clipping the catheter (20%). There was a significant decrease in both cholangiogram time and need for attending assistance after the PGY-1 year, even when adjusted for individual residents ($p>0.05$).
Conclusions: The routine use of intraoperative cholangiography in a general surgery teaching program results in increased technical proficiency and decreased operative time after the PGY-1 year, and can be safely performed by residents at every level without adding significant time to the operation.

P098

Do Surgeons Recognize the Critical View of Safety During Laparoscopic Cholecystectomies?: A Pilot Study

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Introduction: Bile duct injury is a rare but serious complication of laparoscopic cholecystectomy. SAGES Safety in Cholecystectomy Task Force recommends obtaining "critical view of safety" (CVS) prior to division of ductal structures. CVS includes 3 components: clearing Calot's triangle from fat and fibrous tissue, separating the lower part of the gallbladder from the liver bed and confirming only 2 structures entering the gallbladder. However, awareness and use of CVS in the community is not known.The purpose of this pilot study was to develop a platform to evaluate knowledge and estimate the degree to which practicing surgeons identify CVS.
Method: We edited 7 laparoscopic cholecystectomy videos demonstrating different parts of dissection and a final view showing either a completed (3 cases) or incompleted CVS (4 cases). Videos were embedded in a survey that included items about the definition of CVS, whether CVS was achieved and whether surgeons would clip ductal structures without further dissection. Surgeons were asked to choose components of CVS from a list of 11 options that included the 3 correct and 8 incorrect components. The survey was sent to attending surgeons performing cholecystectomy in a university hospital network. Survey-link: (https://www.surveymonkey.com/r/BPFWDY6)
Results: The survey was sent to 34 surgeons and 16 responded; 6 (38%) with >15 years of experience. When asked to select components of CVS, 8 (50%) chose only the correct components, 5 (31%) added extra components, and 3 (19%) missed at least one. In the 3 videos where CVS was demonstrated, 75 to 82% (mean77%) correctly agreed CVS was obtained. The remaining felt more separation from the liver bed was required before clipping. In the 4 videos where CVS was not demonstrated, 50 to 87% (mean72%) agreed CVS was not obtained. In 14% of instances the surgeon felt comfortable dividing ductal structures despite correctly recognizing that CVS was not obtained. In these instances, surgeons felt it was safe to clip prior to full dissection of the lower part of gallbladder from the liver bed.
Conclusion: In this platform, only half of surgeons precisely identified the components of CVS but were still able to correctly identify when CVS was obtained in most cases. There was less agreement in cases where CVS was not obtained, largely due to judgment about the adequacy of dissection of the lower part of the gallbladder from the liver. This suggests areas to target for educational interventions to promote safety if confirmed in a larger study.

P099

Laparoscopic Choledochoduodenostomy as a Rescue and Reliable Procedure for Failed ERCP and Complicated Bile Duct Stones

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Background/Rationale: Conventionally, removal of common bile duct stones (CBDS) by endoscopic retrograde cholangiopancreaticography (ERCP) is the standard of care. In failed ERCP due to multiple large CBD calculi or inaccessibility, Laparoscopic common bile duct exploration(LCBDE) is an established option for treating CBDS. The aim is to look at the feasibility of LCBDE and choledochoduodenostomy as a salvage procedure after failed endoscopic bile duct stone extraction, complicated bile duct stones and primary CBD strictures and to examine the short term outcomes of our laparoscopic choledochoduodenostomy series.
Method: We retrospectively reviewed a prospective database, to study the feasibility of LCBDE with choledochoduodenostomy as salvage procedure for failed ERCP and complicated bile duct stones
Result: In our Institution from period of Jan 2013 to October 2015, total number of ERCP done for CBD stones was (n1)=519 out of which failed ERCP account to (n2)=26.
26 patients who failed endoscopic stone extraction due to multiple large CBD calculi(13), recurrent stones(5), lower CBD stricture(4), impacted primary CBD stone(3), periampullary diverticulum(1). These patients underwent LCBDE and choledochoduodenostomy and achieved successful stone clearance. Average operating time was 135 min and average blood loss was 55 ml. Stone clearance was done using direct choledochotomy in 13 patients, Dormia basket was used in 7 patients and balloon extraction was done in 6 patients. Stone clearance was confirmed with either choledochoscope or intraoperative cholangiogram in all patients. One patient developed bile leak which resolved spontaneously. The median length of stay for these 24 patients was five days.
Conclusion: Laparoscopic common bile duct exploration with choledochoduodenostomy has been shown to be safe and effective method for treating complex CBDS with failed ERCP procedures, with added bonus of a short hospital stay and early recovery.

P100

Ambulatory Single Port Laparoscopic Cholecystectomy Using Standard Laparoscopic Instruments

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Background: Single-port Laparoscopic Cholecystectomy (SPL-C) is a new minimally invasive technique, which has been developed to minimize the surgical access trauma, limiting to one incision which is needed for specimen extraction anyway. The aim of this study was to evaluate the feasibility and security of SPL-C in an ambulatory care setting using standard laparoscopic instruments.
Methods: From April 2012 through July 2016, 436 ambulatory single port laparoscopic Cholecystectomies were performed by a single surgeon using standard laparoscopic instruments. Data were compiled prospectively regarding age, sex, diagnosis, surgical time, ASA, conversion to multiport technique and complications. Diagnosis for cholecystectomy was Chronic Cholecystitis in 75% (CI95% 71,2–79,3) (n=328).
Results: 436 SPL-C procedures were performed using standard laparoscopic instruments, 328 women and 108 men, median age was 43 years old (range, 13–81), The median operative time was 32 min (range, 20–120), ASA score of 1 in 76,6% (CI95% 72,6–80,6); obesity was found in 18,6% (CI95% 14,9–22,2) with median BMI 31 kg/m2 (range 19–40), previous abdominal surgery 59,6% (CI95% 55,0–64,3) (n=260), conversion rate to multiport technique was 3,2% (CI95% 1,5−4,9) (n=14) and there was no conversion to open surgery. Ambulatory setting was feasible in 373 patients (CI95% 82,2–88,9), the main factor for outpatient failure was gallbladder perforation 5,3% (CI95% 3,2–7,4) (n=23) and there was no readmissions. Minor complications were recorded, the most frequent was wound seroma 2,7% (CI95% 1,2–4,3) (n=12).
Conclusions: ambulatory SPL-C using standard instrumentation is feasible and seems to be safe. Anatomical issues were the main cause to exclude patients from outpatient consideration.

P101

Reduced-Port Laparoscopic Cholecystectomy with 3 mm Minute-Diameter Forceps

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Introduction: Laparoscopic cholecystectomy (Lap-C) is the standard operation for the benign diseases, such as cholecystolithiasis, adenomyomatosis and gallbladder polyp. Single-incision laparoscopic cholecystectomy (SILS-C) contains the difficult techniques for the young surgeons. Therefore, we examined the utility of reduced-port Lap-C (RPL-C) using the needlescopic surgery for young surgeons.
Procedures: The adjustment is the benign illness including the cholecystolithiasis, and advanced obesity and the cases of the inflammation remaining have been excluded. The incision is put and cut open the abdomen to the umbilical region, and camera port was inserted. We used 5 mm flexible scope. 3 mm forceps for holding of the gallbladder bottom and left hand of operator were inserted directly with no port (RPL-C).
Methods: RPL-C has been introduced in this department since July, 2009. We performed 109 cases of Lap-C, containing SILS-C and American style conventional Lap-C, and we performed RPL-C has been performed already 54 cases. We compared the patient background and the operation factor between RPL-C, SILS-C, conventional Lap-C. Operators were young surgeons, they were not specialists of gastroenterological surgery or endoscopic surgery.
Results: The difference was not admitted in the age, gender, the physique, and the disease, and the difference was not admitted in hospital stay after the operation (RPL-C:SILS-C:conventional Lap-C=5.6±1.6 days:6.6±4.6 days:6.8±5.0 days)and the amount of blood loss (RPL-C:SILS-C:conventional Lap-C=9±2ml:9±2ml:10±5 ml) and operation time (RPL-C:SILS-C:conventional Lap-C=117±40 min:120±36 min:115±42 min). And surgical wound after RPL-C was cosmetically acceptable.
Conclusion: Reduced port Lap-C is safely for young surgeons and comparable method to SILS-C and conventional Lap-C.

P102

Role of Staging Laparoscopy in Patients Undergoing Pancreatoduodenectomy

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Introduction: We aim to evaluate the role of staging laparoscopy in patients undergoing pancreatoduonectomy for pancreatic/periampullary tumors at our institution.
Methods: All patients planned for pancreatoduodenectomy who underwent staging laparoscopy between September 2014 and June 2016 were included. Findings at laparoscopy and whether a change in management plan occurred was recorded.
Results: Between September 2014 and June 2016, a total of 56 patients underwent staging laparoscopy before pancreatoduodenectomy. Of these, 9 patients were found to have liver lesions and 5 patients had peritoneal nodules. Among patients with liver lesions, 2 patients had metastatic pancreatic adenocarcinoma, one had metastatic neuroendocrine tumour, while the other three had benign lesions on histopathology. All the patients with peritoneal nodules turned out to have benign lesions on histopathology of these nodules. Management plan was changed in three patients due to staging laparoscopy. Two patients were planned for curative resection but liver lesions consistent with metastatic pancreatic carcinoma were found making them irresectable. The other patient was previously known to have a liver lesion the biopsy of which showed a neuroendocrine tumour thus making him potentially resectable.
Conclusion: Staging laparoscopy is a useful investigation for patients planned for pancreatoduodenectomy with curative intent as it helps to detect small volume peritoneal and liver metastatic disease. If any liver or peritoneal lesions are encountered, biopsy is useful in differentiating benign lesions from metastatic disease.

P103

Manometric Measurement of the Sphincter of Oddi in Patients with Common Bile Duct Stones: A Consecutive Study of the Han Population of China

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Background: Dysfunction of the sphincter of Oddi (SO) may be involved in the etiology of common bile duct (CBD) stones. However, this possibility is controversial and needs further characterization.
Aims: This study was to evaluate SO motor activity in patients with CBD stones in the Han population of China.
Patients and Methods: In this study, 76 patients with CBD stones were enrolled in a single tertiary endoscopy center. Data of SO motor activities was prospectively evaluated by endoscopic manometry. Mean basal SO pressure, amplitude and frequency were collected and analyzed.
Results: The mean basal SO pressure, amplitude, and frequency were 52.68±40.03 (1.60–171.1) mmHg, 39.93±19.67 (14.9–115.5) mmHg, and 5.73±3.20 (1.3–13.8)/min, respectively. The basal SO pressure was higher in patients with CBD stones<10 mm in diameter than in those with CBD stones with larger diameters. There was no significant difference in the basal SO pressure, amplitude, and frequency when compared with the CBD diameter, CBD stone number, prior cholecystectomy, periampullary diverticula, and symptoms. Levels of alanine aminotransferase, aspartate transaminase, γ-glutamyl transpeptidase, and alkalinephosphatase showed no significant difference in patients with normal or elevated basal SO pressures. **Conclusion:** These results identify abnormalities of SO motor activity that correlate with the formation of CBD stones.

P104

Distance from a Port to a Target Organ as a Predictive Factor for Difficult Cases in Single-Incision Laparoscopic Cholecystectomy

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Background: Single-incision laparoscopic cholecystectomy (SILC) has gained popularity recently thanks to improvements in laparoscopic instruments and techniques. However, it is more challenging than conventional (multi-port) laparoscopic cholecystectomy because of instrument collisions and limited workspace. The procedural difficulty may increase when the port-to-target distance is long. We aimed to assess the correlation between port-to-target distance and procedural difficulty and determine the predictability of difficult cases in single-incision laparoscopic cholecystectomy (SILC).
Methods: In 36 consecutive patients who underwent SILC at our hospital, the intraoperative umbilicus-to-Calot's triangle distance (UCD) was measured, and, in addition, the UCD was estimated from preoperative computed tomography (UCD-CT). The correlation between the UCD and the operative time and the predictability of the actual UCD from UCD-CT were analyzed. Operative time was calculated as pneumoperitoneum time to eliminate the effect of trocar placement and wound closure. The usefulness of UCD-CT as a predictive factor for difficult cases was assessed by receiver operating characteristic (ROC) curve analysis.
Results: Thirty-four patients successfully underwent SILC. Two patients required conversion to open cholecystectomy for severe inflammation and adhesion, and they were excluded from further analysis. There were positive correlations between the UCD and pneumoperitoneum time ($rs=0.682$, $P<0.0001$) and between the UCD-CT and UCD ($rs=0.802$, $P<0.0001$). The area under the ROC curve of UCD-CT for detecting prolonged operative duration cases (pneumoperitoneum time>60 min) was 0.875 (95% confidence interval, 0.75–1); the sensitivity and specificity sum was maximum at a UCD-CT of 219 mm.
Conclusions: A longer UCD is correlated with longer operative time, and it is possible to estimate actual UCD from preoperative computed tomography. The UCD-CT may be a good predictive factor for difficult SILC cases. If the UCD-CT is ≥220 mm, shortening of the umbilical incision and use of an additional trocar may help decrease invasiveness and improve surgical maneuverability.

P105

Single Incision Laparoscopic Cholecystectomy

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Introduction: Thanks to technological advances, laparoscopic surgery continues to evolve. One recent advance in this field is laparoscopy performed through a single incision. In this study we present our experiences concerning cholecystectomy through a single incision.
Materials and Methods: Between November 2009 and September 2016 we performed single incision laparoscopic cholecystectomy in 594 patients.391 of the patients were female, 203 were male.The mean age was 44 years (range:7–79 years). 46 patients presented with acute cholecystitis,others with cholelithiasis. In 14 cases an ERCP had been performed preoperatively. The procedures were realized using a SILS portTM (COVIDIEN®), flexible and articulated instruments (COVIDIEN®) and 5 mm endoclip as the ligation device (COVIDIEN®) and electrocautery as the energy source
Results: Average operative time was 33 min (15–240 min).An additional trocar was inserted in 14 cases,because of difficulty at exploration in 10, for bleeding control in three and because of a choledocal cyst in one other case. An abdominal drain was used in 27 cases,which had been removed the following day. No conversation to laparoscopic or conventional surgery. Postoperative complications occurred in 16 cases:Bile leakage due to accessory bile duct in one case, wound problems(seroma and infection) in 13 cases and hernia in two cases. Nonsteroid antiinflammatory agents had been used for postoperative analgesia. Mean hospital stay was 1.02 day (range:1–3 days).
Conclusion: With its superiority of scarlessness, single port laparoscopic cholecystectomy may be admitted as an alternative method to its multiport counterpart

P106

Laparoscopic Bile Duct Exploration in the Management of Choledocholithiasis During Pregnancy

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Introduction: The management of symptomatic choledochal stones in pregnant women is a complex and divisive issue. There a several risks to take in consideration as for any other patient with this pathology, in addition to those risks attributed to pregnancy scenario, such as preterm delivery.
The aim of this study is to show a series of cases of pregnant women with choledocholithiasis and their treatment resolution through laparoscopic cholecystectomy and laparoscopic bile duct exploration.
Methods and Procedures: Retrospective study, where pregnant women were admitted with symptomatic choledochal stones confirmed by Ultrasonography (US) or Magnetic Resonance Cholangiopancreatography (MRCP), and were posteriorly managed with a surgical intervention. Surgery in these cases consisted in a laparoscopic cholecystectomy during which an intraoperative US (IUS) was performed in order to confirm the presence of choledocholithiasis. If choledochal stones were found the surgeon continued to perform a laparoscopic exploration of the bile duct, with assistance of flexible choledochoscopy, preferring the transcystic approach when possible.
The approach for port placement was adjusted to avoid the risk of injury in lower sections of the abdomen by using an open epigastric port for pneuoperitoneum and optic access.
Perioperative morbidity and mortality was assessed, including a perinatal follow up to address complications such as preterm delivery.
Results: Ten patients were explored for positive symptomatic choledocholithiasis at the US/MRCP. Of these patients, 60% (n=6) patients were confirmed with IUS. All patients were treated by transcystic choledochoscopy. All patients had a dilated cystic duct at the moment of the procedure.
In the follow up, only one preterm delivery happened at gestational week 35, with no morbidity associated to the infant. After this case No bile leaks were registered in this series.
Conclusions: Laparoscopic bile duct exploration is feasible and safe for managing choledocholithiasis during pregnancy, especially in highly symptomatic cases who are not suitable for observation. Using a IUS approach also avoids the risk of radiation required for ERCP or transcystic non-endoscopic therapies. The presence of a dilated cystic duct also avoids the necessity of choledocotomy, which would theoretically diminish the risk of bile leaks and strictures. It is also important to show that even with preoperative imaging 40% of patients had negative findings during surgery, which may be attributed to false positives in their imaging studies, or spontaneous resolution of choledocholithiasis.

P107

Experience with Single-Incision Laparoscopic Cholecystectomy

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Introduction: We herein report our own single-incision laparoscopic cholecystectomy (SILC) technique using several useful devices in order to eliminate the need for extra ports or instruments, and reduce interference between the instruments and the laparoscope.
Patients and Methods: We performed SILC in 270 patients, comprising 130 males and 140 females with a mean age of 55 years. Their diagnoses included 250 gallbladder stones, 15 polyps and 5 adenomyomatosis. We made a 2.5-cm longitudinal skin incision at the umbilicus. A wound retractor and a surgical glove or other devices were applied at the incision. We used the three 5-mm ports technique. After retracting the gallbladder upward using an Endo-GrabTM, the cystic duct and artery were divided and identified using pre-bending forceps through the flexible port and laparoscopic coagulating shears (LCS). The cystic artery was dissected using the LCS and the cystic duct was also dissected after clipping. The gallbladder was freed from the liver bed using the LCS, and the specimen was retrieved from the umbilical wound.
Results: There were conversions to open laparotomy in 4 cases (1.5%) and requirement of additional ports in 17 (6.3%). The mean operation time was 85 min. The complications were bile duct injury in one case (0.4%) and pneumothorax in two (0.7%). The mean postoperative hospital stay in completed SILC cases was 3 days.
Conclusion: SILC using a hands-free retraction system, flexible port and pre-bending instruments is a feasible and safe procedure when conducted by experienced surgeons.

P108

Impact of Obesity on Short-Term Outcomes of Single Incision Laparoscopic Cholecystectomy

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Background: In recent years, single port surgery (SPS) has gained great interest and popularity. Actually, single incision laparoscopic cholecystectomy (SLC) can be safely completed in non-obese patients. However, SLC must be carefully performed in obese patients because obesity is generally associated with increased surgical problems such as access difficulty, instruments conflict and postoperative complications. The aim of this study is to assess the early outcome of SLC in patients with abdominal obesity as compared to the non-obese patients.
Indications for SLC:
The indications for SLC were as follows: (1) gall bladder stone; (2) cholecystitis with mild inflammatory change; (3) gall bladder benign polyp
Study Design/Method: A total of 393 patients underwent SLC between April 2009 and June 2016 at the Department of Surgery of Juntendo University Urayasu Hospital.
The patients were divided into obese, overweight and non-obese categories using BMI as the criterion.
Procedures: 2 cm Z type skin incision is made, and access platform is placed in the small umbilical incision area. All SLC procedures were performed using a similar surgical technique to our standard laparoscopic manner. However, we often use the additional one port when we encounter a technical difficulty in maintaining a good working space due to a visceral fat accumulation.
Results: 393 SLC procedures were performed. Of them, 33 patients (8.4%) were obese, 118 patients (30%) were over-weight and 242 patients (61.6%) were non-obese. Patient characteristics, such as age, gender and disease of gall bladder were similar among the three groups. There were no significant differences in bleeding volumes, intra- and postoperative complications and hospital stay. However, obesity was associated with increased operative time compared with non-obese (120 ± 70 vs. 90 ± 42 min, $p<0.05$).
We tended to apply the additional one port technique in the obese compared with non-obese (39.4 vs. 18.2%, N.S.). Conversion to conventional laparoscopy was needed in two patients in non-obese, and in one patient in obese (N.S.). There were no conversions to open surgery.
Conclusions: Single incision laparoscopic cholecystectomy (SLC) in obese patients had significantly longer operative times, however SLC can be performed in obese patients with similar short-term outcomes to non-obese or over-weight patients' outcomes.
Additional one port technique enables us to safely complete SLC in difficult cases among obese patients.

P109

Hybrid Modified Hepatico-Jejunostomy in the Management of Bile Leakage from Discontinued Bile Duct Injury

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Background: Iatrogenic biliary injuries leading to segment loss and bile leak represent complex injuries associated with postoperative morbidity and mortality. The outcome of their management depends on multidisciplinary input.
Patients and Methods: This prospective pilot study included 12 cases with severed bile duct injuries and leak (post cholecystectomy) in the period from January 2013 to September 2015 at Kasr Al-Ainy hospital, Cairo University. They were managed by our suggested hybrid technique involving preoperative insertion of a percutaneous transhepatic biliary draining (PTBD) catheter followed by a modified hepaticojejunostomy in the same hospital stay. The PTBD catheter served as a stent and for postoperative imaging. A Follow up MRCP was performed at 6 and 12 months.
Results: Modified bilio-enteric anastomosis was successful in 2 patients. Two cases of postoperative bile leak occurred requiring reoperation. Four postoperative strictures were successfully managed by trans-PTBD dilatation.
Conclusion: This hybrid technique is simple, time saving and duct length preserving. It restores bilio-eneteric continuity in one hospital stay and can be performed by most surgeons of average dexterity and surgical expertise, but requires excellent liaison with the interventional radiologist.

P110

Laparoscopically Assisted Transgastric Endoscopic Retrograde Cholangiopancreatography: Large Single Center Experience

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Introduction: Evaluation and treatment of biliary pathology in patients who have previously undergone roux-en-y gastric bypass can be challenging. Percutaneous cholangiography and stenting is possible for some pathological conditions, but is not always indicated. Laparoscopic assisted transgastric endoscopic retrograde cholangiopancreatography (TGERCP) is becoming increasingly commonplace. Here we present a large single institution series.
Methods: We retrospectively identified patients who underwent TGERCP at our institution from January 2009 through September 2016. Demographic data, presenting symptoms, preoperative imaging studies operative details, and follow up to 30 days was collected.
Results: Fifty nine patients underwent TGERCP. Of these, 56 were completed laparoscopically while 3 required conversion to open. In one case, TGERCP attempt was aborted after inadvertent posterior gastrotomy at trocar insertion, and open biliary exploration was performed. Demographics included 51 female patients (86.4%), with a mean age was 54.6 +/- 9.8 years, and a median BMI of 31.8 m/kg2 (IQR 27.8–36.9). There were 49 patients (83.1%) who had previously undergone cholecystectomy, with seven completed concomitantly with prior gastric bypass operation. Presenting symptoms included post prandial right upper quadrant pain (n=17, 28.8%) constant right upper quadrant pain (n=33, 55.9%), and nausea (n=26, 44.1%). Twenty four (40.7%) had prior acute pancreatitis, 30 had liver serum maker abnormalities, and 6 had prior clinical jaundice. Ampullary stenosis was identified in 31 patients (53.4%), and choledocholithiasis in 17 patients (29.3%). Brushings performed in 10 patients (17.2%) were all negative for malignancy. The gastrotomy was closed in the majority of patients (n=48, 82.7%). Median length of stay was 2 days post-procedure. There were 4 intraoperative complications (6.9%). The most common complication was biochemical pancreatitis in 10 patients (17.2%), with 7 (11.9%) having clinical symptoms. Major complications included myocardial infarction, line-associated DVT and pneumonia (all in a single patient), organ space infection requiring drainage. Minor complications included transient bilirubin elevation (n=2, 3.4%), and superficial wound infection (n=4, 6.8%). At time of follow up, 62.1% of patients had symptom resolution.
Conclusions: Laparoscopically assisted TGERCP can be successfully performed in most cases, with a low risk of complications. This procedure is an important adjunct for centers performing gastric bypass surgery, and is probably best done by those most familiar with the altered foregut anatomy post gastric bypass. Moreover, for benign pathologies, and for patients without need for repeat TGERCP, the gastrotomy can be safely closed during the index procedure if no stent is placed.

P111

Comparitive Study on Antibiotic Versus no Antibiotics in Elective Laparoscopic Cholecystectomies in South Indian Population

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Introduction: With the advent of laparoscopy, laparoscopic cholecystectomy has become one of the most commonly performed surgeries today. In many parts of the world, laparoscopic cholecystectomy is performed as a day care procedure. Our aim is to assess the usefulness of antibiotic cover in patients undergoing elective laparoscopic cholecystectomy in South Indian population.
Methods and Procedures: All patients with uncomplicated cholecystitis undergoing elective laparoscopic cholecystectomy in the Department of General Surgery, Sri Ramachandra University, were included in the study. This study was conducted on 220 patients undergoing surgery between 2014–2016. All patients were followed up for a period of 3 months. They were randomized into Antibiotic group and Non Antibiotic group. 108 patients received no antibiotics whilst the other 112 patients received 3 or more doses of antibiotics. All patients underwent traditional four port laparoscopic cholecystectomy. The gall bladder specimen was removed through the 10 mm epigastric port without using a Endo-bag in all patients. The parameters assessed were port site infection and post-op pyrexia.
Results: It was noted that there was no statistically significant difference in port site infection and post-op pyrexia in the no antibiotic group when compared to the group which received antibiotics.
Conclusion: This study shows us that in cases of elective laparoscopic cholecystectomy, antibiotics do not play a major role in controlling post-operative infections. By avoiding antibiotics we are reducing not only the cost, but also the risk of antibiotic resistance.

P112

Symptomatic Hyperkinetic Biliary Dyskinesia: A Predictor of Successful Outcomes After Cholecystectomy

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Objective: Classic biliary colic and a cholecystokinin hepatobiliary iminodiacetic acid (CCK-HIDA) scan demonstrating an ejection fraction less than 35% is a well-established indication for cholecystectomy as definitive treatment. However, in patients without stones and symptoms consistent with biliary colic, an ejection fraction>80% is not widely accepted as an indication for cholecystectomy. The objective of our study was to evaluate hyperkinetic biliary dyskinesia (defined as a gallbladder ejection fraction of greater than or equal to 80%) as a predictor of symptom resolution following cholecystectomy.
Methods: All patients undergoing cholecystectomy from 2010 to 2016 at a single institution were reviewed. Patients with an ICD-9 code for cholelithiasis or acute cholecystitis were excluded from the study. A retrospective chart review of the remaining patients was performed. Patients with symptoms consistent with biliary colic (postprandial right upper quadrant pain with or without nausea), a right upper quadrant ultrasound negative for gallstones, and a CCK-HIDA scan with documented ejection fractions greater than or equal to 80 percent were included. A total of 403 patient charts were reviewed, 31 met study criteria and 23 had clearly documented follow up. Improved or resolved preoperative pain, determined from patient's post-operative clinic visit documentation was the primary endpoint. Surgical pathology was reviewed for evidence of pathologic changes and to confirm the absence of stones.
Results: Of the 23 patients included in the study, 21 patients (91.3%) reported improvement or complete resolution of their preoperative pain. Nineteen (90.5%) of the 21 patients with symptom improvement or resolution had pathologic findings of chronic cholecystitis. Only 2 patients (8.7%) reported no change in preoperative symptoms.
Conclusions: Patients with symptomatic hyperkinetic biliary dyskinesia, as defined by an ejection fraction greater than or equal to 80% on CCK-HIDA may benefit from cholecystectomy. Additionally, 90.5% of patients with improvement or resolution were found to have pathology consistent with chronic cholecystitis providing support of an underlying pathology contributing to symptoms of biliary colic.

P113

Prospective Evaluation of Low Insufflation Pressure Cholecystectomy Using an Insufflation Management System Versus Standard Co2 Pneumoperitoneum

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Background: Pneumoperitoneum produces significant hemodynamic and cardiopulmonary changes. At present abdominal insufflation to 15 mmHg is standard during laparoscopy; however, even at that accepted pressure studies demonstrate increased mean end tidal CO2 (etCO2) and airway pressures. Thus, operating at reduced pressure may confer physiologic benefits. We aimed to assess the safety and efficacy of operating at a lower intra-abdominal pressure as well as the potential value of an insufflation management system versus conventional C02 insufflation to maintain these pressures.
Methods: Between January 2016 and August 2016, a continuous quality improvement project prospectively collected data on 51 patients who underwent laparoscopic cholecystectomy at 10 mmHg. Cholecystectomy was performed either with a conventional C02 insufflator (CI) or an insufflation management system (IMS). Bivariate statistical analysis was used to compare preoperative, intraoperative and postoperative data with p-values<0.05 considered significant.
Results: Of the 51 patients, 25 underwent cholecystectomy with IMS and 26 CI. No significant difference in preoperative demographics, acuity of operation, body mass index or laboratory values were demonstrated. Mean intraoperative pressure was 10.6 ± 1.6 mmHg for IMS versus 11.1 ± 1.8 mmHg for CI (p=NS). Insufflation pressure was increased in 32% of IMS vs. 44% of CI patients (p=NS). No significant difference in etC02 (35.2 vs. 35.2), mean airway pressure (10.1 vs. 9.6), intraoperative complications (4% vs. 1%) or operative time (50 vs. 42 min) was demonstrated between IMS and CI, respectively. Postoperatively, PACU total morphine equivalents given was significantly decreased in IMS as compared to the CI group (21.8 vs. 41.4, p=0.04) as was length of stay based on incision start time (19.6 vs. 30 h, p=0.03). No difference in PACU VAS pain scores was demonstrated. No differences in pain or complications were demonstrated at 30-days.
Conclusions: Operating at lower intra-abdominal pressures is safe, feasible and may be associated with a more favorable ventilatory profile as compared to averages cited in the literature. While not significant, a trend in maintenance and stability of lower pressure was demonstrated with utilization of IMS. Despite similar VAS scores, PACU length of stay and morphine requirements were significantly reduced in IMS patients. This finding suggests a recovery benefit to patients who underwent surgery with IMS; however, more studies are needed to corroborate this finding.

P114

Laparoscopic Common Bile Duct Exploration: Trans-cystic and Trans-choledochal in the Management of Patients with Choledocholithiasis

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Management of patients with common bile duct stones should be in only one session. For the past two decades this has been our practice in the majority of cases of patients undergoing laparoscopic cholecystectomy (LC). Only in a small group of patients we still depend on endoscopic sphincterotomy(ES)
Material and Methods: From 1992 to 2016 we have performed 1,150 laparoscopic cholecystectomies for symptomatic gallstone disease. We found 115 patients (10%) with common bile duct stones with routine dynamic cholangiography. All of them were submitted to common bile duct exploration during the laparoscopy with flexible choledochoscopy: trans-cystic or trans-choledochal.
Results: 108 patients (94%) were treated successfully with extraccion of common bile duct stones during LC. 80 cases (74%) were trans-cystic and 29 (26%) were trans-choledochal bile duct exploration using wire basket and flexible choledochoscopy. In only 7 patients (6%) we had to convert to open surgery or refer to post-op ES. Morbidity in 5 patients (4.6%) without bile leaks and mortality 0%. Hospital stay of 48 h.
Conclusion: Must of the patients (94%) were treated successfully with the laparoscopic aproach either trans-cystic or trans-choledochal without any major complications. We strongly belive that one session for the management of choledocholithiasis is the best treatment .

P115

Hepatic Teratoma Masquerading as a Post-deployment Echinococcal Cyst: A Case Report and Literature Review

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Hepatic Echinococcal cysts in native-born US citizens and hepatic mature cystic teratomas are both rare entities and can present similarly due to mass effect. Less than forty cases of hepatic mature cystic teratomas have been reported in the literature with only two individual cases occurring in adult males. This paper discusses the case of a 37-year-old active duty US Army male who presented with biliary obstructive symptoms and a large hepatic lesion on imaging. His military work while deployed to the Middle East led to him consuming locally prepared meals. We attempt to review clinically relevant and distinguishing features of hepatic Echinococcal cysts and mature cystic teratomas of the liver, as well as review the current literature on mature cystic teratomas of the liver, and summarize our patient's medical and surgical management. Given their similar presentations and imaging characteristics, but profound differences in management, both diagnoses should be considered when approaching patients with hepatic cystic lesions of uncertain etiology.

P116

Campaign for Greater Safety in Laparoscopic Cholecystectomy in Denmark

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Introduction: We aim to popularize SAGES Safe Cholecystectomy Program among Danish surgeons.
Method: In June 2016 a survey was conducted at a symposium about the surgical treatment of gallstones in Central Denmark Region. In the first part of the survey participants were asked questions about their knowledge and implementation of Danish and Tokyo guidelines in everyday practice together with questions about age, sex, experience, estimated number of performed cholecystectomies, and their experience of severe complications such as bile duct injuries and bile leaks. In the second part of the survey the strategies suggested by the SAGES Safe Cholecystectomy Program were presented, and the participants were asked to assess the importance of those strategies according to their personal experience on a scale from 0 to 9, 0 being completely irrelevant and 9 being absolutely crucial. Answers given by residents and attendings were then compared.
Results: All participants (50) at the symposium received the questionnaire. 84% (42) participants filled in the questionnaire, and 74% (37) were completed fully. Of the 37 completed questionnaires, 20 were completed by attendings and the remaining 17 by residents. The average age among attendings was 47.3 years and the average experience as surgeons was 16.1 years, while among residents the average age was 35.4 years and the average experience was 3.4 years. 25% of attendings were female compared to 71% of residents. Among residents 59% (11) had performed more than 50 cholecystectomies, none had performed over 500. Among attendings 25% (5) had performed more than 500. 20% (4) of attendings experienced bile duct injury during their career and 65% (13) experienced bile leaks, as compared to 0% of bile duct injury and 17.6% (3) of bile leaks among residents. 80% (16) of attendings knew and implemented Danish guidelines in daily practice, while 25% (5) also knew and implemented the Tokyo guidelines. Among residents corresponding numbers were 53% (9) and 12% (2).
All participants agreed that the strategies suggested by the SAGES Safe Cholecystectomy Program were very important with the average score varying from 7.45 to 8.65 among attendings and from 7.53 to 8.95 among residents.
Conclusion: The strategies listed by the SAGES Safe Cholecystectomy Program were unanimously voted very important by surgeons in Central Denmark Region. Popularizing SAGES Safe Cholecystectomy Program seems suitable to ensure greater safety in laparoscopic cholecystectomy. Another nationwide survey is scheduled at the next Danish Surgical Society meeting in November 2017.

P117

The Minimum Incision for Single Port Laparoscopic Cholecystectomy

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Background: We introduced the single port laparoscopic surgery in May 2009 and our experiences of single port surgery are 900 and more until April, 2016. The benign diseases occupied about 80% of them, such as cholecystectomy, appendectomy, and inguinal hernioplasty (TAPP and TEP). The majority, which occupied 45% of them is cholecystectomy.
At the first, the size of our transumbilical incision was 2.0 cm and more. This size of incision is becoming shorter year after year. Now the size of our incision is only 1.0 cm.
Methods: We make a 1.0 cm incision at the bottom of umbilicus. After small laparotomy, we insert the Alexis wound retractor, size of XXS. 1.0 cm of incision wound is the smallest size for the insert the sound retractor into the abdominal cavity. After the insert wound retractor, the surgical glove is attached and two low-profile laparoscopic 5 mm ports are inserted through the holes of the surgical glove with cut fingertips. The original pre-bending forceps inserted directly through the hole of the cut fingertip. We usually use the 5 mm flexible laparoscope by Olympus.
Results: We cannot detect the surgical wound on the patient in the one month after the operation.
Our average of hospital stay was 3.5 days, and operation time was 70 min for overall. (65 min for the expert.) The average of BMI in our patients is 24.6 Kg/m2.
The rate of complications is only 3.2%, and only one case is the incisional hernia. Our follow-up outcome is continued until one year after surgery.
A supplemental miniport or 5 mm port including the conversion to conventional laparoscopic cholecystectomy, was required for 6.8%, and the conversion to open surgery is only one case.
Conclusions: We can perform the single port laparoscopic cholecystectomy via 1.0 cm transumbilical incision. We believe that 1.0 cm incision wound is the minimum for single port laparoscopic cholecystectomy.

P118

Massive Biliary Dilation After Roux-En-Y Gastric Bypass: Is It Ampullary Achalasia?

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Background: Symptomatic biliary dilation commonly follows an obstructive process. However, in the absence of an obvious structural lesion, a functional etiology may be sought. Biliary dilation has been described in patients following either Roux-en-Y gastric bypass (RYGB) or cholecystectomy, but not in patients with a history of both RYGB and cholecystectomy presenting with biliary symptoms and a finding of significant biliary dilation of 10 mm or greater in the absence of structural lesions or other obvious etiologies. In this case series, patients presenting with this constellation of symptoms and findings underwent laparoscopic assisted transgastric endoscopic retrograde cholangiopancreatography (ERCP) for evaluation and treatment.
Methods: All patients undergoing transgastric ERCP were retrospectively identified from an institutional database. Patients were included if they had no tumor, gallstones, or stricture identified contributing to biliary obstruction.
Results: We identified 13 patients. All patients were female with an average age of 53.8 years (range 38–66) and a BMI of 32.3 kg/m^2 (range 17.7–43.2) at the time of transgastric ERCP. Additionally, all patients had undergone prior RYGB and cholecystectomy. On presentation, 10 patients (76.9%) had post prandial or constant right upper quadrant pain, 8 (61.5%) had abnormal liver enzymes, 8 (61.5%) had nausea and/or vomiting, 4 (30.8%) had at least one prior episode of acute pancreatitis, and 1 (7.7%) had clinical jaundice or increased bilirubin. Preoperative imaging revealed a mean bile duct diameter of 16 mm (range 10–25 mm). In each case, the papilla appeared normal on endoscopic assessment, and cholangiogram did not reveal choledocholithiasis or strictures within the biliary system. A biliary sphincterotomy was performed on each patient without intraoperative complications. At initial post-operative evaluation, 8 (61.5%) patients had significant symptom improvement.
Conclusions: In this small cohort of post-gastric bypass patients undergoing sphincterotomy for symptomatic significant non-obstructive biliary dilation, an improvement of symptoms was seen in the early postoperative period. This could represent a disease pattern unique to the post gastric bypass population and may reflect vagal nerve injury during that operation. Further investigation is warranted to unearth the etiology of this condition and elucidate the pathophysiology of tonic contraction of the ampulla: ampullary achalasia.

P119

Routine Nasobiliary Insertion During ERCP to Prevent, Diagnose and Treat of Biliary Injury in High Risk Patients

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Introduction: ERCP followed by laparoscopic cholecystectomy (LC) is the most common management of gallstone complicated by clacular obstructive jaundice (COJ). ERCP itself is a risk factor for difficult cholecystectomy. Other factors include old age, male gender, obesity, acute or long standing inflammation. LC in this situations associated with increased risk of bile duct injury (BDI), to reach up to 3.5 times as in easy LC. The intraoperative changiography (IOC) can decrease the incidence BDI, but its main role is the intraoperative diagnosis for early management.This study aimed to evaluate routine insertion of nasobiliary tube during ERCP for clacular obstructive jaundice in high risk group for difficult cholecystectomy not only to diagnose BDI intaoperatively but also to prevent and in the same time to treat biliary injuries if happened, by leaving nasobiliary in situ postoperatively
Methods and Procedure: Case controlled study in which 400 patients with COJ admitted to the endoscopy unit of Minia university hospital for ERCP from April 2015 to April 2106. 110 were high risk for difficult cholecystectomy and were divided into 2 equal groups. in group 1 nasobiliary was inserted during ERCP after CBD clearance (NB group). In group 2, only CBD clearance was done (control group). In all patients LC was done within the same week of ERCP. In NB group, multiple tans-nasobiliary IOC was done when anatomy was quarry during dissection of Calot's triangle and just before clipping, when the clipper on the supposed cystic duct. At the end of the procedure, methylene blue was injected to detect any hidden leak.
Result: From the total 110 case, 65 (59.1%) patients were male and 45 (40.9%) were female. Median age was 55 (range 40–70).The average operative time in NB groups was 110 min (range 69–150 min) VS. 125 (range 90–170) in control group.The average post-operative hospital stay was 2.2 ± 0.1 in NB group VS. 4 ± 5.7 in control group. One cases of biliary leak (1,8%) in NB group with no intervention other than leaving the NB in place till chalangiography revealed no leak VS. 4 cases (7.3%) in control group. No conversion to open in NB group (0%) VS. 6 cases (10.9%) in control group.
Conclusion: Routine nasobiliary insertion during ERCP for clacular obstructive jaundice in high risk patients for biliary injury during LC is safe procedure and can prevent, diagnose and treat biliary injury and decrease the conversion rate.

P121

Documentation of the Critical View of Safety During Laparoscopic Cholecystectomy in a High-Volume Hospital System

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Introduction: This study sought to determine the rate and accuracy of documentation of the Critical View of Safety (CVS) during laparoscopic cholecystectomy (LC) within one hospital system. Despite the goal of CVS to prevent biliary injury, studies suggest that documentation of surgical technique may be incomplete or inaccurate.

Methods: Within a 4-hospital system, 500 cases between 2009 and 2015 were randomly selected and retrospectively reviewed, and preoperative, intraoperative, and postoperative data were collected. Successful documentation of CVS was defined in two ways: "stated" if the operative report included a statement that the critical view was achieved, and "described" if the description of the procedure was consistent with the definition by Strasberg and SAGES' Safe Cholecystectomy Program: 1. Calot's triangle cleared, 2. lower third of the gallbladder separated to expose the liver bed, 3. only two structures seen entering the gallbladder, with the liver bed visible, before any structure was divided. Predictors of successful documentation of CVS were determined using multivariable logistic regression models.

Results:

Table 1a. Significant Differences between Patients where CVS was Stated

	Stated, N (%)	Not Stated, N (%)	P-Value
Total # of Patients	*152 (30.8)*	*342 (69.2)*	
Abnormal HPB Anatomy Documented	35 (23.0)	30 (8.8)	<0.001
Convert to Open	1 (0.7)	14 (4.1)	0.046
Surgery Minutes, Median (q1, q3)	56 (43, 74)	47 (33, 66)	<0.001
Attending Surgeon	Too many to display		<0.001
Critical view described correctly	61 (40.1)	1 (0.3)	<0.001
Critical view described incorrectly			
Insufficiently detailed	63 (41.5)	241 (70.5)	<0.001
Detailed but wrong	28 (18.4)	98 (28.7)	
Surgeon Diagnosis: acute cholecystitis	48 (31.6)	80 (23.4)	0.055
Pathology Diagnosis: necrosis, gangrene, ulceration	15 (9.9)	16 (4.7)	0.028

Table 1b. Multivariable Model for Predicting CVS Stated

	Odds Ratio	95% Confidence Interval	P-Value
Abnormal HPB Anatomy Documented	3.35	1.66-6.78	<0.001
Convert to Open	0.03	0.01-0.34	0.005
Critical view described incorrectly	Reference		
Insufficiently detailed	0.01	0.00-0.04	<0.001
Detailed but wrong	0.01	0.00-0.03	<0.001
Pathology Diagnosis: necrosis, gangrene, ulceration	3.12	1.32-7.39	0.010

Table 2a. Significant Differences between Patients where CVS was Described Correctly

	Described, N (%)	Not Described, N (%)	P-Value
Total # of Patients	*62 (12.5)*	*432 (87.5)*	
Surgery with Multiple Procedures	25 (40.3)	96 (22.2)	0.002
Surgery Minutes, Median (q1, q3)	55 (46, 65)	49 (35, 68)	0.055
Attending Surgeon	Too many to display		<0.001
Critical view stated	61 (98.4)	91 (21.1)	<0.001
Surgeon Diagnosis: acute cholecystitis	23 (37.1)	105 (24.3)	0.032

Table 2b. Multivariable Model for Predicting CVS Described Correctly

	Odds Ratio	95% Confidence Interval	P-Value
Surgery with Multiple Procedures	3.41	1.40-8.29	0.007
Critical view stated	102.2	13.5-773.1	<0.001

Attending surgeon (n=24) was an independent predictor of both stated and correctly described CVS. 6 patients (1.2%) had a bile duct injury; 8 (1.6%) had a surgical site infection; and 1 (0.2%) had an incisional hernia.

Conclusions: In this institution, the Critical View of Safety is not consistently utilized in LC. The correlation of abnormal anatomy with both CVS documentation categories could indicate that surgeons who document CVS prefer notes with a higher level of detail; this is also suggested by more detailed description of dissection methods, regardless of consistency with correct CVS technique. Documenting CVS displays an awareness of the method, but 18.4% of these surgeons do not describe dissection consistent with the correct technique. Although surgeon is an independent predictor of both CVS documentation and correct description, neither category correlates with whether or not the surgeon has completed a minimally invasive surgery fellowship.

There is no difference in outcomes for either group (operative time excepted), suggesting that CVS was not a factor in preventing bile duct injury. However, this is moderated by the low number of charts where CVS was correctly obtained and the rarity of BDI. The data also suggest that obtaining what the surgeon believes to be a critical view may preclude converting the case to open, which is concerning if the CVS was not correctly obtained. These findings have implications for both resident training and continuing education on safe laparoscopic cholecystectomy.

P122

Management of Choledocholithiasis After Roux En Y Gastric Bypass at Tertiary Care Center

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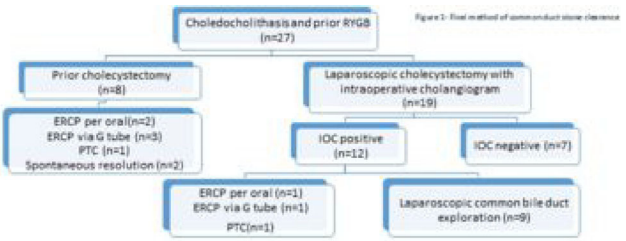
Introduction: Numerous options exist for managing choledocholithiasis in patient with prior Roux-en-y gastric bypass (RYGB), including percutaneous, endoscopic, laparoscopic and open approaches. While many studies describe the results of a single preferred management strategy, no study to date has described how the combination of these methods are being used in clinical practice or examined their relative effectiveness.

Methods: We performed a retrospective chart review of patients admitted to our tertiary care center with prior RYGB and diagnosis of choledocholithiasis from 2005 to 2016. Our primary end point was the final procedure used to successfully clear common bile duct stones. Secondarily, we looked at the total number of procedures required for clearance.

Results: Twenty seven patients with prior RYGB and choledocholithiasis were identified. At time of choledocholithiasis our patients were on average 51 years old, had an average BMI of 29.8, and had undergone RYGB 8.2 years previously. All 27 patients successfully cleared their common bile duct stones, and are classified in Fig. 1 by the final, successful procedure resulting in clearance. Nineteen patients underwent laparoscopic cholecystectomy (LC) with intraoperative cholangiogram (IOC) while 8 had undergone prior cholecystectomy. In the 19 patients undergoing LC with IOC, 12 showed filling defect and 7 did not (presumed passed stone). Three patients had initial LC with positive IOC at a community hospital, and subsequently transferred to tertiary center for definitive management. After transfer, one underwent percutaneous transhepatic cholangiogram (PTC), one ERCP via laparoscopic gastrostomy tube and one ERCP per oral for duct clearance. In the remaining 9 patients with positive IOC, laparoscopic common bile duct exploration (LCBDE) was successful using a variety of techniques: basket/balloon transcystic extraction (n=2), pushing stone forward with choledochoscope (n=3), both (n=3) and laparoscopic choledochotomy with direct stone extraction (n=1). In the 8 patients who presented with choledocholithiasis despite prior cholecystectomy, their ducts were cleared using ERCP via laparoscopic gastrostomy tube (n=3), ERCP per oral (n=2), PTC (n=1) and spontaneous resolution (n=2). Altogether, patients required 1.7 procedures on average for successful duct clearance; however every patient undergoing LCBDE needed only 1 procedure, while the remaining patients required 2.04 procedures on average ($p<0.05$).

Conclusion: Management of choledocholithiasis in patients with prior RYGB may require a variety of treatment strategies. LCBDE was the most commonly utilized strategy in patients who required concomitant cholecystectomy, and resulted in the fewest invasive procedures overall. In patients with prior cholecystectomy, ERCP via gastrostomy tube was the most common strategy.



P123

Intraoperative EST for CBD Stone

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Aims: There are various approaches for the treatment of cholecystocholedocholithiasis. Laparoscopic cholecystectomy after endoscopic sphincterotomy (EST) is standard methodology now a day. However, compared with such metachronous strategy, simultaneous endoscopic sphincterotomy with cholecystectomy is favorable. And we usually perform it by rendezvous technique except for emergent case such as acute cholangitis. Additionally we also perform percutaneous and totally laparoscopic common bile duct exploration (LCBDE) therapy as options. We report such strategies suitable for each patient as follows.

Methods: In case of rendezvous, laparoscopic operation starts with supine position after general anesthesia completed. After cystic duct is ligated, guide wire is inserted from the cystic duct then the endoscopic cannulation is done by using the wire from Papilla Vater. Finally the choledocholithiasis is cleared by EST. In case of percutaneous method, we use percutaneous endoscopic Laser lithotomy for instance such case as post-gastrectomy. And in cases of total laparoscopic method, we perform laparoscopic common bile duct explorations with primary common bile duct closure such case as huge stones.

Results: We had no complications caused by these methodologies.

Discussion: The results are worth comparing with standard approach. Our way, one-stage surgery is superior to reciprocal implementation of surgical and endoscopic procedures. Referring to the risk of iatrogenic damage, our ethodologies seems safer than standard treatment due to no pancreatic duct cannulation.

Conclusions: One-stage surgery and other option techniques showed favorable outcome. And we think we should perform each suitable strategy for each case.

P124

Two Port Laparoscopic Cholecystectomy Using the Teleflex Minigrasper in a Modified Dome Down Technique

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Background: The majority of surgeons use four ports including for laparoscopic cholecystectomy (LC). Multiple efforts have been made to reduce number and size of ports. left upper quadrant (LUQ).

Patients and Methods: Of 127 LCs performed from 6/2013–9/2016, 115 (91%) were done using three instruments including 46 cases in which 2 trocars and a needle grasper were used. A 5 mm trocar was placed in the left upper quadrant (LUQ) and a 10–12 mm trocar (n=25) or 5 mm trocar (n=21) into the umbilicus. The Teleflex minigrasper was placed between the two trocars. The gallbladder (GB) serosa was incised on both sides and a window was created behind the GB midportion and widened towards fundus and infundibulum. Cystic artery (CA) and cystic duct (CD) were dissected out obtaining the critical view and after the last fundus adhesion was cut, CA and CD were secured with clips or endoloop.

Results: Median age of 36 women and 10 men was 44.1 (range 23.2–77.4) years. LC was done for acute cholecystitis (n=12), chronic cholecystitis (n=25), other (n=9). In 41 cases the procedure was done in the modified dome down technique. Additional procedures were done in 20 patients including liver wedge biopsy (n=5), lysis of adhesions (n=10) others (n =5). Median operative time was 46 min with a range of 27 to 120 min. There were no vascular or bile duct injuries in this series. 54% of cases were done as outpatient procedures, 34% of patients required 23 h observation and 11% were hospitalized.

Conclusions: Three instrument modified dome down technique with trocar placement in LUQ is feasible in the majority of cases. The Teleflex minigrasper can replace a port. In selected cases with small stones or biliary dyskinesia, LC with only two 5 mm ports and a needle grasper is possible. This approach is associated with high patient satisfaction and excellent cosmetic result.

P125

Comparative Study Between Open and Minimally Invasive Surgery for Congenital Biliary Dilatation and Pancreatobiliary Maljunction

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Background: The treatment of congenital biliary dilatation (CBD) and pancratobiliary maljunction (PBM), which contains the resection of the extrahepatic bile duct and bilioenteric anastomosis, is probably a good indication for minimally invasive surgery, because the rate of these diseases are higher in young women. Therefore, we have performed laparoscopic and robot-assisted surgery for CBD or PBM, and reported previously [J Robotic Surg 2015 9: 143–148].

Aim: We considered that minimally invasive approach would yield a profit to the patients with CBD or PBM, especially in short-term postoperative outcomes. Therefore, we performed comparative study between MIS and open surgery for the treatment of these diseases.

Patients and Methods: We have started laparoscopic resection of the extrahepatic bile duct for CBD under the approval of IRB from 2011, and robot-assisted procedure was approved in 2012. In our institution, the indication for these procedures were patients with type I CBD (Todani classification) and symptomatic PBM. Patients with type IV CBD and complicated PBM, which is classified as type III according to new Komi classification, were excluded and underwent open surgery. In this study, patient characteristics, intraoperative outcomes, and postoperative course of the patients who underwent minimally invasive or open surgery for CBD or PBM were retrospectively analyzed.

Results: Between January 2011 and September 2016, 18 patients with CBD or PBM underwent surgery in Tohoku University Hospital. Median age was 34 (16–70) years old and 16 patients were female. In these patients, 10 patients underwent MIS (laparoscopic: 5 patients, Robot-assisted: 5 patients), and 8 patients underwent open procedure. In patient's backgrounds, age, sex, and diagnosis were comparable between open and MIS group, however, body mass index was significantly lower in open group. In intraoperative outcomes, median blood loss of MIS group was 10 (3-140) g and significantly smaller than open [200 (38–602) g], although operation time was comparable. In postoperative course, there was no difference in morbidity, and there was no mortality. However, postoperative hospital stay was significantly shorter than open group [9.5 (7–37) vs. 16.5 (11–20) days: p =0.035].

Conclusion: In selected patients, laparoscopic or robot-assisted surgery are feasible for the treatment of PBM and CBD, and will be more useful approach than open procedure.

P126

Laparoscopic Exploration of Common Bile Duct with Primary Closure After Failed ERCP

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Introduction: Exploration are still performed by laparotomy with choledochotomy plus T tube placement after CBD stones removal subsequiently to failed ERCP in a large number of cases due to the technical challenges in the laparoscopic approach.

Methods: From January 2014 to August 2016, 49 consecutive patients with common bile duct stones (CBDS) including gallbladder in or not in situ, undergo to laparoscopic common bile duct exploration with primary closure after failed ERCP. Records were reviewed and analyzed for demographic data, mean operative time, blood loss, intra or postoperative complications and hospital stay.

Results: All procedures were carried out succesfully with no conversions registered
Mean operative time: 68.2 minutes
Blood loss was less than 15 cc
We registered no major complications or re-interventions
2 patients required stenting for biliary fistula with succesfull closure
Media hospital stay was 54 h

Conclusions: Laparoscopic common bile duct exploration with primary closure after failed ERCP is a feasible and safe surgical approach as demonstrated in this case series.

P127

Cancer of Unknown Primary (CUP) Presenting as a Spigelian Hernia: A Case Report

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Cancer of unknown primary (CUP) is a well-known entity that can present in a multitude of clinical presentations. We present a case of a 72 year old female that presented with an abdominal wall mass; on laparoscopy she was found to have a spigelian hernia due to an omental metastatic lesion from a CUP. Patient presented with complaints of pain in the left side of her abdomen and feeling a lump in that location for the past 7–10 days. On physical exam she was found to have a bulge on the left side of the abdomen just lateral to the rectus muscle, firm and immobile, it appeared to be outside of the abdominal wall. A CT scan of the abdomen and pelvis was obtained and showed a hernia as well as signs of carcinomatosis. She was scheduled for a diagnostic laparoscopy and an esophagogastroduodenoscopy (EGD). Her EGD was completely normal, but on her diagnostic laparoscopy she was noted to have diffuse tumor implants along the liver, diaphragm, peritoneum and omentum. The largest omental implant, measuring about 3×4 cm was herniated through the semilunar line of the abdominal fascia causing a spigelian hernia. Biopsies of the peritoneal and omental implants were obtained. The pathology report returned as metastatic adenocarcinoma of unknown origin. The cancer stained diffusely positive for CK7 and CK 20; suggestive of gastrointestinal, pancreatic, biliary or ovarian origin, less likely pulmonary origin. Her pathology report from her prior SOO showed both ovaries were benign serous cystadenoma and histologically no similarity to current pathology. She underwent CT chest/brain, colonoscopy, mammogram, and CA 19−9 level; all returned normal. She underwent a PET scan as well and only the known abdominal masses were suggestive of cancer. Decision was made to treat the patient as primary peritoneal malignancy with a platinum-taxane based chemotherapy regimen.

Cancer of unknown primary is a clinical entity that is not as uncommon as previously thought. As our patients CUP presented as a spigelian hernia this is quite a rare occurrence. Spigelian hernias are anterior abdominal wall hernias that occur at a defect adjacent to the semilunar line and they comprise only 0.12% of all abdominal wall hernias and are difficult to diagnose clinically depending on its location. Though rare concomitant disease processes, CUP as a spigelian hernia should be included in the differential diagnosis of anterior abdominal wall masses, even in the absence of symptoms suggestive of cancer.

P128

Endoscopic Finding of Colonic Spirochetosis in an Immunocompromised Patient

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Introduction: Spirochetes caused by Borrelia eurgyrata, Brachyspira aalborgi, and Serpulinaj pilosicoli, are known pathogens that infect the colon of humans resulting in watery diarrhea, abdominal pain, rectal bleeding and colonic distention. This case report describes the diagnosis and treatment of colonic spirochetosis in an HIV-positive male who presented with rectal bleeding and condyloma accuminata.
Case Report: A 46 year old black male presented to the general surgery clinic for evaluation of rectal bleeding and diarrhea. The patient's past medical history is significant for human immunodeficiency virus positive (CD4 count 200), Hepatitis B, Hepatitis C, herpetic esophagitis, tobacco abuse, intravenous drug use, and hypertension. The patient sees his Infectious Disease provider regularly and is on Genvoya for his HIV disease. Physical exam was significant for occult blood and several perianal condylomas. The patient then underwent colonoscopy demonstrating colonic spirochetosis at the cecum on biopsy. The patient complete an extended course of Amoxicillin, Doxycycline, and Metronidazole. The patient reported resolution of his symptoms following the completed course of antibiotics at time of follow up.
Conclusion: Colonic spirochetosis can represent an incidental finding in most patients, but in the case of an immunocompromised patient, it presents a unique challenge. Spirochetosis prevalence varies from 2.5%-16% in developed nations. Other studies have reported its incidence as 5% among healthy patients and up to 30% among immunocompetent homosexual men. Oral-anal transmission has been suggested as a possible route of infection, but has not been definitively studied. This case study is unique in that the patient has significant proximal colon manifestation of spirochetosis with a low CD4 count. Treatment with Metronidazole has demonstrated good efficacy in the elimination of spirochetes. An addition of Amoxicillin and Doxycycline was added for gram negative and atypical coverage respectively. This case highlights a rare, but complicating intra-colonic infection that presents a unqiue challenge in the immunocompromised host.

P129

Superior Mesenteric Artery Syndrome: A Case Report

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Introduction: Superior mesenteric artery syndrome is a rare entity of duodenal outflow obstruction caused by compression of the third portion of the duodenum between the superior mesenteric artery (SMA) and the aorta. The symptoms are variable and can result in intermittent, acute, or chronic partial or complete duodenal obstruction. It often poses a diagnostic dilemma.
Case Report: An 86 years old woman presented to the emergency department with 1.5 month history of worsening epigastric pain, abdominal fullness, and bilious emesis. She admitted to relief of pain with gentle massage of the epigastrium. Her past medical history was significant for infra-renal abdominal aortic aneurysm of 3.2 cm and laparoscopic cholecystectomy. Her vital signs were normal, BMI 17 kg/m^2, abdomen was soft, distended, and nontender. The placement of a nasogastric tube was followed by drainage of 1 L of bilious fluid. Laboratory data were within normal limits. A computed tomographic (CT) scan of the abdomen revealed marked proximal gastroduodenal distension with complete obstruction of the third portion of the duodenum. CT angiography identified an aortomesenteric angle of 22° (normal 38–65°). She failed conservative management. A laparoscopic loop duodenojejunostomy was performed without complications. Oral caloric and nutritional supplementation was started and she was discharged from the hospital. She continues to do well at 2-month follow up.
Discussion: Any process that narrows the aortomesenteric angle can lead to SMA syndrome, including weight loss leading to depletion of fat pad around the SMA; scoliosis surgery resulting in lengthening of the spine; abdominal surgeries, such as ileal J-pouch anastomosis, that result in caudal pull of the small bowel mesentery. The diagnosis of SMA syndrome is based on clinical symptoms and radiologic evidence of obstruction. CT criteria include an aortomesenteric angle of less than 25 degrees and an aortomesenteric distance of less than 8 mm. Traditionally treatment has been conservative consisting of nasogastric decompression and hyperalimentation followed by oral feedings. Correcting the geometrical configuration, as achieved in some patient cases by weight gain and redeveloping the fat cushion around the SMA, may be associated with prolonged therapy, long hospital stays, and high costs. Conservative management is associated with low success rate in patients with chronic obstructive symptoms. Surgical options have evolved. Previously duodenal mobilization, known was Strong's procedure, was the operation of choice. However it has a 25% failure rate. Current literature supports duodenojejunostomy as the operation of choice with a success rate up to 90%.

P130

Unusual Complication in Use of Permanent Tack in Laparoscopic Surgery

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Laparoscopic repair with mesh placement has become a common method of ventral or incisional hernia repair over the years. Intraperitoneal onlay mesh placement is commonly performed laparoscopically, and the mesh is generally fixated to the abdominal wall using transabdominal sutures, tacks, or both of these. However, long term risk of non-absorbable tack in laparoscopic hernia repair is not completely known.
A 84 year old female presented with chronic infected mesh and associated abscess. Patient had history of multiple laparatomies and underwent laparoscopic ventral hernia repair with synthetic mesh six years ago. Her past medical history included diabetes mellitus and obesity. The infection and abscess had been treated with percutaneous drainage but failed. She was scheduled for laparoscopic excision of the mesh and ventral hernia repair. Peritoneum was entered laparoscopically, and dense omental adhesion to the mesh was taken down. A loop of incarcerated small bowel was identified with multiple spiral titanium tacks eroding through the bowel wall. There was a fistula between the abscess and the bowel where the tacks were eroded. In addition, multiple serosal injuries were noted along the incarcerated segments of the small bowel. The mesh was bunched within the hernia sac. The case was converted to open laparotomy due to extensive adhesion, and the mesh was excised. The incarcerated and eroded small bowel was resected with side-by-side anastomosis. Postoperatively, she developed an intraabdominal abscess which was treated with IV antibiotics and drainage. To the current date, she is doing well without further infection and recurrence.
In hernia repair with mesh placement, the ideal fixation method remains a highly debated topic. At this time there is no ideal method or device that has been identified. There are cases of complications using tacks in the literature, including small bowel obstruction, tack hernia, volvulus, liver hemorrhage, hemopericardium, and etc. This case of a chronically infected mesh with tack erosion into the small bowel demonstrates an unusual complication of use of spiral titanium tacks for mesh repair of a ventral hernia. Additional research is needed to explore the long term risks and benefits of the alternatives.

P131

Veno-Venous Extra Corporeal Membrane Oxygenation as Rescue Therapy for Severe Aspiration Pneumonitis After Bariatric Surgery

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Introduction: Veno-venous extra corporeal membrane oxygenation (ECMO) in the non-cardiac, adult patient is not commonly used in treatment of overwhelming aspiration pneumonitis.
Case Report: We report two patients who developed respiratory failure from severe aspiration pneumonitis within 2 months of undergoing a roux-en-Y gastric bypass. Both these patients failed conventional treatment and underwent early rescue with veno-venous EMCO. Both patients survived and returned to baseline functional status.
Discussion: This is one of the first successful reports of veno-venous ECMO being used as rescue therapy for massive aspiration pneumonitis after bariatric surgery. Veno-venous ECMO should be considered early for bariatric patients with severe aspiration penumonitis not responding to conventional treatment strategies.

P132

Ileosigmoid Knot: A Rare Pediatric Surgical Emergency

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Introduction: Ileosigmoid Knot (ISK) is a rare cause of bowel obstruction that leads to necrosis. In this condition, the ileum wraps around the sigmoid colon causing a knot and strangulation of both structures. ISK is extremely rare in North America; most cases are reported in Asia and Africa. Furthermore, ISK typically presents in adults in their fourth decade or older. Here we present a case of an ileosigmoid knot in a 14-year-old male.
Case Report: A 14-year-old male presented with a chief complaint of sharp abdominal pain of 2 h duration associated with multiple episodes of vomiting. Past medical history included chronic constipation for which he eats a diet high in fiber in addition to using enemas regularly. On physical exam the patient was febrile and his abdomen was moderately distended with tympany, tenderness, guarding, and rebound tenderness. His white blood count was 25.7 k/ul and lactic acid level was 3.5 mmol/l. A CT scan of the abdomen and pelvis found markedly distended loops and thickened walls of small bowel in the mid-abdomen suspicious for midgut volvulus versus internal hernia. The patient was taken to the operating room for an exploratory laparotomy. Intra-operative findings included serosanguinous ascites with ischemic loops of distal small bowel and sigmoid colon. Involved portions of proximal and distal small bowel were resected along with the sigmoid colon. The remaining small bowel was anastomosed in a side-to-side fashion. The mesentery of small bowel was closed to prevent internal herniation. The proximal and distal sigmoid colon was anastomosed in a side-to-side fashion. The peritoneal cavity was irrigated and the abdomen was closed. Since his operation, our patient has been free of any complications and has advanced to a regular diet as tolerated.
Discussion: Ileosigmoid knot usually occurs in adult males in the fourth decade of life. There have been few reports of ISK in children. The specific etiology of ISK is not known. It is theorized that some anatomical features are involved in ISK including elongated small intestine mesentery, a hyper-mobile small intestine, and a redundant sigmoid colon. The small intestine descends and then wraps around the sigmoid colon causing early strangulation of both structures. Pre-operative diagnosis of ISK is difficult and should be considered when there is radiographic evidence of double closed-loop obstruction with the sigmoid being in the right upper quadrant and the small intestine being in the left upper quadrant.

P133

Reoperation of a Nissen Fundoplication by Hybrid Minilaparoscopic Technique: Case Report

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Introduction: Nissen fundoplication is the most common technique used for the treatment of GERD. The surgical technique is based in the 360° involvement of the distal esophagus by the gastric fundus, which behave as an anti-reflux valve. This case reports the reoperation for a Nissen fundoplication with a hybrid minilaparoscopic technique.
Case Report: A female patient was admitted in the hospital with a history of dysphagia for solids for 5 years, starting after a gastroesophageal fundoplication to resolve GERD. Patient reported significant weight loss (21 kg in the first 50 postoperative days). Patient developed a peptic stricture of the distal esophagus, and several attempts of esophageal balloon dilation were performed without success. Physical examination showed a flat abdomen, with pain in the epigastric area, without signs of peritonitis. A hybrid minilaparoscopic approach was performed using a 10 mm optics in the umbilical incision, 2 minilaparoscopic 3 mm trocars, and a 5 mm trocar in the left upper quadrant. The pneumoperitoneum was created by the open technique. A moderate dilation of the distal esophagus with inflammatory adhesions, and an incomplete valve with esophageal stricture were observed. During the surgery, the release of the gastric fundus and body was performed using an ultrasonic device to ligate the gastroesplenic and gastrohepatic ligaments. Then, the esophagus and its pillars were dissected with a subsequent repair of the herniary failure in the esophageal hiatus. Transoperatory endoscopy was performed to identification of the Z line. A new anti-reflux valve (Nissen fundoplication) was created with the gastric fundus using 2−0 Vicryl. A biosynthetic mesh was also fixed with 2−0 Vicryl for the treatment of the diaphragmatic hernia. The surgery was uneventful. The patient had no major blood loss, no further complications, and was discharged 2 days after surgery in good clinical conditions.
Conclusions: The Hybrid minilaparoscopic approach showed to be safe and effective for this procedure. The known advantages of minilaparoscopy such as less trauma, better visualization, dexterity, and better aesthetics were observed.

P134

Endoscopic vs Surgical Management for a Gastric Lipoma: A Case Report

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Introduction: Gastrointestinal lipomas are a rare entity that can arise in portions of the gastrointestinal tract. The most common location is the colon, followed by the small intestine, stomach, and esophagus respectively. Gastric lipomas comprise only 5% of lipomas found in the gastrointestinal tract and less than 3% of benign gastric neoplasms. These submucosal tumors, which are comprised of mature adipose tissue, are typically asymptomatic and usually found incidentally on abdominal imaging or upper endoscopy. In symptomatic patients, surgical resection remains the treatment, however with the advent of new techniques there have been numerous reports of endoscopic resection. This case report looks at a patient with a symptomatic gastric lipoma and discusses the literature regarding the treatment of these rare neoplasms.
Case Report: 68 y/o M presented with two-day history of melenic stools and lethargy. Hemoglobin on admission was 8.2. The patient underwent an EGD which revealed a submucosal gastric mass with a central mucosal ulceration. There was no stigmata of recent bleeding. A CT scan revealed a 6.5 cm submucosal gastric mass consistent with a gastric lipoma. Due to the large size of this gastric lipoma, it was not amenable to endoscopic submucosal resection. Through an upper midline laparotomy, the stomach was mobilized allowing for exposure of the mass located on the posterior aspect of the greater curvature. The serosa overlying the mass was incised with electrocautery and the mass was dissected from surrounding tissue. The mucosa was noted to be adherent to the lipoma therefore the lipoma and mucosa were lifted from surrounding tissue and transected with a TA-90 stapler. Final pathology revealed a 7.5 cm submucosal lipoma with overlying mucosal ulcerations. Immunostains for C-kit and DOG1 were negative.
Discussion: There is no general consensus in surgical literature regarding the best management of symptomatic gastric lipomas. Due to the rare nature of these submucosal tumors, much of the literature available is in the form of either small retrospective studies or case reports. With the advent of new endoscopic techniques and instruments there have been numerous reports of endoscopic resection utilizing techniques such as snare ligation, partial resection, and endoscopic submucosal dissection (ESD). ESD has shown to be effective in removal of submucosal gastric tumors less than 5 cm, with resection rates approaching 92%. With tumors larger than 5 cm, there is a higher incidence of incomplete resection, hemorrhage, and gastric perforation; therefore, formal surgical resection remains the treatment of choice.

P135

Strangulated Internal Herniation with Bowel Ischemia Following Abdominoplasty: A Case Series and Review of the Literature

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Background: Internal hernia following Laparoscopic Roux-en Y Gastric Bypass (LRYGB) is a well reported complication that can result in significant morbidity. Abdominoplasty is a commonly performed body contouring procedure following massive weight loss after LRYGB. We report on two cases of internal hernia withextensive bowel ischemia that occurred immediately following abdominoplasty in patients withprevious history of LRYGB.
Case Series: The patients were 52-year old and 32-year old females who underwent LRYGB three and five years prior to presentation to the emergency department (ED) with severe, acute abdominal pain following uncomplicated outpatient abdominoplasty. Prior to this presentation, both patients experienced excellent weight loss (current BMIs were 24.9 kg/m2 and 26.7 kg/m2 respectively) with improvement in medical comorbidities and quality of life. Based on the suspicion of advanced bowel ischemia, in both cases, patients were taken to the operating room for take-down of abdominoplasty and emergent laparotomy.
Intraoperatively, both patients were found to have advanced bowel ischemia due to strangulated internal hernias through the mesenteric (Petersen's space) defects. These findings required management with reduction of the internal hernias, open abdomen and second look laparotomy in 48 and 24 h respectively. After determining bowel recovery and viability, and no need for resection, laparostomy wounds (fascia and abdominoplasty) were closed. Following intensive care monitoring, both patients had uneventful further recovery and were discharged home on postoperative days seven and eight.
Conclusion: Strangulated internal herniation with bowel ischemia following abdominoplasty in patients with prior LRYGB can be devastating and life threatening. Both plastic surgeons and bariatric surgeons should be aware of this potential complication in order to detection and treat in a timely fashion. We propose a mechanism by which a preexisting and asymptomatic internal hernia can progress to bowel ischemia and strangulation following fascial placation, which tightens of the intra-abdominal compartment resulting in a "narrow neck" internal defect leading to mesenteric vascular compromise. A low index of suspicion is mandatory in post-abdominoplasty patients presenting with sudden and severe abdominal pain, elevated intra-abdominal pressures may accelerate progression to bowel ischemia. Emergent operative intervention, release of fascial plication and reduction and repair of internal herniation are critical. If massive bowel ischemia is present, open abdomen - laparostomy with a second look laparotomy and bowel reevaluation may be necessary in order to minimize further morbidity of this rare phenomenon.
Keywords: RY Gastric Bypass, internal hernia, abdominoplasty, intestinal ischemia, massive bowel resection, short gut, fascial plication

P136

Uncommon Presentation of Endometrioid Adenocarcinoma as an Abdominal Wall Mass

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Initial presentation or recurrence of gynecological malignancies as a soft tissue mass is extremely uncommon and there is limited literature describing the current data. This case presents a 74 year old black female, with surgical history of total hysterectomy and bilateral salpingo-oophorectomy for endometrial cancer. Per FIGO cancer staging system, her cancer was classified at stage II, high-grade serous cell endometrioid carcinoma. Three years later, she presents with a slow growing five centimeter mass located on her left anterior abdomen. Given the history of malignancy, the patient underwent computed tomography of the abdomen and pelvis which did not report any obvious malignancies or lymphadenopathy. Afterwards, the mass underwent fine needle aspiration biopsy and showed an epithelial neoplasm with papillary features, likely of Mullerian origin. An excisional biopsy was performed with final pathology reporting a $5.4 \times 4.4 \times 4.0$ centimeter mass, high-grade endometrioid adenocarcinoma with papillary architecture. The mass was confirmed to be a primary Mullerian neoplasm, positive for CK7, PAX8, and ER tumor markers. The patient was referred to be evaluated by oncology for further work up.

P137

Laparoscopic Evacuation of Retroperitoneal Hematoma via Anterior Extraperitoneal Approach

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Introduction: Retroperitoneal hematoma is an uncommon condition seldom requiring operative intervention. Uncomplicated retroperitoneal hematoma is typically treated with observation, transfusion and correction of coagulopathy. In more complex cases, radiologic intervention and even operative intervention may be required. We describe a case of complex retroperitoneal hematoma addressed laparoscopically through an anterior extraperitoneal approach.
Methods and Procedures: A 69-year-old-male on rivaroxiban for atrial fibrillation presented to the Emergency Department with 24 h of severe left upper thigh, flank, and abdominal pain. On exam he had left abdominal guarding and rebound tenderness. His INR was 3.0 with hemoglobin 6.2 g/dL, though he was hypertensive. Abdominal CT demonstrated a large left retroperitoneal hematoma with active extravasation. He responded to fluid resuscitation and transfusion, followed by Interventional Radiology coiling and gel foam embolization of the left fifth lumbar and left internal iliac arteries. Despite embolization, he continued to have severe left thigh pain and 2/5 strength in hip flexion and knee extension, suggesting progressive femoral nerve dysfunction. He was taken to the operating room for laparoscopic evacuation of the hematoma using an anterior extraperitoneal approach. Entry to the preperitoneal plane was accomplished using a standard TEP balloon dissector and port placement. Dissection into the lateral preperitoneal space allowed visualization and evacuation of the large hematoma with suction and a 10 mm biopsy spoon forceps. Closed suction drains were placed. There were no intraoperative complications.
Results: No further bleeding complications arose and the patient was discharged to home on postoperative day 4 with improved range of motion of his left leg and appropriate analgesia. Drains were removed prior to discharge. By his 4-week follow-up, numbness and tingling improved, though he continued to have some pain and weakness necessitating outpatient physical therapy.

P138

Acute Abdomen Secondary to Renal Artery Aneurysm Rupture

Mauricio Pasten, MD, Caja Petrolera de Salud

Male Patient 44 years old, with sudden abdominal pain localize in right inferior quadrant and lumbar region, ultrasound was perform reported normal, WBC 14000 HB15, rest of the laboratory and vital signs normal. We decided to perform a CT scan that shows a liquid collection in retroperitoneum with no other important sign. Patient with no history of previous diseases, no trauma reported. We decided to perform a laparotomy, doing an incision in the midline infra umbilicus, we found all organs without pathology except for Meckel diverticulum that was not complicated, during the surgery we found a retroperitoneal hematoma in the right hemi abdomen that was temporally controlled, with no hemodynamic changes. We decide to perform a CT angiogram that shows a renal artery aneurism rupture, so we prolong the incision in the midline and we got access to the retroperitoneal region, finding a 2 cm saccular renal artery with a rupture. A right nephrectomy was perform that involves this renal artery saccular region, a repair in vena cava was perform and an incidental appendectomy. We perform exploration of the abdomen, no other organs were involved, we left drainages localize in right retroperitoneum. Patient was admitted in the intensive care unit for resuscitation and renal replacement therapy, the patient stabilized his vital sings and also the hypovolemic shock was controlled. The patient stay in UCI for 4 days, in good conditions, adequate urinary function, and creatinine values normal. He stay in surgery unit for one week more, tolerating oral diet, in good conditions. Follow up of the patient was perform in surgery consult.

P139

Angled Glidewires and Angiographic Catheters in the Management of a Chronic Gastrocutaneous Fistula Resulting from a Sleeve Gastrectomy Staple Line Leak: A Case Report

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Introduction: Management of a chronic gastrocutaneous fistula (GCF) secondary to sleeve gastrectomy (SG) staple line leaks include an arsenal of non-surgical and surgical approaches. Focusing on non-surgical methods, a common approach is controlling contamination via external drainage and exclusion of the gastric opening using covered esophageal stents. Less commonly, endoscopic injection of fibrin sealants into the tract either intraluminally or percutaneously is also employed. While these methods have been successful for short/straight tracts, they are less effective when tracts are longer and/or more tortuous. We present the use of angled glidewires and angiographic catheters to delineate and, with the application of fibrin glue, obliterate a chronic, tortuous GCF secondary to a sleeve leak.
Case Description: A 51 year-old female underwent a SG in August 2015, which was complicated by a proximal staple line leak resulting in a GCF. The fistula persisted for 12 months despite bowel rest, jejunostomy tube feeds, two attempts at endoscopic placement of covered esophageal stents, placement of a T-tube in the fistula tract, and injection of fibrin sealant into the gastric and cutaneous openings. Her care was transferred in July 2016, and due to her inability to tolerate the stent and persistent fistula output, a fistulogram was obtained. Imaging demonstrated a large peri-gastric cavity that communicated with the gastric sleeve and skin, and a previously placed esophageal stent (Fig. 1). Given the tortuous nature of the tract, and inability to access it endoscopically, we opted to use to use a 0.89 mm flexible angled glidewire to access the tract and the large peri-gastric cavity from the cutaneous opening (Fig. 2). A 6 Fr catheter was introduced over the wire and the anatomy of the tract/cavity was delineated with contrast agent (Fig. 3). Twenty milliliters of fibrin sealant was injected into the tract and the stent was removed. Fibrin was identified endoscopically within the lumen of the sleeve at the level of the leak, confirming tract filling (Fig. 4). Follow-up upper GI swallow demonstrated a significantly smaller cavity and a narrower tract, with <10 cc output from the cutaneous opening. The patient remained on tube feeds and at her 2 week clinic visit demonstrated cessation of output at the level of the skin indicating healing.
Conclusion: Angled glidewires, angiographic catheters, and application of fibrin glue from the external skin opening are useful tools/approaches for delineation and obliteration of tortuous GCFs secondary to leaks after a SG.

Figure 1: Fistulogram demonstrates a large peri-gastric cavity (bracket) and a tortuous fistula tract (yellow arrows). A previously placed esophageal stent (red arror) is also seen.

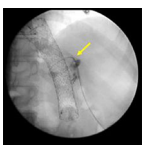

Figure 2: Angled glidewire (arrow) was used to cannulate the fistula tract

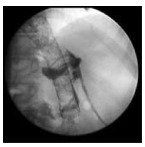

Figure 3: Angiographic catheter was advanced over the wire allowing for accurate delineation of the fistula tract using iohexol contrast agen and direct application of fibrin sealant along the length of the tract.

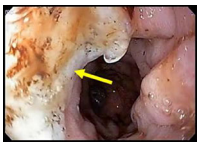

Figure 4: Fibrin sealant seen at the internal opening of the GCF (arrow)

P140

Idiopathic Segmental Infarction of the Greater Omentum Simulating Acute Appendicitis: Diagnostic Challenge and Efficient Laparoscopic Treatment. Case Report

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Introduction: Idiopathic segmental infarction of the greater omentum (ISIGO) is a rare cause of acute abdomen. Patients, typically males in their fifties, present with abdominal pain located in the right quadrants, mimicking acute cholecystitis, appendicitis or gynaecological pathological conditions in females. Before the liberal use of the CT, the diagnosis was made mostly intra operatively. Actually, the conservative treatment is widely proposed unless atypical radiologic findings, failure of the medical management or unstable patient.
Case Report: 30 yo male presented in the emergency department with right para umbilical region and right iliac fossa (RIF) pain since 6 days, chills and anorexia. He was apyretic and had normal blood pressure and heart rate. The physical examination revealed tenderness and rebound in the RIF and right flank. Blood tests showed CRP 57 mg/l and normal WBC count. The US examination: intra-peritoneal fluid in the RIF without visible caecal appendix. The CT scan confirmed the presence of intra-abdominal fluid in the RIF, a slightly enlarged appendix and an inflammatory mass located in the right para umbilical region, corresponding probably to an ISIGO. In these conditions, an emergency laparoscopy was undertaken for diagnostic confirmation. Bloody ascites was found with a normal appendix and a typical segmental necrosis of the right part of the omentum. We performed laparoscopic omental resection and appendectomy. The patient was discharged on postoperative day 1. The pathological examination of the specimens confirmed the diagnosis. The patient's recovery was uneventful.
Conclusion: The management of the ISIGO is usually non-operative. Failed conservative treatment, worsening (deteriorating) condition or unclear imaging findings prompt laparoscopic abdominal exploration. Bloody ascites and segmental necrosis of the omentum are typically found. Treatment consists in the removal of the diseased omentum. The laparoscopy proved to be a diagnostic and therapeutic tool. The minimal invasive surgery offers substantial advantages compared to laparotomy, as: shorter hospital stay, reduced pain medication, lower rates of postoperative complications, less onerous and greater patient satisfaction

P141

Laparoscopic Considerations in the Management of Congenital Gallbladder Duplication

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Introduction: Congenital gallbladder duplication (CGD) is a rare anatomic anomaly that occurs when there is abnormal embryologic development during gestation. While numerous cadaveric studies have estimated the incidence to occur in 1: 4,000 individuals, the true incidence is unknown. For patients with benign gallbladder disease, Laparoscopic Cholecystectomy (LC) has become the standard of care. Many variations of biliary anatomy have been described in the literature with aberrant anatomy having a positive correlation with bile duct injuries. This case report looks at a patient with benign gallbladder disease who was found to have CGD and discusses laparoscopic considerations that should be taken into account during LC.
Case: 32 year old female presented with recurrent right upper quadrant pain for one year. The patient underwent an ultrasound that showed cholelithiasis within two fluid filled structures. All hematologic and chemistry panels were within normal limits. A MRI/MRCP was ordered to evaluate the anatomy more precisely, which revealed two completely separate gallbladders draining into a common cystic duct. The patient underwent a successful elective laparoscopic cholecystectomy and was discharged home later in the afternoon.
Discussion: Gallbladder duplication requires special considerations intra-operatively in order to avoid potential complications. There have been numerous reports detailing the various forms of biliary anatomy encountered in patients with CGD. Y-type cystic anatomy, in which there is a common insertion of the cystic duct into the extrahepatic bile duct and H-type cystic anatomy, in which there are separate insertions into the extrahepatic bile duct remain the most common forms. Concurrent removal of both gallbladders during surgery is recommended in order to prevent symptoms of biliary colic or cholecystitis in the remaining gallbladder. Due to the atypical anatomy, patients with gallbladder duplication have higher incidences of cystic artery avulsion, postoperative bile leaks, and bile duct injuries. Intraoperative cholangiography is benificial in better defining the abnormal biliary system associated with CGD and is useful in preventing complications.

P142

An Unusual Case of Colonic Schwannoma with Malignant Degeneration

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Schwannomas are tumors arising from Schwann cells in the peripheral nervous system. Their presence in the gastrointestinal system is rare. Colonic schwannomas are an extremely rare variant accounting for less than 6% of mesenchymal tumors of the colon and less than 1% of all subepithelial lesions. It is estimated that fewer than a hundred cases of colonic schwannoma have been reported in the medical literature. Schwannomas of the gastrointestinal tract arise from the submucosa or the muscular propria where peripheral nerve sheaths of Auerbach's or Meissner's nerve plexuses exist. Although generally thought of as benign process, very few case reports describe local recurrence after resection and/or malignant degeneration. They pose a diagnostic challenge to the pathologist, radiologist and surgeons. Colonic schwannomas can mimic other malignancies (i.e. Gastro-Intestinal Stromal Tumors and Gastrointestinal Autonomic Nerve Tumors), which also arise from Schwann cells in the enteric nerve plexus. Therefore, immunohistochemical staining techniques are essential in diagnosing gastrointestinal schwannomas. Colonic schwannomas show diffusely strong positivity for S-100 and vimentin. They are typically negative for CD34, CD117, desmin, c-Kit and actin. Their submucosal location also poses a diagnostic dilemma endoscopically. A colonic schwannoma's appearance is frequently inconsistent but may appear well-circumscribed, sessile, and nodular with occasional ulceration. Due to their location in the muscular propria, it is difficult to obtain an adequate tissue sample endoscopically. Accurate diagnosis is imperative as the prognosis is vastly different for other tumors included in the differential diagnosis. This paper presents the case of a 56 year-old female who underwent a laparoscopic colon resection for definitive management of a colonic schwannoma exhibiting degenerative features and servers as a comprehensive literature review of this rare colonic tumor.

P143

Xanthogranulomatous Cholecystitis: A Challenging Laparoscopic Cholecystectomy 3 Case Report

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Introduction: Even if nowadays is considered a routine, standardized and well mastered procedure, laparoscopic cholecystectomy may become a difficult challenge in patients presenting xanthogranulomatous cholecystitis (XGC). XGC is a rare variant of cholecystitis (3%, higher incidence in Indian patients), with a rate of coexisting carcinoma ranging from 2 to 13%. Pre-operative symptoms and signs are non-characteristic and the radiological findings specific for XGC or discriminative between XGC and carcinoma are infrequently mentioned. In most of the cases, the diagnosis is histopathological. The laparoscopic management of the XGC has an important conversion rate (30–60%) and a higher post-operative complication percentage.
Methods: We report 3 cases of patients presenting with XGC: 1 male, 2 females, aged respectively 78, 44 and 78 years. Clinical presentation and blood test were specific for acute cholecystitis.
We performed laparoscopic cholecystectomies, which proved to be laborious with a difficult identification of the anatomic landmarks. Intraoperative cholangiography was necessary in 1 case. Operative was time sensibly longer than a routine cholecystectomy for acute cholecystitis.
Results: No conversion to open surgery was necessary and the length of hospital stay was between 2 and 5 days. No postoperative morbidity was recorded. Histopathological examination confirmed XGC in the 3 cases ruling definitively out gallbladder cancer.
Conclusion: Difficult identification and dissection of the anatomical landmarks, prolonged operative time are common features of laparoscopic cholecystectomy for XGC. The final diagnosis is histopathological; an intraoperative frozen section would be suitable in order to eventually identify a gallbladder neoplasia. The laparoscopic cholecystectomy for XGC is feasible, safe, but challenging.

P144

Isolated Tuberculosis of Spleen in an Immunocompetent Patient

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Background: Isolated tuberculosis of spleen is a rare entity, though spleen is commonly involved as a part of miliary and /or disseminated tuberculosis.
Materials and Methods: A thirty-six year female presented with weight loss and pain left upper quadrant abdomen for 8 months duration. She denied any history of fever, night sweats and cough. There was no history of diarrhea or hematochezia. There was no pallor and lymhadenopathy. On abdominal examination, spleen was palpable about 6 cm below the left costal margin along the midclavicular line. Hemogram was normal except for increased erythrocyte sedimentation rate. Her immunological assays were unremarkable
Ultrasound of the abdomen revealed multiple hypoechoic lesions in an enlarged spleen. She was subjected to a contrast-enhanced computed tomography of the abdomen, which revealed irregular, multiloculated hypodense lesions in the spleen with displacemnet of the pancreatic tail and compression of the left kidney. No hepatomegaly, intraabdominal lymphadenopathy or ascites was noted. Chest X-ray did not show any significant lesion. USG-guided fine needle aspiration from the lesions yielded only necrotic tissues and was inconclusive.
Results: A diagnostic laparascopy revealed a hugely enlarged spleen with adhesions of its lateral surface to parieties. Laparoscopic splenectomy was performed and tissue sent for histopathological examination. Histopathological examination revealed multiple areas of epoitheliod histiocytes alongwith scattered multinucleated Langhan type giant cells. Stain for acid-fast bacilli was positive. Patient has been on national regime of anti-tubercular therapy and is symptom-free and doing well on her second follow-up visit spaced at completion of initiation phase of 2 months.
Conclusion : Isolated splenic tuberculosis is rare, especially in immunocompetent individuals, but should be considered in space-occupying lesions of spleen even with nonspecific symptoms. Splenectomy may be the only option to provide material for diagnostic purpose and treatment.

P145

Pancreatic Pseudocyst: A Complex Problem with a Sequelae of Recurrent Pancreatitis

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Pancreatitis has traditionally been a very difficult disease to manage surgically. More recently, the development has been finding minimally invasive methods of diagnosing and treating complex pancreatitis process that is refractory to medical management.
We present a case of severe gallstone pancreatitis complicated by pseuocyst formation in a 64 years old female patient. Pseudocyst was noted on CT scans performed after she failed to recover in an expected fashion with appropriate supportive care. Patient eventually became symptom free and discharged from the hospital. Two month later, she underwent definitive concomitant laparoscopic endoscopy-assisted cysto-gastrostomy and laparoscopic cholecystectomy. Patient recovered post-operatively without any initial complications but developed recurrent pancreatitis 6 month later. Conventional imaging during that hospital stay did not identify the cause of the recurrence. An outpatient endoscopic ultrasound was performed after that acute episode. Ultrasound study showed a pancreatic head with dominant dorsal duct, an absent pancreatic body with hyperechoic scar in its place, and a remnant pancreatic tail with a patent duct that is not in communication with remaining pancreas. This remnant tail was believed to be the source of the recurrent pancreatitis
To date, the literatures has predominantly focused on the progressive advancement in the treatment of pancreatic pseudocyst. There is minimal description of combined minimally invasive cysto-gastrostomy and cholecystectomy. This is the first description of a cysto-gastostomy performed using transgastric ports and endoscopic assistance, hence limiting the extent of gastrostomy. This also describes both procedures performed using the same port sites.
Our case demonstrates the utility of combined endoscopic and laparoscopic approaches in the approach of complex pancreatic diseases. This patient underwent laparoscopic and endoscopic treatment for her pancreatic disease. She also had a successful use of endoscopic ultrasound in diagnosing recurrent pancreatitis that could not be identified by traditional imaging.
The days of high mortality open surgery is limited. The future of complex pancreatic disease is in the hands of laparoscopic surgeons and the endoscopists.

P146

Beware: Preduodenal Portal Vein

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A 53 year-old woman was referred for evaluation of congenital intestinal malrotation. First diagnosed at the age of 16 years, repair was deferred due to minimal symptoms. Worsening dysphagia led to an UGI with small bowel follow through that showed complete malrotation with a distended duodenum. She therefore elected to undergo a laparoscopic Ladd's procedure. Intraoperatively upon dissection of adhesions anterior to the duodenum a large structure was identified and then dissected into the hilum and towards the pancreas; correlation with a prior CT scan demonstrated it was the portal vein.

Preduodenal portal vein is a rare anomaly and although generally asymptomatic may occasionally cause duodenal obstruction or may coexist with other anomalies as in the case of this patient. Although embryological anomalies are rare, surgeons must be aware of their possibilities and be able to recognize them to avoid major intraoperative injuries.

P147

Why is My Gastric Band Patient Still Gaining Weight?

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Introduction: Lipomas are well-defined, encapsulated benign tumor of mature adipose tissue commonly located in the subdermal tissues of the trunk and extremities. However, primary intestinal mesenteric lipomas are rare. They are usually asymptomatic but a few can cause partial intestinal obstruction and even rarer to cause volvulus or complete intestinal obstruction due to torsion. We present a case of a male patient who previously underwent a successful laparoscopic adjustable band presenting with a progressively enlarging palpable abdominal mass and found to be a giant mesenteric lipoma.

Case Presentation: A 52 year-old male with a history of morbid obesity who underwent a laparoscopic adjustable gastric band 8 years ago presented with complaints of recent weight gain and abdominal fullness despite initial success with his band. Workup revealed a 24 cm tumor appearing to be mesenteric in origin on computed tomography (CT). An exploratory laparotomy was performed, and the mesenteric mass was removed in its entirety, measuring 24×18 cm and weighing 4.5 lbs. Its blood supply was derived from a single large vessel that appeared to arise from the epiploica of the sigmoid colon. Histopathology showed signs of fat necrosis within the core of the essentially giant lipoma. The patient tolerated the procedure well; his diet was resumed upon return of bowel function and was discharged on post-operative day 3.

Discussion: A lipoma is a slow-growing benign mesenchymal tumor of mature adipose cells. It is commonly found in the subdermal tissues of the trunk and extremities. Primary mesenteric lipoma is rare. Literature review performed by Cha et al. at 2007 showed less than 30 reported cases of mesenteric lipomas. Usually, these benign lesions are asymptomatic but can infrequently cause abdominal discomfort or an acute intestinal obstruction due to volvulus.

On ultrasound and CT, lipomas are homogenous with slight hyperechoic smooth outlines. With larger lipomas, it can compress adjacent tissues or organs and become heterogeneous making them indistinguishable from malignant liposarcoma. Thus, when evaluating a mesenteric mass, other fat attenuation processes should be considered including liposarcoma, lipoblastoma, lymphangiomas and cavitating mesenteric lymph node syndrome.

Conclusion: Mesenteric lipoma is a rare benign tumor of adipose tissue. They can be diagnosed using ultrasonography or CT, showing the mass as a smooth, well-defined homogenous echogenic entity. Complete surgical excision is the main treatment with a good prognosis.

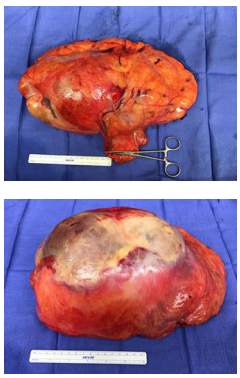

Fig. 1 **a–d** Intraoperative findings

P148

Unusual Complication of Esophageal Stents; Fracture of the Stent and Partial Stent Migration

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Today, in the treatment of malign esophageal stricture, self-expandable stents applied through endoscopic means is widely used. Although such applications are conducted in experienced centers. In such applications complications arising from the application such as bleeding, stent malpositioning, perforation of the esophagus, stent occlusion distal migration of the stent may occur. In this case presentation, the diagnosis and treatment applied to a 63 year old female patient, who admitted to our clinic as a result of acute dysphagia symptoms due to a stent fracture in a stent applied in the second month of a post stent application and esophageal stricture due to inoperable esophagus cancer, is shown. Besides the diagnosis of situations such as recurrence of dysphagia symptoms in a post stent situation generally resulting in stent migration and tumor growth over or into the stent, fracture of the stent and partial stent migration which is rare complication should be kept in consideration.

P149

A Case of Video-Assisted Thoracoscopic Transdiaphragmatic Surgery with a Preoperative Three-Dimensional Computed Tomography Visualization System for Lung Metastasis and Subphrenic Dissemination of Rectal Carcinoma

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A 74-year-old man, who had previously undergone low anterior resection for rectal cancer and segmental hepatectomy (S5 and S6) for liver metastases approximately 2 years previously, was observed to have a solitary lung nodule and a nodule located between the diaphragm and right lobe of the liver.

We planned a transdiaphragmatic approach using video-assisted thoracoscopic surgery for the resection of the lesions to evade the adhesion by hepatectomizing it of the last time.

The operation was performed by using a preoperative three-dimensional (3D)-computed tomography (CT) visualization system (SYNAPSE VINCENT). Specifically, the appropriate position of the port for thoracoscopic surgery was selected and the position of the nodule under the diaphragm was confirmed using the system.

During the operation, we first performed thoracoscopic partial resection of the lung and confirmed the portion of the diaphragm located directly above the nodule by using intraoperative thoracoscopic ultrasonography. Subsequently, we cut and opened the diaphragm and resected the subphrenic nodule using ultrasonic incision and a coagulation device.

The post-operative pathological diagnoses were lung metastasis and pleural dissemination derived from rectal cancer.

In conclusion, the approach through the diaphragm using thoracoscopy is useful and safe for tumor resection in the subphrenic area, and the operation performed by using a preoperative 3D-CT visualization system facilitates the identification of accurate port positions for the thoracoscope, and confirms the location of the tumor.

P150

Successful Treatment of Laparoscopic Lateral Segmentectomy for Intra-hepatic Port-Systemic Shunt Transection in an Infantile Case

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Case: A one-year-old girl was prenatally found to have abnormal vascular formation via ultrasonography, which was most likely a port systemic shunt in the liver. After a cesarean section delivery at full term, a 4.8-mm abnormal vessel was detected in the left lobe of the liver. Using enhanced computed tomography, this abnormal vessel was diagnosed as a port systemic shunt between segment 3 of the portal vein and the left hepatic vein. The serum transaminase and galactose levels were within the normal range, but the NH3 levels were elevated slightly above the normal range. The patient was observed conservatively in the hope of spontaneous closure of the shunt vessel, but the shunt vessel gradually enlarged into an aneurysm shape. The serum NH3 and total bile acid levels were in the abnormal range despite a normal liver function (transaminase). In addition, the patient was found to have progressive metabolic acidosis based on the lactate data, so surgical intervention was applied to close the shunt vessel.
Operative findings and procedure: The patient was place in a broad base position, and a 10-mm 30° laparoscope was inserted through the umbilical incision using the open 12-mm Hasson trocar method. Pneumoperitoneum was established at 8 mmHg CO2 inflation. Under inspection with a laparoscope, the shunt vessel was easily recognized at the surface of lateral segment 3. Initially, transection or stapling for only the shunt vessel was intended. However, given the intraoperative findings, uncontrollable hemorrhage was expected during shunt vessel dissection. We therefore performed lateral segmentectomy for safe and secure transection of the shunt vessel. Based on the findings of repeated laparoscopic ultrasonography, liver dissection was performed. The surface area was dissected using an ultrasonically activated device. The deep portion was dissected by CUSA, and hemostasis was by bipolar. Finally, the shunt vessel was stapled using a linear stapler (Powered Echelon; Ethicon), and lateral segmentectomy was completely performed. The dissected surface was coagulated using an Argon beam coagulator, and the lateral segment was extracted through the Pfannenstiel incision.
Results and Conclusion: There were no intra- and postoperative complications. The postoperative course was uneventful, and the patient showed a good clinical course. The serum transaminase and lactate levels were immediately normalized. Cranial magnetic resonance imaging showed no manganic deposition. The intra-hepatic shunt vessel was difficult to approach in the present case, and laparoscopic hepatectomy is one method for resolving a shunt vessel.

P151

Role of Emergency Endoscopic Decompression of Colon in a Case of Compartment like Syndrome of Left Lower Limb Secondary to Severe Acute Pancreatitis

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Severe acute pancreatitis is known complication of abdominal compartment syndrome, however literature doesn't give any evidence of severe acute pancreatitis leading to compartment like syndrome of the lower limb.
35-year-old lady admitted from emergency department with diagnosis of severe acute pancreatitis secondary to chronic alcohol abuse with raised amylase and lipase with Glasgow pancreatic scoring of 3. Despite initial resuscitation patient developed persistent colonic ileus, which unfortunately didn't respond to conservative management. On the 2nd hospital day it was noted that she developed unilateral edema of her left lower limb with skin changes, which was initially attributed to venous thrombosis, which was eventually ruled out by a venous Doppler. She developed marked neutropenia with raised CRP and blood culture send was positive of gram negative septicemia. In view of increasing lower limb edema, colonic ileus and worsening inflammatory markers a CT done on the 4th hospital day was suggestive of acute pancreatitis with minimal necrosis and retroperitoneal inflammation and colonic dilatation likely causing external compression on the left lower limb major vessels. However the colonic ileus and lower limb edema persisted with increase in skin mottling changes and she continued to be neutropenic. An emergency flexible sigmoidoscopy was done for decompression of the dilated large bowel relieve the colonic ileus. Following emergency endoscopic decompression of the colon and resolution of the colonic ileus it was noted that the lower limb edema with skin changes had gradually resolved.
Colonic ileus not responding to conservative management can lead to translocation of bacteria, which can lead to gram negative septicemia. Retroperitoneal inflammation and colonic ileus had caused extramural compression on the lower limb vessels causing compartment like syndrome. A timely endoscopic decompression helped in treating the colonic ileus and preventing further translocation of gut bacteria and helped in reducing the compression on the lower limb vessels and leading to improvement in the patients clinical condition.

P152

Eosinophilic Colitis, What Effect the Effect of Immune System Deficiency in the Etiology?

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Background: Eosinophilic colitis is a rare disease in digestive system. Genetic predispositions, food intolerance, increase of immunologic response are all included in pathophysiology of this disease. Allergic conditions associated with this disease frequently. Main symptoms are mucoid diarrhea and abdominal pain. Eosinophilic infiltration in endoscopic examination is diagnostic criteria.
Methods: In this report we assume that eosinophilic colitis should be considered for differential diagnosis of abdominal pain and chronic mucoid diarrhea.
Results: Forty-two years old female patient was admitted to our hospital with complaining of abdominal pain, weight loss and 10 times a day diarrheal attacks. In her history, she has pollen allergy and discomfort when she eats nuts and dairy products. She is taking Hashimoto's thyroiditis treatment. In her biochemical examination there is anemic findings and increasing RF value. In stool examination mucus, leukocytes and erythrocytes are seen but not parasites. Pangastritis is detected in her upper GIS endoscopic examination. Aphthous erosional lesions in right colon and caecum are detected in lower GIS examination. Eosinophilic pericriptitis in right colon and caecum are seen in histopathological examination of endoscopic biopsies. Food elimination and short time steroid treatment is started. Patient's symptoms are relieved. Recurrence is not seen in follow-up.
Conclusions: Symptoms of EC are not specific so it's confused with other digestive diseases. It's commonly seen in atopic people. Diagnosis begins with suspicious of disease. Evaluation of biopsies from the digestive tract and exclusion of other causes is diagnostic. Eosinophilia could not be in blood. Main treatment is food elimination.

P153

Gastrointestinal Lipomas: Is it Truly a Benign Process

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Gastrointestinal Lipoma has traditionally been viewed a benign process. It has minimal malignant potential, and it rarely causes life threatening conditions.
We report a series of 3 cases of gastrointestinal lipoma that have led to life threatening complications requiring surgical intervention.
Patient 1 was a 53 years old male, who presented with coffee ground emesis. He was found to have severe UGI hemorrhage and required 6 units of blood transfusion within the first 24 h of admission. Patient underwent upper endoscopy where a large duodenal lipoma with surface ulcerations and stigmata of recent bleeding was noted. Endoscopic clipping was applied to control the hemorrhage. The lipoma was deemed to be too large for endoscopic resection. Patient underwent duodenostomy and surgical resection.
Patient 2 was a 64 years old female, who experienced 6 days of vague abdominal discomfort. She presented to the ER after an outpatient CT scan revealed intussusceptions of ascending colon into transverse colon. Patient was taken emergently to OR for laparoscopic right hemicolectomy. Pathology showed right colon lipoma resulting in colonic congestion and ischemia.
Patient 3 was a 52 years old female who presented to the ER with a 3 day history of abdominal pain. On further questioning, she described multiple similar episodes over the course of her life time, which resolved after 1–2 days. A CT scans demonstrated intussusception of ascending colon into the transverse colon. Patient underwent emergent laparoscopic right hemicolectomy. Pathology showed submucosal colonic lipoma with overlying mucosal erosion, inflammation, and ischemic changes.
The literature does not view gastrointestinal lipoma as a serious disease process. As a tumor, it is slow growing and low metastasis potential. It accounts for only 4% of all benign gastrointestinal tumors. The incidence of symptomatic presentation has not yet been truly documented. There are about 25 case reports of duodenal lipomas causing upper GI bleeds and 25 cases of colonic lipomas presenting with colonic intussusceptions. Because of its "benign" nature, there is no literature report or review on incidental finding of GI lipoma.
Our case series illustrates the serious clinical implications of gastrointestinal lipoma. Furthermore, they demonstrate the role of endoscopic and laparoscopic treatment in the emergent setting.
Whilst gastrointestinal lipomas are typically slow growing and rare, it is certainly not a benign disease. It has potential to cause life threatening conditions requiring emergent endoscopic and laparoscopic treatment.

P154

CMV Cholangitis Mimicking as Periampullary Carcinoma

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Introduction: CMV Cholangitis is caused by Cytomegalovirus. It is commonly prevalent in immunocompromised group of people such as Retropositive, Organ Recipients and patients on immunosuppressant therapy. We are presenting a case of CMV Cholangitis mimicking as Periampullary carcinoma.
Case Details: 50/M came with complaints of waxing and waning jaundice for the past month associated with abdominal pain and generalised fatigue for the past two weeks. On examination, Vitals stable, Icterus noted, Epigastric tenderness present. Investigations – Total Bilirubin – 3, Direct Bilirubin 2.5, CA 19.9–45.5, Alkaline Phosphatase – 529, RETROPOSITIVE STATUS. CECT abdomen showed narrowing of Distal CBD with an Ampullary mass of size 2.7×2.5 cm, CBD dilatation 15 mm and dilatation of Hepatic ducts and IHBR. In view of the above features, Patient diagnosed to have ?Periampullary Carcinoma. Patient underwent Laparoscopic Whipple's Procedure. Histopathology report - Dense lymphpoplasmacytic infiltration along with giant cells with inclusions in the epithelium in the stroma and in the endothelium. Cells are Vimentin positive. Large cells are positive for CMV antigen. Features suggestive of CMV Cholangitis. Patient started on Anti-Retroviral Therapy post-operatively.
Discussion: Cytomegalovirus is a DNA virus of the family Herpesviridae. Human form of CMV is Humanherpesvirus-5. CMV has a wide spectrum of disease such as CMV Retinitis, CMV Colitis, CMV Cholangitis, CMV Esophagitis, CMV Hepatitis. Diagnosis can be made by demonstrating antibodies to CMV. Culture from bodily fluids such as tears, saliva, breast milk and semen maybe used to demonstrate the virus. Histopathologically, the most characteristic feature of CMV is the presence of Intra-nuclear inclusion bodies which is called as owls eye appearance. Treatment involves the use of Ganciclovir and Valganciclovir.

P155

Case Report: Idiopathic Intra-abdominal Adhesions Causing Gastric Outlet Obstruction

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Introduction: Gastric outlet obstruction (GOO) usually presents with emesis with or without abdominal pain. Imaging will show a dilated stomach and may also show a paucity of gas in the distal gut. Causes included peptic ulcers, cancers, or other pathologies. Treatment is often aimed at the underlying etiology. Here we report a case of an unusual cause of GOO.
Case Description: M.B., a 48 year old woman, presented with LUQ pain associated with anorexia, but denied any nausea or emesis. Her surgical history was a laparoscopic uterine fibroid excision over ten years ago. She had a sense of fullness in the epigastrium associated with some tenderness. A CT of the abdomen showed a dilated stomach with an abrupt narrowing at the distal gastric body, suspicious for gastric outlet obstruction (Fig. 1). She was admitted and a nasogastric tube was placed. An EGD showed what appeared to be a large hiatal hernia, but there was no gastric mass or ulcer (Fig. 2). Furthermore, the pylorus was widely patent (Fig. 3). An upper GI contrast study showed similar results to the CT - a dilated stomach with tapering distally. Interestingly, there was no hiatal hernia (Fig. 4). Endoscopic ultrasound did not reveal any extrinsic pathology, although the endoscopist was concerned for an internal hernia (Fig. 5). A diagnostic laparoscopy showed an adhesion from the falciform ligament to the base of the transverse mesocolon (Fig. 6). This created an internal hernia that included the transverse colon and the distal stomach. The adhesion was lysed with ultrasonic shears. The external compression of the stomach was clearly visible (Fig. 7). Postoperatively, her diet was advanced as tolerated. She was discharged on postoperative day two.
Discussion: The cause of this patient's GOO is certainly a rare cause of such pathology. One thought is whether the history of fibroid resection contributed to the adhesion. The author's opinion is no because of the considerable distance from the pelvis to the falciform. The adhesion was presumed to be congenital. The case emphasizes the need to maintain a broad differential, especially when there is discordance between studies. The hiatal hernia seen on EGD was not present on prior imaging. In retrospect, this was most likely the level of the adhesive band.

P156

Hybrid Minilaparoscopic Resection of Giant Tumor of the Right Ovary with Left Ooforoplasty: Case Report

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Introduction: The ovarian cyst is a benign disease, which may appear in young and elderly women, and not related to cancer in most cases. It is a lesion that when small, usually does not cause symptoms and may disappear spontaneously over time. But when there is torsion, rupture or rapid increase in volume, surgical intervention is almost mandatory. The aim of this study is to report a successful treatment of a giant ovarian cyst in an elderly patient by a hybrid technique, using laparoscopic and minilaparoscopic instruments.
Case Report: A 64 years-old, female patient, asymptomatic, with physical examination showing a pelvic mass. Abdominal ultrasound showed a right ovarian cyst of $11.3 \times 8.4 \times 8.3$ cm. Abdominal MRI showed the presence of a large expansive cystic formation with a slightly thick septations of 20×15 cm, extending form the adnexal region to the right flank. Besides, it showed hydronephrosis in the right kidney due to distal compressive effects. MRI also showed a cystic mass on the left ovary of similar aspects. A hybrid minilaparoscopic approach was performed using a 10 mm optics in the umbilical incision, 3 minilaparoscopic 3 mm trocars in the left flank, and a 5 mm trocar in the epigastrium for the resection of the cysts. The pneumoperitoneum was performed by open technique under direct vision. Prior to resection, the cyst was punctured and its content fully aspirated. The vascular pedicle in the right ovary was ligated using a vessel sealing device and, then, the cyst and the ovary were resected. The cyst in the left was removed by unroofing it, and, then, an ooforoplasty was performed. Blake drain was inserted in the pelvis. The specimens were removed by the 10 mm umbilical incision. The surgery was uneventful, with total surgery time of 140 min. The patient had no further complications, being discharged after 2 days.
Conclusion: The Hybrid minilaparoscopic approach showed to be safe and effective for this procedure. The known advantages of minilaparoscopy such as less trauma, better visualization, dexterity, and better aesthetics were confirmed.

P157

Bariatric Surgery Nightmares. Revisional Surgery for Extreme Cases. Cases Report in Colombia

Evelyn Dorado, Fundacion Valle del Lili

Introduction: Sleeve gastrectomy is more performed bariatric surgery at the time in the world, it has proved effective and very good long-term results, but despite being an easy surgery to perform, overlooking technical aspects of the surgery can lead a disastrous result like dysphagia, pain and excessive weight loss.
Main: Show how failed results after laparoscopic sleeve gastrectomy can be fixed with total or subtotal gastrectomy.
Methods: 2 female patients with LSG, performed at another institution and asked a second opinion about there symptoms.
Case 1: 26-y/o, quadriplegia secundary a traffic accident, BMI 32, 3 years ago LSG with 20% residual stomach measured on CT Scan. The patient has severe malnutrition with BMI 14, sacral bedsores, secondary osteomyelitis,and severe reflux, last endoscopy with Barrett's.
Case 2: 38-y/o, BMI 38, 2 years ago LSG, after surgery vomited and severe dysphagia with exaggerated weight loss, and this studies: CT scan esophageal dilation, gastroesophageal juntion with stenosis and residual stomach 30%. Manometry: Hypertonic IEE, esophageal body motility decreased, endoscopy with stenosis in the gastroesophageal junction without passage to the distal stomach. albumin 4.
Result:
Case 1: The patient was recovered nutritionally ,preoperative albumin 2 and 3.7 after TPN and NE nutrition. Osteomyelitis was handled with antibiotic therapy and negative pressure. she underwent laparoscopic subtotal gastrectomy YenRoux. The patient was hospitalized 3 days, starting clear liquid diet the day after surgery. There was improvement in the food patron and currently without reflux symptoms with weight stabilization and now BMI 18.
Case 2: gastric tube kicking with the fundus on the right side, moderate esophageal dilatation and a gastric reservoir 20% with stenosis in middle of tube was observe. I performed laparoscopy total gastrectomy with anastomosis esophagojejunal.She was hospitalized four days, with esophagogram negative for leaks. at 1 month after surgery tolerating soft diet and regain weight.
Conclusion: Bariatric surgery is helpful for patients with morbid obesity, but in Latin American countries not all surgeons who perform bariatric surgery have proper training, which does not guarantee the basic principles to avoid technical problems,in this cases sleeve gastrectomy with technical failures, which can lead to many problems in patients with catastrophic results and very aggressive revision surgeries. Is very important choose the right procedure for each patient but most important is verifed the expertise, trainning of bariatric surgeon, becouse we have the live of patients in our hands.

P158

Sigmoid Volvulus and Hypothyroidism; an Often Missed Correlation

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Background: Sigmoid volvulus is a surgical emergency treated initially with decompression via colonoscopy before advancing to surgical correction.
Severe hypothyroid presenting with colonic dilation is a phenomenon known as myxedema pseud-ovolvulus.
However, if the patient presents late in the course, surgical management is needed followed by replacement of thyroid hormone.
Case Presentation #1:
Patient is a young Asian male with a chief complaint of 3 days of increasing abdominal pain and distension leading to constipation and eventually obstipation.
Physical exam: extreme abdominal distention, + rebound/guarding
CT scan findings were consistent with massive colonic dilatation and volvulus
The patient was taken emergently to the OR for sigmoidectomy.
A large dilated sigmoid colon with a point of torsion with a dense adhesion in the small bowel mesentery was found
Thyroid panel to evaluate chronic constipation was sent with the following findings: TSH: >150 mc/ml, Free T3: <.2 pg/ml, Free T4: .12 ng/dl.
Patient was started on thyroid replacement and had return to normal bowel function
Case Presentation #2:
Patient is a young Asian male with chief complaint of 2 week history of bloating and increasing abdominal pain. 8/10 intensity.
Physical exam significant for extreme abdominal distention and tympanic abdomen.
Abdominal X-ray and CT scan findings significant for sigmoid dilatation and volvulus.
TSH: 24.6, Free T4: .71
Patient was decompressed via colonoscopy. After bowel prep was performed. Patient underwent a second colonoscopy where no masses were noted.
Thyroid hormone was replaced and patient had resolution of the volvulus with return to normal bowel function. Patient was discharged with medical and surgical follow-up.
Discussion: There are several case reports in the literature of hypothyroid myxedema causing colonic pseudo-obstruction presenting with megacolon.
It is thought that the megacolon is due to decreased peristalsis and increased edema of the bowel directly related to the deposition of hydrophilic glycoprotein and lymphoid aggregates in the colonic wall.
Conclusions: Sigmoid volvulus is a rare late complication of severe hypothyroidism. Surgical management should be coupled with hormone replacement.

P159

Cholecystocutaneous Fistula Following Hepatic Angioembolization for Complex Liver Injuries: A Case Report

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Hepatic angioembolization (HAE) of arteries with active extravasation following traumatic injury is routinely performed in trauma centers. Gallbladder necrosis, hepatic necrosis, abscess, and bile leak are some of the known complications of HAE. In approximately 75% of patients, the cystic artery divides into the superficial and deep branches, with several additional minor branches known as Calot's arteries. Since the cystic artery is an anatomic end artery, the gallbladder is susceptible to ischemia and perforation if HAE occludes the artery. We describe the presentation and management of a delayed cholecystocutaneous fistula and bile leak following HAE for actively bleeding grade 4 liver lacerations.
This 23-year-old male presented to the level I trauma center with multi-system trauma following a motorcycle crash. He suffered cardiac arrest upon arrival and was resuscitated. Further workup revealed multiple fractures of the face, extremities, and spine, pulmonary contusions, traumatic brain injury with intracranial hemorrhage, two splenic lacerations, and a complex grade 4 liver laceration. The right hepatic lobe laceration extended centrally within segment 5 and exhibited active extravasation. On hospital day 1, an interventional radiologist performed embolization of the right and left hepatic arteries with injection of a gelatin hemostatic agent. The patient was then admitted to the trauma intensive care unit for critical care management and non-operative therapy of the liver and splenic lacerations.
The patient's abdomen became clinically distended, and a CT scan on hospital day 22 showed a perihepatic fluid collection. A percutaneous drain was placed with bilious output, and a HIDA scan on day 37 confirmed the persistent biliary leak. On day 39, the trauma surgeon performed an endoscopic retrograde cholangiopancreatography (ERCP) with sphincterotomy and common bile duct stent placement to facilitate internal bile drainage. Cholangiography demonstrated multiple biliary leaks from the laceration of the right hepatic lobe and gallbladder fundus. Open cholecystectomy, abdominal washout, and drain placement was performed, and the gallbladder fundus was noted to be necrotic and perforated. The external drain output gradually decreased, and the drain was removed on day 51. He was transferred to a rehabilitation facility, with follow-up in 4 weeks to remove the biliary stent.
Right hepatic artery angioembolization can lead to cystic artery occlusion and gallbladder infarction. Internal biliary drainage, facilitated by a trauma surgeon's placement of a biliary stent via ERCP, can reduce biliary leakage by promoting antegrade biliary flow.

P160

Intraluminal Mesh Erosion as a Complication of Hernia Repair: A Case Series

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The use of synthetic mesh in the intraperitoneal position to reinforce the repair of abdominal wall defects has become a commonly accepted practice in modern surgery. Specifically, numerous commercially available meshes are designed with anti-adhesive barriers to be used in such position. However, the introduction of a foreign body into the peritoneal cavity is not without potential risk. A rare complication involves erosion of the mesh into a hollow viscus such as the bowel. Patients may be asymptomatic, but often symptoms of abdominal pain, obstruction, infection, or fistulas may severely impact quality of life.
Within a span of four months, three patients presented to our institution for clinical symptoms related to erosion of synthetic mesh into the intraluminal position from prior abdominal hernia repairs. The first patient had a remote history of stage IV rectal cancer and intraperitoneal mesh plug placement for the treatment of an obturator hernia. He then presented with an enterovesical fistula and bowel obstruction. The second patient presented with a liver abscess as a sequela of mesh infection and a chronic intraabdominal abscess from mesh erosion into small bowel from prior repairs. The third patient had a history of a parastomal hernia repair with intraperitoneal synthetic mesh and presented with obstructive symptoms.
This series of patients, while small, occurred in a short span of time, highlighting the increasing clinical prevalence and significance of complications from intraperitoneal placement of synthetic mesh. Numerous patient and technical factors may contribute to the occurrence of this rare complication. We propose avoiding the use of intraperitoneal mesh when possible. Specifically, we advocate the use of lightweight mesh in the preperitoneal or retromuscular to minimize the risk of mesh-related complications.

P161

Laparoscopic Removal of Gastric Lipoma

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Lipomas are mesenchymal tumors which originates benign adipose tissue. Small gastric lipomas are frequently asymptomatic; they become symptomatic when they grow in size. The most common symptoms are fullness; hemorrhage due to the erosion of the mucosa on the lipoma, yet particularly in distally established ones can cause obstruction symptoms. Diagnosis of gastric lipomas can be made through endoscopic and radiologic examination. Endoscopic ultrasound is currently the most accurate means of both the diagnosis and the determination of the depth and dimensions of the lesion. This video presentation shows a laparoscopic treatment applied to a female patient 56 years old diagnosed with submucosal stomach lipoma after endoscopic – endosonographic observation due to complaints of a feeling of early satiation and a full stomach, complaints the patient had for a year. Gastric lipomas can be removal with minimally invasive surgery procedures without the need for open surgery methods of surgery in centers which are using advanced endoscopy and laparoscopy.

P162

Internal Hernia Through the Foramen of Winslow; is Laparoscopy the New Standard for Management? A Case Presentation

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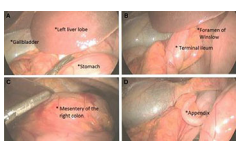
Introduction: Internal hernia through the Foramen of Winslow is a relative rare event comprising only 8% of all internal hernias. In recent years, laparoscopic approach to management appears to be the favored approach indicating a paradigm shift over past years. A standard approach to dealing with this type of hernia has yet to be established. We present a case of this rare hernia which was safely managed laparoscopically.
Case Presentation: 52 year-old female presented to the emergency department with severe abdominal pain. The pain was described as pressure type in the epigastric region and radiated to her back and across right upper abdomen. Her abdomen was soft, not distended, and tender in the right upper quadrant and epigastric area with voluntary guarding. Intravenous and oral contrast-enhanced?computed tomography?(CT) of the abdomen and pelvis was obtained. A small amount of contrast was noted within non-distended small bowel loops located in the lower abdomen and pelvis. A large structure was visualized within the epigastrium. The structure was exerting a mass effect upon the lesser curvature of the stomach displacing it towards the left and inferiorly. The patient was taken to the operating room for a diagnostic laparoscopy. Once intra-abdominal access was gained, gross examination revealed the colon herniating through the foramen of Winslow into lesser sac. The right colon and cecum appeared incarcerated but not strangulated. The colon was reduced with gentle traction and appeared viable. Given the redundant nature of the colon we elected to perform a laparoscopic right hemi-colectomy to prevent recurrence. The patient tolerated the procedure well and was discharged home on post-operative day three.
Conclusion: Foramen of Winslow hernia appears to be more common in middle aged male patients. With mortality rates as high as 50% prompt diagnosis is crucial. Management options vary from resection of herniating structures to organopexy. Some studies report closure of the foramen although given possibly of injury to vital surrounding structures this should be avoided. Placement of omentum into the foramen in another option. All options can be effectively carried out via a minimally invasive approach thus laparoscopy should be strongly considered as the first line option for management of this rare hernia (Fig. 1).



P163

Melanosis Coli in Irritable Colon Syndrome Patients Who is not Using Laxatives

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Background: Melanosis coli (MC) is a benign condition caused by the accumulation of dark pigments in macrophages in the colonic mucosa. Usually incidentally find out in endoscopic examination. Accumulation of melanin, hemosiderin, ferrum sulfate, most frequently lipofuscin pigments in macrophages in the colonic mucosa is occurred. It has been reported to occur in 73% of Irritable Bowel Syndrome and chronic constipation patients that are users of anthraquinone laxatives.
Methods: In this presentation it's presented that our irritable bowel syndrome patients without using anthraquinone laxatives or herbal tea have diagnosed MC.
Results: Thirty six years old female patient was admitted to our clinic complaints about 3 years of intermittent abdominal pain, swelling of the abdomen, inability to fully emptying of colonic content and indigestion. Patient was going to the toilet every day and did not use laxatives. Biochemical parameters were normal. No pathology was found in stool examination. Reflux esophagitis, helicobacter pylori (+) and pangastritis are revealed in upper gastrointestinal endoscopy. In her colonic mucosa lower gastrointestinal endoscopy founded brown colored areas and internal hemorrhoidal disease. MC was detected in her histopathological examination. Treatment was initiated with a fiber-rich diet and again tried to gain a regular bowel habit. Patients were taking in followed up.
Conclusion: MC that is considered to be benign in previous studies usually seen in patients with chronic constipation problems and using the anthraquinone laxatives. However, as shown in our case, MC can be seen in irritable bowel syndrome without using of laxatives and herbal teas.

P164

Chronic Appendicitis Treated by Laparoscopy: Case Report

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Introduction: Appendicitis is the most common disease of the vermiform appendix, with its acute presentation widely known. However, it should be differentiated from chronic appendicitis, a less common presentation, corresponding to 1% of cases. Its clinical course is different, characterized by recurrent bouts of acute appendicitis or chronic pain in the lower right quadrant for 3 or more weeks.
Case Report: a 24 years-old, male patient, reported pain in the lower right quadrant for 5 weeks. He also presented with fever during the first week, disappearing spontaneously. Two weeks later, the patient noticed a mass in the lower right quadrant followed by resurgence of pain in the same area. CT scan of the abdomen showed findings suggestive of an appendicoliths and a possible inflammatory component of the appendix. Laparoscopic appendectomy was performed using a 10 mm optics and 5 mm instruments. An intense inflammatory process was observed in the lower right quadrant, with multiple adhesions, the presence of a small abdominal wall abscess, and the cecal appendix involved by inflammatory and fibrotic tissue, with points of necrosis and perforation. The exploration of the retroperitoneal area was performed, with lysis of the adhesions, and drainage of the abcess, exploration of the inflammatory blockage and exposure of the cecal appendix, with its base ligation. Pathological examination showed a chronic inflammatory infiltrate, severe fibrosis, a hyaline muscle wall and mesoappendix, consistent with chronic appendicitis. The surgery proceeded uneventfully, the patient had no major blood loss, and no further complications.
Conclusion: the laparoscopic approach was a safe and suitable technique technique for this procedure, improving the dexterity, the visualization of the surgical field, and with minimal trauma to the abdominal wall.

P165

Laparoscopic Retrieval of an Impacted Capsule Following a Capsule Endoscopic Study

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Introduction: Capsule endoscopy has been increasingly used in recent times for evaluating small bowel disease and obscure gastrointestinal bleeding. Although capsule endoscopy is non-invasive and relatively safe procedure, retention of capsule is a major concern, necessitating endoscopic or surgical retrieval. Retrieval by laparotomy is the most common surgical approach for retained capsule. We describe a case of successful laparoscopic retrieval of impacted capsule from an underlying small bowel stricture.
Case Report: 69-year-old female with history of chronic abdominal pain, nausea and weight loss was referred for surgical removal of retained endoscopic capsule. She previously underwnent upper endoscopy and colonoscopy, which were unremarkable. CT revealed small bowel thickening and gallstones. Capsule endoscopy identified a focal small bowel stricture in the mid to distal jejunum with ulceration. Interestingly, the capsule did not pass beyond the stricture for several days. Contrast CT revealed capsule within the small bowel in left lower quadrant with mild proximal small bowel dilatation (Fig. 1).
We utilized 5 mm camera port and 2 additional 5 mm ports, one in the epigastrium and the other in right mid abdomen. Intra operatively, a focal area of hyper vascularity on the serosa of mid jejunum was identified as the site of impacted capsule (Fig. 2 & 3). The abnormal segment of small bowel with impacted capsule was exteriorized and resected. The rest of the small bowel appeared normal. She was discharged on second post operative day. Her pathology came back as benign small bowel stricture.
Discussion: Capsule retention defined as presence of capsule in the digestive tract for at least 2 weeks. The reported retention rates range from 1.4 to 3%. Although majority of patients are asymptomatic, retained capsule indirectly indicates significant underlying pathology that warrants surgical exploration. Majority cases of surgical retrieval of retained capsule published in the literature were performed by laparotomy. In fact, there are only two reported cases of laparoscopic retrieval of retained capsule in the literature. Our case further support laparoscopic approach for retrieval of retained capsule endoscope over laparotomy.
Conclusion: Capsule retention following capsule endoscopy is rare and is suggestive of underlying small bowel pathology. Surgical approach preferably by laparoscopic retrieval is recommended for diagnosis and treatment of associated small bowel disease.

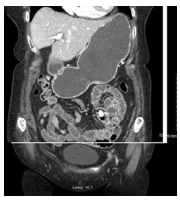

Fig. 1 CT revealing impacted capsule in mid small bowel

Fig. 2 Demostrating hypervascualar serosa of the small bowel at site of impacted capsule

Fig. 3 Small bowel specimen with stricture and capsule

P166

Capsule Endoscopy Retained in Small Intestine

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A 46 y.o. patient presented with intermitent abdominal colic pain. After a complete physical examination and routine clinical studies wich resulted normal, a small intestine barium contrast radiographic study demonstrated a stenosis in the proximal jejunum, and complemented by computerized tomography (CT) with smal bowell dilated loops. Capsule endoscopy was the next study with non-specific findings.(Fig. 1) 5 days after, the patient presented with acute abdominal pain and an abdominal x-ray revealed a retained capsule. During laparoscopy we found a distal jejunum stricture with a retained capsule, the rest of the small bowel was normal.(Fig. 2–5) We exteriorized the bowel and resected the stenosis with an entero-enterojejunostomy. The histopathological diagnosis was of Crohn´s disease.
Comment: During capsule endoscopy the transit times have been reported in several studies and the average pasage time to the colon is 300 min. An 8-hour acquisition time assures that most capsules will reach the colon allowing for complete inspection of the small bowel.The patients are instructed that in 3 days the capsule is seen to pass. An x-ray can be obtained should there be a question if the capsule has remained within the patient and not excreted.

P167

Gastrointestinal Stromal Tumor (GIST) of Jejunum Presenting as Perforation Peritonitis: A Report of a Case

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Background: Gastrointestinal stromal tumors (GIST), originating from the interstitial cells of Cajal, are rare but it is the commonest mesenchymal tumors of the gastrointestinal tract accounting for 0.1–3% of all gastrointestinal tumors.
Jejunal location of a gastrointestinal stromal tumor is not common occurrence and its presentation in the form of peritonitis is even rarer.
We intend to describe a case in which an exploratory laprotomy with a provisional diagnois of duodenal ulcer perforation turned out to harbor a perforated jejunal tumor. Clinical scenario, management of the unexpected tumor, and postoperative will be discussed. Gross tumor,histopathological slides and immunohistochemistry findings will be described in images.
Materials and Method: A 52/f presented to emergency room with acute abdomen for a duration of 2 days. Examination was consistent with hollow viscus perforation. Lab values showed leukocytosis without renal function derangements. Plain X ray revealed gas under right dome of diaphragm. Findings on an emergent laparatomy was that of a perforated jejunal mass near DJ flexure adherent to parietis not involving abdominal muscles. Peritoneal cavity including liver was free of any seedling. Segmental jejunal resection and end to end anastomosis was performed. Histopathological examination and immunohistochemitry panels confirmed a diagnosis of GIST. Postoperative CECT chest and abdomen didnt show metastatic disease. Chemotherapy was instituted - a daily 400 mg oral imatinib. Patient is well tolerating the chemotherapy till her first follow-up at 4 months after surgery.
Conclusion: An unsual finding during an exploratory laparatomy was managed with a good outcome. Advocacy for routine use of CECT in hollow vicus perforation peritonitis in settings as ours could give a better plan in the management of such cases.

P168

Laparoscopic Reduction of SBO Secondary to Fitz-Hugh-Curtis

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Fitz-Hugh-Curtis is a rare complication of pelvic inflammatory disease (PID) that is characterized by ascending gonococcal or chlymadial infections that cause perihepatitis. This leads to adhesive bands developing between the liver and the anterior abdominal wall, and causes the pathognomonic 'violin string' appearance. Surgical intervention for Fitz-Hugh-Curtis has infrequently been reported in the literature. This case report demonstrations an unusual presentation of this disease in a female with no evidence of PID. A 50 year old female initially presented to the emergency department with a one day history of acute onset of right upper quadrant abdominal pain. She described the pain as constant, cramping and non- radiating. Associated symptoms included nausea and several episodes of vomiting. Her last bowel movement was one day prior to the onset of pain. Past medical history was significant only for hypertension. She denied any past surgical history, did not take any medications, and did not have any allergies. On physical exam her abdomen was distended, tender to palpation most prominently in the right upper quadrant but not peritoneal; the remainder of the exam was benign. CT scan revealed a transition point in the right upper quadrant with a loop of distended small bowel residing on top of the liver, consistent with a small bowel obstruction possibly from an internal hernia. An NGT was inserted and almost 1L of gastric contents were immediately returned. The patient was taken to the operating room for a diagnostic laparoscopy and was found to have incarcerated small bowel amid dense adhesions between the anterior abdominal wall and the liver; most likely secondary to Fitz-Hugh-Curtis. The small bowel was laparoscopically reduced and the all adhesions were lysed using electrocautery. The patients' NGT was removed, her diet was advanced, she had return of bowel function, and she was discharged home without complication. She denied any history of pelvic inflammatory disease or sexually transmitted diseases, but was referred to gynecology for follow up. Fitz-Hugh-Curtis can be a significant cause of RUQ abdominal pain, occurring mostly in women of child- bearing age. This condition and its potential complications should be included on the differential diagnosis when evaluating a patient who presents with similar symptomatology. This case report exhibits how a small bowel obstruction secondary to Fitz-Hugh-Curtis can be successfully managed using minimally invasive techniques.

P169

Wondering Spleen; A Report of Two Cases, One Complicated by Acute Torsion

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Introduction: Wandering spleen is a very rare condition. Patients may be asymptomatic or present with an abdominal mass. Occasionally, patients present with acute abdominal pain due to acute torsion of the splenic vascular pedicle. In the absence of a splenic pathology, splenopexy is recommended while with splenic infarction, segmental or total splenectomy should be performed. We report two cases of wondering spleen; one of them was complicated by acute torsion.

Case 1

A 24-years old single female patient presented to the outpatient clinic with recurrent lower abdominal pain. Her past medical and surgical history was negative. Abdominal examination revealed a mass in the left iliac and hypo-gastric regions. Abdominal ultrasonography and contrast-enhanced CT scan of the abdomen confirmed that the spleen was found partly in the left iliac and hypo-gastric regions. Blood tests were normal. A decision of splenectomy to prevent splenic torsion was made. A small (7 cm) left middle paramedin incision was used. Pathologic examination of the resected spleen showed normal splenic tissue. The patient was discharged home 2 day after surgery. No complications were recorded over a 2-year postoperative follow-up.

Case 2

A 56-year-old female patient presented to the emergency room with a 6-hours history of severe left upper quadrant abdominal pain associated with vomiting and fever. The patient's history was positive for compensated liver cirrhosis. On physical examination, blood pressure was 110/65 mm Hg, pulse rate 100 beats/min, respiratory rate 22 breaths/min and body temperature 38.6°C. Palpation of the abdomen showed a tender swelling partly in the left lumbar, umbilical and left iliac regions with mild abdominal guard. Laboratory investigations were within normal range except for: LDH 1190 u/l, Hb 8.9 gm/dl, platelet count 65000/ml, AST 84 U/L, ALT 120 U/L, serum albumin 2.7 gm/dl. Abdominal ultrasonography and contrast-enhanced abdominal CT scan confirmed the diagnosis of a wondering spleen (18.6 cm) complicated by acute splenic torsion with infarction of most splenic parenchyma. The spleen was removed through a left subcostal incision. Pathology of the spleen showed necrosis of splenic tissue. The patient developed mild ascites that was controlled rapidly with diuretics. She was discharged home 3 day after surgery. No more complications were recorded during 4-year postoperative follow up.

P170

Surgical Technique of a "Hybrid Approach" to Laparoscopic Decapsulation Combined with Splenic Artery Balloon Occlusion for a Splenic Cyst

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Background: Carbohydrate antigen (CA) 19−9 producing splenic cysts are relatively rare, and usually occur in females and in young individuals. Surgical treatments would be considered when symptomatic cases. Recently, the approach to splenic cysts has changed towards conservative surgery, in order to prevent sepsis after splenectomy. We will describe the use of novel method for splenic preserving surgical approach in the Hybrid operating room, in order to reduce its risk of bleeding.

Case Presentation: A 27-year-old woman presented to our hospital with a chief complaint of chest pain. CT showed an encapsulated left pleural effusion and multiple splenic cysts, the largest measuring $89 \times 85 \times 72$ mm. Thoracentesis revealed its CA19-9 level was over 600,000 U/ml; cytologic examination was negative for malignancy. Although serum and pleural fluid CA19-9 levels were elevated, imaging showed no findings suggestive of malignancy. We diagnosed the patient with CA19-9 producing splenic cysts and performed laparoscopic decapsulation.

In the Hybrid operating room, a balloon catheter was positioned in the splenic artery. Four ports were inserted into the abdomen; the cyst was punctured and intracystic fluid was suctioned out. Combined splenic artery balloon occlusion was performed to control bleeding when the cyst wall was resected near the splenic parenchyma, using the Thunderbeat TM. Occlusion was performed to create intermittent blockage consisting of 20 min of ischemia and 5 min of reperfusion; this was repeated twice. Then, the inner surface of the cyst wall was cauterized using the VIO soft-coagulation system TM. Total operation time was 170 min (laparoscopic time, 110 min) and blood loss was 100 grams.

There were no intra- or post-operative complications and the patient was discharged on the sixth post-operative day. Histological findings revealed that the lesion was a benign true epidermoid cyst, and immunostaining analyses showed that the epithelium was positive for CA19-9 antibody. The patient's serum CA19-9 level decreased from 3,437 to 62 U/ml after surgery, and she has remained well with no recurrence for four months.

Conclusions: Laparoscopic decapsulation for treatment of splenic cysts can prevent life-threatening bacterial infections by preserving the spleen, while increasing the risk of bleeding from the left splenic parenchyma. Combining splenic artery occlusion with laparoscopic decapsulation is a safe and feasible approach in the Hybrid operating room.

P171

Acute GI Bleed and Small Bowel Obstruction Following a Roux En Y Gastric Bypass: A Case Report

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Introduction: Small bowel obstructions are a complication following a number of procedures, and a known possibility following bariatric procedures. Etiologies include internal hernia, adhesive disease, ileus, improper surgical technique as well as strictures. Less common, however, is obstruction the result of an intraluminal hematoma. We present a case of acute small bowel obstruction secondary to intraluminal hematoma in a postoperative Roux-en-Y gastric bypass patient, as well as our solution for surgical intervention.
Methods: This is a single surgeon's experience in management of an acute postoperative obstruction after a Roux-en-Y gastric bypass. Early small bowel obstruction was identified and intervention was performed by the surgeon with resident assistance. The patient was followed throughout his hospital stay as well as with follow up visits in the clinic. A retrospective literature review was also conducted via PUBMED-Cochrane database in regards to management of intraluminal hematomas in Roux-en-Y gastric bypass patients.
Results: Patient is a 39 year old male who underwent a laparoscopic Roux-en-Y gastric bypass procedure for weight loss. The initial procedure was performed routinely without complications. On postoperative day 2, he developed nausea, hematemesis, bloody bowel movements and tachycardia. A CT scan was obtained showing obstruction of the Roux limb as well as the biliopancreatic limb secondary to an intraluminal mass at the level of the jejunojejunostomy. It was suspected that the patient had developed an intraluminal hematoma causing obstruction and the decision was made to return to the operating room. He underwent upper gastrointestinal endoscopy and diagnostic laparoscopy. The endoscope was unable to reach the jejunojejunostomy despite laparoscopic assistance. An enterotomy was made at the level of the jejunojejunostomy and evacuation of the hematoma was achieved. This resulted in resolution of the obstruction of both the Roux limb and the biliopancreatic limb. The enterotomy was closed primarily with suture. He recovered from the procedure and had an uneventful postoperative course following the case.
Conclusion: There are a number of possible causes for obstruction postoperatively, and while previously reported, an intraluminal hematoma is unusual. This diagnosis is important to include on the differential. In such a case, being aware of possible management strategies can help the patient avoid complication and morbidity. As such, the utilized technique proved successful and can be considered as one such management strategy.

P172

Bariatric Surgery in Patients with Kidney Failure: A Case Report

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Introduction: While there are many criteria that are considered when selecting a patient for a kidney transplant, a BMI of over 35–45 kg/m2 is deemed the upper limit to consider evaluation. Whereas voluntary weight loss attempts are a major concern for the general population, for patients to attempt this while on hemodialysis is even more daunting. However, bariatric surgeries have opened up a new door to notable weight loss results, even demonstrating significant improvements of patients' diabetic profile and hypertensive control.
Case Report: This is a case of a 52-year-old male, known to have type 1 diabetes mellitus as well as hypertension and hypothyroidism. The patient was in end-stage renal disease when the need for kidney transplant was determined. However, at that time his BMI was 42 making him ineligible to be placed on the waiting list.Therefore it was determined that a laparoscopic sleeve gastrectomy (LSG) should be performed in order to aid with his weight loss. He managed to lose the maximum amount of weight 6 months after surgery, reaching a BMI of 31.5 kg/m2, also showing a major improvement in his hypertension and diabetes profiles. While the patient was being prepared for the kidney transplant, he started to show an increase in his weight as well as deterioration in his diabetic control. He underwent the renal transplant 1.5 years post LSG, after which he starting showing imporovements in his blood results, diabetic and hypertensive control. However, his weight began to increase once more, for which he consulted his surgeon that recommended gastric bypass surgery. Since the surgery, the patients' glucose, BUN and creatinine have normalized and his weight continued to drop, reaching a BMI of 32.99 kg/m2 2 years post bypass.
Conclusion: Bariatric surgeries have been shown to be safe and effective weight loss, as well as metabolic control options in renal failure patients.

P173

Hiatal Hernia after Transhiatal Esophagectomy Resulting in Mechanical Small Bowel Obstruction; Conservative Management as a Viable Option

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Introduction: Hiatal hernia is rare after transhiatal esophagectomy occurring in less than 2% of patients. Even more rare is a small bowel obstruction to occurring at the hiatus. We present the case of a mechanical small bowel obstruction occurring at the hiatus in a patient four years after transhiatal esophagectomy. The patient was successfully managed conservatively with resolution of his SBO.
Case Presentation: 63 year old male with past medical history of esophageal carcinoma who underwent a transhiatal esophagectomy in 2011 presented to the office with dysphagia. Barium swallow was performed which was consistent with aspiration secondary to dysphagia. Given recurrent episodes of aspiration, the decision was made to laparoscopically place an elective jejunostomy tube (J-tube). Trophic tube feeds were started on postoperative day (POD) #1 and gradually advanced to goal. The patient began to have increasing abdominal pain and thus a contrasted CT-scan was obtained showing left diaphragmatic hernia with transition point in the small bowel at the hiatus without evidence of cancer recurrence (Fig. 1). The decision was made to manage this patient conservatively given his multiple medical comorbidities and high risk for surgery. Tube feeds were resumed once the patient had return of bowel function and was discharged to a skilled nursing facility on POD #22, tolerating tube feeds and feeling well.
Discussion: Diaphragmatic hernia occurring at the hiatus after esophagectomy occurs in 0.4–15% of patients. The hernia rate is higher for minimally invasive esophagectomy than for transhiatal esophagectomy. It is hypothesized that adhesions from open surgery are responsible for the decreased hernia rate after transhiatal esophagectomy. Diagnosing a diaphragmatic hernia in such patients can be enigmatic especially if the patient is symptomatic. Although rare, it is important to keep this clinical entity in mind as it can be associated with serious complications such as gastrointestinal bleeding, small bowel obstruction and possible perforation. CT scan is likely the best modality to detect the hernia and possible complications associated with it. Mortality rates associated with complicated hernia range from 20 to 80% if discovered late and only 10% if discovered early. Presentation varies but may include respiratory distress, nausea/emesis, chest pain, gastrointestinal bleeding or vague abdominal pain. In this case we present the successful conservative management of a patient with small bowel obstruction related to a diaphragmatic hernia suggesting the feasibility of this treatment option.

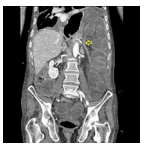

Fig. 1 Transition point at the hiatus indicated by arrow

P174

Giant Nonparasitic Spleen Cyst in a Pediatric Patient Treated by Minilaparoscopy: Case Report

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Introduction: Splenic cysts are a low frequent disease, being categorized as a true cyst (parasitic or non-parasitic), and a pseudocyst. Traditionally, non-parasitic cysts would be treated with a partial or a total splenectomy by laparotomy, but the minimally invasive surgery has been showing great results as a new surgical approach in the treatment of this disease.
Case Description/Technique Description: An eleven years old patient, female, who was diagnosed 6 months earlier with a splenic cyst of 10 cm of diameter by an ultrasound after a trauma episode. Since then, the patient has been submitted to periodic ultrasounds, which showed a constant size of the lesion, and confirmed by a CT scan of the abdome. The patient developed recurrent episodes of pain in the left upper quadrant. The surgery was performed with the patient in the right lateral decubitus. Three low-friction 3 mm minilaparoscopic trocars and one 11 mm in the umbilical region for the 10 mm the optics were used in this procedure. Before starting the resection, the cyst was punctured and its content completely aspirated. The cyst was resected carefully using an electrocautery in its margins and trying to preserve as much splenic tissue as possible. The lesion was removed through the umbilical incision. The histopathological result showed a true non-parasitic splenic cyst.
Conclusion: The minilaparoscopic approach was a safe and effective technique for this procedure, improving the dexterity, the visualization of the surgical field, and with minimal trauma to the abdominal wall.

P175

Case Report of Surgical Laparoscopic Treatment for Median Arcuate Ligament Syndrome

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Introduction: An anatomical compression of celiac ganglion and axis by the diaphragmatic crura and the median arcuate ligament, a fibrous arch anterior to the aorta causes celiac artery compression syndrome or median arcuate ligament syndrome (MALS) which is an uncommon disorder. It occurs in young to middle age adults, while it has been elaborated in infants and children. MALS is treated with surgical strategy such as arterial bypass, open or laparoscopic or robotic assisted median arcuate ligament (MAL) release, endovascular treatment with stent placement or angioplasty, or combination of these techniques to reestablish sufficient blood flow. We report a case of 57 year old symptomatic patient with angiographically confirmed MALS who was treated with laparoscopically MAL release in tertiary care hospital and had no symptoms.
Case Report: A 57 year old white female presented with post prandial abdominal pain since one year. Physical examination was not significant except for abdominal examination associated with tenderness and fullness in the well located area to the right of midline that was markedly worsen with deep inspiration.Magnetic resonance angiogram (MRA) of abdomen with and without omniscan gadolinium intravenous contrast was done and compared with CT scan abdomen and pelvis which showed high grade proximal celiac artery compression immediately after the origin with mild dilation of the celiac artery distally. The Stenosis was respiratory dependent. laparoscopic release along with robotic assisted cholecystectomy due to having gallbladder polyp were performed. She was discharged at 5th day post operatively with no complications were observed.
Conclusion: In the above case, we presented a 57 year old symptomatic angiographically confirmed MALS patient who underwent laparoscopic surgery to release MAL and robotic assisted cholecystectomy for gallbladder polyp with excellent outcome.

P177

Euglycemic Diabetic Ketoacidosis in Bariatric Surgery Patients Taking Canagliflozin

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Background: Approximately 200,000 people undergo bariatric surgery annually. Of these, many have non-insulin dependent diabetes mellitus (NIDDM) frequently managed with sodium/glucose cotransporter 2 (SGLT-2) inhibitors such as canagliflozin. SGLT-2 inhibitors have been associated with ketoacidosis, even when serum glucose levels are normal. We performed a literature review and describe a case of euglycemic diabetic ketoacidosis (eDKA) in a 52 year old male, taking canagliflozin preoperatively, after an uncomplicated laparoscopic roux-en-Y gastric bypass (LRYGB).
Methods: A Pubmed search for eDKA in bariatric surgery patients taking SGLT-2 inhibitors was performed.
Results: Two previous cases of eDKA after bariatric surgery were found, of which only one actually met the definition of euglycemia. Our case describes a 52-year-old obese male with a body mass index of 45 kg/m2 and NIDDM who underwent an uncomplicated LRYGB. Per institution protocol he was started on a low carbohydrate diet 5 days prior to surgery. He was instructed to continue all medications, including metformin 1000 mg twice daily and canagliflozon 300 mg daily until the day prior to surgery.
Postoperatively he developed a leukocytosis and an anion gap metabolic acidosis. Although he was completely asymptomatic, serum studies revealed carbon dioxide of 9 mmol/L, glucose of 112 mg/dL and a beta-hydroxybutyrate of 49.7 mg/dL. The anion gap was calculated to be 23. A urinalysis was significant for a urine glucose of 500 mg/dL with urine ketones of more than 80 mg/dL. Further workup included undetectable acetaminophen and salicylate levels and a normal lactic acid.
Given the high anion gap metabolic acidosis, markedly elevated beta-hydroxybutyrate and additional studies indicating no other unmeasured anions, the diagnosis of eDKA was made. The patient was started on aggressive IV hydration and an insulin drip. The acidosis corrected and he was discharged home two days after the diagnosis.
Conclusions: SGLT-2 inhibitors such as canagliflozin, represent a relatively new class of oral hypoglycemic that have been rarely associated with eDKA. The incidence of postoperative eDKA is likely higher than that reported in the literature specifically in patients undergoing bariatric surgery as a consequence of depleted glycogen stores and surgical stress. It is of the utmost importance that surgeons learn to recognize eDKA. Also, guidelines must be developed in order to minimize adverse events in surgical patients that have been prescribed SGLT-2 inhibitors.

P178

Eosinophilic Proctitis and Treatment in Adults

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Goal: Eosinophilic rectitis (ER) is a rare form of primary eosinophilic gastrointestinal disease common in adolescents and newborns. ER in elder patients is generally chronic and recurrent disease. Genetic predispositions, environmental factors, allergic conditions such as food intolerance are stand out in the etiology. Symptoms such as diarrhea, rectal bleeding and increased mucus production are typical for ER. Allergic conditions such as atopic dermatitis are accompanied by these patients. Diagnosis is made by demonstrating mucosal eosinophilic inflammation in endoscopic biopsy. In this report ER should be considered in the differential diagnosis if presence of gastrointestinal symptoms associated with food in atopic and allergic patients.
Case: Fifty-six years old female patient; she was admitted to our hospital with intermittent diarrhea of 10–15 times a day in about 3 years, abdominal pain, abdominal swelling and fatigue complaints. Being allergic to dust and increase in complaints when eats fermented foods and dairy products was remarkable in her history. There was no eosinophil in her peripheral blood smear. Serum fibrinogen, anti-microsomal anti-neutrophilic cytoplasmic autoantibodies, sedimentation and CA 19−9 levels were high. Stool examination was abundant in leukocytes erythrocytes and mucus, but no evidence for parasites. Antral gastritis was found in her upper gastrointestinal endoscopy examination. In her lower gastrointestinal endoscopy examination there are polyps in her descending colon and sigmoid colon, edema and erythema in rectal mucosa. Chronic gastritis, tubular adenoma in the descending colon, hyperplastic polyp in the sigmoid colon and eosinophilic pericryptitis in the rectum is determined in her histopathological examination. Dairy products and fermented foods were eliminated from the diet of ER diagnosed patient and symptoms are revealed.
Result: ER is a rare disease characterized by eosinophilic inflammation. ER can be mixed with other gastrointestinal diseases because its symptoms are not specific to the disease. Diagnosis begins with suspected to the disease. Definitive diagnosis is made by endoscopic examination and biopsy. Drugs such as steroids can be used in the treatment together with the elimination of food. If toilet habits change in atopic patients, especially with taking of certain foods, EC should be kept in mind.

P179

Quality of Life After Skin-Tissue-Saving Excision with Electrosurgical Peeling (STEEP) Surgery for Inguinal and Genital Hidradenitis Suppurativa

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Introduction: Until recently, radical excision was regarded as the preferred surgical method forpatients with hidradenitis suppurativa (HS) Hurley stage II/III. Recent studies has shown that STEEP procedure is a promising alternative to radical excision as it salvages healthy tissue to a maximum and achieves comprehensive removal of diseased tissue. The aim of this study is to assess the quality of life for patient undergone STEEP procedure and the impact of surgery on their psychosocial outcome.
Patient and Methods: Medical records including operative notes for all patients who underwent surgery for Hurley stage III HS in colorectal department in a tertiary referral centre, done by a single colorectal consultant with special interest in dermatosurgery, between 2013 and 2015. The data was analysed retrospectively. All patient underwent STEEP procedure. Patients were asked to fill a questionnaire before and after surgery to assess their quality of life, depression, anxiety and pain levels. DLQI, PHQ-9, GAD-7 and PAINVAS-2 were used to assess these parameters respectively. Discharge before and after surgery was also assessed on scale from 0(no discharge) to 10 continuous discharge.
Paired t test was used for statistical analysis of the results.
Results: Surgery for Hurley stage 3 was performed for 23 patients (22 men and one woman), the average no of proceduresof procedures performed for HS was 3 (range 1–6), the mean age of the disease was 42 (range 27–66), No patients has lost follow up all completed the questionnaire.
The results showed statistically significant improvement in the QOL after surgery with t-test value of -4.254571 (p=0.000353). Improvement of depression, the value of t-test is -3.853644 (p=0.00107), improvement of anxiety the value of t-test is -2.123245 (p= 0.046404), improvement of pain the value of t-test is -2.849356 (p=0.009603) and improvement of discharge the value of t-test is -5.322906. The value of p is 5.6E-05. The result is significant at $p \leq 0.05$.
Conclusion: Skin-tissue-saving excision with electrosurgical peeling (steep) surgery for inguinal and genital hidradenitis suppurativa has shown promising surgical outcome for Stage II/III HS patients, this study proves the significant improvement of patient QOL and psychosocial outcome after such surgery.

P180

Assessment of Anastomosis Following Transanal Total Mesorectal Excision for Rectal Cancer

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Objective: The aim of this study was to assess completeness of anastomosis after transanal total mesorectum excision (TaTME) for rectal cancer.
Methods: Prospectively collected data of 15 consecutive patients with middle (n=5) and low (n=10) rectal cancer who underwent TaTME from November 2014 to August 2016 were evaluated. Completeness of anastomosis was assessed at 7th day after surgery. Completeness of mesorectum, involvement of CRM, morbidity and mortality, operative time for TaTME and intraoperative blood loss were also assessed. For completeness of anastomosis, mucosal stain of anastomosis using ICG, full thickness of resected ring after anastomosis, air leakage test and hand sewn anastomosis were utilized to decide creation of diverting ileostomy.
Surgical Procedure: Patient was placed in the lithotomy position with the arms parallel to the body. TaTME and laparoscopic TME were simultaneously performed with two teams. For TaTME, using the Lone Star Retractor System, a purse-string suture was placed through the rectal mucosa to tightly occlude the rectum with a 3 cm margin distal to the tumor. After irrigation with saline, a full-thickness rectal transection distal to the purse string was initiated circumferentially. The access device was inserted, maintaining pneumoperitoneum with carbon dioxide using an AirSeal platform. The mesorectum was mobilized, including the posterior dissection toward cephalad in the avascular presacral plane, proceeding anterior and lateral dissections to achieve circumferential rectal mobilization. For laparoscopic TME, after inserting trocars, medial approach was performed with mobilization of the splenic ?exure, previously described. Then, TME achieved until connecting TaTME. After completing an anastomosis, mucosal stain of anastomosis using ICG, full thickness of resected ring after anastomosis, air leakage test and hand sewn anastomosis were assessed to decide creation of diverting ileostomy. In the case of single staple technique, we put transanal.drain.
Results: Completeness of anastomosis were obtained in all cases. Twelve patients created a diverting ileostomy because of hand sewn anastomosis (n=10), incompleteness of resected ring after anastomosis (n=1) and poor ICG stain (n=1). Pathologic examination of specimens demonstrated complete mesorectal excision in all cases with negative CRM. Four patients (3 of ileus and 1 of deep SSI) had postoperative complications. There were no mortality. The mean operative time for TaTME and intraoperative blood loss were 150 min and 50 g, respectively.
Conclusions: Assessment of anastomosis and appropriately decided ileostomy ensure completeness of anastomosis after surgery, resulting in being a safe and feasible procedure of TaTME for middle and low rectal cancer.

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Evaluation of a Critical Pathway Application to Improve Colorectal Cancer Outcomes: A Propensity Scoring Matching Analysis

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Background: In recent years, critical pathway (CP) has been applied to the majority of the colorectal cancer patient who has minimal invasive surgery (laparoscopic surgery, robot assisted surgery). The aim of this study is to evaluate the advantage of CP and to ascertain whether combining minimally invasive surgery and CP have additional value within colorectal surgery.
Methods: We evaluated 1099 consecutive cases of colorectal cancer surgery between January 2010 and December 2012 retrospectively. Of these, the group A (CP group) was the colorectal cancer patients (N=711) who received the elective colorectal cancer surgery and postoperative care of CP, and the group B (Non-CP group) was the colorectal cancer patients (N=388) who was not indicated to CP during the same period. To overcome selection bias, we used propensity score matching to achieve a one-to-one CP group: Non-CP group ratio.
Results: After propensity score matching, 338 patients were included in each group. Baseline characteristics did not differ between the groups. The median (interquartile range) length of hospital stay was 11 (9–14) days in the group B and 7 (6–8) days in the group A, i.e., a four-day reduction ($p<0.001$) in the CP group. The overall incidence of postoperative complication according to the Clavien-Dindo classification was 8% in the group A and 4.7% in the group B, respectively ($p=0.11$). The value of preoperative prognostic nutritional index (PNI) was no difference between the group A and group B (50.1 vs. 49.2, $p=0.07$), however, postoperative PNI of group A is higher than group B (47.2 vs. 46.0, $p=0.01$). There were no significant differences in the other variants that searched. Median disease free survival (DFS) was 34 (range, 0–60) months and median overall survival (OS) was 36 (range, 0–60) months. In the survival analysis, there was no significant difference in DFS (86.7% vs. 84.3%, $p=0.36$). However, a significant difference in OS was observed in between group A and group B (97.3% vs. 93.2%, $p=0.01$).
Conclusion: The CP for colorectal surgery helped to reduce the length of postoperative hospital stay without adversely affecting morbidity. The group that applied CP has benefit in postoperative PNI and overall survival. These results indicate that CP may be feasible and effective in patients with colorectal cancer.

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Temporary Ileostomy with Laparoscopic Low Anterior Resection in Rectal Cancer Patients

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Anastomotic leakage is the most serious complication of low anterior resection (LAR) for rectal cancer and temporary ileostomy is common procedure preventing it. The aim of this study is to clarify the usefulness and safety of temporary ileostomy with laparoscopic LAR in rectal cancer patients.
Four hundred and eighteen rectal cancer patients who underwent laparoscopic LAR with (n=226, LAR-I group) or without ileostomy (n=192, LAR-non I group) at Saitama Medical University, International Medical Center, between 2007 and 2015 were included in this study. The short-term results of primary and secondary (ileostomy closure) operation were retrospectively analyzed.
The characteristics of patients in LAR-I and LAR-non I group were; male/female: 175/51 and 100/92 ($p<0.001$), mean±SD age: 62±11 (19–86) and 63±11 (22–86) ($p=0.325$), respectively. The anastomotic leakage after primary operation was occurred in 20 (8.8%) and 18 (9.4%) patients in LAR-I and LAR-non I group ($p=0.866$), and 5 (2.2%) and 8 (4.2%) of them required re-operation in LAR-I and LAR-non I group ($p=0.273$). Of 226 patients in LAR-I group, 22 (9.7%) patients had ileostomy-related complications. In details, outlet syndrome (obstruction at ileostomy site), surgical site infection (SSI) and bleeding were occurred in 19, 3 and 1 cases, respectively. The contrast study of rectal anastomosis was performed in all patients, and it revealed that asymptomatic anastomotic leakage was found in 3 patients, who were conservatively observed and underwent secondary operation after confirming the leakage undetected. The secondary operation was performed in 210 (92.9%) patients after 118 (median, 30–502) days after the primary operation. Sixteen (7.1%) patients avoided the secondary operation because of treatments for metastatic lesions, patient's will and complications of the primary operation in 10, 3 and 3 patients, respectively. The complications after the secondary operation were occurred in 19 (19/210, 9.0%) patients, including SSI, intestinal obstruction, anastomotic bleeding and anastomotic leakage in 11, 4, 3 and 1 patients, respectively.
Although the overall rate of anastomotic leakage was not significant different between LAR-I and LAR-non I groups, fewer cases required re-operation in LAR-I group and ileostomy closure was safely performed in most cases.

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Wound Infection and Surgical Site Infection in Laparoscopic Colorectal Surgery can be Minimized

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Surgical site infection (SSI) is common after colorectal surgery. With superficial SSI rates ranging from 5 to 30%, we hypothesize that performing laparoscopic procedures using a strict clean and dirty technique further reduces the risk of SSI.

We analyzed all laparoscopic colorectal procedures performed on a prospectively maintained database for colorectal procedures retrospectively. 2067 patients were analyzed over a 20-year period from 2/1996-5/2016. Surgeries were performed using the clean and dirty technique. We defined superficial-SSI as an infection in the subcutaneous tissue without abscess, deep-SSI as an abdominal wall abscess, and organ space-SSI as an abdominal abscess, leak, or peritonitis. SSI rate with superficial, deep, and organ space, anastomotic leak, abscess, and fistula were analyzed by: age, sex, BMI, OR-time, preoperative radiation, transfusion, mortality, type of case(abdominal/pelvic), and LOS. Student's t-test was performed.

49.8% were male. 24.1% received preoperative radiotherapy. 3% received transfusions. The conversion rate was 2.95%. Averages of the following were computed: age 61(16–95), BMI 27.1, EBL 189 cc, OR-time 270 min, LOS 5.8days, largest incision 4.9 cm, follow-up 28.7mos.

SSI=4.69%(n=97), superficial-SSI=1.26%(n=26), deep-SSI=0.15%(n=3), organ space-SSI=3.67%(n=76), anastomotic leak=1.35%(n=28), and abdominal abscess/fistula=2.3%(n=48). There was a statistically significant difference in SSI for males, preoperative radiotherapy, increased EBL, increased OR-time, and LOS. There was no significant difference in perioperative mortality, age, BMI, transfusion rate, conversion rate, mortality, or type of case, abdominal/pelvic.

Laparoscopic colorectal surgery using a clean and dirty technique is associated with a much lower superficial-SSI rate compared to the literature in addition to lower overall SSI rate.

	n-SSI	%SSI
SSI	97	4.69
Superficial-SSI	26	1.26
Deep-SSI	3	0.15
Organ Space-SSI	76	3.67
Anastomotic Leak	28	1.35
Abdominal Abscess/Fistula	48	2.30

	n-Total	%Total	n-SSI	%SSI	p-value
Sex(Female/Male)	1038/1029	50.2/49.8	37/60	3.56/5.83	0.0149
Preoperative Radiation(Y/N)	498/1570	24.1/75.9	34/63	6.83/4.01	0.0298
EBL(≤100/>100 cc)	1184/883	57.3/42.7	39/58	3.29/6.57	0.000868
OR Time(≤240/>240 min)	952/1115	46.1/53.9	27/70	2.84/6.28	0.000147
Length of Stay(≤4/>4 days)	1041/1026	50.4/49.6	23/74	2.21/7.21	0.00000131

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The Cost-Effectiveness of Laparoscopic Colon and Rectal Surgery; A Systematic Review of the Literature

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Objective: To perform a systematic review of economic evaluations comparing laparoscopic versus open colorectal surgery

Background: Laparoscopic colorectal surgery is ever-increasingly being utilized for both benign and malignant processes of the colon. The higher operative cost of MIS surgery is often thought to be offset by other hospital and longtem costs such as earlier discharge. This systematic review seeks to examine the current literature for the cost-effectiveness of laparoscopic colorectal surgery compared to open procedures.

Methods: A systematic review of the literature was conducted using Pubmed, EMBASE and the Cochrane Library of all studies that did an economic analysis of minimally invasive colorectal surgery between 2005 to the present. Studies were included if they included if they included both open and minimally invasive treatment arms, were limited to resections of the colon and rectum, and did quantitative cost-analysis in terms of real dollars. A quality assessment of the papers was conducted using the Consenus on Health Economic Criteria (CHEC) guidelines.

Results: The literature review generated 1514 unique articles and 17 of those papers met the inclusion criteria of our systematic review. Of the studies included, 12 were considered high-quality (CHEC score>=12). Overall 8 studies found MIS surgery to be cost-saving, 6 favoured open surgery and 3 were cost-neutral. All studies that included metrics for quality life years gained compared to cost (3) found laparoscopic surgery to be a very cost-effective intervention.

Conclusion: From the current literature, the evidence for the costs associated with minimally-invasive surgery versus open colorectal surgery slightly favours the laparoscopic technique. All studies that examined quality outcomes in association with cost found laparscopic colorectal surgery to be very cost-effective. Most studies found the high operative costs of laparoscopic surgery were offset by lesser ward and pharmacologic costs. Further studies should aim to incorporate long-term costs, such as ventral hernias, within their economic outcomes to better elucidate the real cost-savings from laparoscopic surgery.

P185

Laparoscopic Right Colectomy: Intracorporeal Anastomosis Versus Extracorporeal

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Introduction: Laparoscopic right colectomy is a standardized procedure. In the beginning of the laparoscopic experience surgeons preferred the extracorporeal anastomosis (ECA). Recently, the preference of intracorporeal anastomosis (ICA) is increasing between coloproctologists due to better esthetic results and lesser hernia risk.

Objective: To compare perioperative morbidity of intracorporeal anastomosis versus extracorporeal anastomosis in laparoscopic right colectomy

Methods: Consecutive 82 patients who underwent surgical laparoscopic right colectomy between 2012 and 2016 were retrospectively reviewed from a prospectively maintained database. The primary outcome was 30-day morbidity, recorded using de Clavien-Dindo classification system. Major complication was defined as Clavien-Dindo classification≥3. Statistical analysis was made using the software SPSS®.

Results: From a total of 82 patients, 24 had ICA and 58 had ECA. Both populations had no difference as related to age, comorbidities, Mass Index (BMI), preoperative hemoglobin or American Society of Anesthesiology (ASA) classification.

Overall, 56 (68,3%) patients had no complications, 21 (25,6%) had minor and 5 (6%) had major complications. The 30-day mortality was 2. Reoperation was necessary for 1 (1,2%) patient, and anastomotic leakage occurred in 1 (1,2%) patient.

The comparison between ICA and ECA did not achieved statistic relevance in any of the categories analyzed. There was a tendency of minor operative time of the ECA group (199 vs 223 min, p=0,76).

Conclusion: Laparoscopic right colectomy is a low morbidity surgical procedure. Both ECA and ICA are safe options, leaving the choice of the technique to the surgeon.

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Our patients with Colorectal Polyp and Their Features. The Importance of Endoscopic Screening

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Background: Colorectal polyps (CRP) are lesions that developing from mucosa and growing through lumen. CRP are seen in 1–12% of adult population, 30% of after the 50 years. They can be pedunculated or sessile, neoplastic or non-neoplastic. Previous studies have shown that the CRP are adenomatous character of 40–70%. We have discussed in this presentation characteristics of CRP that detected in surgical endoscopy unit.
Material and Methods: Patients with CRP were retrospectively reviewed from Surgical Endoscopy Unit report in between 2011–2015.
Result: Polyps were detected in 71 of 305 patients (%23.2) in their lower gastrointestinal endoscopy. 43 patients were male and 28 were female. The mean age was 54.5 years. Polyps were found in rectum of 21 patients, in sigmoid colon of 21, in left colon of 23, in transverse colon of 19, in right colon of 9 and in 4 of caecum. The majority of polyps (72%) of sessile. 58% of patients have only one polyp. Diameters of 82% polyps were 0–5 mm and 56% of all polyps were adenomatous, 43% were hyperplastic and 1% was inflammatory polyps. The majority of adenomatous polyps (92%) was tubular type. 56% of adenomatous polyps had dysplasia. 57% of all dysplasia were mild dysplasia, 3% were moderate and 40% were severe. Polypectomy and hot biopsy was performed to the patients. Patients were followed up.
Conclusion: Screening programs with rectosigmoidoscopy and colonoscopy must be developed to detect cancer precursor polyps because of common in left colon as it appears that in our study.

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Identification of Patient Subgroups Associated with Unfavorable Long-Term Outcome in the Laparoscopic Surgery for Colon Cancer Compared with Open Surgery: Subanalysis of a RCT Comparing Open and Laparoscopic Surgery for Colon Cancer (JCOG0404)

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Introduction: Previously we reported that the long-term survivals in open surgery (OP) and laparoscopic surgery (LAP) were almost identical from the randomized controlled trial of Japan Clinical Oncology Group (JCOG0404) for stage II/III colon cancer patients, but long-term survival was unfavorable in the subgroup such as rectosigmoid colon, cT4, cN2 and high BMI of LAP arm (ASCO-GI 2015 #656). The purpose of the present study is to identify postoperative factors associated with poor long term survival in the LAP arm compared with the OP arm after adjusting clinical and pathological factors excluding the patients with pathological stage IV and R2 resection.
Methods and Procedures: Eligibility criteria in JCOG0404 included patients aged 20–75, tumor located in the cecum, ascending, sigmoid, or rectosigmoid colon; clinical T3 or deeper lesion without involvement of other organs, clinical N0-2 and M0. Additionally in this analysis, the patients with pathological stage IV and R2 resection were excluded. Relapse-free survival (RFS) and overall survival (OS) from surgery were assessed using the multivariate Cox regression model adjusted by the clinical and pathological factors of which p value was smaller than 0.3 in Fisher's exact test.
Results: Between Oct 2004 and Mar 2009, 1057 patients were randomized (OP 528, LAP 529), among whom 1025 patients (OP 511, LAP 514) were included in the current analysis. The adjusted HR (95% CI) of important clinicopathological factors in OS is shown in the table.
Conclusions: The subgroup analysis suggests that pT4, pN2, high BMI were factors associated with unfavorable long- term outcome of laparoscopic surgery for colon cancer with curative resection, but tumor located in RS was not associated. LAP might not be recommended for patients with high BMI and careful postoperative follow-up is recommended for patients with pT4 and pN2.
Table: Adjusted HR (95%CI) with OS

Factors (N of OP, N of LAP)	Adjusted by clinical factors	Adjusted by clinico-pathological factors
BMI≥25	3.80	3.37
(OP 121, LAP 133)	(1.40-10.26)	(1.24–9.19)
RS	1.33	0.98
(OP 136, LAP 119)	(0.64–2.76)	(0.46–2.09)
pT4	1.29	1.33
(OP 87, LAP 92)	(0.71–2.35)	(0.73–2.41)
pN1	0.79	0.79
(OP 144, LAP 167)	(0.43–1.45)	(0.43–1.45)
pN2	1.74	1.74
(OP 58, LAP 65)	(0.76–3.97)	(0.76–3.97)

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Oncological Outcome of 90 Patients After Transanal Totalmesorectal Excision for Rectal Cancer: Short Term Follow Up

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Introduction: The transanal total mesorectal excision (taTME) seems to be a valid alternative to the often technical difficult performance of open or laparoscopic TME. Pathological results seem comparible to the laparoscopic or open technique. This study is one of the first studies to show oncological follow up of a large series of patients treated by taTME.
Methods and Procedures: All patients with rectal cancer treated at our hospital by taTME between November 2011 and June 2016 were prospectively included in a standardized database. Patients with a minimal follow-up of 24 months were included in this analysis. High-, mid- and low rectal cancer were included in this analysis, patients with a preoperative T4 tumor were excluded. Patients periodically visited the outpatient clinic with analysis of serum carcinoembryonic antigen concentrations, colonoscopy, thoracic and abdominal computed tomography to determine recurrence of disease.
Results: A total of 90 patients were included in this analysis. At time of surgery patients had a median age of 67.5 years (range 38–85) and 64.4% (n=58) were male. Patients were classified as ASA I in 5.6%, ASA II in 83.3% and ASA III in 11.1%. Neoadjuvant chemoradiotherapy was administered in 56.7% (n =51) of the patients and one patient only received radiotherapy. Tumor was located in the high-, mid- and low rectum in respectively 24.4%, 52.2% and 23.3%. Postoperative pathological staging showed complete remission in 11.1%, pT1 in 8.9%, pT2 in 27.8%, pT3 in 46.7%, pT4 in 3.3%, pTis in 2.2%. Furtermore, pathological results showed N0 in 67.8%, N1 in 22.2%, N1c in 1.1% and Nx in 2.2%. CRM was <1 mm in 8.9% and the mesorectal quality was complete in 98.9%.The included patients had a median follow up of 34.5 months (range 24.0–56.0). Of these patients 80% (n=72) had no recurrent disease, 16.7% (n=15) had recurrent disease and three patients had died with recurrent disease. Median time of overall recurrent disease was 19.5 months (range 4.0–37.0). A total of 15.6% of the patients had systemic recurrent disease, with a median time of 17.0 months (range 4.0–33.0). A total of 6.7% of the patients had locoregional recurrent disease, with a median time of 24.0 months (range 10.0–37.0).
Conclusion: Short term oncological outcomes after taTME are comparible to outcomes after laparoscopic TME.

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The Ingenuity for Convincing Lymph Node Dissection Around Inferior Mesenteric Artery for Advanced Left-Sided Colon Cancer

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Laparoscopic surgery benefit surgeons due to the magnifying effect of the targets and knowledge of micro-anatomy accumulated through high quality visualizations under HD image. Thus, by performing laparoscopic surgery with fine and accurate manipulation, surgeons could pursuit high quality and convincing procedures yield to the procedures conducted by conventional operation through major laparotomy, even at surgical treatment for malignant tumors. However, acquisition of appropriate technique for laparoscopic surgery is challenging and surgeons should at least aware of laparoscopic-surgery specific weak point such as less sense of touch, difficulty of acquisition of wide and bird visualizations to accomplish safe and adequate procedure. To overcome these issue, standardization of laparoscopic surgery-specific technique is indispensable.
With regards to surgical technique for colon cancer, lymph node dissection thought to be critical, since lymph node metastases from primary lesion are linearly co-related to the prognosis of patients. According to the recent emerging concept about lymph node dissection, surgeons could perform dissection by carefully tracing the "embryologic tissue plane" to accomplish complete mesocolic excision (CME) and central vascular ligation (CVL) which thought to be indispensable for curative resection for colon cancer, worldwide. Actually, CVL+CME have much in common with Japanese D3, a traditional concept in Japan. The pivotal point, common in both concept, is that procedure on mesocolic mobilization and that on vascular ligation should be divided clearly to achiving fine and accurate lymph node dissection.
Here, we present detailed ingenuity to achieve convincing lymph node dissection around inferior mesenteric artery (IMA) for advanced left-sided colon cancer under laparoscopic condition. First, to start medial to lateral approach, peritoneum around IMA was incised from caudal side to duodenal recess. By doing this, the angle between Aorta and IMA was maximized, in this line, injury of hypogastric nerve was easily avoided. Second, by using the magnifying effect, the border between the lymph tissue around IMA and paraaortic lesion, which is separated by pre-hypogastric nerve (HN) facia, was finely and carefully traced and dissected. With these procedures, ideal CME +CVL around IMA is feasible without any injury of hypogastric nerve.
From 2004 to 2011, 511 laparoscopic surgery for advanced colon cancer were performed. The mean operative time was 175 min and the mean blood loss was 30 g. Five-year disease free survival rate was 86.7% at stageII and 76.1% at stageIII, respectively. In the presentation, we also show representative movie of the case of standard sigmoidectomy accompanied with CME+CVL.

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Long-Term Outcomes of Laparoscopic Versus Open Surgery for Primary Tumor Resection in Patients with Stage 4 Colorectal Cancer

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Purpose: The aim of this study was to compare the long-term outcomes of laparoscopic surgery with those of open surgery in patients with stage I□ colorectal cancer.
Background: Laparoscopic resection has also developed as a commonly accepted surgical procedure for advanced colorectal cancer. There are conflicting data on the influence of laparoscopic surgery on survival benefits. However, advantages of primary tumor resection by the laparoscopic surgery in patients with stage I□ colorectal cancer are still obscure.
Methods and Procedures: We retrospectively reviewed a total 130 consecutive stage I□ patients who underwent primary tumor resection of colorectal cancer between January 2007 and December 2013.
Results: Of 130 patients, 29 underwent laparoscopic surgery and 101 underwent open surgery. The median duration of observation was 22.5±23.4 months. The five-year overall survival rate was 13.8% in all patients with stage I□ colorectal cancer, with median survival times of 26 months. There were no deaths within 30 days after surgery in the laparoscopic group. Five patients (17.2%) in the laparoscopic group required conversion to open surgery because of bulky tumors. The five-year overall survival rate was 6.9% in the laparoscopic group and 15.8% in the open group, with median survival times of 34 and 23 months, respectively (P=0.17). Although the median survival times of laparoscopic surgery were longer than open surgery, laparoscopic surgery was not significantly associated with the overall survival.
Conclusion: Laparoscopic surgery seems to be a safe and feasible option, with long-term benefit for primary tumor resection with stage I□ colorectal cancer, although the difference was not statistically significant.

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Colorectal Cancer Screening from a Large Single Center of Thailand

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Background: Increasing morbidity and mortality from colorectal cancer is evident in recent year in the developing Asian nations. Result of screening colonoscopy from Western countries reported adenoma detection rate (ADRs) of 30–40% while those from Asia has ADR as low as 10%. There have been limited data regarding screening colonoscopy in Thailand. The objectives of this study were to determine polyp detection rate in Thai people, to evaluate the incidence of colorectal cancer detected during screening colonoscopy, and to determine the endoscopic finding of the polyps which might have some impacted on endoscopist to performed polypectomy.
Materials and Methods: This study was retrospective electronic chart review of asymptomatic Thai adults who underwent screening colonoscopy in our endoscopic center from September 2012 to July 2016. Biopsy and surgery was performed depending on the identified lesions.
Result: A total of 630 cases were reviewed. The average age of patient was 59.0±12.2 years (range 15–87) and 60.2% were female. Most of the cases (58.3%) has no lower gastrointestinal tract symptoms and 95.3% of cases had achievement of total colonoscopy. About 44.4% (280 cases) of all colonoscopy had abnormal colonoscopic finding, and of these, 200 patients (31.7%) were reported to have colonic polyps or tumor. High risk adenomatous (villous or tubulovillous or high grade dysplasia) were found in 9 cases (1.4%), low risk adenoma in 71 cases (11.3%) and hyperplastic polyp in 22 cases (3.5%). Seventeen cases (2.7%) had colorectal cancer and 88.2% of them were non-metastatic including two stage 1 cases, seven stage 2 cases and four stage 3 cases. Only two cases had metastasis. The most common cancer site was left-sided colon including rectum (76.4%).
Conclusions: High prevalence of colorectal cancer and high risk adenoma were found in the Thai population age 49–74 years old by screening colonoscopy and more dominant in female. The overall polyp and tumor detection rate was 31.7%, low risk adenoma detection rate was 11.3%, high risk adenoma detection rate was 1.4% and colorectal carcinoma detection rate was 2.7%. Integration of screening colonoscopy into the national cancer screening program should be implemented to detect early cases of advanced colorectal neoplasia and improved survival of colorectal cancer patients in Thailand. Therefore, new technology would play an important role indistinguishing polyps.

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Clinical Outcomes of Laparoscopic Lateral Pelvic Lymph Node Dissection Following Total Mesorectal Excision for Lower Rectal Cancer

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Purpose: The standard surgical treatment for lower rectal cancer in our department is total mesorectal excision (TME)+bilateral lateral pelvic lymph node dissection (LPLD). We previously reported on the effectiveness of LPLD in preserving the autonomic nerve using an open approach, but have recently adopted laparoscopic TME+bilateral LPLD to achieve a more precise autonomic nerve preservation. Here we compare the surgical outcomes between patients who underwent laparoscopic LPLD and those who underwent open LPLD to assess the feasibility and oncological safety of laparoscopic LPLD.
Methods: We retrospectively reviewed the clinical records of 250 patients who underwent open LPLD (Group O) and 30 patients who underwent laparoscopic LPLD (Group L). These patients were selected from a total of 844 patients who underwent surgery for rectal cancer at our medical department between January 2000 and August 2016. We compared the clinicopathological features and surgical outcomes between patients from Groups O and L.
Results: Of the 250 patients, 202 were men and 78 were women with a mean age of 64 years. In all Group L patients, the procedures were completed without conversion to open surgery. The mean surgical duration was longer in Group L than in Group O (310 vs. 205 min, $p<0.01$). Group L also showed less hemorrhage (91 vs. 625, $p<0.01$). The total number of lymph node dissections was 27 in Group O and 26 in Group L. The number of lateral pelvic lymph nodes was 10.4 in Group O and 11.7 in Group L. The number of dissected lymph nodes was not statistically different between the two groups. Postoperative mortality and morbidity rates were 0% and 45%. Postoperative complications of Clavien–Dindo grade II or above were observed in 45% of Group O patients and 18% of Group L patients ($p<0.01$). Dysuria was observed in 8% of Group O patients, although temporary dysuria was observed in one Group L patient. Group L had shorter hospital stay than Group O (16.2 vs. 21.4 days, $p=0.03$).
Conclusion: Laparoscopic TME+bilateral LPLD can preserve the autonomic nerve, has less blood loss, and enables precise dissection. It is technically feasible, safe, and oncologically acceptable.

P194

Comparative Study of Rectovaginal Fistula Versus Conventional Anastomotic Leakage After Laparoscopic or Robotic Low Anterior Resection for Rectal Cancer: Optimal Strategies in Single-Institute Experience

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Background: Rectovaginal fistula (RVF) after low anterior resection for rectal cancer is umcommon and few studies have been reported. The aim of this study was to compare RVF and conventional anastomotic leakage(CL), and to evaluate the success rates of each treatment for RVF.
Methods: All female patients who underwent laparoscopic or robotic low anterior resection with colorectal anastomosis or coloanal anastomosis between January 2003 and April 2015 (n=630) were retrospectively analyzed. Among them 36 patients experienced anastomotic leakages. Subjects were divided into two groups depending on the types of anastomotic leakage (RVF, n=19 vs. CL, n=17). Patients' demographics and perioperative outcomes were compared between two groups.
Results: Compared to the patients of CL, the patients in the RVF group had high incidence of neoadjuvant chemoradiotherapy (36.8% vs. 5.9%; $p=0.044$), lower level of anastomosis (2.47 ± 1.61 vs. 3.88 ± 2.08; $p=0.030$) and later onset of symptoms (median 112 day after surgery vs. 5; $p<0.001$) than the CL group. A total of 27 procedures were performed in 19 patients with RVF. Redo coloanal anastomosis(RCA) showed satisfactoty success rates (100%, n=8) while primary repair(transanal or transvaginal) alone had high recurrence rates(50%, n=10)
Conclusions: Compared to CL, RVF is a later complication developed more frequently from patients who have lower level of anastomosis or received neoadjuvant chemoradiotherapy. In addition, this study's findings suggest that RCA might be considered as a successful treatment strategy for RVF.

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Three-Dimension (3D) Laparoscope Reduced Operative Time for Sigmoid Colon Cancer Compared with Two-Dimension (2D) Laparoscope

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Background: Laparoscopic surgery brought patients several benefits; less pain, quick recovery to normal activity and minimally invasive. However, laparoscopic procedure insisted surgeon long learning curve due to difficult sensation for depth, less touch sensation and long operation time compared with that of open surgery. Three dimension laparoscope could have advantage to understand depth in abdominal cavity and could reduce the operation time.
Aim: Our hospital adopted 3 D (three-dimension) laparoscope (Olympus) on December, 2014. We compared sigomoidectomy operation time between before and after 3D laparoscope adoption. The operation time before induction, 2013 until November 2014, and operation time by 3D scope after December 2014 up to August 2016. The reason why the compared object was laparoscopic sigmoidectomy was that it was designated procedure by endoscopic surgical skill qualification examination of JSES (Japan Society for Endoscopic Surgery).
Material and Methods: Seventeen surgeon participated in this analysis. Two surgeon were qualified by endoscopic surgical skill qualification examination of JSES. Six was staff surgeon, and others were senior residents. There were fifteen lap-sigmoidectomy under 2D scope (Olympus Visera Pro) during January 2013 and November 2014, and forty six lap-sigomoidectomy under 3D scope (Olympus Endoeye Flex 3D) after December 2014 to December 2015. SPSS one-way analysis of variance was performed and mean$\pm$standard deviation was shown, P value less than 0.05 was considered as significant.
Results: Operation (n=13) time by 2D was 312.4 ± 94.6 min and operation time (n=45) by 3D scope was 271 ± 63.4 min (P=0.047).
Discussion and Conclusion: 3D scope was useful for understanding how the target organ or layer was deep. These easier understanding about anatomy was beneficial for younger surgeons and was considered as 3D scope made shorten learning curve of laparoscopic surgery.

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Five Cases of Laparoscopic Surgery for Mucocele of the Appendix

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Mucocele of the appendix is an uncommon condition where luminal distention by mucin, usually results from either benign (hyperplasia or mucinous cystadenoma) or malignant (mucinous cystadenocarcinoma) epithelial proliferation. Standard therapy is surgical resection because of the difficulty in determining malignant or benign, and the risk of rupture that may cause pseudomyxoma peritonei whether the lesions are benign or malignant. We usually chose appendectomy or partial cecectomy for mucocele of the appendix, but if it is considered malignancy we chose ileocecal resection with dissection of the lymph nodes. Five patients underwent laparoscopic surgery for mucocele of the appendix between January 2013 and June 2016 at our single insutitution. It consists 1 women and 4 men with a mean age of 62.4 years (range, 49–77 years). One patient experienced pain of right lower abdomen, other four patients had no symptoms and tumor was detected incidentally. The mean maximum diameter of tumor by CT was 61.8 mm (range, 27–95 mm). Surgical procedures performed were appendectomy in one case, partial cecectomy in three cases and ileocecal resection in one case. In the case of ileocecal resection, CEA level was elevated at 12.1 ng/mL. The mean operative time was 134 min (range, 83–232 min). Perioperative mortality and morbidity were 0% and 20% respectively. One case needed laparoscopic adhesiotomy because of adhesive intestinal obstruction. The mean post operative hospital stay was 13 days (range, 4–45 days). Pathology revealed low-grade appendiceal mucinous neoplasm in all cases. There are no re-admission or tumor recurrence, such as pseudomyxoma peritonei. Recently many cases have reported successful laparoscopic surgery for mucocele of the appendix, although laparoscopic surgery is still controversial, as inadvertent rupture of the cyst due to improper handling will cause pseudomyxoma peritonei. In our five cases, all patients underwent laparoscopic surgery safety, but we selected open surgery in cases of the tumor was very large or it was suspicious of infiltration of other organs. We should select proper surgical technique according to each disease condition.

P197

Surgical Outcomes for Diverticulitis in Young Patients: Results from the NSQIP Database

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Introduction: Recent epidemiological studies have reported changing patterns of diverticular disease in the American population. The incidence of diverticulitis is increasing among the young (<50 years), as are the rates of recurrent disease. There is ongoing controversy regarding the best management strategy for this group. Traditionally elective colectomy was recommended after a single episode, this has changed to a less aggressive approach. Current ASCRS guidelines recommend an individualized approach with selective use of elective colectomy rather than routine elective resection based on age.
This study investigates the clinical presentation and surgical outcomes of young patients presenting with diverticulitis using the ACS NSQIP database, and compares these outcomes over two time periods, being 2005–2010 and 2011–2014. It was expected the change to a more conservative management approach for this patient group has not resulted in any change to severity at presentation, rates of emergent procedures, rates of Hartmanns procedures, or rates of surgical complications.
Methods and Procedures: The NSQIP dataset from 2005 to 2014 was searched to identify all patients<50 year with diagnosis of diverticulitis (ICD-9 code 562.11). Patients with disseminated carcinoma or recent chemo or radiotherapy and were excluded. Data was collected regarding patient demographics, clinical presentation, intra operative details and 30 day post-operative outcomes.
Results: 11648 patients were included in the analysis. The average age was 42.2 years and 35.1% were female. 53.2% of patients were obese (BMI>30) or extremely obese (BMI>40). Group 1 (2005–2010) had 4643 patients, Group 2 (2011–2014) had 7005 patients. Co morbidities were comparable between groups with the exception of diabetes and obesity ($p>0.05$). Rates of pre operative sepsis, Hartmanns procedure, perforation rates and post operative complications were similar between the groups. The laparoscopic surgical approach use more in Group 2 (65%) vs. Group 1 (53%) ($p<0.05$). The rate of emergency surgery was significantly higher in Group 2 (24.1%) vs. Group 1 (12.8%) ($p<0.05$).
Conclusions: Young patients presenting for surgery for diverticulitis are likely to be male and obese. Over time, with a change in management, the rates of pre-operative sepsis, Hartmann's procedures, perforation or post-operative complications have not changed significantly, while rates of laparoscopic surgery have increased ($p<0.05$).The observed increase in emergency surgery rates demonstrated may be due to the temporal effects of the change in management approach in terms of reduced elective cases, or a true change in the incidence of this disease among this population.

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Loop Ileostomy and Colonic Lavage for Fulminant Clostridium Difficile Colitis: Survey of Current Practice

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Introduction: The gold standard treatment for fulminant Clostridium difficile colitis is a total abdominal colectomy. However, this is associated with high morbidity and mortality. Diverting loop ileostomy and colonic lavage has emerged as an attractive option, but limited data exists. We sought to assess surgeons' experience with the use of this procedure.
Methods: After institutional review board approval, a 25 multiple-choice question survey was distributed from 09/2015-09/2016 to the members of the Canadian Association of General Surgeons, the Québec Association of General Surgeons, and the International Society of University Colon and Rectal Surgeons, and members of the Society of American Gastrointestinal and Endoscopic Surgeons research committee using societal distribution.
Results: 101 surveys were completed. Of these, surgical trainees comprised 13.9% of respondents, while surgeons who had less than <5, >5 to 15, and >15 years of experience accounted for 20.7%, 40.2%, and 39.1% of respondents, respectively. The majority of respondents were from Québec, Canada (64.7%) followed by Ontario, Canada (11.1%) and various regions in the U.S. (7.1%). Surgeons' practice settings were academic (60.4%), community (41.6%), or private (5.9%). Half of the respondents treated at least one patient with fulminant Clostridium difficile colitis during the last year and 18% of respondents had performed at least one loop ileostomy with colonic lavage. After creation of the loop ileostomy, surgeons reported that colonic lavage was performed in the operating room, intensive care unit, and/or ward in 87.5%, 25.0% and 12.5% of cases, respectively. There was no consensus on the regimen for colonic lavage or post-operative management, however vancomycin flushes were given for 10–14 days by 61.2% of respondents and they were administered by a nurse in 93.0% of these cases. Failure of the loop ilesotomy requiring a conversion to total abdominal colectomy was reported in 13.3% of respondents. After resolution of fulminant colitis, 33.3% of surgeons closed the loop ileostomy in their patient(s) and 25.0% of surgeons reported a recurrence of Clostridium difficile infection after ileostomy closure. The majority of participants (78.7%) supported this procedure in patients with fulminant disease. Most surgeons (59.3%) voiced the need for more evidence and expressed an interest in performing this procedure within the confines of a study.
Conclusion: Loop ileostomy and colonic lavage is being used for fulminant Clostridium difficile colitis. The exact indications, technique and post-operative management remain unclear, and would be best determined by prospective, multicenter studies.

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Initial Single Institutional Experience of Ultra-low Anterior Resection without Routine Covering Ileostomy

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Introduction: Defunctioning ileostomy, practiced routinely for ultra low anterior resections (ULAR) has its own complications and decrease the quality of life. With experience, the leak rate and complications of stapled anastamosis at the pelvic floor after ultra-low anterior resection has reduced. Hence the role for routine defunctioning ileostomy is becoming questionable. We present our initial experience of ultralow anterior resection without routine ileostomy.
Materials and Methods: A prospective non-randomised study of consecutive patients undergoing ultralow anterior resection from January 2013 to June 2016 was performed. Thirty three patients with low rectal tumors who underwent ULAR were classified into two groups based on whether defunctioning ileostomy was performed. A tube drain adjacent to the anastomosis in pelvis was placed in all patients. The leak rates and complications were analyzed in the two groups.
Results: Among the total of 33 patients, 15 had ileostomy and 18 did not have defunctioning ileostomy. Only one patient without ileostomy developed anastomotic leak, requiring laparoscopic peritoneal lavage and diversion ileostomy on post operative day 3. Two among the 15 patients with routine ileostomy had re-operation in the same admission for ileostomy obstruction. Though patients with ileostomy had early return of bowel function, there was no difference in the duration of hospitalization.
Conclusion: Our initial experience of performing ultra-low anterior resection without routine diversion ileostomy has been promising. Early diagnosis of leak and peritoneal lavage with diverting ileostomy in case of a leak is a safe option instead of routine diverting ileostomies.

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Preliminary Results and Lessons Learned from an Inanimate Ex-Vivo Porcine Stomach ESD Training Model

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Introduction: Endoscopic submucosal dissection (ESD) is routinely used in Japan to remove large sessile colorectal adenomas and superficial T1 colon cancers. Few American gastroenterologists perform ESD, thus, most large sessile polyps in the US are treated via segmental colectomy. A few surgeons perform ESD in the operating room in conjunction with laparoscopy. If ESD fails, a MIS colectomy or wedge resection is immediately done. It is difficult for a surgeon to become proficient at ESD because the volume of large polyps may be low/sporadic and a good percentage of candidate polyps will not fully lift due to prior hot snare use. To gain ESD experience and skill the authors instituted a training program that includes an inanimate ex-vivo porcine stomach model.
Method: The colon model is a hollow plastic tube with a rectangular cutout "window" well away from the end of the tube. The scope is inserted via an opening in a round sponge that is placed at the tubes end. A rectangular piece of porcine stomach mounted on an electrocautery pad (connected to generator) is placed over the "window" cutout. ESD is done with the same instruments used in humans. This model does not require insufflation and bleeding is not an issue. Each session's goal is to excise en bloc a 2-2.5 cm circular mucosal "lesion" drawn or burned onto the mucosa.
Results: ESD en bloc lesion excision was completed in 15 of 16 "cases"; with time, the trainees learned the elements of ESD and developed an approach. The mean case duration was 64 min (range 32–111), with no time trend noted. The mean number of muscularis propria injuries/case was: partial thickness, 6 (range 0–13); full thickness, 1 (range 0–5). Difficulty maintaining conductivity between cautery pad and tissue was a problem that prolonged most cases. Maintaining the lift was an issue in 69% of cases (mean # sclerotherapy catheter insertions/case, 5 [range 2–9]; mean # injections/case, 17 [range 9–25]). Notable variability in tissue quality and integrity was noted. In general higher cautery settings and the need for more pressure/force on the needle knife was needed to cut tissue.
Conclusion: The model related difficulties noted above detract from the model but, nonetheless, it is useful in allowing trainees to learn the steps involved with ESD and to complete multiple excisions. After gaining experience, further training using the more realistic ex-vivo bovine rectum model is needed.

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Interim Review of ESD/EMR vs Wedge vs Segmental Resection Study Results for Large Sessile Adenomas: Lengthy Learning Curve, Need for Ex-Vivo Training Programs, and Reliability of "Non Lifting" Sign as Marker for Cancer

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Introduction: Endoscopic Submucosal Dissection (ESD) is the gold standard for the removal of large sessile adenomas in Japan. Adoption rates in the U.S. have been low and colectomy remains the most commonly used treatment. Seven years ago, to introduce ESD into a surgeons practice the protocol below was initiated. This is a mid-study report.
Methods: Patients with large sessile polyps consented to polyp removal by 1 of 3 methods in the operating room. First, if deemed feasible, ESD excision (+endoscopic mucosal resection (EMR) if needed) is attempted. If polyp not amendable or ESD fails, then a laparoscopic "wedge" partial circumference resection or a segmental colectomy is performed. Colectomy is mandated for polyps that do not fully lift because of concerns that a cancer which invades the muscularis propria is present. Other reasons why a polyp may not lift include prior "hot" snare use or scarring from prior inflammatory process. Prospectively gathered data about the polyps, patients and the pathology results were reviewed.
Results: ESD/EMR was attempted on 33 patients. Polyps by location were: right, 15(45%); transverse, 2(6%); left, 3(9%); sigmoid, 7(21%); and rectum, 6 (18%). The ESD/EMR success rate was 60% (9/15) for left sided polyps and 27% (4/15) for right colon polyps. Colectomy was avoided in 19 pts (58%), removal methods used were: ESD or ESD/EMR, 15; transanal, 2; and wedge resection, 2. The reasons for colectomy were perforation (6), location or size of polyp (6), and non-lifting part of lesion (6). Another 8 patients were evaluated in the OR and ESD was not attempted because of failure to lift; all underwent colectomy. There were 14 patients with non lifting lesions, 8 had history of prior treatment with hot snare; the final path was benign in all.
Conclusion: The authors have had limited success in removing polyps via ESD/EMR, however, in 58% colectomy has been avoided. Variable case volume is one issue. Also right sided polyps proved to be very difficult to remove. To improve ESD skills and to permit practice an intense ESD training program (ex vivo models) has been introduced. Also, in a subset of patients prior snare use causes scarring that prevents full lifting and eliminates ESD as an option. It is imperative that endoscopists refrain from snare use on large polyps if they do not intend to fully remove the lesion on that exam.

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Hybrid Approach Using Laparoscopy/Transanal Minimally Invasive Surgery to Treat Rectal Cancer with Invasion

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We treated a 64-year-old man for rectal cancer with direct invasion to the seminal vesicles and no distant metastases by complete resection with laparoscopy and transanal minimally invasive surgery (TAMIS). We inserted the TAMIS device into the anal canal to above the anorectal ring and dissected to prostate level. High ligation of inferior mesenteric artery and vein was performed by standard medial laparoscopy. Sigmoid and descending colon was mobilized, and in the postrectal space we dissected to the space made by TAMIS. Membranous peritoneum was dissected on both sides of the rectum to the cul-de-sac. Peritoneum was dissected anterolaterally to reveal the seminal ducts, which were ligated and dissected on both sides. Seminal vesicles were dissected from the posterior wall of the bladder to the prostate level. The rectal specimen was now fully mobilized. Lower rectal resection with combined laparoscopy and TAMIS provides a better surgical plane than standard laparoscopy.

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Laparoscopic Ventral Rectopexy with Tensor Fascia Lata: A Preliminary Report

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Introduction: Laparoscopic ventral mesh rectopexy is promising procedure for rectal prolapse and pelvic floor descend syndrome, but mesh complications are major concern in this technique. Tensor fascia lata had been used as autologous prosthesis for many reconstructive surgeries with good results, but there was no report of its used in rectal prolapse.
Objective: To evaluate the short-term outcome of using tensor fascia lata in laparoscopic ventral rectopexy
Method: Preliminary cases report of patients who had rectal prolapse and were treated with laparoscopic ventral rectopexy with tensor fascia lata in King Chulalongkorn Memorial hospital from 2013 to 2016
Results: 9 patients underwent laparoscopic ventral rectopexy with tensor fascia lata with median follow up time of 12 months. All patients had no recurrent rectal prolapse with improvement in constipation, incontinence and no major complications occurred.
Conclusion: The use of tensor fascia lata in laparoscopic ventral rectopexy is comparable to synthetic mesh, and may avoid the mesh complications. This technique could be considered as an effective alternative treatment for rectal prolapse, but long term results are needed.

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Is There an Optimal Operation Time for Elective Laparoscopic Colectomy?

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Introduction: With growing usage of minimally invasive approaches, utilization of laparoscopy in technically challenging cases is becoming increasingly prevalent. This increased use of MIS has generally been accompanied by prolongation of the operative time (OT). We investigated how the OT affect the outcomes of laparoscopic partial colectomy (LPC).
Methods and Procedures: The ACS-NSQIP targeted colectomy files were utilized to identify patients who underwent elective LPC from 2012 to 2014. All patients underwent primary anastomosis. Exclusion factors included conversion to open procedure, ostomy formation, and emergent procedures. Patients were divided into four groups (L1-L4) based on mean OT (167 min) and standard deviation (SD, ±78 min). This defined L1 as two SD less than the mean (OT<89 min), L2 as one SD less than the mean (90 min
Results: Of 11255 patients, 1144 (10.2%) were L1, 5690 (50.5%) were L2, 3366 (29.9%) were L3, and 1055 (9.4%) were L4. Following risk adjustment, there was no significant difference in 30-day mortality and morbidity rates in L2 group compared to L1. 30-day mortality rate was not significantly different between L2 and L3, but serious morbidity rate was significantly higher in L3 patients compared to L2 (14.1% vs. 11.8%, AOR: 1.23, P=0.001). Also, patients in L3 had higher risk of surgical site infections (SSI) than L2 (7.4% vs. 5.5%, AOR: 1.27, P=0.007). Notably, Anastomotic leak and postoperative ileus were significantly higher in L3 compared to L2 (2.6% vs. 1.8% and 7.5% vs. 6.2%, respectively, P<0.05). Patients in L4 had higher serious morbidity, risk of SSI, anastomotic leak, and ileus compared to L2 (P<0.05). Patients in L4 had no significant differences in terms of mortality and morbidity compared to L3 except for prolonged hospitalization (more than 30 days) and renal insufficiency which were significantly higher in L4 group (0.9% vs. 0.2% and 0.6% vs. 0.1%, respectively, P<0.05).
Conclusion(s): Our data revealed that patients with shorter operative times experience significantly lower serious morbidity, risk of SSI, anastomotic leak, and ileus compared to patients whose operative times exceed the mean. These findings suggest that LPC procedures with OT longer than average (167 min) have higher postoperative complications compared to the resections with OT shorter than average.

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Acute Hemorrhagic Rectal Ulcer: An Experience in an Urban Emergency Hospital

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Introduction: Acute hemorrhagic rectal ulcer (AHRU) is characterized by a sudden onset of painless and massive lower rectal bleeding in elderly, bedridden patients (pts) with major co-morbidities. AHRU, often reported in Japan and East Asia, is not reported in the West. This study examines the incidence, co-morbidities, endoscopic findings, management and outcomes in pts with AHRU.
Methods and Procedures: The medical records of 2,253 consecutive inpatients, who underwent colonoscopies on the surgical service at an urban emergency hospital between July 1, 2009 and December 31, 2015, were reviewed.
Results: There were 66 pts (2.9%) out of 2253 inpatients who underwent colonoscopy and were found to have rectal ulcers. Etiologies included stercoral (18 pts), enema-related (17 pts), AHRU (11 pts), solitary (7 pts), HIV related (3 pts), rectal injuries by gunshot wound (3 pts), cocaine induced (2 pts), ischemic (2 pts), pseudomonas (1 pt), idiopathic (1 pt), and non-bleeding acute rectal ulcer (1pt). Patients with colitis, inflammatory bowel disease, pouchitis, and radiation proctitis were excluded. Some stercoral ulcers were difficult to differentiate from AHRU. All 11 AHRU pts presented with painless hematochezia and had major comorbidities. There were five men and six women, with a mean age of 65 (range 45–88). All were admitted to the ICU. Comorbidities included hypertension (7 pts), end-stage renal disease (6 pts), diabetes mellitus (4 pts), CVA (4 pts) and liver failure (3 pts). Five pts had been treated with anticoagulant or anti-platelet agents. Endoscopic classification of AHRU included: (A) long circumferential ulcer (5 pts), (B) multiple small ulcers near or at dentate line (4 pts), (C) round or irregular ulcers (1 pt), and (D) Dieulafoy-like ulcer (1 pt). All ulcers were located in the distal rectum within 10 cm of the dentate line. Four pts underwent successful colonoscopic hemostasis; 3 pts died from comorbidities; 4 pts stopped bleeding spontaneously.
Conclusions: AHRU, rarely recognized in the West, occurs in elderly, critically ill, and bedridden pts. Most patients present with sudden, severe, painless, rectal bleeding and are best managed by correction of coagulopathy and by endoscopic hemostasis.

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Feasibily and Safety of Laparoscopic Lateral Pelvic Lymph Node (LPLN) Dissection for Locally Recurrent Rectal Cancer and Risk Factor for Re-recurrence

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Backgrounds: Lateral pelvic lymph node (LPLN) metastasis has been considered as distant metastasis and often treated by systemic chemotherapy. However, complete radical resection of LPLN metastasis can achieve cure in some patients. As safety and efficacy of radical LPLN resection have not been well elucidated, this study evaluated the feasibility of laparoscopic radical LPLN resection comparing with the conventional open approach and oncological outcome between the patients with and without re-recurrence after LPLN resection.
Patients and Methods: We retrospectively reviewed the clinical records of 17 patients who underwent radical resection for metastasis of LPLN after curative rectal surgery between July 2012 and August 2016 in Osaka National Hospital.There were 4 open surgeries and 13 laparoscopic surgeries.Operative factors (time, blood loss, post-operative complications, CRP elevation, and post-operative hospital stay) were compared between the open and laparoscopic surgeries. Sixteen patients had pre-operative chemoradiation and/or radiation therapy. Oncological outcomes were assessed in terms of response of preoperativeadjuvant therapy. Responders were defined as the pathological tumor regression greater than 67% of all tumor areas.
Results: There were no mortalities in all 17 patients, and no conversion to open surgery in the laparoscopic group.Median blood loss (60 vs 1075 ml, P=0.03), CRP elevation on post-operative day 3 (5.95 vs 18.09 mg/dl, P=0.014), and post-operative hospital stay (17.0 vs 32.5 days, P=0.023) were significantly smaller and shorter in the laparoscopic group. The median operation time (316 vs 311 min, P=0.9), R0 resection rate (100 vs 100%), morbidity incidence (Clavien-Dindo grade I&II ; 61.2%(8/13) vs 50.0%(2/4), P=0.68), and (Clavien-Dindo IIIa&IIIb ; 7.7%(1/13) vs 50%(2/4), P=0.07) were similar between the laparoscopic and open group. After a median follow-up of 582 days, local re-recurrence was found in 4 patients (1 in open and 3 in laparoscopic), brain metastasis was found in 1 patient (in laparoscopic), lung metastasis was found in 1 patient (in laparoscopic) and brain and lung metastasis was 2 patients (1 in open and 1 in laparoscopic). Local re-recurrence after LPLN resection rate was higher in non-respoders than in responders (50% and 0%, P=0.08).
Conclusions: Laparoscopic surgery for LPLN metastasis was feasible and less invasive than open surgery. Laparoscopic radical resection of LPLN might be justified in some cases for cure intent. Patients with incomplete pathologic response to neoadjuvant therapy should be followed carefully and adjuvant therapy must be considered.

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Laparoscopic Colorectal Surgery in Colorectal Cancer Patients with Previous Abdominal Operations

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Introduction: Laparoscopic surgery in patients with previous abdominal operations is considered as a relative contraindication because of concern for the presence of adhesions and risk of injury. The aim of this study is to evaluate how previous abdominal operations influence the outcome of the patients with laparoscopic colorectal surgery (LAC) for colorectal cancer (CRC).
Methods and Procedures: Total 237 patients who had LAC for CRC in Tohoku University Hospital from 2008 to 2016 were retrospectively analyzed by comparing perioperative factors of the patients with previous abdominal operations (n=101, group A) to those of the patients without any history of operations (n=136, group B).
Results: In group A, the frequencies of previous abdominal operations were one-time: 83, two-times: 15, three-times: 3, respectively. Operative procedures were appendectomy: 70, gynecologic surgery: 27, cholecystectomy: 9, urologic surgery: 6, colectomy: 4, gastrectomy: 3, abdominal aortic aneurysm repair: 2, respectively. In perioperative factors, there are no statistically difference between group A and B in terms of blood-loss (25 vs 25 ml, p=0.37), operative time (204 vs 206 min, p=0.48), hospital-length of stay after surgery (11 vs 10 days, p=0.43), and incidence of complications (7.0 vs 10.3%; Clavien-Dindo grade>or =2). In group A, however, there was a trend for increasing operative time of patients with history of three-time operations (282 vs 206 min) and of colectomy (237 vs 206 min). In this study, three cases (1.3%) of conversion from laparoscopic to open surgery were observed, and two of three had previous abdominal operations which included a case of abdominal total hysterectomy with lymphnodes dissection for uterine cancer and a case of cholecystectomy for cholecystolithiasis with peritonitis.
Conclusions: Most cases of LAC for CRC patients with previous abdominal operations might safely be completed. However, it should carefully be performed in the patients with previous histroy of multiple abdominal operations, colectomy, gynecological operation with lymphnodes dissection for malignancy, and operation for disease with peritonitis.

P209

Laparoscopic Procedure and Surgical Outcomes for Transverse Colon Cancer at Splenic Flexure in Our Institute

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Purpose: The laparoscopic procedure for transverse colon cancer (TCC) is technically demanding and its efficacy is controversial. Of those, laparoscopic procedure for TCC at splenic flexure (spTCC) is oncologically more difficult to perform. The reasons are as follows; the incidence rate of spTCC is low, there are important organs surrounding splenic flexure such as duodenum, spleen, pancreas and intricately adhered greater omentum, the recognition of anatomical (surgical) plane is difficult, and feeding vessels are various patterns in this area.
Methods: We prospectively collected data of spTCC patients who underwent laparoscopic left hemicolectomy between January 2005 and December 2015. The perioperative outcomes and oncologic outcomes were assessed. The surgical procedure was as follows. The 5-port technique was utilized for laparoscopic left hemicolectomy. Especially, the umbilical port (a small wound protector and a silicon cap) through the 3.5-cm small umbilical incision was attached and 12-mm and 5-mm trocars were inserted, when starting the operation. The medical-to-lateral approach was suitable for this procedure. The lymph nodes (LNs) dissection had done around the root of IMA, and the LCA was dissected at the root (IMA, SRA preservation) and/or around the root of MCA when necessary. The takedown of splenic flexure to fully mobilization of left colon was mandatory. We performed this from lateral side certainly exposing bursa omentalis and pancreas tail.
Results: TCC were collected in 62 patients (9.6%) of 649 colon cancer patients during study periods. Of those, spTCC was 19 cases (2.9%). Advanced colon cancer was in 17 cases (Tis/T2/T3/T4a=2/4/10/3). Median operation time was 180 min. Median estimated blood loss was 20 g. The conversion to open procedure was two cases (10.5%). The rate of complications was approximately 15% without anastomotic leakage. A median of 16 LNs were retrieved. Median length of hospital stay was 9 days. Median follow-up period was 289days. One death caused by peritoneal dissemination during this period.
Conclusions: Although the incidence of spTCC is low, our standardized technique gained good perioperative outcomes.

P210

Learning Curve for Single-Incision Plus One Port Laparoscopic Surgery for Rectosigmoid Cancer: A Cusum Analysis

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Background: Single-incision plus one port (SILS+1) surgery possesses minimally invasive advantages such as less postoperative pain, faster postoperative recovery, shorter hospital stay, and better cosmetic results compared with conventional five-port laparoscopic surgery, meanwhile, it's less technical demanding and easier to access compared with pure single-incision laparoscopic surgery. The aim of this study was to investigate the learning curve for single-incision plus one port laparoscopic surgery for rectosigmoid cancer and to compare the learning curve phases in terms of perioperative clinicopathologic outcomes.
Methods: From Jan 2013 to Mar 2015, a series of 85 consecutive patients underwent selective SLIS+1 for rectosigmoid cancer by a surgeon who had experience of more than 100 cases of conventional five-port laparoscopic surgeries at Nanfang Hospital, Southern Medical University. The learning curve for SILS+1 was evaluated using moving average, cumulative sum control chart (CUSUM), and risk-adjusted CUSUM (RA-CUSUM) methods. For risk-adjusted CUSUM, surgical failure was defined as conversion, postoperative complication within 30 days, retrieved lymph nodes<12, or local recurrence through follow-up. Data of all the perioperative variables and pathologic results among the learning curve phases were compared.
Results: Combining the results from CUSUM and RA-CUSUM methods, the learning curve was determined as three phases: phase 1 (case 1–14) as the initial learning period; phase 2 (case 15–44) as the learning plateau period; phase 3 (case 45–85) as the competent period. The RA-CUSUM curve did not ascend after 44th case, which suggested technical competence to satisfy feasible perioperative outcomes. The total operating time (120.1 vs 97.0 vs 91.6 min, p=0.001) and intraperitoneal operating time (80.5 vs 62.1 vs 58.3 min, p=0.002) both decreased significantly after phase 1. The time to first flatus was significantly different between phase 2 and 3 (63.9 vs 48.1 h; p=0.004). The number of harvested lymph nodes increased accordingly with the surgeon's experience escalating (14.4 vs 20.2 vs 25.1; p<0.001). There were no significant differences in terms of rates of conversion, local recurrence or postoperative complications among the learning phases.
Conclusions: The learning curve of SILS+1 for rectosigmoid colon cancer consisted of three phases. According to the CUSUM and RA-CUSUM, for experienced conventional five-port laparoscopic surgeon, after 14th case the learning process reached the plateau period, and the technical competence was achieved after the 44th case.

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Analysis of Trends in Ureteral Stent Utilization for Diverticulitis Surgery

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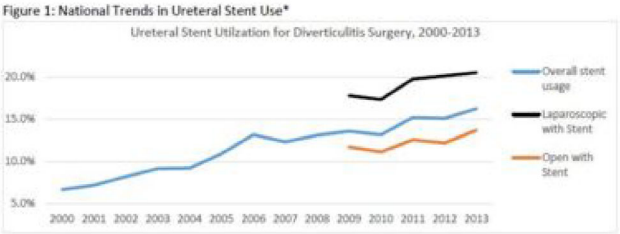
Introduction: The benefit of prophylactic ureteral stents in colorectal surgery for diverticulitis has yet to be determined. Rationale for use include possible prevention and easier identification of ureteral injuries; others argue that the added time, costs, and risks of stent placement negate any potential benefits. Even among those who use stents, there is practice variability in selective versus universal use for colectomies. In light of this lack of consensus, our study evaluates trends in ureteral stent usage for all patients undergoing colectomy for diverticulitis and the factors influencing stent usage.
Methods: Data from the National Inpatient Sample (NIS), a weighted nationwide inpatient database, from 2000 to 2013 were analyzed. Stent placement was determined by patients having a concomitant ICD-9 CM procedure code for ureteral catheterization on the same day as a code for partial colectomy or anterior rectal excision for diverticulitis. Trends in intraoperative stent placement over this time period were evaluated and multivariate logistic regression was performed to evaluate the factors influencing stent placement.
Results: A total of 834,311 admissions nationally with a diagnosis of diverticulitis and undergoing either laparoscopic or open partial colectomy, or anterior rectal resection for diverticulitis were identified. Usage of ureteral stents has increased from 6.65% in 2000 to 16.22% in 2013. Rates of stent usage were consistently higher among laparoscopic surgery compared to open (17.3%-20.5% vs. 11.1–13.7%). Multivariate regression demonstrated factors influencing the use of stents included hospital geography in the Northeast (Midwest OR 0.57 95%CI [0.45,0.72], South OR 0.66 95% CI [0.53, 0.84], West OR 0.27 95% CI [0.20,0.36], all p<0.001), elective admission (OR 2.63 95% CI [2.38, 2.86], p<0.0001), hospital colectomy volume (High Volume OR 1.67 95% CI [1.37,2.05], Medium Volume OR 1.25 95% CI [1.07, 1.46], both p<0.01), and low Charlson Comorbidity Index (OR 1.28 95%CI [1.12, 1.47] p<0.001).
Conclusion: The use of prophylactic ureteral stents in surgery for diverticulitis has steadily increased since 2000, despite the lack of consensus on their overall benefits. There was wide variation in stent usage among regions of the country and hospitals of different colectomy volumes.

Figure 1: National Trends in Ureteral Stent Use*



*(Laparoscopic data only available from 2009-2013)

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Detrimental Resident Effect on Infection-Related Complications Mitigated by Use of Laparoscopic Proctectomy for Cancer

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Introduction: Surgical complications delay adjuvant oncologic therapy, impairing long-term outcomes and worsening survival. We previously demonstrated resident association with increased 30-day overall morbidity following laparoscopic and open colectomy. This study assessed resident post-graduate year (PGY) effect on laparoscopic and open proctectomy for cancer.

Methods and Procedures: Elective open and laparoscopic rectal procedures for cancer from 2005 to 2012 were identified in the ACS-NSQIP database. Demographics, co-morbidities, and 30-day outcomes were analyzed according to resident level (PGY 1–7). We constructed a "resident complication" variable combining surgical site infection, deep space infection, and wound dehiscence to evaluate technical effects of resident involvement. Multivariate logistic regression models with appropriate inputs assessed overall morbidity, surgical site infection (SSI), and "resident complication" in open and laparoscopic cohorts, respectively.

Results: 10,258 rectal cancer patients undergoing open (n=7,180; 70%) or laparoscopic (n =3,078; 30%) proctectomy were analyzed. Absent a resident, attending surgeons performed 1,624 (22.6%) open and 875 (28.4%) laparoscopic procedures. Patients operated on by attendings alone were older with higher rates of cardiac, hepatic, vascular and neurologic comorbidity on univariate analysis. No differences in mortality were observed. Overall morbidity was significantly increased with resident involvement in open (26.5% vs 32.1%, $p<0.001$) and laparoscopic proctectomy (17.6% vs 21.4%, $p<0.001$). Rates of overall morbidity worsened as PGY level increased above PGY1 in open and PGY2 in lap cases, respectively (linear-to-linear, $p<0.001$ for all groups). Similarly, rates of SSI and "resident complication" in open proctectomy worsened with increased PGY level (linear-to-linear, $p<0.001$). Interestingly, statistical differences in rates of SSI and "resident complication" disappeared on univariate analysis of laparoscopic proctectomy. On multivariate analysis, resident level was independently associated with SSI in open proctectomy, but not laparoscopic proctectomy (Table 1).

Conclusions: Independent association of resident level with differential morbidity following open and laparoscopic rectal surgery for cancer suggests an impact of resident involvement. Minimally invasive proctectomy appears to mitigate negative infection effects of resident participation. To provide optimal outcomes for oncologic patients in the modern age of surgical training, further evaluation of competency-based observation and teaching platforms are needed.

	Open Proctectomy				Laparoscopic Proctectomy			
	OR	95%CI		P value	OR	95%CI		P value
Age	0.99	0.98	0.99	<0.001	0.99	0.98	0.99	0.02
Cardiac Comorbidity	-	-	-	-	1.14	0.78	1.66	0.51
Hepatic Comorbidity	-	-	-	-	3.13	0.96	10.39	0.06
Neurologic Comorbidity	1.01	0.78	1.31	1.01	-	-	-	-
Vascular Comorbidity	1.17	1.02	1.35	0.02	-	-	-	-
ASA Level >=3	1.55	1.36	1.77	<0.001	1.46	1.14	1.89	0.003
PGY1	0.72	0.44	1.19	0.2	0.89	0.26	1.78	0.44
PGY2	1.22	0.84	1.76	0.3	0.37	0.11	1.2	0.1
PGY3	1.25	0.98	1.59	0.08	0.75	0.44	1.26	0.27
PGY4	1.21	0.98	1.5	0.08	0.96	0.65	1.41	0.83
PGY5	1.35	1.13	1.62	0.001	1.04	0.76	1.41	0.83
PGY6	1.32	1.07	1.63	0.01	1.18	0.84	1.66	0.34
PGY7	1.94	1.4	2.68	<0.001	1.33	0.61	2.91	0.47

Table 1 – Multivariate Analysis of Resident Contribution to Surgical Site Infection in Cancer Patients Undergoing Open and Laparoscopic Proctectomy

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Risk Factors for Conversion from Laparoscopic to Open Surgery in Colon Carcinoma: An Experience from a Low Middle Income Country

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Introduction: We conducted this study to identify the risk factors responsible for conversion from laparoscopic (L) to open (O) in our patients.

Methods and Procedures: We retrospectively analyzed the medical record files of all the patients who presented to our hospital with the diagnosis of colon carcinoma from Jan 2006 to Dec 2015 and underwent laparoscopic resection. Demographics, operative findings and histopathological reports were all recorded on a preformed data sheet. Risk factors responsible for conversion were identified and compared. All the analysis was performed on SPSS 20.

Results: In total 127 patients were operated laparoscopically. There were 19 conversions (15%). Increase BMI (21.7 for Lap Vs 25.3 for Open), male sex and tumor size (6 cm for Lap Vs 7 cm for Open) are significant risk factors that contributed to laparoscopic conversion rates. Age, pre-operative ASA and CEA levels were not significant risk factors. T4 disease was a significant risk factor for conversion (14.8% in lap and 31.6% in open group). Intra-operatively there was not much difference in two procedures in terms of blood loss (mean 50 mls for Lap Vs 100 mls for Open), duration of surgery (mean 227 min for Lap Vs 235 min for Open). Proximal, distal and mesenteric resection margins were comparable. Median number of lymph nodes retrieved were more in open group (average 22 for open Vs 16.5 for lap).

Conclusion: Tumor stage, tumor size, male sex and increased BMI were significant risk factors for conversion from laparoscopic to open colonic resections. Age, ASA status and CEA levels were not significant risk factors.

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Combination of Medial and Cranial Approaches Ensure Patients Safety During Laparoscopic Complete Mesocolic Excision for Transverse Colon Cancer

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Introduction: We propose a surgical strategy we have developed for performing laparoscopic complete mesocolic excision via a combination of medial and cranial approaches with three dimensional visualization around GCT and its tributaries to avoid organ injury in patients with transverse colon cancer. This technical strategy achieves a three dimensional visualization of the surgical anatomy around the GCT, SMV and SMA. This procedure is technically simple and allows safe lymph nodes dissection around the GCT, SMV and SMA. We show our surgical procedure using video record.

Procedures: First, the medial approach started by exposing the superior mesenteric vein (SMV) and then separating between the transverse mesocolon and pancreatic head, preserving the duodenum. The meddle colic arteries (MCAs) were identified arising from superior mesenteric artery (SMA) and divided at their roots, accompanied by lymph node dissection. Next, the GCT, MCV, anterior superior pancreaticoduodenal vein (ASPDV), and accessory right colic vein (ARCV) were carefully and sufficiently exposed from the medial side. The embryological tissue plane between the pancreatic head and the transverse mesocolon was then separated. And then, a cranial approach was performed by dissecting the greater omentum, after which the fusion fascia between the omentum and the transverse mesocolon was separated. The transverse mesocolon was then dissected below the lower edge of the pancreas, exposing the SMV. The ARCV was carefully dissected with the lymph node, thus accomplishing radical lymph node dissection along the SMV and SMA with 3D visualization around the GCT. We divided the MCV from the medial side and completed radical lymph node dissection.

Surgical Outcomes: Complete mesocolic excision completeness was graded as the mesocolic and intramesocolic plane in 21 and 3 patients, respectively. Eleven, two, eight, and three patients had T1, T2, T3, and T4a tumors, respectively; none had lymph node metastases. Mean of 18.3 lymph nodes were retrieved. Mean of 5.4 lymph nodes were retrieved around the origin of the MCV. The mean of large bowel length was 21.9 cm, operative time 274 min, intraoperative blood loss 41 mL and length of hospital stay 15 days. There were no intraoperative and two postoperative complications.

Conclusion: Laparoscopic CME with combined medial and cranial approaches for transverse colon cancer ensure patients safety understanding of the embryological surgical planes and vascular anatomy.

P215

Remarkably Elevated Levels of Proangiogenic Proteins in Wound Fluids After Colorectal Resection for Benign Indications Contributes to the Persistently Elevated Plasma Levels of These Proteins Postoperatively

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Introduction: Minimally Invasive Colorectal Resection (MICR) for malignant and benign indications is associated with significant increases in plasma levels of 12 proangigenic proteins for up to 1 month which may stimulate tumor angiogenesis and growth in patients with residual cancer. It is thought that the plasma increases are related to wound healing. It has been shown that levels of 8 proangiogenic proteins (VEGF, Placental Growth Factor [PlGF], Angiopoetin2 [Ang2], Monocyte Chemo-attractant Protein 1(MCP-1), Chitinase 3-like1 [CHI3L1], Osteopontin [OPN], Matrix Metalloproteinase-2 [MMP-2], and MMP-3) in postoperative (postop) pelvic and subcutaneous Wound Fluid (WF) in MICR cancer patients is many fold higher than plasma levels. This study's purpose was to see if similar WF elevations are noted in benign indication MICR patients.
Method: Patients in an IRB approved data/plasma bank who underwent elective MICR for benign conditions were studied. Clinical and operative data was collected. Besides preop blood samples, postop blood and wound fluid (WF) samples were simultaneously collected on POD 1 and 3. Also, a 3rd sample set was taken for most patients between POD 7–13; these samples were bundled and considered as a single time point. Samples were centrifuged and stored at -80°C. WF was collected via subcutaneous Jackson Pratt (JP) drains placed in the largest incision. Blood and WF levels of the above 8 proteins were determined in duplicate via ELISA. Analysis was done with the Mann Whitney and Wilcoxon signed rank tests.
Results: 21 benign indication patients (diverticulits, 11; benign polyp, 8; other, 2) were studied (mean age 58.2±12.9 years). Laparoscopic (Lap) methods were used in 14 and Hand-assisted Lap in 7; the mean incision length was 7.5±2.7 cm; mean OR time 327.9±118.5 min; and mean LOS was 5.7±3.0 days. Plasma levels of all 8 proteins were significantly elevated over their preop baseline on POD 1, 3, and POD7-13. Versus plasma levels, significantly elevated WF levels were noted for all 8 proteins at all time points.
Conclusion: As shown in prior studies, MICR was associated with plasma elevations postop for all 8 proangiogenic proteins at all 3 time points ($p<0.05$ for all); further, WF levels at the same timepoints were 2-107 x higher than plasma levels. These results suggest the source of the added plasma protein is the surgical wounds and that surgery-related proangiogenic plasma changes are surgical trauma related and are not dependent on the surgical indication. Further studies are warranted.

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Single-Dock Robotic Total Proctocolectomy: An Emerging Operative Technique

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Background: Recent developments in robotic surgery now enable single-dock robotic total proctocolectomy for complex colorectal disease both facilitating dissection and decreasing operative time. This study represents initial surgical experience with single-dock robotic total proctocolectomy.
Methods: We performed a retrospective review of all patients undergoing robotic total proctocolectomy at an academic, tertiary referral center. Operative data and outcomes were collected and descriptive statistics obtained. All patients were required to have minimum 3 months follow-up.
Results: In total, 9 patients underwent single-dock, robotic total proctocolectomy within 20 months. Seven patients had ulcerative colitis; two had familial polyposis. Seven patients received concurrent steroid therapy at the time of operation, with a differnt group of 7 receiving anti-TNF blockade. Mean BMI was 26.1 with a median age of 36. Mean blood loss between cases was 200 cc, with mean operative time of approximately 320 min to include diverting ostomy creation. Median Length of Stay was 5 days, with median return of GI function on post-operative day 2. One patient had a high grade / Clavien-Dindo scale III complication requiring percutaneous drainage.
Conclusion: Robotic total proctocolectomy with a single-dock is a safe and feasible choice for patients with advanced colorectal disease. A greater cohort is needed for definitive comparison to traditional operative techniques.

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Intracorporeal Anastomosis in Laparoscopic Colectomy for Stagei Colon Cancer

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Objective: Laparoscopic colonic resection is increasingly regarded as the gold standard fof benign and malignant colonic lesions.
Laparoscopic assisted colectomy for colon cancer with an extracorporeal anastomotic technique is the standard technique.
However the extracorporeal anastomosis technique requires the relatively large wound and mobilization of colon, due to extract colon and mesenterium.
The aim of this study was to evaluate safety and feasibility of intracorporeal anastomosic (IA) technique in laparoscopic colectomy for Stage I colon cancer.
Methods: Between May 2015 and July 2016 at Kagoshima University Hospital, six patients who underwent IA in laparoscopic colectomy were included (1 male and 5 female, age: 61.5 (range 50–67) years old, body mass index of 22.6 (range 19–25)).
The outcomes were evaluated in terms of operation time, intraoperative blood loss, length of postoperative hospital stay and perioperative complications.
Surgical Procedures: The patients were placed in the supine position under general anesthesia. Five trocars were inserted in the abdomen, maintaining pneumoperitoneum at 10 mmHg with carbon dioxide.
A 10 mm flexible laparoscope was inserted from the umbilical port. After exploring abdominal cavity, colon cancer was identified.
Then the medial-to lateral dissection technique was performed with minimum mobilization of olon in all cases. The targeted nutrient arteries were identified and dissected.
After transection of colon or ileum with 60-mm endostapler, the anastomosis was fashioned. Functional end-to-end anastomosis was created with a 60-mm endostapler, and the enterotomy was closed with endstapler or continuous suture of V-Loc.
The specimen was extracted through an umbilical incision which was required minimun size using EndoBags.
Results: Intracorporeal anastomosis in laparoscopic colectomy for Stage I colon cancer was performed for six patients with 1 ascending colon cancer, 2 transverse colon cancer, 1 descending colon cancer and 2 sigmoid colon cancer.
Tumor stage in pathological diagnosis was all stage I (4 T1 tumors and 2 T2 tumors).
The mean operative time was 306 min, the mean blood loss was 40 ml. The mean length of postoperative hospital stay was 12 days. There were no intraoperative complications and no conversion to open surgery. One patient experienced postoperative complication which was ileus of grade 2 according to the Clavien-Dindo classification. There were no 30-day mortality.
Conclusion: Intracorporeal anastomosis technique in laparoscopic colectomy for Stage I colon cancer is a safe and feasible procedure.

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Total Laparoscopic Abdominoperineal Resection of Rectum; Techniques of Lateral Node Dissection, Creation of Sigmoid Colostomy and Retroperitonealization

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Background: Laparoscopic low anterior resection (L-LAR) for rectal cancer has been increasing because of the development of the laparoscopic procedure such as setting good operative view, lateral node dissection method, and anastomotic technique. However, laparoscopic abdominoperineal resection (L-APR), which has the complexity of the maneuver such as retroperitonealization (suturing skills to close the peritoneal defect) and creation of sigmoid colostomy, is more complicated than L-LAR. We demonstrate the L-APR with lateral node dissection and discuss the techniques of creation of sigmoid colostomy and retroperitonealization.
Methods: Laparoscopic operation is performed with five ports under right side head down position. Dissection and mobilization of the left side of the colon is performed from a medial-to-lateral retroperitoneal approach. Lymph node dissection with ligation of the inferior mesenteric artery and total mesorectal excision to expose the levator ani muscle are performed. The proximal rectum is transected by linear stapler. Rect-anal specimen with total mesorectum was retrieved through the perineal wound. The perineal wound is closed by two layers. Laparoscopic lateral lymph node dissection is performed with enlarged view and by using energy device. Sigmoid colostomy is constructed in left abdomen by retoroperitoneal approach. A skin incision in a circle and splitting rectus abdominis muscle was done with exfoliating peritoneum enough. Sigmoid colon is drawn outside of the abdominal wall. Intracorporeal closure of the pelvic cavity to suture the peritoneum by using 3–0 V-Loc™ is performed. In female, the uterus is used as the floor of the pelvis to suture the peritoneum and uterus by using 3–0 V-Loc™. Drain is set up through the retroperitoneal route at the port of left lower abdomen.
Results: Between April 2006 and March 2016, we experienced 280 laparoscopic rectal surgeries with reginal lymph node dissection. Among them, L-APR is only nine cases composed with 6 males and 3 females. Although all patients successfully underwent L-APR of the rectum and colostomy formation, two emergency operations were required due to Richter's hernia of ileum and stoma necrosis for early postoperative period. Four patients were received lateral lymph node dissections with safety.
Conclusion: Though the total laparoscopic abdominoperineal resection of rectum is difficult procedure, we should master this procedure as minimally invasive surgery. It is necessary to pay attention not to have a suture gap and to avoid ischemic change of colostomy. We think the use of 3 −0 V-Loc™ for intracorporeal closure reduces intra-operative surgeon's stress in L-APR.

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30-Day Surgical Outcomes in Laparoscopic Versus Open Colorectal Surgery Between 2005–2014 Using the ACS-NSQIP Database

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Background: Previous analysis has suggested that laparoscopic surgery is being widely adopted in the field of colorectal surgery (CRS), including in higher risk and more acutely ill patients. The goal of the current study is to analyze surgical outcomes in laparoscopic versus open CRS as minimally invasive technique is applied more broadly.
Methods: Using the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database from 2005 to 2014, colorectal procedures were identified by CPT codes and categorized to open or laparoscopic surgery. Overall and yearly means and rates were then calculated for 16 outcomes measures.
Results: A total of 277,376 colorectal cases were identified, 114,359 (41.2%) performed laparoscopically. The use of laparoscopy increased yearly, from 22.7% in 2005 to 41.2% in 2014. Differences were noted in all analyzed 30-day outcomes in the laparoscopic versus open groups: death (0.90% (0.85–0.96) vs. 5.48% (5.37–5.59)), cardiac arrest requiring CPR (0.30% (0.27–0.34) vs. 1.21% (1.16–1.27)), stroke (0.18% (0.16–0.21) vs. 0.50% (0.47–0.54)), myocardial infarction (MI) (0.37% (0.33–0.40) vs. 0.94% (0.90–0.99)), pulmonary embolism (0.46% (0.42–0.50) vs. 0.97% (0.92–1.02)), deep vein thrombosis (0.92% (0.87–0.98) vs. 2.21% (2.14–2.28)), pneumonia (1.38% (0.31–1.45) vs. 4.94% (4.84–5.05)), ventilator>48 h (1.07% (1.01–1.13) vs. 7.45% (7.33–7.58)), superficial surgical site infection (SSI) (4.69% (4.57–4.82) vs. 8.56% (8.42–8.69)), deep incisional SSI (0.88% (0.83–0.94) vs. 2.17% (2.10–2.24)), organ space infection (3.18% (3.01–3.29) vs. 5.76% (5.64–5.87)), renal insufficiency (0.47% (0.44–0.52) vs. 1.19% (1.14–1.24)), acute renal failure (0.31% (0.28–0.34) vs. 1.40% (1.34–1.46)), urinary tract infection (2.31% (2.23–2.41) vs. 4.34% (4.24–4.44)), operating room time (174.3 min (173.8-174.8) vs. 167.5 (167.0-168.0)), and length of hospital stay (6.3 days (6.2–6.3) vs. 11.5 (11.4–11.5)), respectively. Additionally, death and stroke tended to decrease over time in the laparoscopic cohort from 1.41 to 0.78% and 0.28 to 0.16%, respectively, while no change or increase was seen in the open cohort. MI tended to increase over time in the open cohort from 0.42 to 1.12%, but not in the laparoscopic cohort.
Conclusion: Over a ten-year period, 30-day outcomes favored laparoscopic over open CRS. Additionally, select outcomes demonstrated improvement in the laparoscopic cohort over time compared to the open cohort. Given the increase in laparoscopic CRS in more complex patients, improved quality in laparoscopy is suggested. However, it is possible that observed differences may be due to unequal characteristics of the two groups of patients. Further analysis is needed to evaluate improved proficiency in laparoscopic surgery.

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Pediatric Transverse Colon Volvulus: 2-Stage Surgical Management Case Report

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Introduction: The transverse colon represents less than 4% of all colonic volvulus in adults. It is more rare in children, with less than 50 cases reported in the literature. A lenghty transverse colon secondary to dismotility disorders, chronic constipation, mental retardation or lax fixation is a predisposing factor for developing the disease. We present the case of a pediatric transverse colon volvulus managed with a 2-stage procedure.
Case Report: A 16 year-old girl complaining of chronic constipation and abdominal bloating since early childhood presented in the emergency room after 36 h of acute abdominal pain in the left quadrants. She denied other symptoms. Physical examination revealed polydactilia. The abdomen was tender, peristalsis was present and no peritoneal signs were found. Laboratory exams reported lecukocytosis (13,000). The plain abdominal radiograph showed a dilated colon. A simple abdominal CT scan showed a dilated transverse colon (14.2 cm) and a whirl sign. She was diagnosed with a colonic volvulus and scheduled for a laparoscopic approach. During the procedure, a transverse colon volvulus without ischemic changes was 360º derotated. The patient had an uneventful recuperation. She was seen by the gastropediatrician who asked for a colonic transit with markers, a triple contrast abdominal CT scan and an ano-rectal manometry. After a multidisciplinary sesion, she was scheduled for an open partial transverse resection with an end-to-end anastomosis. She was discharged home on day 5.
Discussion and Conclusions: Because transverse colon volvulus is a rare cause of large bowel obstruction, diagnosis can be challenging. In contrast to sigmoid and cecum volvulus, endoscopic decompression is not recommended. Surgical options for transverse colon volvulus include detorsion, detorsion plus colopexy, resection and primary anastomosis, resection and stoma creation, or detorsion followed by elective transverse resection depending if necrosis or ischemia is present. Morbidity and mortality rate is high in these patients. Our patient was managed by a two-stage procedure since the colon appeared viable.

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The Uptake of Laparoscopic Colon Cancer Surgery in Canada: 2004–2015

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Background: Although the safety and efficacy of laparoscopic surgery in colon cancer have been established, the uptake of laparoscopic colectomy for cancer (LAC) in Canada is not known. We sought to describe the uptake and use of LAC from 2004 to 2015 in Canada, and to identify patient, surgeon and system related factors associated with its use.
Design: This population-based cohort study used a national hospital discharge abstract database to identify all patients undergoing non-emergency colectomy for cancer in all provinces except Quebec from 2004 to 2015. Type of resection (laparoscopic or open) was determined based on procedure codes within the discharge abstract database. Multiple logistic regression was used to identify factors associated with LAC.
Main outcome measures: Proportional rates of LAC (overall and annual) at national and provincial level.
Results: Among the 63,504 cases overall, 19,691 (31.0%) involved LAC. The proportion of patients undergoing LAC increased from 9.2% in 2004 to 51.5% in 2015 in a relatively constant fashion. There were marked differences in rates of LAC by province ($P<0.001$); in 2015 this ranged from 11.2% in Newfoundland to 60.2% in British Columbia. On multivariate analysis, factors associated with increased use of LAC included female gender, urban residence, geographical region (i.e. province), and hospital and surgeon volume of colectomies. LAC was used less in older patients and those with a higher Elixhauser comorbidity index (Table 1).
Conclusions: Although there has been considerable uptake of LAC in Canada over the past ten years, wide interprovincial variation exists. Analyses of factors associated with LAC suggest both patient selection and practice patterns likely contribute to its uptake.

Table 1. Factors associated with laparoscopic colectomy for cancer

Variable	Adjusted OR (95% CI)
Female gender	1.07 (1.03-1.11)
Urban residence	1.24 (1.18-1.30)
Provincial uptake	
Newfoundland (Reference)	1.00
Prince Edward Island	1.20 (0.86-1.67)
Nova Scotia	0.52 (0.45-0.61)
New Brunswick	1.80 (1.49-2.19)
Ontario	0.28 (0.25-0.32)
Manitoba	0.73 (0.63-0.85)
Saskatchewan	0.56 (0.48-0.66)
Alberta	0.49 (0.43-0.56)
British Columbia	0.32 (0.28-0.37)
Hospital volume (average number of procedures / year) by quartile	
Very low : 1-3.89 (Reference)	1.00
Low: 3.90-16.18	1.01 (0.82-1.25)
Medium: 16.27-36.63	1.10 (0.90-1.36)
High: 37.36-102.81	2.22 (1.81-2.73)
Surgeon volume (average number of procedures / year) by quartile	
Very Low: 1-2 (Reference)	1.00
Low: 2.1-3.88	1.56 (1.33-1.82)
Medium : 3.9-7.0	1.71 (1.48-1.97)
High: 7.09-37.27	2.06 (1.79-2.37)
Age (years)	
18-50 (Reference)	1.00
51-65	0.99 (0.92-1.07)
66-80	0.87 (0.81-0.94)
>80	0.76 (0.70-0.83)
Elixhauser comorbidity score	
0 (Reference)	1.00
1-3	1.24 (1.01-1.53)
>3	0.36 (0.29-0.45)

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Colonic Web and Tubular Duplication: A Rare Combined Anomaly and Review of the Literature

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Gastrointestinal tract duplications are infrequent congenital abnormalities that can occur anywhere throughout the alimentary tract. There are several theories about this abnormality but none of them clearly describes this clinical problem. Duplications are hard to diagnose. Most of the cases present in the first two years of life, but in rare conditions it can be remain silence or cannot diagnosed till adulthood.
We present a case with combined anomaly, tubular duplication on left colon and also webs on the right colon and terminal ileum, in a 21-year old young woman. Her symptoms were abdominal pain and chronic constipation since childhood and she has been treated with total proctocolectomy and reconstructed with ileal J-pouch.

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How Accurate is Preoperative Colonoscopic Localization of Colorectal Neoplasms?

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Introduction: Pre-operative colonoscopic localization with or without tattoo as a guide for resection has been extensively used with variable accuracy. Difficulty in intraoperative identification of the lesion may lead to resection of an incorrect segment or to more extensive resection than originally planned. The aim of this study was to evaluate the accuracy of preoperative colonoscopy in determining the site of the lesion.
Methods: A prospectively maintained IRB-approved institutional database was retrospectively queried for all consecutive patients who underwent an elective colon resection for neoplasia between 2013–2016.Excluded were patients without preoperative colonoscopy reports available for comparison or who underwent emergency surgery. Surgical plan based on pre-operative colonoscopic localization with or without tattoo was compared to the final surgery and pathology reports.
Results: 203 patients were identified, 34 (16.7%) of whom had a change in their surgical plan due to inaccurate pre-operative colonoscopic localization. Patients with transverse or distal lesions were more likely to have a change in final surgical management compared to proximal sided lesions (29.7% vs 3.9%, respectively; $p<0.001$). In addition, patients who had undergone preoperative endoscopic tattooing of the primary lesion were more likely to have a change in final surgical management than were patients without tattooing (22.9 vs 5.5%, respectively; $p<0.001$). Only 3.8% of the tattoo ink could not be identified during surgery. Intraoperative colonoscopy was needed in 11 patients (5.5%) to verify lesion location. The average length of the resected segment was longer in patients who required a change in surgical plan (26.44 cm vs 22.47 cm;$p=0.02$) (see Table).
Conclusions: Inaccurate pre-operative colonoscopic localization led to a change in surgical management in 16.7% of cases. Factors associated with intraoperative change in surgical management include transverse or left sided lesions and tattooing. Surgeons should consider these findings when planning colonic resections.

	Change (%)	No Change (%)	*P* value
Anatomical site			<0.001
Proximal	4/102 (3.9)	98/102 (96.1)	
Transverse	8/22(36.4)	14/22 (63.6)	
Distal	22/79(28)	57/79 (72)	
Right vs. transverse + distal	4/102 (3.9) vs 30/101 (29.7)	98/102 (96.1) vs 71/101 (70.3)	<0.001
Tattoo			=0.001
Yes	30/131(22.9)	101/131 (77.1)	
No	4/72 (5.5)	68/72 (94.5)	
Colonoscopy complete			=0.914
Yes	30/178 (16.8)	148/178 (83.2)	
No	4/25 (16)	21/25 (84)	
Operator			=0.475
Gastroenterologist	26/145 (18)	119/145 (82)	
Colorectal surgeon	8/58 (13.8)	50/58 (86.2)	
Pathology			=0.083
Cancer	28/142 (19.7)	114/142 (80.3)	
Benign	6/61 (9.8)	55/61 (90.2)	
Type of Surgery			=0.841
Laparoscopic	30/177 (16.9)	147/177 (83.1)	
Open	4/26 (15.4)	22/26 (84.6)	
Size of specimen, cm	26.44	22.47	=0.02

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Laparoscopic Versus Open Right Hemicolectomy: Results from a Country with Limited Resources

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Introduction: We conducted this study to evaluate the early surgical outcomes of open and laparoscopic right hemicolectomy in our patients where most of the laparoscopic surgeries are performed in last 5 years.
Methods and Procedures: We retrospectively analyzed the medical record files of all the patients who presented to our hospital with the diagnosis of right sided colon carcinoma from Jan 2006 to Dec 2015 and underwent laparoscopic / open right hemicolectomy. Demographics, operative findings and histopathological reports were all recorded on a preformed data sheet and compared. All the analysis was performed on SPSS 20.
Results: Total of 133 patients were operated during the study period, out of which 48 were operated laparoscopically and 85 open. Median age was 50 for lap and 51 for open. Blood loss was less in lap group (50mls) as compare to 100mls for open group but operative time was more in lap group (average 240 min Vs 170 min for open). Specimen length was comparable in both the groups (median 30.5 cm for lap vs 32 for open group), similarly proximal, distal and mesenteric margins including the number of retrieved lymph nodes (median 18.5 for lap vs 18 for open group) were all comparable between the two groups. In lap group 2 (4.1%) patients developed pelvic collection in comparison to open group in whom 7 patients (8.2%) developed complication including pelvic collection in 5 patients.
Conclusion: We concluded that there is no difference in early surgical outcomes of laparoscopic versus open right hemicolectomy.

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Incidence of Incisional Hernia in the Specimen Extraction Site for Laparoscopic Colorectal Surgery: Systematic Review and Meta-analysis

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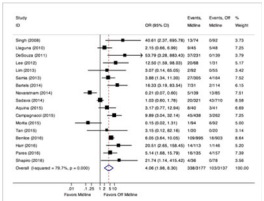
Introduction: The incidence of incisional hernia(IH) after laparoscopic colorectal surgery has not decreased compared to open surgery. However, IH may be affected by the choice of specimen extraction site(SES) incision. The objective of this study was to perform a systematic review and meta-analysis comparing the incidence of IH after midline and off-midline SES incisions in patients undergoing laparoscopic colorectal surgery.
Methods: A systematic search was performed according to PRISMA guidelines to identify all comparative studies published from 01/1991 to 08/2016 that reported the incidence of IH after midline and off-midline(transverse or Pfannenstiel) incisions in patients undergoing laparoscopic colorectal surgery. Case series and studies reporting the IH after stoma site extraction, SILS, or NOTES were excluded. The two main comparative groups were midline and off-midline(further subdivided into transverse and Pfannenstiel) SES incisions, with the incidence of IH as the main outcome measure. The MINORS instrument was used for quality assessment for observational studies. Weighted estimates were calculated using a random effects model.
Results: The systematic search identified 946 unique records, of which 54 underwent full-text review. A total of 17 articles were included for quantitative analysis, 16 of which were observational studies and 1 was an RCT. The mean MINORS score for observational studies was 12.9(SD 3.2, range 7–17). Sample sizes in the midline(mean 185, range 20–995) and off-midline(mean 184, range 20–903) groups were similar. Outcomes for transverse SES incisions were reported in 14 studies(mean N 144, range 7-710) and Pfannenstiel SES incisions in 7 studies(mean N 137, range 6-636). Follow-up was reported in 14 studies and ranged from 17.3 to 42 months. The pooled incidence of IH was 10.6%(338/3177) in midline, 3.7%(48/1314) in transverse, and 0.9%(9/956) in Pfannenstiel incisions. The incidence of IH was significantly higher in the midline compared to off-midline SES groups(weighted OR 4.1, 95%CI2.0-8.3, I2=79.7%, p for heterogeneity<0.001) [Figure 1]. Midline incisions were also at higher risk of IH versus transverse(weighted OR 3.0, 95% CI1.4-6.7, I2=72.7%, p for heterogeneity<0.001) and Pfannenstiel(weighted OR 8.6, 95%CI3.0-24.6, I2=43.5%, p for heterogeneity=0.101) SES incisions. There was no publication bias according the funnel plot or statistically(Egger's p=0.336).
Conclusions: Midline incisions for the SES in laparoscopic colorectal surgery are at significantly higher risk of IH compared to off-midline(transverse or Pfannenstiel) incisions, but these data are poor quality and heterogeneous.



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Laparoscopic Versus Robotic-Assisted Sigmoid Colectomy: Evaluation of Clinical Outcomes

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Introduction: Robotic technology in colorectal surgery has facilitated the performance of more complex and technically demanding resections. Prior to robotics, our institution was highly selective in identifying patients as candidates for laparoscopic procedures to reduce the conversion rate.

The aim of the study was to analyze and compare the short-term clinical outcomes between the selected laparoscopic and unselected robotic resections for patients undergoing sigmoid colectomies at a single institution.

Methods and Procedures: We conducted a retrospective chart review from 23 patients who underwent laparoscopic resections and 50 patients who underwent robotic-assisted sigmoid colectomies in a three-year period. Data analyzed included patient demographics, operative times, blood loss, time to return of bowel function, length of stay, intraoperative or postoperative complications, conversion rates, 30-day readmission and mortality.

Results: There was no statistical difference in age, BMI and ASA between the two groups. The mean length of stay (2.5 vs. 3 days) and postoperative complications (5.5% vs. 6.9%) were comparable between robotic and laparoscopic groups.

The operative time was longer in robotic surgery (236 vs.191 min, p=0.0003). Fifty percent of patients in the robotic group had complicated diverticular disease as compared to 21% in the laparoscopic group. The mean blood loss (51 vs. 91 ml, p=0.0064) was significantly statistically less in the robotic group. There were no conversions or anastomotic leakage in either group. Readmission was 2.7% in robotic vs. 4.1% in the laparoscopic group, which is not statistically significant.

Conclusion: Unselected patients undergoing robotic-assisted sigmoid colectomy can expect similar short-term clinical outcomes to patients selected for laparoscopic approach. Complicated diverticular disease was more prevalent in the robotic cohort with significantly greater operative times and less blood loss.

Robotic sigmoid colectomy provides favorable outcomes in unselected patients requiring resection.

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Single-Institutioinal Clinical Results of Laparoscopic Intersphincteric Resection for Very Low Rectal Cancer Near the Anus

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Objective: The aim of this study was to clarify oncological results of laparoscopic intersphincteric resection (ISR) for very low rectal cancer near the anus.

Methods: We began laparoscopic ISR for very low rectal cancer locating below 5 cm from the anus since 2003. Our initial indication of laparoscopic ISR was primary rectal cancer with c-stage I and we then expanded it to c-stage II or III from 2011, for which we additionally performed lateral lymph node dissection (LLND) under laparoscope. We have experienced total of 100 patients of laparoscopic ISR completing at least 3-years follow-ups and evaluated the oncological results of them.

Results: The current clinical series included 60 male and 40 female with average age of 61 years old. The average distance from the tumor to the anal verge was 4.5 cm. There were 76 TME procedures for patients with c-stage I and 24 procedures of TME plus LLND for patients with stage II or more. We performed partial ISR in 51, subtotal ISR in 29 and total ISR in 20 patients, respectively and partial resection of the external anal sphincter was added in 12 patients. Operative time in TME group was 368 min and one in TME plus LLND group was 469 min. All the patients were curatively treated without tumor exposure at CRM. Postoperative anastomotic leakage with grade I, II, and III of Clavien-Dindo classification was found in 3, 3 and 13 patients. Ninety-four patients had received closure of ileostomy and 2 patients of the rest could not done due to recto-vaginal fistula and mucosal prolapse. 3-years recurrence rate and 3-year local recurrence rate were found in 9% and 4% of p-stage I, 20% and 20% of p-stage II and 40% and 10% of p-stage III and IV. There experienced 7 local recurrences totally, but in which more than 1 mm of CRM were achieved in them and sites of the local recurrence were mainly seen in lateral cavity.

Conclusion: Laparoscopic ISR was feasible for stage I rectal cancer near the anus. For stage II or III rectal cancer, additional preoperative therapies might be needed to reduce the risks of their local recurrences.

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Comparative Study Between Laparoscopic Suture Rectopexy and Laparoscopic Mesh Rectopexy in Terms of Improvement in Constipation and Recurrence

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Introduction: Complete rectal prolapse is a full thickness, circumferential, true intussuseption of the rectal wall which protrudes from the anus and is visible externally caused by weakening of ligaments and muscles that hold the rectum in place. More than 50% of the patients with prolapse have incontinence and 15–65% have constipation which makes it socially and medically debilitating. Patients with rectal prolapse have markedly impaired rectal adaptation to distension. Laparoscopic rectopexy is a mimimally invasive technique which involves fixing the rectum to the sacrum and surrounding structures using either mesh or sutures until it becomes fixed by scar tissue. Laparoscopic mesh and suture rectopexy .

Materials and Methods: Patients of complete rectal prolapse(CPR) fit for surgery aged 25–75 were selected from our tertiary care institution.All patients underwent anorectal manometry, defecography, colonoscopy and barium enema. Patients having normal sphincter and colonoscopy were included.Detailed history of constipation and incontinence(celeveland clinic faecal incontinence scores) was taken. After this screening 48 patients underwent laparoscopic mesh rectopexy and suture rectopexy. For Patients in mesh rectopexy group, synthetic composite meshes were used and unabsorbable sutures were used in the suture rectopexy group to hitch up the rectum to the sacrum. Patients were followed up for 2 years and both groups were compared in terms of mean operative time, first passage of stools, post operative pain, improvement in incontinence(compared to pre operative scores), constipation and post operative complications. No recurrences were reported in both groups at 2 year follow up.

Results: Out of the 25 patients who underwent mesh rectopexy 2 patients had mesh related complications, with one having mesh migration and the other having mesh erosion both requiring re operation. One patient in the 2nd group(sutured) required converting to open due to severe adhesions Mesh rectopexy patients had a mean operative time of 124±10 min and suture rectopexy group had mean time of 96±10 min.12 out of 16 patients(75%) had improvement in constipation in the suture rectopexy group compared to only 05/15 patients(33%) in the mesh rectopexy group. Post-op flatus and bowel moments were earlier with the suture rectopexy group. There was no significant difference in terms of improvement in incontinence between the 2 groups.

Conclusion: Laparoscopic suture rectopexy has a shorter operative time, and significantly better improvement in the constipation compared to mesh rectopexy without the additional complications and cost related to mesh rectopexy without significant difference in recurrence rates.

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Cancer Recurrence After Laparoscopic Low Anterior Resection and Inter Sphincter Resection for Stage1 Rectal Cancer

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Introduction: Recurrence after Laparoscopic Low Anterior Resection (LAR) and Laparoscopic Inter Sphincter Resection (ISR) for Stage1 rectal cancer is unclear. We examined recurrent cases after LAR or ISR for pStage1 rectal cancer.

Methods: LAR (97 cases) or ISR (29 cases) was performed in 126 fStage1 rectal cancer patients between March 2007 and March 2014 at our institution and recurrence after surgery was occurred in 7 cases (5.6%).Patients were grouped by surgery into LAR and ISR group, clinicopathological factors related to recurrence were retrospectively analyzed. We also examined recurrent cases.

Results: As for all of 134 patients, mean age was 63(34–90) years old, maximum width of tumor was 29.7±17.9 mm, pT1/T2 were 63/63 cases, recurrence after surgery was occurred in 7 cases (5.6%). Recurrence rate was significantly higher in ISR cases than in LAR case (p=0.0006). Clinicopathological factors related to recurrence was compared between two groups, significantly longer duration of surgery (p=0.0005), more blood loss (p=0.0413), and more venous invasion (p=0.0310) was observed in ISR group. In recurrent cases, mean age was 62(49–74) years old, maximum width of tumor was 28.6±16.2 mm, Type 0/2 were 3/4 cases, wall invasion sm/mp were 2/5 cases, histologically well differentiated cancer were observed in 6 cases. Lymphatic and venous invasion was positive in each one and 4 cases.Recurrent sites were 2 anastomotic site (6.9%) and two lateral lymph node (No.263), one liver metastasis, and one lung metastasis in ISR group. In LAR group, 1 anastomotic site recurrence (1.0%) was observed. The period from surgery to recurrence was 21.7±9.7 months. Treatments of recurrence were surgical resection in five cases, chemotherapy for one case, and radiotherapy for one case. All patients are alive after surgery.

Conclusions: In ISR cases which including lower located rectal cancer, higher rate of recurrence was observed than LAR cases. Local recurrence rate excluding lateral lymph node metastasis was low.

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Safety and Efficacy of Preoperative Elemental Diet for Patients with Circumferential Colorectal Cancer

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Background/Aim: Preoperative enteral nutrition and bowel cleansing is desirable even for patients with circumferential colorectal cancer to reduce the postoperative complications. We evaluated the safety and efficacy of enteral nutrition protocol using Elental® before laparoscopic colorectal resection (LCR).
Methods: We performed elective LCR on 208 patients for primary colorectal cancers between December 2012 and November 2015. Four patients with complete obstruction and four patients who refused Elental® intake were excluded in this study. Among 200 patients, 50 circumferential colorectal cancer patients were fasted and given Elental® at 900 kcal/day (1 mL/kcal) for about 9 days before LCR (group E). Elental® is composed of amino acids and contains only small amounts of fatty acids. The 150 patients with non-circumferential cancer were given normal food and mechanical bowel preparation (MBP) (group C).
Results: Group E patients were considered at poor risk compared with those in group C because of their large tumors (groups E vs. C: 60.5±19.2 vs. 32.2±17.1 mm), advanced-stage cancer, and low prognostic nutritional index (45.9±7.0 vs. 49.9±5.5). No severe adverse effect was obtained during taking Elental®. In addition, their large bowels were well irrigated without MBP, and their gastrointestinal tracts were not dilated. The surgical time (212.5±106.1 vs. 198.3±83.2 min), and amount of blood loss (64.7±265.6 vs. 38.1±124.2 g) were almost equivalent between two groups. The incidence of postoperative complications, including surgical-site infections, was not significantly different between two groups [E (n=50) vs. C (n=150): 2 vs. 5%]. The details of postoperative complications (Clavien-Dindo classification grade≥3) in group E were one case of wound dehiscence (2%) and one case of ureteral stenosis (2%). In Group C, acute myocardial infarction (1 case, 0.7%), bile leakage (1 case, 0.7%, associated with liver resection), acute cholecystitis (1 case, 0.7%), and intraabdominal hemorrhage (1 case, 0.7%) and anastomotic leakage (3 cases, 2%). The starting dates for drinking fluids (1.0±0.2 vs. 1.0±0.2 postoperative day) and eating (5.0±2.0 vs. 4.4±1.8 postoperative day) and postoperative hospitalization (14.3±11.0 vs. 13.7±17.6 days) were similar in the two groups. Despite the disadvantages in group E, the operative outcomes and postoperative courses were equivalent in the two groups.
Conclusions: Elemental diet using Elental® was a safe, effective strategy along with cleansing the gastrointestinal tract without MBP for patients with obstructive colorectal cancer before LCR.

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Single-Incision Laparoscopic Completion Proctectomy with Ileal J Pouch-Anal Anastomosis for Ulcerative Colitis

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Background: Total proctocolectomy (TPC) with ileal J pouch-anal anastomosis (IPAA) is considered one of the most challenging colorectal surgical procedures. While most TPC with IPAA are performed with open surgery, minimally invasive approaches such as multiport, hand-assisted, and robotic-assisted laparoscopy have been described. We adopted single-incision laparoscopic (SIL) TPC with IPAA as our preferred approach, since it utilizes the ileostomy site as the location for the single-port in which the entirety of the procure can be accomplished. We present, to our knowledge, the largest series of TPC with IPAA for chronic ulcerative colitis (CUC) performed utilizing SIL technique
Methods: The data were obtained from an IRB-approved prospectively maintained database. From June 2012 to September 2016, consecutive patients with CUC who underwent planned TPC with IPAA in were analyzed. All procedures were performed by a single surgeon (EMH) utilizing SIL approach. The single port device was placed though the ileostomy site in which the camera and instruments were placed to accomplish the procedure.
Results: During the study period, a total of 24 patients had CUC and underwent SIL TPC and IPAA. The median age, ASA, and BMI were 35, 2, and 23.8, respectively. Just over half were female (n=13, 54.2%). The median OT and EBL were 249 min and 50 mL, respectively. The success rate of the IPAA was 100%. No cases required terminal vessels division or peritoneal scoring as a lengthening maneuver. None of the cases required open conversion and 10 cases necessitated one additional 5 mm trocar. The median LOS was 3 days (range 2–6) and all but 3 patents were discharged within 4 days (87.5%). There were 6 postoperative complications (25.0%), 5 readmissions (20.8%), and 1 re-operation (4.2%) for closed loop small bowel obstruction. There were no anastomotic leaks.
Conclusions: SIL TPC with IPAA is a safe and feasible minimally invasive approach for CUC. This technique has a high success rate and results in favorable short-term outcomes. By utilizing the ostomy for all ports as specimen extraction, this approach avoids port site incisions and specimen extraction incision and therefore has the potential to reduce surgical site infection rates, postoperative pain, and hernia formation. Comparative analysis will be warranted to evaluate benefits and limitations of this approach.

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Evaluation of Bacterial Contamination in Intracorporeal Anastomoses Created During Laparoscopic Colectomy

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Purpose: Intracorporeal anastomosis (IA) are commonly created during laparoscopic colectomy. However, there is concern regarding the possibility of intra-abdominal infections caused by the leakage of digestive liquid. In this study, we evaluated the bacterial contamination in IA during laparoscopic colectomy.
Materials and Methods: A total of 29 patients who underwent laparoscopic colectomy with IA at Tokyo Medical University Hospital between January 2014 and April 2016 were included in the study. In each patient, after perfoming of the IA, the abdominal cavity surrounding the anastomosis was washed with 300 mL of saline, and 10 mL of the saline for culture analysis. In addition, post-operative body temperatures (BT) and C-reactive protein (CRP) levels of the study subjects were compared with IA and 35 patients who underwent laparoscopic colectomy with extracorporeal anastomosis (EA) during the same period.
Results: Pathogenic bacteria were present in 13 patients (44.8%). The identified bacteria, listed in order of their pathogenicity (from the most pathogenic), were *Pseudomonas aeruginosa, Escherichia coli*, Streptococcus and Anaerobic bacteria. Subjects in the IA group had higher BT than those in the EA group 1 day after surgery (100.4 °F vs. 99.9 °F; $P=0.03$), as well as in 1 day after surgery, had higher CRP levels both 1 day after surgery (5.9 mg/dL vs. 3.3 mg/dL; $P=0.01$) and 3 days after surgery (7.4 mg/dL vs. 5.7 mg/dL; $P=0.04$). The lengths of hospital stays were similar in the IA and EA groups (11 days vs. 10 days; $P=0.67$).
Conclusion: Intra-abdominal infection may occur owing to the leakage of digestive bacteria during laparoscopic colectomy with IA. We hence conclude that methods should be designed to prevent infection during the IA procedure.

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Predicting Opportunities to Increase Utilization of Laparoscopy for Rectal Cancer

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Background: Despite proven safety and efficacy, reported rates of laparoscopic surgery for rectal cancer in the United States are low. With recent reports of inferiority compared to open surgery for rectal cancer, and movements to standardize techniques and develop centers of excellence, investigating current utilization and predictors of laparoscopy for rectal cancer resection are warranted. Our goal was to evaluate the current utilization and identify factors impacting use of laparoscopic surgery for rectal cancer.
Methods: The Premier Hospital Database was reviewed for elective inpatient resections for rectal cancer (2010 through Q3 2015). Patients were identified by ICD-9-CM diagnosis codes for rectal cancer or carcinoma-in-situ, then stratified into open or laparoscopic approaches by ICD-9-CM procedure codes or billing charge. A logistic multivariate regression model identified variables predictive of using laparoscopy for rectal cancer. The Cochran-Armitage test was used for trend analysis. The main outcome measures were trends in utilization and factors independently associated with use of laparoscopy for curative rectal cancer resection.
Results: 3,336 patients were included- 43.8% laparoscopic (n=1,464) and 56.2% open (n=1,872). Use of laparoscopy increased from 37.6 to 55.3% during the study period ($p<0.0001$). General surgeons performed the majority of all resections, but colorectal surgeons were more likely to approach rectal cancer laparoscopically (41.31% vs 36.65%, OR 1.082, 95% CI [0.92, 1.27], $p<0.3363$). Higher volume surgeons were more likely to use laparoscopy than low volume surgeons (OR=3.72, 95%CI: [2.64, 5.25], $p<0.0001$). Younger patients (OR 1.49, 95% CI [1.03, 2.17], p=0.036) with minor (OR 2.13, 95% CI (1.45, 3.12), $p<0.0001$) or moderate illness severity (OR 1.582, 95% CI [1.08, 2.31], $p<0.0174$) were more likely to receive a laparoscopic procedure. Teaching hospitals (OR=0.842, 95% CI [0.710, 0.997], p=0.0463) and hospitals in the Midwest (OR=0.69, 95% CI [0.54, 0.89, p=0.0044) were less likely to use laparoscopy. Insurance status and hospital size did not significantly impact use of laparoscopy for rectal cancer.

Table 1: Multivariable Analysis of Factors Impacting Use of Laparoscopy in Rectal Cancer

	OR	95% CI of OR	p-value
Age category: < 50 years vs. > 80 years	1.493	(1.03, 2.17)	0.036
APR severity of illness			
Minor vs Extreme	2.129	(1.45, 3.12)	0.0001
Moderate vs Extreme	1.582	(1.08, 2.31)	0.0174
Surgeon Rectal Cancer Cases/Year: >20 vs. <10	3.724	(2.64, 5.25)	<0.0001
Hospital Region: Midwest vs. West	0.694	(0.54, 0.89)	0.0044
Hospital Type Teaching vs Non-Teaching	0.842	(0.710,0.997)	0.0463
Surgeon Specialization: Colorectal vs. General	1.082	(0.92, 1.27)	0.3363

Conclusions: The use of laparoscopy for rectal cancer has steadily increased over the years examined. Patient, provider, and regional variables exist, with hospital status, geographic location, and colorectal specialization impacting the likelihood receiving laparoscopic rectal cancer surgery. However, surgeon volume had the greatest influence. These results emphasize the importance of training and surgeon specific outcomes to increase utilization, surgical quality, and improve patient recovery in appropriate cases.

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The Short-Term Outcomes of Reduced Port Surgery and Conventional Laparoscopic Surgery for Colon Cancer: A Prospective Observational Multicenter Study

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Objective: Reduced port surgery (RPS) is not standard therapeutic options for colorectal cancer because the evidences as safety and feasibility in RPS have not been established. This study is a prospective observational multicenter study to compare the conventional laparoscopic surgery (CLS) with single port surgery and needlescopic surgery.
Material and Methods: This study was multicenter trial conducted by 10 Japanese institutes between May 2013 and July 2015. We analyzed all the included patients with colon cancer of Stage I or II who had been treated with curative intent. Tumor location was assigned as right colon (cecum and ascending colon) or left colon (descending colon to rectosigmoid). The primary endpoint was pain assessment by Visual Analogue Scale (VAS). The pain scale was evaluated from the postoperative day 0 to day 7.
Results: A total of 188 consecutive patient records were available for analysis: 92 for CLS group and 96 for RPS group which included 46 with needlescopic surgery and 50 with single port surgery. CLS group included 44 males, 48 females (mean age, 63.4 ± 10.3 years); RPS group included 56 males, 40 females (mean age, 65.6 ± 9.3years). There were no significant differences of clinical backgrounds such as age, gender, BMI, clinical stage and size between two groups. Left sided colon was more included in CLS group than in RPS group ($p<0.0001$). There were no significant differences in operation time, blood loss, surgery-related complications with CTCAE grade 3–4 between two groups. The conversion rate was 2.0% in CLA group and none in RPS group. The reoperation rate was 2.9% in CLA group and 1.9% in RPS group, which was mainly due to anastomotic leakage. The overall hospital mortality rate was 0% and all the surgeries were with curative contents. Postoperative pain scores from 0 POD to 7 POD were no significant difference between two groups with mixed effect model adjusted be age, sex and tumor location (left side or right side).
Conclusions: Our results provide that PRS for colon cancer is safe and acceptable, but postoperative wound pain using VAS indicated no significant difference between RPS group and CLS group.

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Is Local Recurrence Increased After Laparoscopic Lower Rectal Cancer Resection?

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Purpose: From ALaCaLT and Z6054 trial, positive CRM of laparoscopic resection for rectal cancer was relatively higher than that of open resection. In this study, long term results of survival and local recurrence were assessed for laparoscopic lower rectal cancer resection.
Patients and Method: Since April 2007 to February 2014, curative laparoscopic resection was performed for 264 lower (extraperitoneal) rectal cancer patients. Laparoscopic lateral lymphadenectomy was performed for 30 patients and 9 patients (3.4%) received preoperative chemoradiation. Statistical difference was decided by chi- square test.
Results: There were 181 males and 83 females, mean age 63.5 year old. Procedures were; LAR 56%, ISR 33%, APR 8%, Hartmann and TPC 3%. Pathological stage was; 0: 6, I: 101, II: 52, III: 105, and pathological CRM positive rate was 2.3% (6 pts). Mean observation was 40.2 months. Five year OS was; I: 95.1%, II: 87.1%, III: 79.3%, 3 year RFS was; I: 93.6%, II: 85.5%, III: 78.0%. Local recurrence was observed in 17 patients (6.4%) and no CRM positive patients in them. Local recurrence according to factors were; gender: male 4.4%, female 10.8% (p=0.048), Stage: I 5.0%, II 13.5%, III 4.8% (n.s.), lateral lymph node: positive 7.7%, negative 6.4% (n.s.), procedure: LAR 4.7%, ISR 10.5%, APR 4.5% (n.s.), surgeon: A 2.8% (4/145), B 7.7% (3/39), C 12.1% (7/58) (p=0.03, A vs C). Local recurrent sites were; anastomosis 5, lateral lymph node 6, intra-pelvic plexus 1, mobilized part 5 (levator 2, presacral 1, piriformis 1, recto-vaginal septum 1).
Conclusion: Although limited study of patient number and observation, rate of local recurrence was not increased after laparoscopic lower rectal cancer resection. Risk factors of local recurrence were female gender and surgeon.

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Postoperative Outcomes Following Abdominoperineal Resection in the Era of Minimally Invasive Surgery

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Introduction: The purpose of this study was to evaluate the current application of minimally invasive surgery and compare the 30-day postoperative complications following open vs. laparoscopic APR for cancer.
Methods: The 2014 ACS NSQIP database was utilized for this study. Patients that underwent an APR for rectal or anal cancer were included in the analysis. Patients were then grouped based on operative approach into an open (CPT code 45110) or laparoscopic group (CPT code 45395). Patient demographic information, preoperative laboratory data, postoperative complications and mortality were compared between groups. Statistical analysis was performed utilizing unpaired t-test and chi square analysis. Statistical significance was defined as $p<0.05$.
Results: A total of 1450 patients who underwent an APR for cancer were included, 549 (38%) in the laparoscopic group and 901 (62%) in the open group. The preoperative demographic data was similar between groups. There was no difference between the groups in regards to superficial SSI, wound dehiscence, readmission, or mortality (Table 1). Open APR was associated with a longer LOS (10.5 days vs. 7.7 days, $p<0.0001$), a higher rate of organ space SSI (8% vs. 3%, $p=0.0005$), more blood transfusions (24% vs. 9%, $p<0.0001$), and more frequent return to the OR (9% vs. 6%, $p=0.027$). Additionally, the open group had a higher rate of pulmonary complications such as, pneumonia (4% vs. 1.5%, $p=0.0021$), reintubation (2% vs. 0.5%, $p=0.024$), and prolonged intubation (2% vs. 0.3%, $p=0.025$).
Conclusion: In the era of minimally invasive surgery the majority of patients received an open APR for treatment of their rectal or anal cancer. However, laparoscopic APR resulted in significantly less postoperative complications, shorter LOS, less need for transfusion, and a lower rate of reoperation.

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Laparoscopic vs Open Resection for Rectal Cancer. A Lower Middle Income Country Experience

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Objective: To measure the short and long term surgical outcomes of laparoscopic rectal cancer surgery at a cancer hospital in a lower middle income country.
Methods: All patients with a diagnosis of rectal cancer from Jun 2006 to Jun 2015 were studied. Patient demographics were recorded. Short term surgical outcomes were recorded. Oncological factors indicating an adequate surgical resection were identified. Successful resection was defined as having negative linear and radial margins and a complete TME. LN yield was also recorded. Post op complications were also compared.
Results: A total of 440 surgeries were performed. 154 abdominoperineal resections, 35 extra levator abdominoperineal resections, 151 anterior resections, 40 ultralow resections, 40 hartman's procedures and 20 total colectomies were performed. 262 were laparoscopic and 178 were open. There were 27 conversions (10%). Tumours in the open group were more aggressive and more advanced. There were more T4 lesions (5.2% vs 0.6%), more mucinous (38.7 vs 26.7%) and more nodal involvement (45% vs 34%). Distal resection margins were negative in all open and laparoscopic resections. CRM was clear in 83.9% in open resections vs 88.8% in laparoscopic resections. TME was complete in in 86% in open surgery and 91% in laparoscopic surgery. Median number of LNs excised were similar in both groups (median of 13). Complications were seen in 8.4% patients in open group versus 5.7% patients in laparoscopic group.
Conclusion: Laparoscopic surgery is similar to open surgery in terms of early surgical and oncological outcomes. A long term comparison of oncological outcomes in terms of recurrence and survival is required.

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Lower Gastrointestinal Disease That is Associated with Colorectal Polyps in Patients with Lower Gastrointestinal Endoscopy

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Background: Colorectal polyps (CRP) are developing from colon mucosa and the most common benign tumors. CRP are seen in 1–12% of the adult population. They can be adenomatous, hyperplastic, inflammatory, hamartamatous and pseudopolyp. The majority are of adenomatous polyps.There may be different diseases in the gastrointestinal tract together with lower CRP. We have discussed in this presentation lower gastrointestinal disease that is associated with colorectal polyps.
Methods: Patients with CRP were retrospectively reviewed from Surgical Endoscopy Unit report in between 2011–2014.
Results: CRP were detected in 71 of 305 patients (23.2%) in their lower gastrointestinal endoscopy. The majority were male (%61). The mean age was 54.5 years (age range 26–82). Polyps were found in rectum of 21 patients, in sigmoid colon of 21, in left colon of 23, in transverse colon of 19, in right colon of 9 and in 4 of caecum. 56% of all polyps were adenomatous, 43% were hyperplastic and 1% was inflammatory polyps. Polypectomy was performed to the patients. It's detected that 76% of these patients have hemorrhoidal disease, 20% have colonic diverticular disease, 4% have colon cancer, 3% have chronic anal fissures and 4% have other diseases (anal fistula, ulcerative colitis, eosinophilic colitis).
Conclusion: As seen in our study, patients with CRP most often have hemorrhoidal disease and colonic diverticular disease. In these patients some tests such as fecal occult blood test could be misleading. In such patients to make the correct diagnosis lower gastrointestinal endoscopy should be planned more stably.

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Evaluation for Stoma Obstruction After Defunctioning Ileostomy and Skin Extension by Pneumoperitoneum

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Background: Although the use of defunctioning ileostomy is a common practice in colorectal surgery, stoma obstruction is sometimes encountered by surgeons, especially after laparoscopic surgery.
Purpose: The aim of this study was to assess the risk of stoma obstruction.
Methods:

1. We retrospectively reviewed all patients who underwent colorectal resection and defunctioning ileostomy between April 2008 and March 2014 in Kagawa University Hospital. A round incision 20 mm in diameter was made in all patients at a preoperatively marked site on the skin.The factors affecting stoma obstruction were analyzed.
2. We prospectively analyzed the clinical data of patients who underwent skin extension by laparoscopic pneumoperitoneum between April 2016 and September 2016 in Sumitomo Besshi Hospital. A circular mark was made on the abdomen using a metallic pipe 19 mm in diameterwith the pneumoperitoneum at 10 mmHg according to the principles of stoma site marking. After degassing, the diameter of the marking was measured.

Results:

1. Forty-five patients underwent defunctioning ileostomy during the study period. Patients were divided into an obstruction group (n=6) and a non-obstruction group (n=39). All stoma obstructions were treated conservatively and there was no surgically treated case. Age (P=0.751), sex (P=0.752), operative time (P=0.726), intraoperative bleeding (P=0.249), postoperative complications (P=0.352), and the use of antidiarrheal drugs (P=0.482) were not associated with stoma obstruction. The percentage undergoing laparoscopic surgery in the obstruction group was higher than in the non-obstruction group (obstruction group: lap/open=6/0 vs the non-obstruction group: lap/open=16/23, P=0.009).
2. Twenty-nine patients underwent circular marking. The marking diameter under pneumoperitoneum significantly decreased by 19.1% after degassing (under pneumoperitoneum: 19.5±0.6 vs after degassing: 17.7±1.0, P<0.001). The patients whose marking diameter decreased 3 mm or more were defined as group A (n=7) and those that decreased less than 3 mm were defined as group B (n=22). There was no significant difference in age (P=0.683), sex (P=0.667), height (P=0.231), weight (P=0.346), or BMI (P=0.628) between the groups.

Conclusion: Laparoscopic defunctioning ileostomy carries a risk of stoma obstruction. Pneumoperitoneum makes the incision seem larger than expected. We should pay attention to making the skin and fascial incision larger under pneumoperitoneum to prevent stoma obstruction.

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Single Incision Versus Conventional Laparoscopic Appendectomy: A Propensity-Score-Matched Analysis of 116 Cases

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Background: We usually perform single-incision laparoscopic appendectomy (SILA) in selected patients. The aim of this study is to evaluate the short-term outcomes of SILA compared with conventional laparoscopic appendectomy (CLA) by using propensity score matching analysis.
Surgical Indications and Techniques: SILA is basically performed in uncomplicated appendicitis by using similar surgical technique to CLA. We usually adopt a 2 cm Z-type skin incision. Multi-access platform is placed in this umbilical incision area. All CLA cases are performed using 3 trocars method.
Design: The study group included 173 patients who underwent SILA and 297 patients who underwent CLA between January 2009 and June 2016. The propensity score matching for age, gender, body mass index, preoperative WBC counts, preoperative CRP levels, appendicitis with abscess formation or diffuse peritonitis and previous major abdominal surgery produced 58 matched pairs.
Results: As for baseline characteristics, there were no statistically significant differences between SILA (n=58) and CLA (n=58) groups. No significant differences were observed in operating time, bleeding volumes, starting time of oral intake, length of hospital stay, analgesic requirements and pathological findings between the SILA and CLA. The overall rate of SILA and CLA was 5.17 and 3.45% (p=0.65). Among them, enteritis was similar in both groups (3.45%). One patient had wound infection (1.72%) in the SILA.
Conclusion: This study indicates that SILA is a safe and feasible option with better cosmetic results in uncomplicated appendicitis.

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Half Circumferential Stapler Hemorrhoidopexy in Grade 4 Gangrenous Hemorrhoids with Maggots

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Male aged 32 years admitted with complain of swelling, bleeding and pain perianal region since three days.On examination ,there were gangrenous hemorrhoids prolapsed outside the anal canal with maggot infestation.Supportive therapy with intravenous dextrose, antibiotics ,analgesic and anti inflammatory drugs started, along with perianal care, for the infected hemorrhoids. He was taken for hemorrhoid surgery after 48 h, as the infection and swelling reduced. intraoperatively, there were still maggots live and dead both ,inside the submucosal plains all around the anal canal which were cleared.The anterior half of anal mucosa was found to be sloughed,and gangrenous, sloughing hemorrhoids were present in the posterior half. To correct the posterior prolapsing hemorrhoids the sutures were taken in mucosa at 3, 6, and 9 o clock with prolene 1−0,just above the apex of hemorrhoids. stapler PPH 03, ETHICON fired and hemostasis achieved by rectal mucopexy at bleeding points.anteriorly debridement with excision of external hemorrhoid done with RF.The postoperative period was uneventful and patient discharged in 24 h.

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Laparoscopic Reversal of Hartmann's Procedure Following an Open Emergent Resection

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Introduction: Procedures to restore bowel continuity following a prior emergent Hartmann's procedure are associated with high morbidity and failure rates. It is estimated that around 20–50% of patients never progress to a restorative procedure. There are few studies that evaluate the feasibility and safety of approaching these complex cases using a minimally invasive platform. We present a single center series evaluating laparoscopic-assisted reversal following an open emergent Hartmann's procedure.
Methods: The data were obtained from an IRB-approved prospectively maintained database. Consecutive patients who presented for closure following a previous emergent open Hartmann's procedure were evaluated. All patients underwent minimally invasive reversal and were included in our study. The procedures were performed using one of four minimally invasive platforms: multiport laparoscopy (LAP), hand-assisted laparoscopy (HAL), robotic-assisted laparoscopy (RAL) and single-incision laparoscopic surgery (SILS).
Results: 40 patients were evaluated. The majority were performed using LAP technique n=25 (62.5%). The mean age, ASA, and BMI were 58.2, 2, and 27.9, respectively. Nearly half were female (n=18, 45%). The mean operative time and EBL were 207 min and 103 mL respectively. In all cases reversal with establishment of bowel continuity was successful, however, 9 patients underwent diverting loop ileostomy to protect the anastomosis. Eight cases (20%) required conversion to open surgery chiefly due to inability to safely expose and mobilize the rectal stump. In all converted cases, the majority of the procedure had already been accomplished using laparoscopic techniques and there were no significant differences in all outcome measures when compared to the non-converted cases. The mean LOS was 4.1 days (range 2–18). There were a total of 5 postoperative complications (12.5%) including 2 deep surgical site infections one of which required readmission. There were no anastomotic leaks.
Conclusion: Reversal of Hartmann's stump following a prior open and emergent procedure can be successfully achieved using a minimally invasive surgical platform. The outcomes result in a higher success rate and lower rates of complications compared to historical data. The benefits of minimally invasive surgery should be considered as a feasible option when planning the surgical approach for these complex cases.

Table 1. Patient characteristics and perioperative outcomes n=40

Age*	58.2±12.1 (30-78)
Female	18 (45%)
American Society of Anesthesiologists score*	2±0.4 (2-3)
Body Mass Index*	27.9±5.2 (16.9-42)
Interval between operations. Months*	7.8±4.7 (3-20)
Operative Time*	207.9±66.9 (31-325)
Estimated Blood Loss*	103.5±65.25 (20-250)
Conversions	8 (20%)
Diversions	9 (22.5%)
Length Of hospital Stay*	4.1±3.1 (2-18)
Post-operative complications	5 (12.5%)
Readmission within 30 days	2 (5%)
Reoperation	1 (2.5%)
*Mean±SD (range)	

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The Benefits of Minimally Invasive Surgery for Colorectal Cancer

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Introduction: Minimally invasive surgery (MIS) such as single port surgery or reduced port surgery yields reduced postoperative pain and improved cosmesis in comparison to standard multiport laparoscopic surgery (MPS). However, the oncological outcomes of MIS for colorectal cancer (CRC) are still matters for debate. Standardization for total mesorectal excision (TME) for rectal cancer or complete mesenteric excision (CME) for colon cancer is resulting in an improvement in the oncologic quality with decreasing the postoperative complication rates. The purpose of this study is to evaluate the benefits of MIS with TME/CME for CRC in a case-matched control study.
Methods and Procedures: Prospectively collected data of patients with stage 0-III CRC who underwent MIS (n=323) or MPS (n=392) between 2008 and 2016 were analyzed. Cases with invasion to other organs or ileus were excluded. The observation data in terms of clinical characteristics and tumor location was adjusted with employing propensity score matching. Their short-term outcomes and prognoses, 3-year disease free survival (DFS) and over all survival (OAS), were compared between the two procedures overall and per side (right, left-sided and rectum).
Results: Each 250 cases were evaluated after matching. Their short-term outcomes, including operation time, blood loss, number of lymph nodes harvested, length of the resected specimen, and complications, were similar between the two procedures, whereas postoperative pain and patients satisfaction for cosmesis were clear advantages in MIS. Operation time for right-sided MIS was significantly shortened. MIS was completed successfully in 98% of right-sided cases and in 98% of left-sided cases. Twelve with ileus and three with anastomotic leakage were observed postoperatively. All of these cases were recovered with conservative treatment. The umbilical scars were nearly invisible 3 months after the procedure, and most patients reported being quite satisfied with the cosmetic outcomes. 3-year DFS and 5-year OS were similar in each pathological stage between two groups.
Conclusions: We concluded that MIS for colorectal cancer is feasible when performed by experienced surgeons in selected patients. Excellent cosmesis and reduced postoperative pain as well as oncologic clearance can be expected. A large-scale, prospective, randomized, controlled trial should be conducted to confirm the superiority of this procedure over MIS.

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Association of Pre-operative Level of Hemoglobin A1c with Post-operative Infections Among Non-diabetic Patients Undergoing Colorectal Surgery

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Introduction: Hyperglycemia is associated with increased post-operative infections. HbA1c is a marker of long-term glucose control and in diabetics is an established indicator of poorer outcomes. However, whether sub-optimal HbA1c levels are associated with post-operative complications in non-diabetic patients is unclear. The purpose of the study was to estimate the extent to which elevated preoperative HbA1c is associated with post-operative infectious complications in non-diabetic patients undergoing colorectal surgery.
Methods Patients with documented pre-operative HbA1c levels as the result of participation in 3 previous studies between 2012 and 2016 were reviewed. Patients without a previous diagnosis of diabetes undergoing elective open or laparoscopic colorectal surgery for benign and malignant conditions were included. Elevated HbA1c was defined as HbA1c≥5.7%. The primary outcome was overall infectious complications occurring within 30 days of surgery, defined as patients having at least one of the following: incisional surgical site infections (SSI) (superficial and deep), organ space SSI, urinary tract infection (UTI) and/or pneumonia. Complications were defined as per NSQIP. Secondary outcomes were overall complications, 30-day readmissions rate and hospital length of stay.
Results A total of 266 patients with preoperative HbA1c were identified; 52(20%) were known diabetics and were excluded, and 213 patients were included (mean (SD) age 66.4(12.5) years, BMI 26.5(4.8) mg/kg2, 43% female, 77% laparoscopic). When grouped according to pre-operative HbA1c levels, 92 patients (43%) had HbA1c<5.7% while 121 patients (57%) had HbA1c≥5.7 (pre-diabetes/provisional diabetes). There were no differences between the normal and elevated HbA1c groups for 30-day overall infections (13 (14%) vs 10(8%), p=0.2), incisional SSI (5(5%) vs 7(6%), p=0.9), organ space SSI (8(9%vs 7(6%), p=0.4), UTI (1(1%) vs 2(2%), p=1) or pneumonia (1(1%) vs 1(1%), p=1). There were also no differences in median (IQR) hospital stay (3(3–7) vs 4 (3–6) days, p=0.9), overall complications (45(49%) vs 63 (52%), p=0.6) or 30-day readmissions (11(12%) Vs 14(11%), p=0.9).
Conclusions In patients without known diabetes, elevated preoperative HbA1c was not associated with higher infectious complications after colorectal surgery. However, given the high percentage of pre-diabetes in this colorectal surgery population, more attention should be directed toward characterising this population and their post-operative outcomes.

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Effects of Absorptive Anti-adhesion Barrier on Prevention of Bowel Obstruction After Laparoscopic Colorectal Cancer Surgery

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Background: A protective efficacy by absorptive adhesion prevention product (Seprafilm®) to bowel obstruction (BO) was proven from large-scale RCT of Europe and America in the open surgery. However, it is uncertain in the laparoscopic surgery.
Purpose: To clarify a protective efficacy by Seprafilm against BO after laparoscopic surgery for colorectal cancer
Methods: From 2006 to 2015, 731 laparoscopic colorectal resections were performed for colorectal cancer. Incidence of BO and short-term results were compared between Seprafilm and Non-Seprafilm group. And, risk factors for BO were retrospectively analyzed.
Results: A total of 546 patients were in Seprafilm group and 185 patients were in Non-Seprafilm group. There were significant differences in age and pathological stage. Seprafilm group was significantly lower than Non-Seprafilm group in grade 2 or more of BO (2.9% vs. 11.4%). There was no difference in grade 3 or more of BO (2.4% vs. 4.3%). There were significant differences in BO within 30 days (2.0% vs. 9.2%) and BO after 30 days (0.9% vs. 3.2%). Incidence of surgical site infection was higher in Non-Seprafilm group (3.1% vs. 10.3%). There was no significant difference in anastomotic leakage between both groups. ASA 2 or more, stoma creation procedure, and non-using of Seprafilm were indicated as a risk factor by the multivariable analysis.
Conclusion: Seprafilm was useful for prevention of BO in laparoscopic colorectal surgery without increasing adverse event. Seprafilm is especially recommended in laparoscopic colorectal surgery, in stoma creation procedure and operation for high ASA patient.

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Short-Term Clinical Outcomes of Hand-Assisted Laparoscopic Surgery of the Left Colon

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Introduction: Laparoscopic colorectal surgery is not widely used because of its technical difficulty, increased learning curve and longer operating time. The hand assisted laparoscopic surgery is a surgical technique in colorectal surgery that provides similar results to laparoscopic surgery avoiding these problems. The aim of this study is to show the clinical characteristics and results of a case series report of the same proficient surgical team.
MATERIAL AND **METHODS:** A retrospective study was performed with analysis of patients who were underwent Hand-Assisted laparoscopic surgery for left colectomy with any diagnosis in the ABC Medical Center IAP during January 1st 2011 to December 31st 2015 by the same surgical team.
Results: During 60 months 88 patients were identified (27.27% female and 72.72% male), average age of 57 years. Twentynine patients had a history of abdominal and pelvic surgery. The most common diagnoses were non-repetition acute diverticulitis and left-sided colon cancer. The average operating time was 103.23 min, average blood loss of 174 ml, average recovery time of gastrointestinal function of 4.45 days, days of hospital stay of 7.98 days. The resected specimen length average was 18.42 cm. For cancer surgery 15,5 lymphatic nodes were obtained on average. 3 perioperative complications, no conversion to open surgery or death were recorded.
Conclusions: Hand-assisted laparoscopic surgery is a technique that offers the advantages of minimally invasive surgery, being a safe and effective option in expert hands.

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Laparoscopic Ileal J-Pouch: A Comparative Study Between Ulcerative Colitis and Familiar Adenomatous Polyposis

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Introduction: Total proctocolectomy with ileal pouch-anal anastomosis is the best surgical therapeutic option for Familiar Adenomatous Polyposis (FAP) with rectum involvement and Ulcerative Colitis (UC) with no response to clinical treatment. There is still limited data regarding laparoscopic approach.
Objectives: To compare perioperative morbidity of laparoscopic total proctocolectomy with ileal pouch-anal anastomosis between patients with FAP and UC.
Methods: Consecutive patients with UC and FAP who underwent surgical treatment between 2005 and 2016 were retrospectively reviewed from a prospectively maintained database. The primary outcome was 30-day morbidity, recorded using Clavien-Dindo classification system. Major complication was defined as Clavien-Dindo classification≥3. Statistical analysis was made using the software SPSS®.
Results: From a total of 34 patients, 10 had UC and 24 had FAP. Both populations had no difference as related to comorbidities, Mass Index (BMI), preoperative hemoglobin or American Society of Anesthesiology (ASA) classification. Patients with UC were significantly older (39,9 vs. 26,9 years, p=0,002). Overall, 16 (47,1%) patients had no complications, 11 (32,3%) had minor and 7 (20,6%) had major complications. There was no 30-day post-operative mortality. Reoperation was necessary for 5 (14,7%) patients, and anastomotic leakage occurred in 9 (26,5%). Patients with UC had significantly higher anastomotic leakage (50% vs. 16,7%, p=0,45), post-operative blood transfusion (30% vs. 0, p=0,005) and hospital stay (14,7 vs. 8,6 days, p=0,007).
Conclusion: Laparoscopic total proctocolectomy with ileal pouch-anal anastomosis is a high morbidity surgical procedure, especially in UC patients.

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Colorectal Neoplasms in a Sub-Saharan Africa Population: A Multicentre Colonoscopy Study

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Background: Colorectal cancer is a disease of global importance with a known risk of cancer from adenomatous polyps. The practice and formulation of effective health policies in developing countries is marred by lack of appropriate colorectal cancer screening and up-to-date cancer registry.
Aims: To study the prevalence of colonic neoplasms in a Sub-Saharan African population.
Patients and Methods: An observational study of all colonoscopies performed in Port Harcourt metropolis of Nigeria from 2013 to 2016. A pro forma was sent for completion to Gastro-Intestinal (GI) endoscopists practising within the metropolis. Variables studied were demographics, indications, endoscopic findings and histopathology. Statistical analysis was done using SPSS version 20.
Results: Data from two Surgical endoscopists were accessible for analysis. A total of 172 colonoscopies were performed during the study period. There were 130 males and 42 females with age range of 4 to 86 years. The presenting complaints included: bleeding per rectum 102(59%), change in bowel habit 17(10%) and screening 8(5%) cases. There was no malignant polyp recorded; however, 30(17%) benign polyps with 7 inflammatory polyps, 4 adenomas with dysplasia and 4 hyperplastic polyps seen. A case of ulcerative colitis was seen and 9 (5%) malignant neoplasms, mostly adenocarcinomas (78%) of rectal origin (78%).
Conclusion: A screen colonoscopy is a cost-effective recommendation for secondary prevention of colorectal cancer in our environment.

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Transanal Total Mesorectal Excision for Rectal Cancer: Outcomes of Obese in Comparison with Non-obese Patients

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Introduction: Laparoscopic rectal cancer surgery is a technically demanding procedure, especially in patients with adverse circumstances such as obesity. High BMI has been associated with increased morbidity. Transanal total mesorectal excision (taTME) has emerged as an alternative to open and laparoscopic techniques and might be associated with improved outcomes in such difficult cases.
Methods and Procedures: From a prospectively maintained database of patients undergoing taTME for rectal cancer in a tertiary referral center, we analyzed the outcomes of patients with BMI<25 Kg/m2 (non-obese group) and patients with BMI>30 Kg/m2 (obese group). Both groups were compared on patient characteristics, intraoperative and postoperative complications. Patients with mid and low rectal cancer were included.
Results: A total of 104 patients were included in the analysis, 83 patients (79.8%) had a BMI of < 25 Kg/m2 and 21 patients (20.2%) had a BMI>30 Kg/m2. Both groups did not differ in male-female ratio (male patients: 53.0% vs. 66.7%, p=0.260) or median age (63 vs. 66 years). Also there was no difference in incidence of nicotine use (31.4% vs. 30.0%, p=903). There was an expected increased risk in the ASA classification for the obese group. T3 disease was present in 62 (77.5%) vs. 13 (61.9%) patients (p=0.146), and T4 was present in 7 (8.8%) vs. 1 (4.8%) patient (p=0.547), with no difference in the administration of neoadjuvancy (71.0% vs. 61.9%; p=0.575). Median operative time was 120 vs. 160 min (p=0.051). Intraoperative complications were present in 5 (6.4%) vs. 3 (15.0%) (p=0.211), being hemorrhage (n=4 vs. n=0) the most frequent. There was 1 case of perforation of the posterior vaginal wall in the obese group. No ureter injuries were documented, and abdominal conversion to hand-port occurred in 1 (1.2%) vs. none (p=0.613). The 30-days postoperative complication rate was 30 (36.6%) vs. 9 (42.9%) (p=0.597). A reintervention was warranted in 6 (7.3%) vs. 1 (4.8%) case (p=0.678), while readmission rate was 9.9% vs. 9.5% (p=0.961). Median length of hospital stay was 6 vs. 7 days (p=0.280). Pathological results showed no difference concerning quality of the specimen between both groups (98.8% vs. 100.0% of completeness of mesorectum, p=0.611) and no difference in positive CRM (8.5% vs. 4.8%, p= 564).
Conclusion: Despite increased technical difficulty of resection, with taTME obesity seems to be no longer associated with higher morbidity.

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Long-Term Outcomes with the Use of Fiber Monotherapy for the Treatment of Fecal Incontinence Patients

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Purpose: Patients with fecal incontinence often have life-long difficulty controlling symptoms of this debilitating condition. There is recent interest in surgical interventions through which successful treatment is considered to be a 50% reduction in symptoms. The aim of this study was to evaluate long-term efficacy of dietary fiber supplementation (DFS) as the sole interventional therapy for patients with fecal incontinence (FI).
Methods: Patients with the diagnosis of fecal incontinence ICD-9 code 787.6 were identified at a single institution (2012–2015). Two colorectal surgeons utilized psyllium seed husk (two tablespoons every morning, 30gms) and at least 64 ounces of water daily as initial treatment of patients with fecal incontinence. Patients were evaluated through a mailed survey to assess efficacy of DFS at greater than one year following initiation of treatment. Pre-treatment vs. post-treatment Pescatori and Wexner scores were compared by paired t-test.
Results: 55 patients (41 females, 74.5%) underwent treatment with DFS. Mean patient age was 61.7±13.3 years. Patients were evaluated after initiation of treatment at one month as an outpatient and again at greater than one year through a mailed survey. Wexner and Pescatori scores were used to evaluate efficacy of treatment. At one month, 60% (Wexner) and 38.2% (Pescatori) of patients showed greater than 50% improvement in their FI symptoms (p=0.001). The results of the survey at one year were not as promising. Fifty patients were sent surveys asking them to evaluate their symptoms before and after initiation of treatment with DFS. Fifteen patients responded to the survey. The average reported Pescatori and Wexner scores prior to treatment were 4.9±0.9 (range 3–6) and 11.4±4.6 (range 3–20) respectively. Following DFS, the average Pescatori and Wexner scores decreased (3.4±1.5, and 6.6±5.4 respectively). At one year post-intervention, 46% (Wexner) and 20% (Pescatori) of patients showed greater than 50% improvement in their FI symptoms. On average, there was a 28% reduction in symptoms per the Pescatori score and a 44% reduction in symptoms per the Wexner score.
Conclusions: The use of dietary monotherapy is an inexpensive and well-tolerated intervention for the treatment of fecal incontinence, but the effects may not endure with long-term treatment. Though the outcomes of DFS at one month may be equivalent to those of surgical intervention, with a greater than 50% reduction in symptoms, DFS may not provide long-term reduction in symptoms when used as a sole therapy.

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The Influence of Body Mass Index on the Outcomes of Laparoscopic Surgery for Colon Cancer

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Objective: The relationship between body mass index (BMI) and laparoscopic colon resection is unclear. The aim of this study was to determine whether obese patients undergoing laparoscopic resection for colon cancer had worse outcomes.
Methods: One hundred and seventy seven consecutive patients who underwent curative laparoscopic resection for stage 2 and 3 colon cancer between January 2009 and July 2016 in a single institution were identified from a prospective database. Patients were divided in two groups based on BMI. Obesity was defined by BMI>25. Outcomes including operative data, the number of retrieved lymph nodes, anastomotic leakage, and recurrence were compared between the groups.
Results: One hundred and thirty three patients (75.1%) were of a healthy weight (BMI<25), whilst 44 patients were classified as obese (24.9%). Both groups had comparable demographics, tumor location, tumor size, tumor stage and the degree of lymphadenectomy. Operative time, intraoperative estimated blood loss and the number of retrieved lymph nodes were no different between the two groups. The anastomotic leakage rate was significantly higher in obese patients (0.8% vs. 6.8%; p=0.048). With a median follow-up time of 19.5 months, there was no significant difference in the recurrence rate (14.3% in BMI<25 vs. 20.5% in BMI>25; p=0.346). The mean interval from the surgery to the recurrence was 13.1 (range, 3.2–32.6) months for the healthy weight patients and 9.9 (range, 1.6–36.1) months for the obese patients.
Conclusions: Obesity leads to increase anastomotic leakage in laparoscopic surgery for colon cancer. However, laparoscopic colon resection may be oncologically feasible in obese patients.

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Pathologic Response to Neoadjuvant Treatment in Rectal Cancer and Impact on Outcome

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Objective: Downstaging and pathologic complete response (pCR) after chemoradiotherapy (CRT) may improve progression-free survival and overall survival (OS) after curative therapy of of rectum. The purpose of this study is to evaluate the pathologic response subsequent to neoadjuvant chemoradiation in locally advanced rectal adenocarcinoma and any impact of response on oncological outcome.
Methods: We retrospectively assessed the clinical outcomes of 76 histologically-proven rectal adenocarcinoma were treated with preoperative radiotherapy and concurrent 5-fluorouracil (5 FU), and followed by curative surgery in Department of Surgery, Istanbul University School of Medicine between January 2010 and March 2016. Pathologic response to neoadjuvant treatment was evaluated by comparing pathologic tumour and nodal staging with pre-treatment clinical staging. Disease-free survival (DFS) and OS were compared in patients with: pathologic complete response, partial pathologic response and no response toneoadjuvant therapy.
Results: 17,1% (13 patients) had a pathologic complete response and 82,9% (63) showed downstaging. At follow-up range, 72−6 months, 11,8% (9) showed recurrence: 14,5% (11) distant metastasis, 7,7% (1) of the patients with pathologic complete response showed distant metastasis, one showed local recurrence. In the downstaged group, 8 had local recurrence (12,7%). Patients with pathologic complete response showed 84,6% DFS and 84,6% OS. In partial responders, DFS was 65% and OS was 76%. Patients with pCR had a significantly greater probability of DFS and OS than In partial responders. Rectal cancer-related death was 22,4% (17) patient 2% with pCR and 2,6% in 19,8% the downstaged group
Conclusions: The majority of patients showed some response to neoadjuvant treatment. Findings of this study indicate tumour response to neoadjuvant chemoradiotherapy improves the long-term outcome, with a better result in patients with pathologic complete response.

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Intracorporeal Free Cancer Cells During Laparoscopic Colorectal Resection Detected via Quantitative Reverse Transcription-Polymerase Chain Reaction

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Introduction: Laparoscopic surgery's complex maneuvers during the procedure occasionally require rough handling. This can result in more opportunities for the cancer cells to migrate into the corporeal cavity. These free cancer cells may be the cause of peritoneal or local recurrence. A previous Japanese clinical trial showed that the rate of peritoneal recurrence was higher with laparoscopic resection than with open resection.
Objective: Our aim was to compare the amount of perioperative intracorporeal free cancer cells between laparoscopic and open resection. We evaluated the levels of carcinoembryonic antigen (CEA) mRNA at the beginning and at the end of the surgery. Furthermore, the clinicopathological risk factors associated with migrating cancer cells during laparoscopic resection were analyzed.
Patients and Methods: One hundred and fifty-eight patients who underwent curative intensive surgery for colorectal cancer were enrolled in this study. The male:female ratio was 85:73. Twenty one patients underwent open resection, and 137 underwent laparoscopic resection. Saline (100 mL) was introduced into the abdominal cavity at the beginning and end of the surgery. For laparoscopic resection, 100 mL saline was added following trochar insertion. The peritoneal cavity was washed with 1 L or 2 L lavage at the end of all procedures; then, 100 mL saline was added again. CEA mRNA levels were determined via a quantitative reverse transcription-polymerase chain reaction. A CEA mRNA level of greater than zero was classified as positive. Clinicopathological factors (age, sex, pT<4 or pT=4, lymphatic metastasis<4 or ≥4, colon or rectum, peritoneal lavage 1 L or 2 L) were analyzed as variables using logistic analysis.
Results: CEA mRNA was detected in 15 patients (9.5%) in the fluid collected at the beginning of the procedure. It was also detected in 10 patients (6.3%) in the fluid collected at the end of the surgery. Of these 10 patients, 8 patients had higher CEA mRNA levels at the end of the surgery than at the beginning. All 10 patients underwent laparoscopic resection (10/137: 7.3%). At the end of the open resection procedure, CEA mRNA was not detected in any patient (0/20%: 0%). This was not a statistically significant difference (p=0.3). Among the 13 patients who underwent laparoscopic surgery, logistic analysis revealed that lymphatic metastasis (≥4) was a risk factor for migration of intracorporeal free cancer cells during laparoscopic surgery.
Conclusion: Laparoscopic resection for colorectal cancer with many lymphatic metastasis may result in postoperative peritoneal metastasis.

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Laparoscopic Surgery and Transanal Endoscopic Microsurgery for Rectal Cancer. Our Own Experience in a Developing Country

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Introduction: This study reports the long-term results for a prospective rectal cancer management program using laparoscopic low anterior resection (LAR), abdominoperineal resection (APR), transanal endoscopic microsurgery (TEM) and laparoscopic radical transanal abdominal transanal proctosigmoidectomy with coloanal anastomosis (TATA).
Methods and Procedures: A prospective study was on 287 consecutive patients with rectal cancer between January 2005 and December 2015 in a tertiary referral university-affiliated center specializing in endoscopic and laparoscopic surgery. All resections were carried out by a team of dedicated colorectal surgeons and standard protocol was used for all pre-and-post-operative care. We were waited 8–12 weeks from the completion of neoadjuvant treatment until surgery to allow for the maximal downstaging effect of chemoradiation. All the patients underwent total mesorectal excision in laparoscopic group.
Results: There were 106 patients in the TEM group. The overall incidence of morbidity was 5,6% (6/106). Mean follow-up was 58 (3-120) months with a recurrence rate of 0% in pTis, 5,8% in pT1, 8,1% in pT2 and 7,7% in pT3. Overall estimated 5-year survival was 95,7% and the disease-free survival rate was 93,7%. Of the 181 patients in the laparoscopic group, 129 underwent LAR, 30 APR and 22 TATA. The major morbidity rate was 14% in LAR, 11% in APR and 13,6% in TATA. Overall estimated 5-year survival was 81,8%.
Conclusion: Minimally invasive rectal surgery can be safely undertaken for a wide variety of procedures with a high expectation of success.

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Body Mass Index and Visceral Fat Area as the Reconstruction Difficulty Indicator in the Laparoscopic Surgery for Transverse Colon Cancer

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Aim: Difficulty in laparoscopic surgery increases depending on the degree of obesity. Especially, in the transverse colon cancer surgery, not only lymph node dissection along with the vessels, but also the anastomosis reconstruction procedure is greatly affected by the degree of obesity. The aim of this study is to verify the relationship between the degree of obesity and the level of difficulty in the anastomosis reconstruction of laparoscopic transverse colon surgery.
Method: Thirteen patients who underwent laparoscopic partial colon resection for the transverse colon cancer in our department in the period of April 2006 to June 2013 were enrolled. The body mass index (BMI) and the visceral fat area (VFA) were calculated and assessed with the surgery-related factors, particularly with the reconstruction-related factors to see the effects on the surgery difficulty.
Results: The BMI had a tendency of correlation with the duration of operation time (correlation coefficient; r=0.542, p=0.055) and the length of the skin incision (r=0.558, p=0.047). Similarly, the VFA showed a trend of correlation with the operation time (r=0.538, p=0.071) and the skin incision length (r=0.75, p=0.005). There was no correlation with other surgery-related factors, such as the amount of blood loss, the extent of dissection mobilization area, the vascular ligation site, the skin incision site, the anastomosis methods, the amount of lymph node dissection, the postoperative complications, and the postoperative hospital stay. Six patients (46.2%) required the incision at the epigastrium instead of the umbilical region. Also, the hand-sawn end-to-end anastomosis, rather than the functional end-to-end stapling, was adopted in 9 patients (69.2%).
Conclusion: In laparoscopic surgery for transverse colon cancer, extension of the skin incision and prolongation of the surgery time was required in accordance with the degree of obesity. In order to perform secure anastomosis reconstruction, skin incision site of the abdominal wall, length of skin incision, and the selection of the anastomosis method is important in the laparoscopic transverse colon cancer resection.

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The Trend of Surgical Technique and Adjuvant Therapy in Colon Cancer, 2000–2012: Retrospective Study of Single Tertiary Referral Center in Korea

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Purpose: Colorectal cancer appears to have rapidly increased over the past two decades in some Asian countries, including Taiwan, Japan, and Republic of Korea. Therefore, it may be significant that we review the change of treatment paradigm for colorectal cancer and its improved treatment results.
Method: Patients with biopsy proven colon adenocarcinoma who underwent colon surgery between Jan 2000 and Dec 2012 were enrolled. The medical records of total 2606 patients were reviewed. The study period was divided into three intervals (P1: 2000–2004; P2: 2005–2008; P3: 2009–2012). Clinicopathological factors were examined included age, sex, BMI, ASA score, operation methods, surgical complication, tumor location, TNM stage, grading of tumor, lymphovascular invasion, tumor size, tumor gross morphology, preoperative CEA level, recurrence pattern, hospital stay, total treatment costs and adjuvant chemotherpapy regimens. We analyze survival according to periods and stage
Results: Tumor location was changed from right side to left side. The significant difference was shown in left side increasingly according to period (46.8%, 53.7%, 54.1%, p=0.018). According to period, operation method was changed from open to MIS. MIS became main operation in period 3 (24.0%, 43.6%, 74.3%, p<0.001). Stage ? increased (12.7%, 16.6%, 39.6%, p<0.001), but stage ? decreased according to period (38.7%, 34.7%, 16.8%, p<0.001). Hospital stay was shorter according to period (19.0[15.0; 23.0], 17.0[14.0; 22.0], 12.0[9.0; 16.0], p<0.001). Total cost of treatment increased from P1 to P3 ($6224.0[5336.0; 7831.0], $8448.0[7105.5; 10409.5], $8932.0 [7814.0; 10790.0], p<0.001). Treatment of oxaliplatin in stage ? was increased according to period (0.8%, 61.9%, 75.8%, p<0.001), but use of leucovorin in stage ? was decreased (78.4%, 18.5%, 0.7%, p<0.001). The surgical complication was less in P3 (2.4%, p=0.02). Recurrence rate in P3 is lower than others (24.4%, 23.9%, 16.6%, p<0.001). No significant difference was observed in disease free survival (78.8% vs 77.7% vs 85.0%, p=0.059) according to period. Otherwise, significant difference in overall survival (68.2% vs 78.9% vs 89.1%, p=0.036) was observed among the period. In addition, overall survival in P1 was poorer than the others in stage ? (56.0% vs 77.2% vs 77.1%, p=0.009).
Conclusion: Our study demonstrates the trend of colon cancer in Korea for over the past 10 years. Early diagnosis, development of surgical technique and newer agent led to improved survival in colon cancer in Korea.

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Laparoscopic Versus Open Sigmoidectomy for Elective Management of Diverticular Disease: Meta-analysis of Randomized Controlled Trials

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Introduction: The evidence from observational studies suggests improved postoperative outcomes associated with laparoscopic sigmoidectomy for diverticular disease. Our objective was to conduct the first meta-analysis of randomized controlled trials (RCT's) to compare the outcomes of laparoscopic and open sigmoidectomy in patients with diverticular disease.
Methods: In accordance with Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement standards, we conducted a systematic search of electronic information sources, including MEDLINE; EMBASE; CINAHL; CENTRAL; The World Health Organization International Clinical Trials Registry; ClinicalTrials.gov; ISRCTN Register, and bibliographic reference lists. We applied a combination of free text and controlled vocabulary search adapted to thesaurus headings, search operators and limits in each of the above databases. The overall morbidity, mortality, and postoperative complications were defined as the primary outcome parameters. Long-term complications and length of hospital stay were secondary outcomes. The combined overall effect sizes were calculated using fixed-effect or random-effects models.
Results: We identified 3 RCT's comparing outcomes of elective laparoscopic and open sigmoidectomy for diverticular disease. Our pooled analysis of 360 patients demonstrated that laparoscopic sigmoidectomy does not significantly reduce risk of overall morbidity (Odd ratio (OR):0.91, 95% CI 0.69–1.21, p=0.53), anastomotic leak (OR: 0.74, 95% CI 0.28–1.93, p=0.54), intra-abdominal abscess (OR: 0.71, 95% CI 0.16–3.15, p=0.65), wound infection (OR:0.86, 95% CI 0.52–1.43, p=0.57), and mortality (OR:0.24, 95% CI 0.03–2.07, p=0.19) when compared to open approach. Moreover, no significant differences existed in the long-term complications such as incisional hernia (OR:1.06, 95% CI 0.40–2.82, p=0.90) and bowel obstruction (OR:0.51, 95% CI 0.14–1.87, p=0.31) between both groups. Low between-study heterogeneity existed in all analysis. The available data did not allow appropriate analysis of length of hospital stay.
Conclusions: Unlike previous meta-analysis on observational studies, our analysis of RCTs did not find any improved short-term and long-term outcomes associated with laparoscopic sigmoidectomy compared to open approach in patients with diverticular disease. Undoubtedly, future high quality RCT's are required to provide stronger evidence as there is a limited number of high level studies with sufficient sample size.

P263

Transanal Total Mesorectal Excision for Rectal Cancer: Assessment with Indocyanine Green

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Objective: Fluorescence angiography (FA) with indocyanine green (ICG) has demonstrated to help in the evaluation of the microperfusion at gastrointestinal anastomoses. Transanal total mesorectal excisions (taTME) anastomosis have a higher leak risk and the change on surgical plans according to the FA results has decreased the rate of anastomotic leaks. We present our experience using perfusion assessment with the PINPOINT Endoscopic Fluorescence Imaging System ® on taTME for rectal cancer.
Methods and Procedures: From our prospectively-maintained database, we identified patients that have undergone ICG assessment from December 2015 to August 2016 (ICG group), and matched with a control group. Leak rate (including anastomotic leakage and perianastomotic collections), overall morbidity, and surgical technique were analyzed.
Results: Twenty patients undergoing taTME for rectal cancer assessed with ICG were identified and matched with 20 control patients (Tables 1 and 2), which were not significantly different except for operative time (p=0.028). FA changed surgical plans in 35% patients, with 75% of these changes occurring at the time of transection of the proximal margin, of which only one presented a dehiscence. Anastomotic leak rate on the ICG group was 5% vs 15% (3 cases) on the control group (p=0.08). Overall morbidity rates were 20 vs 35% (p=0.04).
Conclusions: ICG assessment contributed to decrease the leak rate and overall morbidity on taTME anastomoses, although a larger sample is needed to reach statistical significant values. Therefore, ICG should be considered as a routine assessment for high-risk anastomosis as it guides surgeons for the construction of succesful anastomosis

Table 1 Patients' characteristics

	ICG	Control
Age	68	74
Gender (male)	13	11
BMI	26	25
Distance from anal verge (cm)	8.9	7.2
Neoadjuvancy	5	7

Table 2 Surgical characteristics

	ICG	Control
Distance of anastomosis from anal verge (cm)	4.77	3.93
Splenic flexure mobilization	7	6
Mechanic anastomosis	16	12
Diverting ileostomy	16	14
Operative time (min)	153	128
Anastomotic complications	1	3
Overall morbidity	4	7

P264

Comparison of Hand-Assisted Laparoscopic Versus Laparoscopic Resection for Right Colon Cancers in Elderly Patients

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Background: In China, existing evidences have revealed an increasing proportion of patients aged 70 or over suffer from colorectal cancers. Little has been investigated on the comparison of hand-assisted laparoscopic surgery (HALS) and laparoscopic surgery (LS) in a specific population of elderly patients with right colon cancers.
Method: We retrospectively reviewed the patients aged 70 years or over who underwent right colon cancers in our institution between June, 2009 and December, 2014. Short- and long- terms outcomes including surgical endpoints, postoperative morbidity and mortality, overall survival (OS) and disease free survival (DFS) were compared between HALS and LS groups. All data was analyzed by SPSS 22.0.
Results: Finally, 45 consecutive patients (HALS=18, LS=27) with right colon cancers were included in the analysis. The baseline characteristics were comparable between groups. HALS experienced shorter operative time than LS (median: 135 min vs. 165 min, p<0.05). On the same time, there were no significant difference between groups with regard to estimated blood loss (median: 34.35 ml vs 33.33 ml, p>0.05), anus exhaust (median: 91.64 h vs 93.47 h, p>0.05), oxygen Inhalation (median: 34.80 h vs 35.37 h, p>0.05), gastric tube retaining time (median: 30.86 h vs 35.48 h, p>0.05), and postoperative hospital time (median: 7.00 days vs 8.43 days, p>0.05). However, more complications were observed in LS group (25.93%, 7/27) than HALS group (16.67%, 3/18). There were no postoperative mortalities in both HALS and LS groups. As for cancer-specific survival, patients with HALS acquired significant decreased 3-year OS than LS (83.3% vs 96.3%, p=0.001), with comparable 3-year DFS (77.8% vs 81.5%, p=0.061).
Conclusion: HALS is more effective than LS for treatment of right colon cancers in terms of surgical time and postoperative morbidity, however, cancer-specific survival in HALS is worse than LS.

P265

Reduced Port Laparoscopy in the Surgical Management of Severe Acute Ulcerative Colitis

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Purpose: Total abdominal colectomy (TAC) is the definitive treatment for patients with severe acute ulcerative colitis (saUC) and has historically been performed in an open (OS) fashion. Minimally invasive approaches (MIS) are standard for many colorectal procedures. Reduced port laparoscopic surgery (SILS+1) is a variation of traditional laparoscopy (LS) to reduce incisions, post-operative pain, and facilitate a faster recovery. The objective of this study is to determine if the SILS+1 approach in patients with saUC is comparable to OS and LS approaches.
Methods: Consecutive saUC patients undergoing emergency TAC by four surgeons at a single academic institution from 2007 to 2016 were included. LS was defined as standard multiport where the extraction site was either the ileostomy aperture or pfannenstiel. For SILS+1, an access system was placed in the ileostomy aperture with a 5 mm port in the LLQ. The extraction site was the ileostomy aperture. 61 patients met criteria (22 OS, 27 LS, 12 SILS+1). 58 patients subsequently underwent IPAA (37 OS, 8 LS, 13 SILS+1).
Results: There were no differences in patient age, sex, pre-operative labs/medications, duration/extent of disease, conversion to open surgery, or time to IPAA between groups. There were no differences in operative times (135.55 OS, 178.37 LS, 147.92 SILS+1), LOS (7.91 OS, 7.78 LS, 8.08 SILS+1), SBO, readmission or re-operation between groups. There was less EBL in SILS+1 compared to OS (356.25 OS, 54.44 SILS+1, p=0.034). There was a higher rate of intra-abdominal abscess in SILS+1 (0% OS, 7% LS, 25% SILS+1, p=0.039). However, one SILS+1 patient suffered iatrogenic colonic perforation during extraction leading to an unfavorably long LOS and infectious complications. Excluding this outlier, SILS+1 fared comparatively to OS and LS.
For IPAA, there was less EBL in SILS+1 compared to OS (250 OS, 68.5 SILS, p<.001) and no difference in operative time or post-operative complications. LOS after IPAA was longer for OS compared to LS and SILS+1. There was no difference in LOS between LS and SILS+1 (8.19 OS, 5.25 LS, 6 SILS, p=0.023).
Conclusions: Early outcomes with SILS+1 show that this technique can be performed safely in patients with saUC and may yield benefits over open surgery, including decreased EBL, shorter LOS, and increased likelihood of subsequently undergoing MIS IPAA surgery.

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Standardization for Single Incision Laparoscopic Appendectomy

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Background: Appendicitis is various pathophysiological conditions from catarrhalis to gangrenous and is also different therapeutic strategies among hospitals. Single incision laparoscopic appendectomy (SILS-A) is one of the therapeutic strategies for appendicitis.
Aim: To clarify the feasibility of SILS-A.
Patients and Method: Patients underwent laparoscopic appendectomy for appendicitis from January 2011 to October 2014. All patients were diagnosed by CT examination in our hospital. We analyzed the patients' characteristics and perioperative complications compared SILS-A with conventional laparoscopic appendectomy retrospectively.
Results: Fourteen patients underwent SILS-A and 210 underwent CLA. There was no significant statistical difference between two groups regarding patients' characteristics and perioperative complications but CLA cases tended to be performed more often than SILS-A cases in emergent cases (p=0.082). Most SILS-A was performed by expert laparoscopic surgeons.
Conclusion: SILS-A was feasible and it will be one of the therapeutic options for appendicitis, on the other hand, operators were limited. Further education is expected for younger surgeons.

P267

Polypoid Lesions in the Upper Gastrointestinal Endoscopy Who Has Colorectal Polyps Performed Simultaneously

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Background: Colorectal polyps (CRP) are the most common pathology seen in colon. It is observed 15–20% in adults. It was detected 0.01% -0.45% esophageal polyps, 2% 6% gastric polyps, 0,3−0,6's%. nonampul duodenal polyps in esophagogastroduodenoscopy (EGD) applied patients. Research in patients with CRP shows that they could be together with the other destive siystem polyps. This presentation features of EGD polypoid lesions, in the patients with CRP.
Method: In a colonoscopy and upper gastrointestinal endoscopy were performed between May 2011- December 2014 CRP and patients with detected CRP and EGD were analysed retrospectively.
Results: Eusophajenal duedunal polypoid lesions were observed at 11 patients who had CRP. 9 patients were male and 2 were female. Their average age was 59 (range 37–82 years). CRP was found most at left column (50%), at least at the cecum (7%).
55% of the CRP was sessile. 73% polyps diameters were beetwen 0–5 mm. 64% of the CRP were hyperplastic polyps and 36% were adenomatous. 100% of adenomatous polyps in the colon showed dysplasia.
In CRP patients, one patient had polyps in the esophagus, seven had polyps in stomach, three had polyps in duodenum.
Five of the lesions found in EGD were hyperplastic polyps, three of them were reagent polyps one of them was fundic gland polyp, adenomatous polypin one, squamous cell polyp in one, gastrointestinal stromal tumor in one and polypoid MALT lymphoma in one. Average polyp diameter was 7.2 mm. 85% polyps were sessile. 36% of patients had HP, 54.6% of patients had alkaline reflux gastritis ,27% of patients had atrophic gastritis and 73% of patients had chronic gastritis. Patients were followed by making a variety of treatments .
Conclusion: In EGD most frequently found polyps types were hyperplastic. Often it is accompanied with chronic gastritis alkaline reflux gastritis and HP infection. Large-scale prospective studies will help to reach more definitive conclusions on this issue.

P268

A Comparative Study on the Outcome of Surgical Procedure of Partial Fistulectomy with Ksharasutra Application and Exclusive Ksharasutra Application in High Anal Fistula: A Clinical Study

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This disease, high anal fistula, a common ano-rectal disorder which usually results as a sequel to some varieties of ano-rectal abscesses, is as old as mankind and a challenge to surgeons even today. Fistula-in-ano has been recognised as a distinct entity for thousands of years. In the fifth century B.C., Hippocrates advocated the laying open of fistulas, including complex fistulas. One would think that after 2,500 years the controversies in the management of fistula-in-ano would have been resolved. But this is not the case and much about the management of fistula-in-ano is still being debated. Available surgical procedures may not only result in incontinence but also recurrences. They cause discomfort and absence from work with the consequent economic strain. Keeping these problems in mind, Susturta, ancient Indian surgeon(800 B.C) has described the k?arasutra technique whereby a medicated alkaline thread, impregnated with the paste of Curcuma longa and latex of Euphorbia rerifolia, is employed along the fistula track which cuts itself and heals the wound naturally from inside. Even Ksharasutra application in these case no doubt is a successful contribution of Ayurveda but makes the patient keep off all his business for longer time with mild constant pain and discharge. Hence, there is always a scope for other easy alternative even with Ksharsutra to minimize the period of cutting the track with fast postoperative wound healing without any recurrence and sphincter fiber disturbance. Keeping this in view, a trial in this paper with a new methodology with partial fistulectomy with ksharasutra application and exclusive Ksharasutra application was performed in 20 patients of High anal fistulae in each group and has the benefits of short post-operative stay, fast wound healing and recovery with a statistical validation with the P value of <0–0001.

P269

A Single Surgeon Experience Transitioning to Robotic Right Colectomy with Intracorporeal Anastomosis

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Introduction: When performed laparoscopically, right colectomy is most commonly a hybrid procedure with hand-assistance and/or extracorporeal anastomosis (ECA) because of the technical complexity of laparoscopic anastomosis. Robotic-assisted right colectomy (RRC) may offer technical advantages over laparoscopic-assisted right colectomy enabling more surgeons to perform a completely minimally invasive procedure.
Methods and Procedures: We conducted a retrospective review of 49 consecutive RRCs performed by a single surgeon during a 17 month period. Data analysis was conducted using independent-samples t-test, linear regression, Fisher's exact test, and Spearman's rank test. Statistical significance was defined as a p-value$<$0.05
Results: Patients were an average age of 61.8$\pm$14.7 years, 28 (57%) were female, average body mass index (BMI) was 29.7$\pm$7.4 kg/m2, and 28 patients (57%) had undergone prior abdominal surgery. The most common indications for surgery were cancer (23 patients) and polyp (21 patients). Conversion to open surgery was required in 4 (8.2%) patients and postoperative complications occurred in 5 (10.2%) patients. There were no anastomotic leaks, mortalities or readmissions within 30 days. Comparing the first 20 cases (ECA) with the next 29 cases (ICA) showed no statistical differences for average operating room time (ORT) (139.1$\pm$28.0 min for ECA, 143.5$\pm$24.5 min for ICA), mean estimated blood loss (EBL) (70.8$\pm$120.1 ml for ECA, 47.6$\pm$46.7 ml for ICA), lymph nodes sampled (LNS) (15.1$\pm$5.4 for ECA, 18.5$\pm$6.4 for ICA), or hospital length of stay (3.7$\pm$1.5 days for ECA, 3.2$\pm$0.9 days for ICA). Comparing procedures performed for malignancy with those performed for non-oncologic indications demonstrated no statistically significant difference in ORT, EBL, post-operative complications or LOS. Earlier cases were significantly associated with conversion compared to later cases (p=0.01). Later case number correlated with a significant increase in LNS (p=0.02) and a trend toward longer ORT (p=0.08). Patients with higher BMI trended toward longer ORT, though this was not statistically significant. Patient characteristics such as BMI, age, comorbidities and prior abdominal surgeries were not significantly associated with LOS. Similarly, conversion, EBL, ORT and anastomosis technique were not associated with LOS. Post-operative complications were significantly associated with LOS and accounted for 16% of the variation in estimated LOS (R2=0.16, p=0.01).
Conclusions: During transition from ECA to ICA with RRC, we noted no significant change in ORT, EBL, LNS or LOS. The robotic platform enabled transition to a completely minimally invasive procedure.

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Short Term Outcomes of Laparoscopic Colorectal Surgery. Is It Really Safe for Elderly Patients?

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Background: As average lifespan has become longer, laparoscopic colorectal surgery (Lap-CS) has been also applied to elderly patients (Pts). Elderly Pts, however, often have comorbidity such as heart, pulmonary, and metabolic diseases. Indication of Lap-CS to elderly Pts is still controversial, because laparoscopic operation usually require long time and increased intraabdominal pressure, both of which might be related to postoperative morbidity. Aim of this study is to assess safety and validity of Lap-CS for elderly Pts.

Method: Medical records of 192 Pts who underwent Lap-CS since 2003 to 2016, were retrospectively reviewed. Pts were divided into two groups by age; group A (>80), and group B(<80), and we compared Pts preoperative general condition and peri-operative outcomes between two groups. Two-tailed Student's test and/or Pearson's chi-square test were used for statistical analysis.

Results: There were 29 and 163 Pts in Groups A and B, respectively. There were no significant differences in male/female ratio and body mass index between two groups. Number of Pts whose ASA physical status was >3, and/or performance status was >2, were greater in group A (ASA; 34.5 vs 18.4%, p=0.049, PS; 20.7 vs 4.9%, p=0.003). Serum albumin level was significantly lower in group A (4.04 vs 4.34 g/dl, p=0.001).The location of tumor was follows; cecum (17.2 vs 8.6%, p =0.15), ascending colon (20.7 vs 15.9%, p=0.528), transverse colon(10.3 vs 4.9%, p=0.246), descending colon (0 vs 3.7%, p=0.294), sigmoid colon (10.3 vs 20.2%, p=0.208), rectum (17.2 vs 38.0%, p=0.030).

The rate of patients who was advanced colorectal cancer did not differ (48.3 vs 51.5%, p=0.746). Intra-operative blood loss, operating time, and number of harvested lymph nodes did not differ between the two groups. As for postoperative complications such as postoperative ileus (3.4 vs 5.5%, p=0.643), intra-abdominal abscess (3.4 vs 1.2%, p=0.374), anastomotic leakage (0 vs 6.1%, p=0.17), significant difference was not observed between the two groups. Incidence of Clavien-Dindo classification>grade 3, and postoperative hospital stay did not differ. The mortality was 0% in both groups.

Conclusion: Short-term outcomes of Lap-CS in elderly Pts were not different from those in young Pts in site of poor preoperative general condition in elderly Pts. These results suggests that Lap-CS could be an alternative operation indicated for Pts with comorbidities.

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Laparoscopic Radical Left Hemicolectomy: A Bursa Omentalis Approach Makes Splenic Flexure Mobilization Easy

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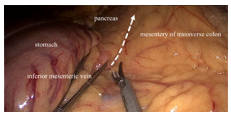
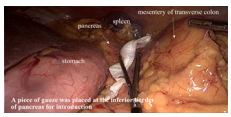
Objective: In several classic trials comparing laparoscopic versus open colectomy, splenic flexure cancer was excluded. On of the most important reasons was the technical difficulty of laparoscopic splenic flexure mobilization. Separating left Toldt's fascia was prior to entering the bursa omentalis in conventional laparoscopic left hemicoletomy. However, in this approach, identifying pancreas is very demanding, especially for fatty patients, and it is easy to enter the retro-pancreatic space for unexperienced surgeons. Herein, we introduce a bursa omentalis approach for laparoscopic radical left hemicoletomy to facilitate splenic flexure mobilization and explore its safety and feasibility.

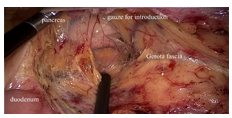
Methods: Firstly, the left part of gastrocolic ligament was dissected and the bursa omentalis was entered (Fig. 1). It was easy to identify the middle colic vessel and inferior mesenteric vein. The anterior lobe of the mesentery of transverse colon was dissected at the inferior border of pancreas from right to left (Fig. 2) and a piece of gauze was placed at the inferior border of pancreas for introduction (Fig. 3). Secondly, the left Toldt's fascia was dissected at the level of the sacral promontory (Fig. 4). The left Toldt's space was expanded cephalad and the pancreas was identified clearly with the introduction of the gauze (Fig. 5). Meanwhile, the inferior mesenteric artery and vein were ligated at root (Fig. 6&7). It was easy to combine the left Toldt's space and bursa omentalis. Thirdly, the lateral attachments of the descending colon were completely mobilized and an extracorporeal side-to-side anastomosis was performed with an umbilical incision.

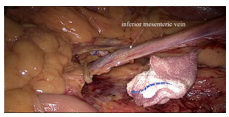
Results: 32 patients with splenic flexure cancer underwent laparoscopic radical left hemicoletomy using a bursa omentalis approach. No intra-operative complication was recorded. The mean operative time was 134.2±27.6 min containing a mean laparoscopic manipulation time of 65.7± 14.5 min. The mean estimated blood loss was 50.7±20.8 ml. The mean first time of flatus was 41.5 ±12.1 h and the time of fluid intake was 47.2±13.5 h. One patient developed a wound infection and was cured with percutaneous drainage and was discharged on 15 days after surgery. The mean hospital stay was 6.4±2.0 days.

Conclusions: Our initial results suggest this? apparoach for laparoscopic radical left hemicoletomy may be safe and feasible approach especially for unexperienced surgeons. The main advantages of present approach contain easy to identify pancreas when expanding the left Told's space and simple to mobilize the splenic flexure in laparoscopic condition.









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Clinical Impact of Intraoperative Navigation Using a Doppler Ultrasonographic Guided Vessel Tracking Technique for Laparoscopic Left Side Colectomy

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Objective: We have been reported the clinical usefulness of intraoperative Doppler ultrasonographic guided vessel tracking during open operation (Pancreaticoduodenectomy) to identify critical arteries and veins in order to reduce operative bleeding (Maemura et al, INt Surg 2014). In this time following preview this report, we anticipate trial evaluating intraoperative Doppler ultrasonography (Dop-US) on laparoscopic left side colectomy preliminary.
Surgical Procedure and Result: The patients were placed in the supine position. Five trocars were inserted in the abdomen as usual, maintaining pneumoperitoneum at 10 mmHg with carbon dioxide. A 10-mm flexible laparoscope was inserted from the umbilical port. We conducted ordinary operation above. When we stumble up the abnormal pattern of artery or vein before or during operation, bidirectional Dop-US blood flowmeter (ES-100V3; Hadeco, Kawasaki, Japan) were functioned trough trocar where side of dominant hand of the operator. This device is able to make sure the waveform of blood flow handy, easily and immediately. Moreover, we were able to realize each different vessel existence to evaluate the detail, for instance, wave shape, interval and velocity on this equipment. Actually, encountering the anomalous systemic drainage of ileocolic veins (called veins of Retzius) which wrap around superior mesenteric artery and flow into inferior vena cava, it was possible to detect and address first blanch of Sigmoid colon arter and some Rezius veinsy quickly. On the other hand, when we stumbled up superior mesenteric artery(IMA) from Abdominal Aneurism, enhanced CT found the complete obstruction of inside of IMA due to blood clot and calcification. Therefore, we intended to avoid to manipulate roots of IMA as much as possible after the conformation where the left colic artery (LCA) and superior rectal artery (SRA) are by Dop-US, after precise dissection, it was available to expose clip and cut down SRA right after branch off LCA safety.
Conclusion: Recently, Dop-US has been successfully used to obtain detailed blood flow images for various organs and organ systems such as the cardiovascular system, kidney, hepatobiliary-pancreatic system, and spleen. The imaging techniques used by surgeons to navigate these network of vessels and nerves are limited to preoperative imaging, which do not accommodate tissue displacement during the operation. Moreover, it is not available to touch pulsation directly on laparoscopic suregery. In case of preservation of LC, Intraoperative Dop-Navi method on laparoscopic left side colectomy allows surgeons to clearly identify the abnormality and to avoid injuries to major vessels.

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Virtual Reality Simulation in Flexible Endoscopy: Implications for Resident Training

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Background: Endoscopic training for general surgical residents has been traditionally accomplished using the apprenticeship model. Given the limitations and controversies of current endoscopy training, Flexible Endoscopic Curriculum (FEC) was adopted by the American Board of Surgery (ABS), and more specifically, Fundamentals of Endoscopic Surgery (FES) was introduced as an inclusive and validated training curriculum. The role of virtual reality simulation in flexible endoscopy has yet to be determined. The purpose of this study was to create a proficiency-based simulator curriculum and to evaluate residents' performance on the hands-on portion of the FES exam and clinical performance as measured by the Global Assessment of Gastrointestinal Endoscopic Skills (GAGES).
Methods: General Surgery residents in their post-graduate year (PGY) 1–4 were divided into two groups: Group 1 (PGY 1–2's) and Group 2 (PGY 3–4's). Clinical endoscopic abilities were measured by GAGES in both groups at baseline and after the FES exam. Residents on Group 1 participated in a formal simulator-based curriculum, and participants in both groups were then expected to complete the FES exam.
Results: Group 1 (10 residents) and Group 2 (7 residents) completed the baseline GAGES evaluation. Residents in Group 1 had a lower mean baseline upper endoscopy GAGES score (16.1 vs. 22.8, $p<0.01$) and lower endoscopy GAGES score (12.4 vs. 18.9, $p<0.01$). To date, two residents in Group 2 have completed the FES exam with mean cognitive score 461 and mean manual score 435.5 (passing 357 in both sections). Additional FES exams for participants in the study are being scheduled and have yet to be completed, and will be reported upon completion.
Conclusion: Baseline GAGES scores accurately reflect clinical experience. As we collect FES scores in Groups 1 and 2, we anticipate that endoscopic simulation will translate into improved clinical performance and in the manual skills portion of the FES exam.

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Coaching for Surgical Skill Development: Stressful But Effective

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Background: Coaching has been identified as an effective technique to improve the technical proficiency of surgeons in training and in practice. However, previous work has shown that high levels of feedback disrupt resource allocation and performance for novice learners. Our goal was to examine the effects of a problem-solving coaching style on trainee skill acquisition and physiologic stress. We also investigated the extent to which trainee sensitivity to feedback, also known as self-monitoring ability, impacts coaching effectiveness.
Methods: Third and fourth-year medical students (MS3/4 s) were invited to participate in this IRB-approved study. Students first completed a pre training demographics questionnaire, a 12-item self-monitoring ability scale (1=always false, 5=always true), and baseline FLS Task 5 with physiologic sensors. Students were then randomized into coaching or control conditions. Both groups watched a laparoscopic suturing instructional video and were provided 30 min to practice the task with or without a coach depending on condition. Coaches logged frequency of coaching behaviors according to a task-specific coaching script. Trainees then completed FLS Task 5 with physiologic sensors, a post training questionnaire with a condition manipulation check, and a 12-item coaching quality evaluation (1=poor, 5=very good).
Results: Twenty-four students (age 24.5 ± 1.4; 54% men; 58% MS4) participated in the study. All were fairly high self-monitors (3.8 ± 0.76). There were no differences in baseline suturing skills between the two groups. Improvement in the coaching group (N=12; 285.0 ± 79.9) was significantly higher than the control group (N=12; 200.9 ± 110.3). One measure of physiologic stress (root mean square of successive heartbeat interval difference; RMSSD) was significantly higher in the coaching group. Trainees who received greater frequency of coaching demonstrated larger improvements ($r=0.7$, $p<0.05$). Overall perceived quality of the coaching relationship was high (4.4 ± 0.6). There was no correlation between trainee self-monitoring ability and skill improvement.
Conclusions: These data support previous work demonstrating the effectiveness of coaching on trainee skill development. This work also suggests that the coaching relationship may increase experienced stress of trainees, but may not necessarily detract from skill improvement. Trainee disposition toward feedback did not play a role in this relationship.

P275

Mathematical Analysis for Hand Motion of Laparoscopic Surgeon and Its Implication for Training

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Background: Hand motions of laparoscopic surgeons may reflect their skills and levels of proficiency.
Aim: This study was performed to examine the differences between the hand motions of the expert and the novice surgeons. There might be possible implication for laparoscopic surgical training.
Methods: The Kyushu University Training Center for Minimally Invasive Surgery holds a 2-day standardized laparoscopic surgical training program The instructors (group E; n=19), the trainees at pre-training (group Pre; n=27) and the trainees at post-training (group Post; n=27) underwent a laparoscopic surgical skills assessment task with a magnetic tracking sensor. The hand motions of the 3 groups were compared with detrended fluctuation analysis (DFA),unstable periodic orbit analysis (UPO), and an optimized 3-layer artificial neural network (ANN) that have learned to differentiate between novice and expert surgeons.
Results: Trend α of group E was closer to 1/f, and that of group Pre was assessed as brown noise with DFA ($p<0.01$). Stability of group E was significantly higher than that of group Pre with UPO ($p<0.01$). Total scores calculated by ANN (E/Pre/Post; 76.5/60.8/69.7) had significant differences between the 3 groups ($p<0.01$).
Conclusions: The hand motions of the expert surgeons were more natural and stable compared with those of the novice surgeons. Significant difference of hand motion of laparoscopic surgeon and result of training could be evaluated by mathematical analysis.

P276

Endoscopic Avatars: Operator and Scope Motion Tracking and Analysis for Teaching Complex Endoscopic Maneuvers

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Introduction: The increasing development of interventional endoscopy raises the challenge to teach and learn complex endoscopic procedures. Today experts are facing the challenge of explaining precisely an elaborate choreography of movements, while novices are confronted with a broad range of hand, wrist and shoulder movements each resulting in different scope. The teaching strategy of endoscopy could benefit from a dedicated motion library that deciphers the operator's motion and the consequent endoscope response. A simplified endoscopic language made of individual motions/words could greatly shorten the learning curve. This study aims at exploring operator and endoscope motion tracking to identify and represent key movements in flexible endoscopy.
Methods and Procedures: Six experts and three novice endoscopists performed standard EGD on a living porcine model. Participants were asked to repeat the procedure 3 times body mouvements and posture were recorded using 17 wireless motion trackers (Xsens MVN Awinda, Enschede, NL.) placed at cardinal points and axes of movements (wrists, arms, legs, torso). Endoscope motion was recorded using a magnetic tracking catheter consisting of 8 magnetic probes, placed, in the working channel of the endoscope (Aurora, NDI, Waterloo, Canada). Both the endoscopic image and an external video of the operator were recorded for motion analysis.
Results: Motions of both operator and endoscope could be synchronized and represented in videos for all participants (Fig. 1). Experts completed the assignment in an average 78±42 s, whereas novices in an average 235±60 s. Although the final endoscope configuration at duodenal intubation was similar for all participants (Fig. 2), the route to reach this end-point was different between experts and novices, both in endoscope trajectory and body motions. Experts steered the endoscope along a smooth path, with on average 3±2 attempts required to intubate the duodenum, while novices needed on average 6±2 attempts for successful intubation, with a a chaotic trajectory. Novices required bimanual actuation to steer the endoscope wheels and kept a more still posture, while experts used the right hand on the scope shaft and liberally used upper body motions and the left arm to rotate the endoscope.
Conclusions: Motion tracking of the endoscopist and endoscope gave can provide new insights in the way we understand, teach and learn flexible endoscopy and could be as a promising educational support to shorten the learning curve.
Figure 1

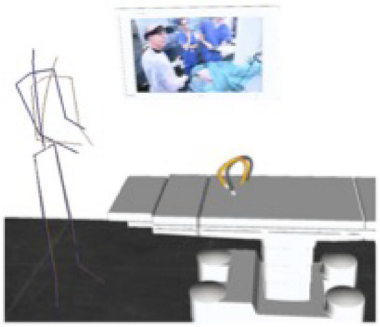
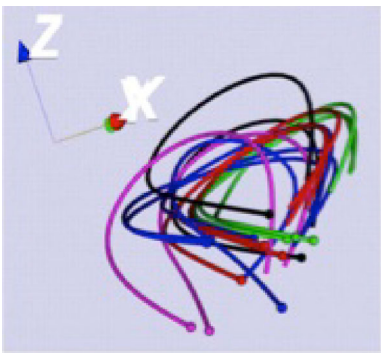


Figure 2



P278

'Make Your Own Laparoscopic Simulator': Results from a Competition Held for Surgical Residents in a Limited Resources Country

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Objective: To share the various designs of laparoscopic simulators designed by surgical residents at a local conference in a lower middle income country.
Methodology: A competition was held at a surgical conference to allow for residents to come up with ideas to design their own simulators. Various factors were looked into assessing the various designs. These included uniqueness, looks, effectiveness, cost and reproducibility.
Results: 4 types of simulators were designed. The first one was a mannequin with a camera fitted inside and 4 ergonomically placed holes to function as ports. This was the most liked and effective simulator. Cost was 100$ and it needed a TV or a monitor to function. Second was a foldable book type of simulator which used the camera and screen of a tablet or a phone to function. It was the simplest and cheapest design but needed a camera phone or tablet to work. Cost 30$. Third was a simple plastic box with a webcam design. Its cost was 40$ and needed a laptop or a computer to function. The fourth one was designed like a periscope and used angled mirrors for reflectors. No electrical equipment was used in this. It was the cheapest simulator in terms of running cost as no cameras or phones were required. Cost 80$.
Conclusion: Various options exist for surgical residents in developing countries to design and use their own simulators. A few have been discussed and all of these can be easily reproduced.

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Video-Based Coaching for Endoscopy: Use of a Secure Mobile Phone Application for Procedural Video Analysis

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Introduction: We investigate the use of a mobile phone application as a platform for video-based coaching for endoscopic procedures. The educational landscape is ripe with opportunity to employ technology to facilitate continuing professional development and disseminate new techniques and ideas. Long utilized in the world of sports, coaching is a relatively new concept in surgical literature. A coach acts as a third party observer, offering a unique perspective, which, when coupled with meaningful, targeted feedback, has the potential to facilitate skill acquisition. Although previously described for both open and laparoscopic operations, to our knowledge, our study is the first to assess video-based coaching for gastrointestinal endoscopy. Our protocol and preliminary results follow.
Methods and Procedures: Our protocol employs the Modica mobile phone application to collect video of endoscopic procedures. Video and audio of the endoscopist performing the procedure, as well as the video from the endoscope, is captured. The video is then accessed from Modica's cloud service by a group of remote peer-surgeons for review. Feedback is collected from the coaches and structured according to the previously validated scale, Global Assessment of Gastrointestinal Endoscopic Skills (GAGES). Both the endoscopists and the peer-coaches complete a questionnaire following the coaching session, assessing the platform and process of coaching through the use of video.
Results: Preliminary results suggest that the application requires minimal additional time for endoscopists to use while performing their procedure. The application is self-explanatory and minimal teaching is required. Acquisition of the videos by the coaches is facilitated through the online cloud transfer function. Videos are of high quality and provide sufficient information to the coach to provide feedback to the endoscopist.
Conclusions: The use of a secure mobile phone application with cloud storage provides an ideal platform for video-based coaching. It is easy to use and minimizes time and effort required of the endoscopist, as well as the coach, all while providing an adequate means to provide assessment. It is HIPAA-compliant and does not use hospital network resources, which allows for easy adoption. Most importantly, it allows for longitudinal assessments of practicing endoscopists, and has the potential to be used as an adjunct for continuous professional development and accreditation programs for endoscopy. Further study is required to assess the use of coaching programs, and their ability to effect positive change on endoscopists.

P280

Simulation to Aquire Experience in a Low Volume of Hepatic Laparoscopic Surgerys Centres

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Introduction: Simulation could give the necessary training to complete long and complex curves of knowledge in laparoscopic hepatic surgery in centres with low to medium volume.
Objectives: Present a training programme of advanced laparoscopic hepatic surgery and evaluate how obtained skills are shown in operation rooms.
Materials and Methods: Fase-1: Two experts surgeons trained in a live sheep model, carrying twelve left hepatectomy totally laparoscopic (LHTL). All the procedures were filmed and blindly analysed by two experts using validated global and specific scales. Other variables recorded were operatory time, mortality, vascular control, hematic loss and quality of parenchymal transaction.
Fase-2: Fase-1 experts trained four digestive surgery residents during training sessions until they performed LHTL with optimal parameters.
Fase-3: Once completed the simulation trained residents carried out a LHTL in one patient. For the analysis of results analytic statistics was used for nonparametric variables; Wilcoxon and McNemar test.
Results: Based on global scales scores, learning curves were obtained during each session of Fase-1 and Fase-2. Scores in global scales significantly improved between first and last surgery for both experts and residents ($p<0.01$). There were non significant differences between overall scores obtained by experts and residents at the end of training. Residents required an average of six sessions to acquire the skills (range of four to eight). During Fase-3 residents performed LHTL in patients without incidents.
Conclusions: Training in a sheep model allows the acquisition of skills to perform laparoscopic liver surgery both in experts and digestive surgery residents. The technical skills obtained are transferred to the operation room.

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Advanced Laparoscopic Yet Institutionally Low Volume Operations: Implementing a Longitudinal Curriculum to Address the Current Training Gap

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Mandated changes in traditional surgical training have resulted in less resident operative exposure and acquisition of technical skill, estimated at a year's worth of clinical experience. Recent literature suggests that a significant portion of incoming fellows may be inadequately prepared to perform basic laparoscopic operations independently. The role of surgical simulation in comprehensive curriculums, particularly in complex, yet institutionally low volume cases, remains to be defined.
We identified hiatal hernia repair with Nissen fundoplication as an advanced laparoscopic, yet institutionally low volume procedure. A comprehensive, longitudinal curriculum was created, consisting of three components. The first is a web based cognitive component with pertinent atlases and videos. The second is an inanimate model, constructed in our simulation center, which houses a replica operating room suite, complete with fully functional laparoscopic equipment. The model was validated after critique and adjustment by five, advanced laparoscopic surgeons. Residents underwent individualized instruction on this inanimate model. The third component consists of laparoscopic repair in a cadaver model. Eight PGY-4 residents participated. Evaluation of all phases of the curriculum was achieved by completing pre and post surveys and self and attending evaluations using the GOALS criteria.
Six out of eight residents completed the cognitive course. All residents (n=8) completed the inanimate model proctoring session. While seven residents attended the cadaveric course, only four performed the entire procedure while three performed portions. This was due to time and cadaver availability. Overall, both the inanimate and cadaveric components of the curriculum increased resident comfort level with the required laparoscopic skills needed to complete the operation. In the inanimate model, a 0.76 increase was seen on average with each question, between the pre and post surveys (1–5 Likert Scale of comfort level with one being the least comfortable and 5 being the most). A 0.83 increase was seen for those completing the cadaver course. An increase in skill level was also seen going from the inanimate lab to the cadaver lab, on both self and attending evaluations. Surgical training is on the verge of a paradigm shift. We feel a comprehensive curriculum to address advanced, yet institutionally low volume cases is necessary to better prepare residents for both practice and fellowship. Specifically, a tactile model, followed by cadaveric course affords residents a more realistic opportunity to gain operative exposure, technique and skill. This study demonstrates the successful implementation and feasibility of such a curriculum.

P282

Operative Time and Mortality Rate as Outcome Measures for Assessment of Residents' Operative Performance in Live Porcine Model

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Introduction: Simulation-based training has become an integral part of most residency training programs in the US. The objective of this study was to assess whether operative time and pigs' mortality rate can be used as outcome measures of residents' operative performance during a structured laparoscopic training course in the animal lab.
Methods: Since 2009, the Arizona Center for Endoscopic Surgery (ACES) Residency Training Program implemented a 2-day intensive laparoscopic training program to help general surgery residents develop operative skill in basic and advanced laparoscopic procedures. In 2014, we implemented a structured curriculum consisting of didactic lectures, skill simulations, and laparoscopic surgery training in a live porcine model. This included instruction and assessment of residents' operative performance by faculty instructors using standardized, validated assessment tools. Both Junior (PGY1-2) and Senior residents (PGY3-5) participated. All residents performed the same procedures on two consecutive days on live pigs. Junior residents performed laparoscopic cholecystectomy and incisional hernia repair, and senior residents performed Nissen fundoplication, splenectomy, and low anterior resection. To assess the impact of the new structured curriculum, we compared the operative time and mortality rate between the first (December 2014 until June 2015) and second year of the program (August 2015 until May 2016). Fischer extract test was used and statistical significance was considered at $p<0.05$.
Results: A total of 80 residents (40 Junior residents and 40 Senior residents) were included. The operative time significantly decreased from day 1 to day 2 after implementation of the structured program (Table 1). Moreover, the pigs' mortality rate significantly decreased in the second half of the course (Table 2).

Table 1

	Operative time (mins)
Day 1	361
Day 2	325

Table 2

	Dec 2014- June 2015	Aug 2015 -May 2016	P value
Mortality N(%)	15(37.5)	4(10)	0.008
No Mortality N(%)	25(62.5)	36(90)	0.008

Conclusions: In this study, we demonstrated that operative time and mortality rate in a porcine model can be used as outcome indictors to assess residents' operative performance in a simulated environment, especially due to its similarities to human subjects. In spite of its costs and other logistical issues, this study shows the value of using live porcine models for resident training, as a preparatory adjunct to hands-on operative experience

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Robotic Skills May be Derived from Skills Attained in a Laparoscopic Simulator

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Introduction: General Surgery is currently the fastest growing specialty with regards to robotic surgical system utilization. Contrary to the recent experience in laparoscopy, simulator training for robotic surgery is not widely employed partly because robotic surgical simulators are expensive. We sought to determine if robotic surgical skills could be derived from those psychomotor skills attained in a validated laparoscopic simulation curriculum (Fundamentals of Laparoscopic Surgery, or FLS).
Methods and Procedures: 27 trainees with no prior robotic experience and limited exposure to laparoscopy were recruited to participate in this study. After IRB approval, they were randomly assigned to one of 3 training groups: no simulator training, training on FLS in a standard FLS video trainer, and training on a robotic computer-based simulator (da Vinci trainer). After randomization and before training, baseline robotic surgical skills were assessed in the clinical robot (not the virtual reality simulator) on 2 tasks – robotic intracorporeal suturing/knot tying and robotic peg transfer. Performance was objectively assessed using a previously validated model. Objective performance scores were calculated as follows: peg transfer score=300 - (time to transfer all 6 pegs) - (penalty for % of pegs unable to be transferred); knot score=300 - (time to tie knot) - (penalty for a loose or a slip knot). Following baseline assessment, subjects underwent four 1-hour long training sessions in their assigned training environment over a course of several weeks. Robotic surgical skills were reassessed on the clinical robot on the same 2 tasks used to assess skill prior to training.
Results: A one-way analysis of covariance (ANCOVA) on post-test scores using trainees' baseline scores as the covariate, indicated a significant difference for the type of training on both knot tying ($p=0.014$) and peg transfer ($p=0.021$) scores. FLS training resulted in a greater score improvement than no training for both knot and peg scores. FLS training was also determined to result in greater score improvement than robotic simulator training for knot tying (Table 1).

	Pre-Training	Post-Training
Intracorporeal Knot Tying	Mean ± S.D.	Mean ± S.D.
FLS Training (n=9)	91.41 ± 70.62	173.59 ± 56.70
No Training(n=8)	85.58 ± 81.97	124.88 ± 69.87*
da Vinci Training (n=10)	97.07 ± 77.73	137.57 ± 78.31*
Peg Transfer		
FLS Training (n=9)	179.63 ± 32.63	223.30 ± 17.11
No Training (n=8)	188.04 ± 33.85	212.96 ± 25.44*
da Vinci Training (n=10)	189.07 ± 33.75	219.53 ± 18.67

Table 1: Mean difference of scores from pre to post-training

* p<0.0 5 vs FLS Training

Conclusions: Robotic surgical skills can be in part derived from psychomotor skills developed in a laparoscopic trainer, especially for complex skills such as intracorporeal knot tying. Acquisition of robotic surgical skills may be enhanced by practice on a laparoscopic simulator using the FLS curriculum. This may be especially helpful in situations where a robotic simulator is not available or poorly accessible.

P284

Advancing Resident Spatial Reasoning Strategies: Integration of Video Technology, Feedback Tools, and Learner Individualization

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Introduction: Laparoscopic surgery poses unique challenges when it comes to resident education. Skills needed for learning laparoscopy are different than for open procedures, thus tools for training residents must be different. Video recording of an individual's performance is not a new concept. Analysis of a recorded activity can be used to instruct the learner in an environment that is focused and low intensity. We implemented a training strategy that is designed to build spatial reasoning by integrating: a review of recorded operations, a feedback questionnaire, as well as one-on-one instruction.
Methods: Our study was completed with categorical surgery residents (PGY2 through PGY5) who were recorded performing a laparoscopic cholecystectomy. The residents were given a questionnaire before each performance. The personalized video and the pre-operative questionnaire was reviewed after the procedure by the resident and the instructor. The resident was instructed to re-watch the video performance as much as possible before the next cholecystectomy. The attendings were surveyed on the residents' improvement over time. These residents were followed for up to 4 years.
Results: Eighty-two general surgical residents participated: 50 males and 32 females, left-handed 19.5%, right-handed 78%, ambidextrous 2.4%. The indication for lap cholecystectomy was varied: acute cholecystitis 19.5% (16/82), with cholelithiasis 37.8% (31/82), cholelithiasis or biliary colic alone 13.4% (11/82), gallstone pancreatitis 24.4% (20/82), gallbladder polyp/mass 4.9% (4/82). The average number of times the resident watched the video between cases was 3 times. PGY2 residents reviewed their videos more often than PGY5s. Overall, the PGY2 and PGY3 residents found this exercise to be the most beneficial; a feeling of improvement peaked at the fourth year of training. We noticed the largest decrease in time for the procedure was between the third and fourth years of training. Predictably the knowledge of anatomy improved with each PGY year.
Conclusions: While this is a limited study in terms of statistical analysis, the principles are sound for building a protocol for the improvement of resident education. Instructing someone in laparoscopy can be difficult. We believe that our three-step approach can be an adjunct to laparoscopic simulations. By integrating video recordings, resident self-awareness questionnaires, and attending feedback; we can improve the residents' knowledge of the 2D representation of actual patient anatomy. The utilization of individualized video recording allows the resident the opportunity for visual repetition and the development of meaningful spatial vocabulary that is so necessary when learning laparoscopy.

P285

Adding Fragility to the FLS Tasks Improves the Accuracy of Assessing Laparoscopic Skills

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Introduction: The Fundamentals of Laparoscopic Surgery (FLS) program has successfully been used to teach and assess basic skills required to perform laparoscopic surgery. The more popular the FLS became, the score difference between surgeons and surgical trainees has been less significant. The purpose of this pilot study was to evaluate the impact of adding fragility to the FLS tasks' models on the accuracy of assessing laparoscopic skills.
Methods: Minimally invasive surgeons (MIS) and general surgeons/surgical trainees (GS) completed modified FLS tasks; the peg transfer (PEG) task and the intracorporeal suturing (ICS) task, in addition to the original two tasks. The agar-based pegs were used for the modified PEG task and Kimwipes wipers (non-woven papers) were used instead of penrose drains for the ICS task. For the original tasks, scores were calculated based on the standard FLS scoring system (time and accuracy). In addition to the accuracy component of the standard scoring system, the degree of damages to the modified tasks was scored. Scores were compared between the MIS group and GS group using Wilcoxon signed-rank test. The correlation between modified task scores and original task scores was estimated using Spearman's correlation coefficient. Data are expressed as median score and interquartile range.
Results: A total of 11 subjects (5 MIS, 6 GS) completed the tasks (mean age 36; 82% male). The MIS and GS groups scored 250[213; 257] vs. 232[214; 239] ($p=0.41$) on the original PEG task and 515[440; 537] vs. 449[400; 480] ($p=0.17$) on the original ICS task. The time scores and accuracy scores on the original tasks had no significant difference between the groups. Compared to the GS group, the MIS group had significantly greater scores on modified tasks (PEG 103[40; 144] vs. 0[0; 8], $p=0.01$ and ICS 494[446; 526] vs. 430[383; 452], $p=0.04$). The differences in performances were due to better scores for the MIS group on the time and accuracy scores of the PEG task (time $p=0.01$, accuracy $p=0.04$) and the accuracy scores of the ICS task ($p=0.03$). While modified ICS task scores correlated strongly with original task scores ($r=0.93$, $p<0.001$), there was no significant correlation between scores on the PEG task.
Conclusions: The preliminary data shows that adding another component to the FLS scoring system can improve the accuracy of assessing laparoscopic skills. Increasing the fragility of the models could take the FLS manual skills assessment to the next level.

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Validation of Ergonomic Instructions in Da Vinci Simulator Training

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Introduction: Robot-assisted surgery continues to be a rapidly advancing field. One aspect is underappreciated in research; ergonomic training of the robotic surgeon. Therefore, the aim of this study was to assess whether a brief explanation regarding ergonomics can improve the current practice.
Methods and Procedures: A comparative study was performed with 26 surgical interns and residents using the da Vinci skills simulator (Intuitive Surgical, Sunnyvale, CA). The intervention group received a 1-minute instruction on ergonomic settings and coaching on clutch usage, while the control group received standard instructions for usage of the system. Participants performed two sets of five exercises. Analysis was performed on ergonomic score (RULA), performance scores provided by the simulator, mental and physical load scores (NASA-TLX and LED score).
Results: The intervention group performed better in the clutch-oriented exercises, displaying less unnecessary movement and smaller deviation from the neutral position of the hands. The intervention group also scored significantly better on the RULA ergonomic score in both exercises. No differences in overall performance scores and subjective scores were detected.
Conclusions: The benefits of a basic instruction on ergonomics for novices are clear in this study. A single session of coaching and instruction leads to better ergonomic scores. The control group showed often inadequate ergonomic score. A difference in subjective scores and overall performance scores was not detected, most likely due to the relatively short exposure.

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Surgical Chief Resident Competency in Laparoscopic and Robotic Surgery: Are We Ready?

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Introduction: The objective of this study was to evaluate general surgery resident competency at our institution through a relatively common surgical procedure (laparoscopic cholecystectomy). The objective was also to demonstrate the effectiveness of our institution's minimally invasive training program, including both laparoscopic and robotic procedures.
Methods: We performed a chart review of all laparoscopic and robotic cholecystectomies from January 1, 2014 – December 31, 2015 performed at Princeton Baptist Medical Center. Over 160 cases were performed by attending physicians and chief surgery residents (PGY5). Statistical significance was determined by Student's t-test.
Results: We analyzed operative time between attending physicians and chief residents in laparoscopic as well as robotic cholecystectomy. We found no significant difference in operative between attending physicians vs. PGY5 residents in laparoscopic or robotic cholecystectomy times (see Table).
Table

	Laparoscopic Time (min)	Robotic Time(min)	P value
Attending	76.44	53.97	0.0119
PGY-5	72.65	56.87	0.0002
P value	.05322	0.3927	

Conclusion: ACGME case requirements for surgical training include basic and advanced laparoscopic cases. Competence in operative technique is often subjective, with little objective data. No statistically significant difference exists at our program between chief resident and attending surgeon operative time on a common minimally invasive operation, in both laparoscopic and robotic approaches. Training in robotic surgery during surgical residency is important in preparing today's trainee general surgeon. Establishing a standardized curriculum for robotic surgery during residency is an effective tool for developing this new skill. Robotic assistance increased overall operative time by an average of 21.5 and 15.8 min for attending surgeons and chief residents, respectively. Our mean operative times match or are superior to published mean operative times. Competence in performing basic laparoscopic operations can be assessed by recording and tracking operative times. Our robotic curriculum is effective in training residents to competently perform a common general surgery operation by the PGY-5 year.

P288

Validation of Newly Developed Physical Laparoscopy Simulator in Laparoscopic Inguinal Hernia Repair

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Background: A realistic simulator for laparoscopic inguinal hernia repair (LIHR) would enhance surgeons' training experience before they enter the operating theater. The purpose of this study was to create a novel physical simulator for LIHR and obtain surgeons' opinions regarding its efficacy.
Methods: Our novel LIHR simulator consists of a physical laparoscopy simulator and a handmade organ replica model. The physical laparoscopy simulator was created by three-dimensional (3D) printing technology, and it represents the trunk of the human body and the bendability of the abdominal wall under pneumoperitoneal pressure. The organ replica model was manually created by assembling materials. The LIHR simulator allows for the performance of all procedures required in LIHR. Fifteen general surgeons performed LIHR using our simulator. Their opinions were scored on a 5-point Likert scale.
Results: All participants strongly agreed that the 3D-printed physical simulator and organ replica model were highly useful for LIHR training (median, 5 points) and LIHR education (median, 5 points). They felt that the simulator would be effective for LIHR training before entering the operating theater. All surgeons considered that this simulator should be introduced in the residency curriculum.
Conclusions: We successfully created a physical simulator for LIHR training using 3D printing technology and a handmade organ replica model created with inexpensive, readily accessible materials. Preoperative LIHR training using this simulator and organ replica model may be of benefit in the training of all surgeons. All general surgeons involved in the present study felt that this simulator and organ replica model should be used in their residency curriculum.

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Can the Endoscopy Training System (ETS) be Used as a Screening Tool to Predict Who Will Pass the Fundamentals of Endoscopic Surgery (FES) Examination?

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Introduction: There is an increasing amount of work suggesting that existing flexible endoscopy training curricula in surgical residency may be insufficient to ensure uniform pass rates on the Fundamentals of Endoscopic Surgery (FES) examination. The goal of our study is to examine the extent to which task performance on a newly developed Endoscopy Training System (ETS) would predict FES exam scores.
Methods: Fellows attending the 2016 SAGES Flexible Endoscopy Course were invited to complete the FES skills examination, one repetition of three tasks on the ETS (ETS1, scope manipulation; ETS2, targeting; and ETS3, retroflexion), and a questionnaire collecting information on demographics and endoscopic experience. Participants provided an anonymous unique identification number to ensure de-identified data aggregation. Basic descriptives, correlations, and regression analyses were conducted with SPSS version 23.0.
Results: Fifty-eight fellows (age 33.89±3.21; 69% men) completed the ETS stations. The frequency of achieving proficiency levels on the simulation tasks during the first repetition was 23.5% (ETS1), 26.7% (ETS2), and 40% (ETS3). Twenty-eight fellows also took the FES skills examination with an overall pass rate of 60%. ETS1 performance significantly correlated with FES scope manipulation performance ($r=.55$, $p<0.001$), and those who met proficiency on ETS1 were more likely to pass the FES exam compared to those who did not meet proficiency (100% vs. 56.3%, $p<0.05$). Performance on ETS2 correlated with ETS1 ($r=0.36$, $p<0.05$), but neither ETS2 nor ETS3 significantly correlated with their respective FES tasks. When all variables were included in a regression equation with upper and lower endoscopic case experience, ETS1 remained a significant predictor of overall FES exam scores ($b=6.17$, $t(5, 20)=4.051$, $p<0.05$), above and beyond clinical endoscopic experience.
Conclusions: These data indicate that there is value in using the scope manipulation task on the ETS to predict performance on the FES examination. In this setting, however, we did not find similar results for the tool targeting and retroflexion tasks. Future work should continue to explore how and when these tools can be used to complement efforts for ensuring uniform competency in flexible gastrointestinal endoscopy.

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A Flexible Endoscopic Trainer Based on Adaptation of the FLS Box is Able to Predict Novice and Expert Performance on Therapeutic Flexible Endoscopy Tasks

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Background: As the Fundamentals of Endoscopic Surgery (FES) system was primarily designed for high stakes evaluation purposes, there is an urgent need for an affordable, easily accessible tool for trainee practice of therapeutic endoscopic skills. We previously reported on the adaptation of the Fundamentals of Laparoscopic Surgery (FLS) trainer box to the practice of six basic therapeutic endoscopic skills. This low-cost trainer could potentially serve as an easily accessible practice and evaluation tool for flexible endoscopy. In gathering evidence to validate this endoscopic trainer box, performance was compared between experts and novices.
Methods: Participants (n=58) included general surgery and gastroenterology staff, fellows, and residents. Experts were identified as those who had performed>200 diagnostic procedures and/or perform>30% of endoscopic procedures for therapeutic purposes. Novices included those who did not meet either of these criteria. Participants were evaluated on six tasks designed for the adapted endoscopic trainer box: (1) forward view peg transfer, (2) retroflexion view peg transfer, (3) puncturing, (4) snaring, (5) clipping, and (6) cannulation. A maximum of 5 min was given to complete each task. Task completion time was compared between experts and novices using Mann-Whitney tests ($p<0.05$).
Results: Overall, experts required significantly less time to complete each of the tasks on the endoscopic trainer box when compared to novices (Table 1).

Table 1. Task completion times by novices and experts on an endoscopic trainer box.

	Task Completion Time (seconds)		P-Value
	Novices	Experts	
Forward View Peg Transfer	267.5 ± 51.4	161.1 ± 61.8	<0.001*
Retroflexion View Peg Transfer	291.9 ± 29.0	173.4 ± 59.9	<0.001*
Puncturing	225.1 ± 72.5	119.3 ± 54.2	<0.001*
Snaring	259.1 ± 57.2	139.1 ± 71.1	<0.001*
Clipping	199.7 ± 66.4	123.1 ± 56.0	<0.001*
Cannulation	130.0 ± 88.1	62.8 ± 76.9	<0.001*

Average ± Standard Deviation, *statistically significant (p<0.05)

Conclusions: The adaptation of the FLS trainer box for flexible endoscopic tasks was demonstrated to be useful in differentiating novices and experts. This study further contributes to the validation of this trainer as a cost efficient practice and evaluation tool for flexible endoscopy skills. Inclusion of a scoring system that incorporates errors/penalties for the tasks may further differentiate expert and novice performance on the trainer box.

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Facebook as a Platform for Coactive Vicarious Learning; Robotic Surgery Collaboration (RSC) Experience

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Introduction: Substantial research has noted that coactive vicarious learning – learning through in-depth discursive interaction with another person, rather than through one-way dissemination of their experiences – is particularly important for sharing complex knowledge and skills. International Hernia Collaboration, a Facebook group was a proof of concept demonstrating that Facebook groups could be used for professional global collaboration paving the way for creation of RSC. Surgeons have long engaged in face-to-face conversations with colleagues to learn, but as the field continues to grow and disperse, opportunities for these interactions may become restricted.
Methods: We analyzed a professional, closed Facebook "group" focused on robotic surgery "Robotic Surgery Collaboration" from its inception in January 2015 through August 2016. The group was established to provide a platform to help surgeons perform safe surgery, improve technique, and ultimately improve patient's outcomes. Data were gathered using the Grytics program and ANOVAs were performed to compare the average number of posts created on different days of the week and the number of written "comments" (an active reaction) and "likes" (a passive acknowledgement) in response to posts of different types (i.e., links to outside content, text "statuses", photos, and videos).
Results: Analysis of the first 602 days (Jan.8, 2015–Aug.31, 2016) of the group resulted in 1278 posts with an average 11.6 comments and 9.3 "likes" each. The average posts/day grew significantly over time from 0.1 to 3.9. Controlling for these monthly differences, we found average daily posts varied significantly by day-of-week ($p<.001$), with most posts on Wednesdays (avg=2.9) and fewest on Sundays (avg=1.2). There were also significant differences in the number of comments (i.e., active engagement; $p<.001$) and "likes" (i.e., passive acknowledgement; $p<.001$) by the type of post. Text statuses garnered the most comments (avg=11.5), followed by photo and video posts (avg=9.3 & 9.6, respectively), and links (avg=4.0). In contrast, photo posts generated the most "likes" (avg=16.2, $p<.001$), followed by videos and links (avg=8.6 & 6.2, respectively) and text statuses (avg=2.6).
Conclusion: Robotic Surgery Collaboration group provided a platform for surgeons to engage and learn vicariously from others' experiences. Posts were incorporated into working hours with text "statuses" generating active engagement and discussion, while photos were associated mostly with passive reactions and less discourse. Creating a professional Facebook group that individuals recognize as the gathering place for sharing ideas and experiences lays the foundation to encourage vicarious learning and could lead to a paradigm shift in education.

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Effects of Regular Review of Performance Videos, with Simultaneously Recorded Oral Feedback, Versus Regular Practise on Laparoscopic Suturing Skills in Novices: A Randomised Control Trial

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Aims: With current time pressures on laparoscopic training, it is vital that new educational strategies be employed to optimally utilize the period available for skill acquisition. Review of task performance videos (with a tutor's voiced-over oral feedback) aids the short-term laparoscopic training of experienced learners. We examined the long-term effects of using this strategy, versus regular practice, on laparoscopic suturing skills in novices.
Methods: After 4 practice sessions, 14 novices (7 per group) were randomized post recording of task video (to eliminate bias) to engage in either twice-weekly regular practice (group A) or review of their fourth trial video [with voiced-over oral feedback] (group B). Only subjects in group B received their task videos. Remote monitoring of sessions was via YouTube™ analytics.
Results: Averages over 4 trials, of performance time and errors, were obtained after 4 to 6 weeks. Errors were assessed with Group C completed the task faster but not significantly so (p values B Vs A=0.9555). There were significantly less errors in group A compared to group B (p=0.0481). In addition, less errors were noted in those subjects in group B who reviewed their combined visual and oral feedback video just before or on the day of assessment (Just prior to assessment: OSATS scores>18 out of 20; OSATS scores<18 out of 20)
Conclusion (50 words max):
In comparison to regular, review of performance videos (with voiced-over oral feedback) produces significantly better technical ability with comparable performance time. It maximizes skill retention in novices (in the long term) learning core laparoscopic procedures and is may be suitable for mastery of more advanced procedures by experienced trainees.
Key Statement (50 words max):
This strategy produces safer surgeons at little or no cost. Performance videos, incorporating voiced-over oral feedback, can be created using smart phones (simulated sessions) and laparoscopic recorders, with audio input provided form wireless head-mounted microphones on the tutor.

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Single-Incision Laparoscopic Appendectomy Performed by Residents is Safe and Feasible

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Purpose: To confirm the safety and the feasibility of single-incision laparoscopic appendectomy (SILA) performed by the residents.

Methods:

Clinical setting

We analyzed, retrospectively, 86 consecutive patients who underwent SILA between August, 2010 and August, 2016 at Kinki Central Hospital. During the study period, 9 residents and 6 board-certified attending surgeons performed SILA.

Surgical technique

The skin incision was performed intraumbilically. EZ access and Lap-Protector were used to maintain the pneumoperitoneum. After the ileocecum was mobilized with conventional straight forceps and the laparoscopic coagulation shears, the appendix was delivered through the umbilical wound. The stump of the appendix was inverted with a purse- string suture, as in open appendectomy. Depending on the operating surgeon's choice and the surgical field, Endo GIA Universal Stapling System was used to resect the appendix. The umbilical wound was closed in two layers in a routine fashion.

Data collection

The patient characteristics and the perioperative complications were collected from the medical records. Whether the patients had complicated appendicitis with gangrenous appendicitis or perforation of the appendix was evaluated, in addition to the baseline demographic data.

Results: The resident doctors operated on 55% (47/86) of patients undergoing SILA in our hospital. There were no significant differences between the groups with regard to the patient characteristics. The mean operative time in the resident and staff surgeon groups was 74 min (range 25–166 min) and 71 min (range 36–160 min), respectively (p=0.5). The median blood loss in the resident and staff surgeon groups was 0 mL (range 0–50 mL) and 0 mL (range 0–63 mL), respectively (p=0.3). The rate of conversion to a different operative procedure was 4% (2/47) of the patients in the resident group and 3% (1/39) of those in the staff surgeon group, respectively (p=1). Two procedures (4%, 2/47) in the resident group were converted to multi-port laparoscopic appendectomy. One procedure (3%, 1/39) in the staff surgeon group was converted to multi-port laparoscopic appendectomy. The mean postoperative hospital stay was 5 days (range 2–8 days) for the resident group and 5 days (range 3–15 days) for the staff surgeon group (p=0.7). Perioperative complications developed in 9% (4/47) of the patients in the resident group and 21% (8/39) of the patients in the staff surgeon group (p=0.1).

Conclusions: Single-incision laparoscopic appendectomy performed by residents is safe and feasible with the guidance of a staff surgeon.

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Identifying the Needs for Teaching Fundamental Knowledge of Laparoscopic Surgery: A Cross-Sectional Study in Japan

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Introduction: Despite the widespread use of laparoscopic surgery in Japan, there is no formal educational curriculum to teach fundamental knowledge of laparoscopic surgery. In order to develop and promote an educational program, it is important to understand the knowledge levels of surgeons and surgical trainees regarding safe laparoscopic surgery. The purpose of this study was to determine baseline knowledge of surgeons and surgical trainees on laparoscopic surgery in Japan.

Methods: Participants completed 24 multiple-choice questions, testing basic cognitive knowledge of laparoscopic surgery, and a questionnaire regarding the current status of laparoscopic education. The examination was developed according to the 11 content domains of the Fundamentals of Laparoscopic Surgery (FLS) program. Sections of the examination included: "equipment and energy sources", "patient considerations and positioning", "establishment and physiology of the pneumoperitoneum & abdominal access and trocar placement", "tissue handling, exposure and examination of the abdomen and pelvis & hemorrhage and hemostasis & tissue approximation", and "exiting the abdomen and postoperative care". Domains of "anesthesia" and "biopsy techniques" were excluded in this assessment. Scores were compared between post-graduate year (PGY)>5 and PGY1-5 participants. Data are expressed as median score and interquartile range. Wilcoxon signed-rank test determined significance.

Results: A total of 45 surgeons and surgical trainees of all years from 5 teaching hospitals (PGY1-5: 23, PGY>5: 22) completed the examination (mean age 34; 87% male). The median score in the entire cohort was 75 [65; 83]% (range=38–92%), with significantly higher scores in the PGY>5 group compared to the PGY1-5 group (67 [58; 75] vs. 81 [74; 84], p<0.001). The differences in performances were due to better scores for PGY>5 group on the sections "equipment and energy sources", "tissue handling, exposure and examination & hemorrhage and hemostasis & tissue approximation", and "exiting the abdomen and postoperative care". Among all participants, the median scores in the subsection of "energy sources (50 [50; 100]%)" and "establishment and physiology of the pneumoperitoneum (50 [38; 75]%)" were lower than the other domains. All participants agreed to a need for learning fundamental knowledge (strongly agree 71%; agree 29%) and formal educational curricula (strongly agree 53%; agree 47%).

Conclusions: The preliminary results show surgical trainees have less knowledge required for laparoscopic surgery compared to experienced surgeons. There is a need for a formal education curriculum such as FLS to help address this knowledge gap and contribute to safer laparoscopic surgery.

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Are USMLE, Academic Grades of General Surgery Residency Applicants and Medical Students Reflective of Their Manual Dexterity?

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Introduction: Manual dexterity represents an important component of a surgical trainee performance. However, the selection of surgical residents currently includes only their academic performance, letters of recommendation, and a formal interview process. This is the first study that assesses fine and gross motor skills in open and virtual reality environments to investigate the correlation between USMLE scores/academic achievements and manual dexterity.

Methods: Twenty-eight applicants to a general surgery residency program and 17 medical students were recruited. Time of completion on the O'Conner tweezer-test, Minnesota Manual Dexterity Test (MMDT), suturing on skin pad kit and laparoscopic peg transfer were assessed. The percentage scores, automatically generated by the simulator, of 3 robotic exercises ("Ring & Rail", "Thread the Ring", "Suture Sponge") were also recorded. Statistical analysis was performed using the Pearson correlation.

Results: The mean Step 1 and Step 2 scores were 238.2 (211–265) and 244.8 (217–268) respectively. The mean scores of the first year basic science courses were 78.5% (65.5% -92.5%). The mean time for completion of the O'Conner tweezer test, MMDT, and the peg transfer mean were 477.7 s, 65.2 s and 154.9 s respectively. The mean scores for Ring & Rail, Thread the Ring and Suture Sponge were: 67.79%, 52.96 and 52.68%. Performance on any of the tasks correlated with neither USMLE nor academic scores (p>0.05).

Conclusion: Preliminary data suggest that manual dexterity does not correlate with USMLE scores or academic grades. Further data must be gathered to confirm these findings prior to implementing manual skill proficiency screening amongst surgical residency candidates.

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A Novel Scoring Calculator Simplifies a Multitude of Metrics for Improved Efficiency in Simulation Curriculum

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Introduction: Residency programs are increasingly challenged by the complexity of laparoscopic simulation technology and their utilization in the training curriculum. Common software can easily be leveraged to uniformly manage the prevalence of metrics which virtual reality simulators provide.
Methods: The third generation laparoscopic simulator was used to collect trials from the hand-eye coordination task of the Basic Skills Module. Sampling included residency applicants through PGY5 over a two year period. Existing software was leveraged to extract laparoscopic learner data from the simulators. Microsoft Suite was leveraged to extract and process the simulator data. A simplified score calculator was developed to consistently discern the level of training of the learner. Accumulated scores were subjected to ANOVA and Tukey's standard range test using SAS Enterprise 6.1.
Results: Pooled candidate scores (n=538) had means and standard errors of 60.62±0.62, 58.08±2.49, 66.6±1.76, 68.22±2.80, 73.72±1.60, 74.81±1.84, for applicants through PGY5 groups, respectively. Significance was not found between applicants and interns, but differences were found between the applicants/interns groups and all upper levels through PGY5 ($p<.001$). PGY2 did not differ from PGY3 but was significantly different from PGY4 and PGY5 ($p<.001$). PGY3 did not differ from PGY4 or PGY5. PGY4 and PGY5 were not significantly different.
Conclusions: Use of a basic scoring system simplifies discrimination of laparoscopic learners. Using this simple tool, simulated procedural competency of the user can rapidly be assessed in an objective manner. It is expected that this novel tool will empower simulation trainers to more accurately tailor evidence-based feedback specifically for each learner's performance level.

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Is It Safty That Laparoscopic Colectomy Performed by Biginner Surgeons with an Assist by a Technical Qualified Surgeon?

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Introduction: Laparoscopic colectomy has been widely spreading, and acquisition of its technique is concerned even for young surgeons. However, the safety of laparoscopic colectomy performed by beginner laparoscopic surgeon is questionable. We have been promoting to provide experiences of laparoscopic colectomy to young surgeons. In this study, we report the safety of laparoscopic colectomy performed by beginner surgeons.
Methods and Procedures: Right colectomy and high anterior resection (because they are relatively easy procedures in laparoscopic colon cancer operations) were selected to the education surgery for beginner laparoscopic surgeon. A qualified laparoscopic surgeon in the Endoscopic Surgical Skill Qualification System (Japan Society for Endoscopic Surgery) always participated in operations as the teaching assistant. Twenty-three right colectomies and 19 high anterior resections were performed by beginner surgeons as the main surgeon between 2014 and 2016. Five trainees, who had 3–10 years prior experiences as surgeons, performed operations under teaching by qualified surgeon in this term.
Results: Each trainee performed 13, 4, 3, 2 and 1 right colectomies and 7, 6, 4, 2 and 0 high anterior resections, respectively. In right colectomy, 11 males and 12 females were included. Mean age and body mass index were 79 and 23.2, respectively. Advanced cancer was diagnosed in 18 cases (78%) and mean tumor size was 50 mm. D2 or D3 lymph node dissection (according to the Japanese Society for Cancer of the Colon and Rectum guidelines) with functional end-to-end anastomosis were performed in all cases. The mean operation time and blood loss were 200 min and 73 mL, respectively. One patient was required conversion to open surgery due to the adhesion. Postoperative morbidities were occurred in two cases (small bowel obstruction and abdominal abscess). In high anterior resection, 9 males and 10 females were included. Mean age and body mass index were 72 and 22.1, respectively. Advanced cancer was diagnosed in 18 cases (68%) and mean tumor size was 33 mm. D2 or D3 lymph node dissection with anastomosis by double stapling technique were performed in all cases. The mean operation time and blood loss were 242 min and 27 mL, respectively. One patient was required conversion to open surgery due to the adhesion. No postoperative complication occurred.
Conclusion: Laparoscopic colectomy was safely performed by beginner laparoscopic surgeons as long as assisting by qualified surgeon.

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Development of a Proficiency-Based Skills Curriculum for Fundamentals of Endoscopic Surgery

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Introduction: Gastrointestinal (GI) endoscopy is a vital skill for general surgeons. The proficiency of graduating general surgery residents in endoscopy has recently been questioned. Given that the number of endoscopic procedures performed during training is only a weak indicator of skill, the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) has developed the Fundamentals of Endoscopic Surgery (FES) program that objectively assesses endoscopic knowledge and technical skill. Nevertheless, a standardized effective simulation-based curriculum for the acquisition of endoscopic skills to complement FES has currently not been established. The purpose of this study was to report our efforts with the development of a proficiency-based endoscopic skills curriculum at a state level.
Methods: Multi-institutional study across 5 residency training programs in North Carolina funded by SAGES. Five experts in endoscopy reviewed the FES online cognitive curriculum and developed a 60 multiple-choice question test for endoscopic knowledge assessment. They then performed several repetitions on select FES representative tasks on three endoscopic simulators (GI Mentor, EndoVR GI, and Kyoto model) available at the participating training programs. Experts practiced until their performance plateaued in two consecutive attempts; the scores achieved during these last two attempts on each simulator were then averaged to develop performance goals for proficiency-based training of residents on each respective simulator.
Results: Expert derived performance goals were developed for 5 tasks of the GI Mentor simulator, 6 tasks of the EndoVR GI simulator and the Kyoto colonoscopy model. Performance metrics chosen as goals included time to procedure completion, % mucosa visualization, applied force, and patient discomfort. Using an evidence-based approach informed by the newly developed performance goals and cognitive test we developed a proficiency-based endoscopic skills curriculum that can be used independent of simulator availability at each participating site.
Conclusion: A proficiency-based endoscopic skills curriculum was developed for resident training across general surgery residency programs in North Carolina agnostic to the simulator available at each institution. Using a standardized methodology expert-derived performance goals and a cognitive test have been established and incorporated into this curriculum. Our hypothesis is that successful completion of this curriculum will enable residents to reach optimal readiness for the FES exam; to test it, we are conducting a randomized controlled trial that will compare training following this curriculum vs traditional skills training in endoscopy at our participating sites.

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Laparoscopic Hernia Repair Master Class of Japan Could Reduce Recurrence

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Background: As for groin hernia repair in Japan, laparoscopic repair started from 1991, however mesh plug repair prevailed since 1993 but turned to decrease 2006. Alternatively laparoscopic repair turn to increase again, of which recurrence rate was kept below 1.0% until 11th Japan Society for endoscopic Surgery (JSES) questionnaire, 2011. Recurrence rate increased to 4% in Trans-Abdominal Preperitoneal Procedure (TAPP) and 5% in Totally-Extraperitoneal Procedure (TEP) according to the result of 12th JSES 2013 questionnaire. It became serious problems of which procedure was correct.
Purpose: We held training courses in order to show appropriate laparoscopic repair at Advanced Training Center (Covidien Japan) 14 times from 2011.
Material and Methods: Training contents consisted of groin anatomies, dry lab suturing training, video lecture by qualified surgeon of endoscopic surgical skill qualification system of JSES and animal lab. The number of participants reached to more than 300 up to April 2016. We made inquiries about kinds of their repair and the recurrence rate before and after the training course. Questionnaire included about postgraduate surgeon's career, change of repair methods concept, actual repair and recurrence.
Results: We received answers from 159 participants (53%). Surgeons career was mean 12.7 years±8.2, As for repair methods change, TAPP was from 20.9±29.9 to 32.4±56.1%($P<0.001$), as for TEP was from 9.5±13.9% to 13.9±16.9%($P=0.0218$). As for anterior approach, the number decreased from 153.1±28.4 to 28.4±52.2 ($P<0.001$). Recurrence rate by TAPP was 0.9% before lecture and it decreased to 0.4% after training. Recurrence by TEP was no previous value before training but 0.4% after training.
Discussion and Conclusion: According to 12th JSES questionnaire, recurrence rate of TAPP and TEP was getting worse unexpectedly. The main reason why recurrence rate raised in JSES questionnaire was due to rapid spread of laparoscopic groin hernia repair without appropriate teaching. It might be ironical results by higher operative price which was induced by Ministry of health and welfare. Our training course recurrence rate were less than the results of JSES recent 2013 questionnaire. So, our laparoscopic hernia master course achieved valuable results.

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Assessment of Resident Laparoscopic Skills: Operating Room Autonomy and Simulator Performance

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Introduction: Given the rising need for quantifiable methods of characterizing resident technical skills, we developed a Short Messaging Service (SMS)-based rating system using the Zwisch 4-point scale for autonomy, to evaluate resident performance of laparoscopic cholecystectomies. We assess whether metrics derived from simulation-based skills practice reflects resident autonomy in the operating room (OR), as perceived by faculty evaluation.
Methods: Over 12 months, 14 post graduate year (PGY) 1–3 general surgery residents were rated for autonomy by general surgery faculty in laparoscopic cholecystectomies. During the same period, 15 residents completed 10 laparoscopic cholecystectomies on the Symbionix LapMentor simulator. Performance metrics were recorded and averaged over all completed simulator cases per resident for analysis. Each resident's OR autonomy was defined as the percentage of high scores (Zwisch level 3–4) among all evaluated OR procedures. Simulator performance was evaluated for relationships with resident OR autonomy and PGY level using Spearman rank correlations.
Results: Resident autonomy correlated with PGY ($rho=0.83$, $p<0.001$). Among 22 simulator metrics evaluated, 12 demonstrated some relationship to OR autonomy or PGY level ($p<0.15$). The majority (75%) of these related metrics demonstrate stronger correlations with resident autonomy than PGY. Metrics significantly associated with autonomy are included in the Table.
Conclusions: Our SMS-based rating system is a simple and effective way to obtain quantifiable feedback on resident technical skills. The correlation noted between simulator technical metrics and autonomy level suggests skills may be better measured by resident autonomy level than PGY. This suggests more effective and efficient learning could be tailored to autonomy level rather than PGY.

Table. Technical metrics signficantly associated with autonomy ($p<0.05$)

	Autonomy Correlation		PGY Correlation		PGY1	PGY2	PGY3
	Rho	P	Rho	P	Mean	Mean	Mean
Left instrument movements(No.)	−0.63	0.017*	-0.49	0.063	359	165	193
Time cautery with adhesion contact(%)	0.67	0.009*	0.60	0.017*	2.5%	4.5%	6.2%
Time cautery<15 mm of clip(%)	0.53	0.049*	0.42	0.12	2.2%	5.9%	5.0%
Time cautery(%)	0.66	0.010*	0.62	0.013*	6%	12%	14%
Total left instrument path length(sec)	−0.62	0.018*	-0.53	0.043*	689	317	341

P301

Rationale and Barriers to Implementation of the Fuse Program

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Introduction: Clinicians are not properly trained in the use of energy devices. The Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) developed The Fundamental Use of Surgical Energy (FUSE) Program, a curriculum designed to educate and promote the safe use of energy devices in the operating room and endoscopy suite. With its recent launch, adoption of the FUSE program has been slower than anticipated. The goal of this study is to determine the catalysts and barriers to implementing the FUSE program in an academic medical center.
Methods and Procedures: An anonymous online survey was distributed to members of a surgery department, including surgical residents, fellows, and faculty, at an academic teaching hospital (n=256). Participants were asked to indicate their level of training. Reasons for completing or not completing the FUSE program were measured using a 5-point Likert scale.
Results: There were a total of 94 (37%) respondents to the survey from September 7–20, 2016. Fifteen surveys were incomplete, leaving 79 responses for analysis. Most respondents were at the faculty level (45/79, 57%). While the majority of respondents had heard of FUSE (62/79, 79%), only 19 completed the certification (19/62, 32%). There was no difference in the completion rate between faculty surgeons and trainees (27% vs. 21%, OR: 1.4, 95% CI: 0.49–4.06, p=0.53). The most common reasons cited for not taking the exam were lack of time to study for the exam (26/43, 61%) and lack of time to take the exam (28/43, 62%). Cost was not a leading barrier to adoption (12/43, 28%). The majority of respondents identified a personal learning gap regarding the safe use of surgical energy (30/43, 70%). Of the 19 respondents who were FUSE certified, the reasons cited for completing the exam included wanting to prevent adverse events to patients (17/19, 90%), wanting to prevent adverse events in the operating room (17/19, 90%), and the belief that the course would make them a safer surgeon (16/19, 84%).
Conclusions: FUSE teaches the proper use of radiofrequency energy, how to prevent unnecessary injury, and promotes safe practice. Professionalism seems to be the primary motivator for completing the FUSE certification. Time restraints were cited most commonly as the barrier to starting and completing FUSE. Integrating the FUSE program into resident educational conferences, faculty grand rounds, or national conferences may help improve participation and drive adoption of FUSE certification.

P302

Cross Sectional Program for Advanced Laparoscopic Training by Long-Term Educational Curriculum

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Recently we started a commissioned project to establish efficient training program for advanced laparoscopic surgery supported by Japanese ministry of education, culture, sports, science and technology (MEXT). This program contains two separated courses: one is "basic course" for 2 years which is for residents from surgery, gynecology, urology or pediatric surgery to learn not only basic skills but also pit falls of different situations and differences of anatomical approaches or devices in the other organs and expertise, and the other is "advanced course" for another 2 years which is for experienced surgeons to become leaders of their field of expertise and they must be certified by the review of Japan Society for Endoscopic Surgery until the end of this program. To influence these long period of two courses, we constructed consortium with a principal investigator of robotics and haptics from the department of science and technology, from the department of anatomy for cadaver training, from animal facility, or surgical instructors from each expertise and also several branch hospitals that have various number of laparoscopic cases as well as IRCAD France by a partnership agreement. Ten residents have been started this program at the first year and now we are in the second year of this program. The "advanced course" has just started. The trainees must take paper exams and also submit reports after each activity. They also give us their opinion on the course they are taking which provides feedbacks for farther improvement of the program itself. This program will be evaluated its efficacy in next three years and we believe that this unique long-term educational program will reduce the incidence of laparoscopic surgery and foster skillful and talented leaders of each field.

P303

Operative Performance Outcomes of a Simulator-Based Robotic Surgical Skills Curriculum

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Background: Robotic platforms offer potential advantages to surgeons performing complex laparoscopic tasks, and continue to expand among surgical modalities. Training and evaluation of trainees in robotic skills continues to increase in importance. Our group has shown that transferability of skills between laparoscopic and robotic platforms is limited, necessitating robot-specific skills curricula. Often, surgical trainees have little access to robotic platforms for training purposes. Simulator-based robotic curricula offer a safe-training option that overcomes most logistical and patient-safety hurdles. To date, however, few reports have examined the performance outcomes in a live operative setting associated with simulator-based robotic skills training. In this study, our group introduced a simulator-based robotic skills curriculum and quantified improvements in performance metrics and subjective work load associated with its use.
Methods: Surgical residents and fellows naïve to robotic platforms were enrolled in the study. Subjects performed a pre-training robot-assisted laparoscopic surgical case with experienced robotic surgeons. Performance metrics were assessed by attending surgeons using a robot-specific modification of the Ottawa Surgical Competency Operating Room Evaluation (O-SCORE). Subjects rated their workload using the validated NASA task load index (NTLX). Subjects then trained to pre-set proficiency goals with the daVinci® Skills Simulator™ using a novel skills curriculum. Subjects performed a post-training case with the same attending surgeon, and O-SCORE and NTLX assessments were repeated. Pre- and post-training outcome data were compared with paired student's t-test.
Results: Eleven subjects completed the curriculum as well as pre- and post-training cases. Completion of the curriculum was associated with improvement in camera control (2.3 pre, 4.8 post $p<0.001$), needle control (2.0 pre, 4.0 post $p=0.002$), tissue handling (2.3 pre, 4.1 post $p<0.001$), and overall performance (2.1 pre, 4.1 post $p=0.001$) as quantified by the O-SCORE assessment. Completion of the curriculum was associated with improvements in physical demand (5.1 pre, 2.8 post $p=0.02$), effort (6.7 pre, 4.4 post $p=0.002$), and frustration (6.0 pre, 1.7 post $p<0.001$) as quantified by the NTLX assessment.
Conclusion: In this pilot study, we have shown that a simulator-based robotic skills curriculum is associated with significant improvements in performance metrics and workload in a live operative setting. These findings highlight the importance of simulation in training robotic surgeons. Future studies will focus on optimizing curricula and assessing their use in additional trainees with blinded evaluators.

P305

OSCE Validation to Evaluate Practical Skills in General Surgery

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Introduction: The actual system to evaluate the acquisition of surgical skills is performed by an oral exam and tutor appreciations during different rotations in general surgery residency. This evaluation is subjective and has high variability between evaluators. There is no assurance that all graduated surgeons of a general surgery program have the minimal practical skills necessary for their clinical performance. The Objective Structured Clinical Examination (OSCE) is an assessment tool that would allow objectify in a standardized and reproducible way practical skills in general surgery residents.
Objectives: Validate an OSCE for evaluating practical skills in general surgery residency.
Methods and Materials: A six station OSCE was designed: Knots and Sutures (KS), Vascular Anastomosis (VA), Pulmonary Tractotomy (PT), Intestinal Anastomosis (IA), Cardiac Suture (CS) and Intracorporeal Laparoscopic Suture (LS). Two second year residents (PGY2), recently graduated surgeons (NS) and expert surgeons (ES) were invited to participate. Video recordings of all participants performing the OSCE were conducted. The videos were blindly evaluated using global [5–25] and specific [see Table 1] validated scales (OSATS), operatory time and procedure approval. The statistical analysis was performed with nonparametric test for comparison between groups.
Results: A total of fourteen participants were recruited; 7PGY2, 4NS and 3ES. The approval rate for the groups PGY2 and NS in the different stations was: 71% KS, 0% VA, 0% PT, 57% IA, 0% CS, 57% LS and 100% KS, 25% VA, 0% PT, 100% IA, 25% CS, 100% LS, respectively. The ES group had 100% of approval in all stations. The average score in the general and specific OSATS in PGY2 was inferior to NS and ES in all stations. The average score in the general and specific OSATS in NS was similar to ES only in KS station. The average time spent in KS, IA and LS stations was inversely proportional to the participant's level of expertise. Average time couldn't be analyzed in stations where the majority of participants didn't complete the procedure. Table 1 summarizes the average score of general and specific OSATS and time for each station.

Table 1.

Category	Knots and Sutures†‡			Vascular Anastomosis†			Pulmonary Tractotomy†			Intestinal Anastomosis†‡			Cardiac Suture†			Intracorporeal Laparoscopic Suture†‡		
	PGY2	NS	ES	PGY2	NS	ES	PGY2	NS	ES	PGY2	NS	ES	PGY2	NS	ES	PGY2	NS	ES
Global OSATS	17.3	22.5	25	8.6	13.5	24.7	8.6	13.8	24.3	14.6	22	24.7	8.3	13.5	24.7	14.3	20.3	24.7
Specific OSATS*	14	25.5	26.7	11.9	17.5	28.7	6.7	8.5	11.7	12.6	19.3	24.7	11.1	13.8	19.7	12.1	17.8	20.3
Time (s)	246	127	87	-	904	584	-	-	646	852	574	463	-	1122	590	807	603	408

† p<0,05 in Global and specific OSATS
‡ p<0,05 in average time
* Specific OSATS: KS [9-27], VA [10-30], PT [6-12, IA [5-25], CS [10-20], LS [7-21].

Conclusion: Validating an OSCE allows the objective evaluation of practical skills in general surgery, complementing the actual educational/evaluation system.

P306

A Learning Curve Study Using the Virtual Translumenal Endoscopic Surgery Trainer (VTEST)

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Background: Minimally invasive surgeries are in high demand since it reduces post-operative pain, scarring, and hospital visits. Training with simulators is becoming a standard approach for teaching surgical skills in the lab before going into the operating room. The Virtual Translumenal Endoscopic Surgery Trainer (VTEST) is a virtual reality system for training skills in the hybrid-NOTES technique. It was used to evaluate the learning curve of novices in a NOTES cholecystectomy procedure.
Methods: Twenty medical students were randomly assigned to a control group or a training group (10 each). All subjects performed the cholecystectomy procedure on the VTEST to establish a baseline (pre-test). The training group received 15 training sessions, over a period of 3 consecutive weeks, consisting of 5 trials per session or as many trials as can be accomplished in an hour, whichever was achieved first. At the end of the training period, all subjects performed one trial on the simulator (post-test), and returned 2 to 3 weeks later to perform a retention test trial. Performance data including completion time, injuries, total score, and CUSUM (cumulative summation scores relative to an expert surgeon of NOTES) were analyzed.
Results: The learning curve results showed that subjects in the training group performed significantly better than those in the control group in completion time, injuries, and total score. This training advantage was evident in post-test, as well as retention test. CUSUM results showed that only one training subject crossed the h_1 line (proficiency) but not the h_0 line. The other 9 subjects in the training group did not reach the expert proficiency score (154).
Conclusions: Although not all training subjects reached proficiency, the training group did show significantly improved performance over the control group, and were able to retain the skill after at least 2 weeks of non-use. The VTEST Simulator is thus a useful tool to provide training and retention of skills for novice learners.

P307

The Effect of Stereoscopic Images from Using a Three-Dimensional Monitor to Laparoscopic Surgical Training for Novices

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Introduction: In recently, the number of three-dimensional (3D) laparoscopic surgeries has increased. However, the effects of 3D images to early experience of novices is controversial. The aim of this study is to clarify the effect of stereoscopic images from using a 3D monitor to laparoscopic surgical training for novices.
Methods and Procedures: The participants in this study were 40 novices who had never performed laparoscopic surgery as an operator (20 medical students and 20 junior residents). Different three laparoscopic phantom tasks (task 1: touching markers on the flat disc with a rod, task 2: straight rod transfer through single loop, task 3: curved rod transfer through two loops) in the training box were performed five times each (as one set) and their performances were recorded by optical position tracker in order to analyze the motion of forceps in 3D space. The participants were randomly divided into two groups: one group carried out a set of tasks initially under a 2D system, and the other group under a 3D system. Both groups performed the same set of tasks again after switching another system. After the second set of tasks was finished, we compared operation time, path lengths of forceps, and technical errors under both 3D and 2D systems in all tasks. In addition, we also investigated the learning curves of each group through all attempts.
Results: In comparison between 2D and 3D, mean operation times (sec) were 25.6, 22.3 ($P=0.03$) in task 1, 28.0, 21.1 ($P<0.001$) in task 2, and 42.8, 37.2 ($P=0.015$) in task 3. Mean path lengths (mm) were 1456, 1337 ($P=0.054$) in task 1, 1308, 1020 ($P<0.001$) in task 2, and 2016, 1797 ($P=0.019$) in task 3. Mean technical errors (times) were 1.4, 0.9 ($P=0.021$) in task 1, 3.1, 1.2($P<0.001$) in task 2, and 10.8, 7.3 ($P<0.001$) in task 3. Each score of all tasks performed under the 3D was significantly better compared to the 2D system. The learning curves showed that each score of the group initially using a 2D system was improved after switching to 3D system. However, each score of the group initially using a 3D system was worse after switching to 2D system.
Conclusions: The stereoscopic images improves laparoscopic surgical techniques of novices. However, novices relying on a 3D system may lose the advantage of experience from stereoscopic images after switching to a 2D system.

P308

Hands on Training Using the Vest or Fire Module Improves Response in Simulated or Fire

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Introduction: There are about 550–650 operating room fires occurring each year which have devastating effects on patients. SAGES FUSE curriculum provides didactic knowledge on OR fire prevention but there is no hands-on component training in identifying fire risk and its management. The objective of this study is to compare the effectiveness of the Virtual Electrosurgical Skill Trainer (VEST™) OR fire hands on training module in addition to FUSE didactics.
Methods and Procedures: The study was a mixed design with two groups, control and simulation. After a pre-test questionnaire that assessed the baseline knowledge of both groups, they were given didactic material that consists of a 10 min presentation in power point format and reading materials from Chap. 3 of the SAGES FUSE manual. Additionally, the simulation group practiced on the OR fire module of the VEST™ for hands-on experience for one session that consisted of five trials within a week from the pre-test. One week from the presentation, performance of both groups was again assessed using a post-questionnaire. Both groups then participated in a mock OR fire scenario, simulated in a mock OR room within one week from the post-test. Subjects were asked to identify the components of fire triangle that are present in the mock OR room and put out a simulated fire. The subjects were videotaped and their performances were assessed using a checklist by two independent raters.
Results: A total of 10 subjects (n=10, 5 per group) participated in this IRB approved study. Mean test scores for both groups combined increased from 5.1 to 7.5 (Wilcoxon signed Rank Test, p=0.01). Mann Whitney U test showed no difference between the two groups in their pre-test (p=0.69) and post-test (p=0.15) scores. Mann-Whitney U test on the checklist scores showed significant difference between the two groups in correctly identifying the Oxidizer source (p=0.015) and correct sequence of action in putting out the fire (p=0.002). Spearman's rho test showed significant agreement between the two raters (r=0.773, p< 0.001).
Conclusions: Subjects who had hands-on training on the VEST™ OR fire module were able to put out the simulated fire using proper sequence of steps compared to the control group, who missed critical steps such has stopping the flow of gases or completely removing the drapes of the patient. Interactive hands on simulation was found to be critical for teaching OR fire prevention and management.

P309

Validation of Simulator for Assessment of Newly Developed Suturing Skills

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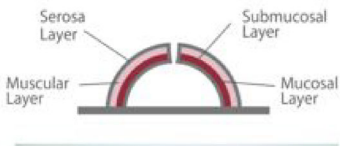
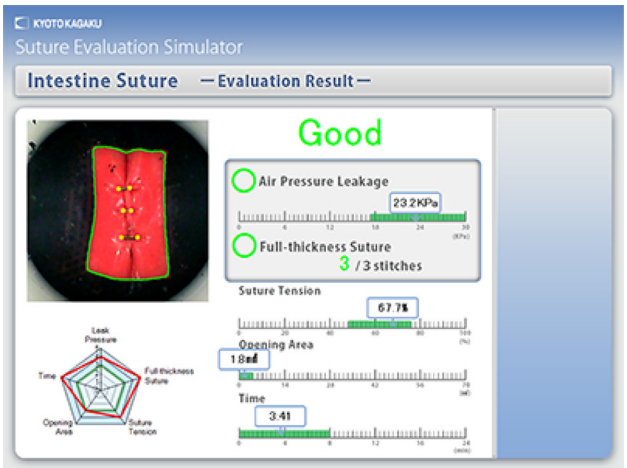
Introduction: The purpose of this study was to evaluate the validity of a newly developed system for assessing suturing skills in laparoscopic surgery (Fig. 1).
Methods and Procedures: Fig. 1 shows our newly-developed computerized system for objective assessment of suturing skills by using a laparoscopic intestinal suturing model, E-Lap. The system includes a new artificial intestinal model that mimics living tissue and pressure-measuring and image-processing devices. Each examinee performs a specific skill using the artificial model, which is linked to a Suture Simulator Instruction Evaluation Unit. The model uses internal air pressure measurements and image processing to evaluate suturing skills. Five criteria, scored on a five-grade scale, were used to evaluate participants' skills (Fig. 2). The volume of air pressure leak was determined by the volume of air inside the sutured artificial intestine. For example, for the criterion "air pressure leakage", the approximate midpoint of the acceptable range was Grade 3. Values lower than the minimum acceptable value received lower grades and those above the midpoint of the acceptable range higher grades.
We enrolled 152 surgeons who attended a laparoscopic surgery training course (Series 150–156, March to July, 2016) held by the Japan Society for Endoscopic Surgery (JSES). Participants performed the skill assessment suturing task using the E-Lap pre- and post-training and the resultant pairs of scores were compared.
Results: The pre- and post-course scores for air pressure leak were 1.36±1.35 and 1.78±1.20, respectively; for full-thickness sutures 3.57±1.53 and 4.21±1.03, respectively; for suture tension 2.99±1.24 and 3.13±1.18, respectively; for area of wound opening 4.03±1.14 and 4.28±0.94, respectively; and for performance time 2.45±0.87 and 3.15±0.96, respectively. Significant differences (p<0.01) between pre- and post-course scores were observed for all criteria except suture tension.
Conclusions: This system has sufficient validity for quantitative assessment of suturing skill in laparoscopic surgery and is therefore a useful tool for training and assessment of laparoscopic surgeons.





P311

Ircad Consensus Conference on Safe Laparoscopic Cholecystectomy

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Introduction: While there is wide diffusion of laparoscopic approach to cholecystectomy (LC), high adverse event rates persists with significant societal implications due to the large number of cholecystectomies performed. An expert guideline conference was conducted to identify factors associated with safe LC with the goal of reducing biliary and/or vascular injury.
Methods and Approach: The IRCAD Guidelines Group was comprised of 19 surgeons from high-volume hepato-pancreato-biliary surgery centers located in 9 countries. A systematic data search of PubMed, Cochrane, and Embase was conducted. Structured group meetings were used to achieve a consensus on method standardization for safe LC. The process identified a list of key items for safer practice of LC. These items were put forward to 99 IRCAD committee members in electronically distributed surveys. Consensus was achieved when at least 80% of respondents ranked an item as 1 or 2 on a Likert scale of importance (1–4).
Results: Guidelines were derived from 26 key items, ranging from exposure of operative field and gallbladder, appropriate use of energy device, establishment of the critical view of safety, systematic preoperative imaging, intraoperative cholangiography and alternative techniques, the role of partial cholecystectomy and dome down (fundus first) cholecystectomy. The highest consensus was achieved on the importance of critical view of safety, dome down technique and partial cholecystectomy being acceptable alternative approaches, A recommendation for a specific type of energy source being used was not brought forward. Preoperative imaging with ultrasound was considered routine while other techniques without special indications were considered not significantly contributory to avoiding adverse events. Other key domains for improvement in training, assessment, and research were identified also.
Conclusions: Despite a low incidence of adverse event during LC overall, the high rate of LC performed leads to a significant number of patients who suffer longterm from adverse events. To reduce this number, guidelines to promote safe surgical practice of LC may help to initiate specific training in the areas including but not limited to single access cholecystectomy. The brought forward guidelines for skill assessment and documentation of critical steps of the operation may contribute to promoting reduction of adverse events.

P312

Development of the Simulator for Laparoscopic Eye Hand Coordination Training for Teaching Oneself Training

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Background: In late years, with the spread of laparoscopic surgery, the basic laparoscopic maneuver training has been carried out for medical students.
Eye-hand coordination is one of the problems of the training of this special maneuver. Generally, the training of eye-hand coordination touches at the tip of a peg appointed optionally with a forceps, but this training requires a person appointing any peg, and there is a difficult point that teaching oneself self-study is not possible. In this study, we develop eye-hand coordination exercise simulator for teaching oneself self-study, and got some knowledge.
Materials and Methods: Twenty medical students in 5th grade of Tokushima Univ. were participated. They were divided into two groups; without new simulator group (without sim group: n=10) and with simulator group (with sim group: n=10). Twenty times of peg touch training with the forceps of right and left was held during clinical clerkship, and self-study period for one week. The number of failure of the peg touch and self-study period were investigated before and after one week self-study period of two groups.
Results: In the number of failure of the peg touch, without sim group showed average of 10 times, and with sim group showed average of 11 times at the point of before one week self-study. After one week, without sim group showed 8 times vice versa with sim group showed 3 times. In self-study period, without sim group spent 90 min, vice versa with sim group spent 150 min in one week.
With sim group studied much longer time and showed significant smaller times of failure of peg touch. The questionnaire results of without sim group showed that "Securing of staff indicating any peg was difficult", "Exercise time was not enough", "Perseverance did not continue", and with sim group showed that "It was able to practice at favorite time", "Because it was not necessary to ask a friend, it was comfortable", "It was interesting".
Conclusions: Newly developed the simulator for the eye-hand coordination reinforcement promoted the self-study of the student, and was useful for reinforcement of eye-hand coordination.

P313

Simple and Economic Surgical Trainer Made of Agar

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Background and Objective: Many kinds of equipment had been proposed from the early days of endoscopic surgery, however, they are expensive for daily training of surgical residents. We developed a simple and economic surgical trainer made of agar.
Material and Methods: 4 g of agar powder is added into 250mL of boiled water and boiled for 2 min. They are poured in a stainless tray with macaroni or rubber tube, and refrigerated for 2 h. Hardness of agar model is measured by a conventional duro-meter for soft rubbers. Basic maneuvers of endoscopic surgery, such as dissection, ligation, coagulation with laparoscopic forceps and electro-surgical devices are applied for this agar model in the conventional laparoscopic trainer.
Results: Hardness of this agar model was 5.3 ± 1.1mN. Basic laparoscopic skills of cutting, dissection and ligation with electro-surgical devices can be practiced repeatedly. Actual times required for production of this model was less than 15minites, and its cost for one training model was 80 US cents.

P314

The Virtual Electrosurgical Skill Trainer (VEST): Face Validation of a Dispersive Electrode Placement Module

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Introduction: The Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) has developed the FUSE didactic curriculum in order to formalize a curriculum and further understanding of the safe use of surgical energy. The Virtual Electrosurgical Skill Trainer (VEST) is being developed as a complementary simulation-based curriculum in order to further train surgeons and operating room (OR) staff to safely use surgical energy tools. Dedicated VEST modules have been developed and face validated at the annual SAGES conference learning center. Subsequently, a new VEST module has been developed to allow surgeons and trainees to learn about dispersive electrode placement and to visualize to flow of electrical energy in human tissue. The purpose of this study is to assess the face validity of this dispersive electrode VEST module.
Methods: Forty six subjects (n=46) were recruited for participation at the 2016 SAGES conference Learning Center. Subjects were asked to complete demographic surveys, a 5 question pre-test, and a 5 question post-test after completing the VEST dispersive electrode module. Subjects were then asked to rate different aspects of the module using a 5-point Likert scale questionnaire.
Results: Mean pre-simulator and post-simulator assessment scores were 1.48 and 3.38, respectively, with Wilcoxon signed rank analysis showing a significant difference in the means ($p<0.05$). Subjects were grouped by presence (n=12) or absence (n=31) of prior FUSE experience and by training level, i.e. trainee (n=21) vs. attending surgeon(n=23). Mann-Whitney U testing showed no significant difference in pre-simulator assessment scores between attending surgeons and trainees ($p>0.05$). In those with and without FUSE exposure, a significant difference ($p<0.05$) was seen in pre-simulator assessment scores, and no significant difference in Likert scale assessment scores, with mean scores above 4 for all questions.
Conclusion: This study demonstrated face validity of a new VEST simulator educational module. Consistently high Likert assessment scores showed that users felt the VEST module helped their understanding of dispersive electrode placement and that the module was useful and realistically represented the process of optimal dispersive electrode placement. Additionally, it reflected a potential knowledge deficit in the safe use of dispersive electrodes in the surgical community, also demonstrating that even some exposure to the FUSE curriculum developed by SAGES provides increased awareness about dispersive electrode use.

P315

Go Global: The Fuse-Based Course Improves Knowledge of Operating Room Nurses on the Safe Use of Electrosurgery in Japan

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Background: Pilot data from North America suggests that surgeons have knowledge gaps in the safe use of electrosurgery (ES) devices and a half-day ES workshop have shown to be an effective method to address the knowledge gaps. Even though operating room (OR) nurses require clear understanding of how to safely use ES devices as a part of the OR team, their knowledge of the safe use of the devices has never been investigated. It is also unclear if curricular content can be effectively delivered in a shorter time frame to OR nurses. The purpose of this study was to determine OR nurses' knowledge regarding the safe use of ES, and determine if critical knowledge of ES safety could be acquired in a 60-minute workshop amongst Japanese OR nurses.
Methods: During the local OR nurse meetings, 60-minute ES workshops based on the SAGES' Fundamental Use of Surgical Energy (FUSE) curriculum and AORN (Association of periOperative Registered Nurses)'s guidelines were conducted. The workshop content was divided into 2 sections: principles of ES, and ES-related adverse events including OR fire. Participants took pre- and post-course assessments (16-item multiple-choice examination), assessing fundamental knowledge of ES. They also completed a questionnaire regarding the educational value of the session. Data expressed as mean score ± standard deviation. Unpaired or paired t-test determined significance ($p<0.05$).
Results: A total of 173 OR nurses from 53 hospitals completed the course (age 34 ± 9; 78% female; years of experience 6 ± 5). The mean pre-course score in the entire cohort was 54 ± 18% (principle of ES 60 ± 25%, ES-related adverse events: 54 ± 24%). After the session, 168 (97%) participants' scores increased significantly with a post-course score of 79 ± 10%, $p<0.001$. Of 163 (94%) participants who completed the questionnaire, the vast majority of participants were either strongly satisfied (58%) or satisfied (42%) with the course content, they either strongly agreed (49%) or agreed (51%) that they would change their practice based on the content that was learned from the course, and 51% of participants would strongly recommend the ES course to their colleagues.
Conclusions: OR nurses have knowledge gaps in the safe use of electrosurgical devices. A 60-minute FUSE-based workshop for OR nurses can help address this knowledge gap and improve surgical team skills for safer surgery.

P316

Development and Validation of Education System for Laparoscopic Inguinal Hernia Repair: A Multicenter Prospective Randomized Controlled Trail

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Background: In recent years, various studies have firmly established simulation training to be superior to traditional training methods, however it is yet to be fully incorporated into the surgical residency training in outside of North America. In Japan, distribution residents in wider variety of hospital, lack of finance and time for training has limited incorporation of simulation into residency training. There is a need for cost effective systematic training system for novice surgeons. We had previously developed and validated the TAPP checklist, to evaluate the recorded performance of transabdominal preperitoneal (TAPP) repair and developed an educational system which included the didactic materials based on the TAPP checklist and incorporated remote evaluation and feedback system.
Objective: To evaluate the educational impact of the TAPP education system on novice surgeons.
Method: Residents and surgeons from participating hospitals, who had performed 0 or 1 TAPP procedure were recruited for this study from April 2015 to March 2016. The participants were randomly assigned to Intervention Group (IG) who trained using this new educational tool and Control Group (CG) who trained using the conventional system. They were required to send the surgical videos of their TAPP cases. These videos were rated by blinded raters. All the participants performed their first case before randomization as control. The participants scoring more than 20 (full marks 24) in their first case were excluded from the study. IG then received the Educational tools and ratings and feedback from their surgery. They were also encouraged to practice intracorporeal suturing in the drybox. They were allowed to perform further cases after they met the predetermined operator criteria. The improvement of the TAPP checklist scores of both groups were compared from case 1 to 3. We also compared their scores of their 3rd case.
Result: The eighteen participants from 9 institutes were recruited for this study. 7 participants in IG and 5 participants in CG completed the study and were included in the final analysis. There was no difference between the backgrounds of the participants. From their first case, the participants in IG and CG had improved their scores by 8.7 (SD5.0) and 1.0 (SD3.2) respectively ($p=0.01$). The IG score of 3rd case by 21.3 (SD2.0) was significantly higher than that of CG score by 16.4 (SD 4.7) ($p=0.04$).
Conclusion: The newly developed TAPP educational system was effective in improving the TAPP performance of novice surgeons.

P317

Test-Retest Evaluation of a Low-Cost Training Tool for Advanced Endoscopic Skills

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Background: The Fundamentals of Endoscopic Surgery (FES) curriculum was developed in response to the increasing use of flexible endoscopy. FES is a high stakes exam, passing of which is required for board certification in general surgery in the United States, but it currently only exists as an examination tool and does not allow students to practice before the test. As the FES system was primarily designed for evaluation purposes, there is an urgent need for an affordable, easily accessible tool for trainee practice of therapeutic endoscopic skills. We previously reported on the adaptation of the Fundamentals of Laparoscopic Surgery (FLS) trainer box to the practice of six basic endoscopic skills. As a part of ongoing validation, participants taking part in an endoscopic training course were tested on the adapted trainer box at the beginning and at completion of the course.

Methods: Participants (n=31) with varying levels of endoscopy experience were recruited from an endoscopic education course (Strasbourg, France) and consisted of general surgery and gastroenterology staff, residents, and fellows. They were evaluated on six tasks using an adapted endoscopic trainer tool on two occasions approximately 12 weeks apart. The six tasks included: (1) forward view peg transfer, (2) retroflexion view peg transfer, (3) puncturing, (4) snaring, (5) clipping, and (6) cannulation. Participants were given a maximum time of 5 min to complete each task. Task times were obtained by evaluators using video recordings from the gastroscope camera. Participants were categorized as experts or novices based on the number of endoscopic procedures previously performed. For each expertise group, differences in task time between test administrations were examined with pairwise comparisons using Wilcoxon tests.

Results/Conclusions: Following a formal endoscopic training course, novices improved times needed to complete six tasks on an adapted FLS trainer box for endoscopic skills. These improvements were statistically significant for four of the tasks (Table 1). In contrast, experts only showed significant improvement for the cannulation task following the training course. These pairwise comparisons may reflect the ability of the endoscopic trainer tool to show improvement with training among novices and also consistency in performance among experts.

Table 1. Task completion times on an endoscopic trainer box by novices and experts before and after an endoscopic training course.

	Novice			Expert		
	Time Before	Time After	P-Value	Time Before	Time After	P-Value
FPT	281.4 ± 40.3	224.7 ± 68.6	<0.001*	156.3 ± 54.2	130.8 ± 71.2	0.465
RPT	299.7 ± 1.4	277.8 ± 56.0	0.017*	168.3 ± 74.3	174.6 ± 75.7	0.068
Puncturing	208.1 ± 68.7	187.1 ± 83.5	0.434	141.7 ± 54.0	148.2 ± 87.0	0.686
Snaring	254.6 ± 55.0	213.8 ± 73.9	0.020*	147.0 ± 83.0	125.6 ± 98.0	0.345
Clipping	198.1 ± 66.4	180.4 ± 55.6	0.472	151.2 ± 82.1	126.6 ± 42.8	0.144
Cannulation	132.5 ± 87.2	87.5 ± 64.2	0.014*	44.2 ± 9.6	25.8 ± 10.8	0.043*

FPT = forward view peg transfer, RPT = retroflexion view peg transfer
Average task time (seconds) ± Standard Deviation, *statistically significant (p<0.05)

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Development of a Training Model to Simulate Laparoscopic Distal Pancreatectomy

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Introduction: Appropriate education is necessary to promote advanced laparoscopic surgical techniques. Each existing method has associated benefits and difficulties. The aim of this study is to develop a training model allowing simulation of the scenario for laparoscopic distal pancreatectomy using standard surgical instruments.

Methods

Planning: A standard surgical scenario for laparoscopic distal pancreatectomy was developed. The scenario was broken down into multiple processes and each process divided into multiple steps. We established tasks to be achieved for each step, and defined the related anatomical structures, instruments to be used, factors determining the level of difficulty, and possible complications.

Design: Structures that could be visualized by imaging studies such as computed tomography or magnetic resonance imaging were directly extracted. The intestinal tract was designed based on anatomical knowledge, and imaging data used to establish its position. Fine structures and membranes such as the visceral peritoneum were designed based on advice from an experienced clinician and images from actual procedures.

Prototyping and Evaluation: The model is made of polyvinyl chloride, which conducts electricity making it possible to use electrosurgical devices. Each component was produced individually. The parts were assembled after evaluating shape, texture, operability and device processes.

Results: We created a training model for simulating laparoscopic distal pancreatectomy (Figure). The model includes the pancreas, spleen, stomach, duodenum, transverse colon, portal vein, splenic vein, superior mesenteric vein, celiac artery, splenic artery, common hepatic artery, left gastric artery and greater omentum. The procedure can be simulated in its entirety. The model utilizes standard surgical devices (e.g. various kind of energy devices, automatic suturing, etc.).

Conclusions: We developed a training model that allows re-creation of operative scenarios using standard surgical instrumentation. The model is anticipated to contribute to patient safety by shortening the learning curve.

P319

"The Fun, Innovative, Nice and Enthusiastic Plus Anything-Goes (F.I.N.E. A+) Way of Learning of Advance Laparoscopic Skills Through Art in Laparoscopic Box"

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Last 2016, the paper entitled "The Fun, Innovative, Nice and Enthusiastic (F.I.N.E.) Way of Learning Laparoscopic Skills through Endoscopic Painting as Laparoscopic Box Exercise" had coined a new interesting way of developing hand eye coordination, non-dominant hand training, spatial orientation, tactile feedback, fine motor skills, and patience in art appreciation of a training surgeon which was well recognized locally and in the international community. The weakness of the exercise was that it was so basic as it will only be applicable laparoscopic cholecystectomy training. Further advance laparoscopic skills should be developed. Hence, further innovation in art was added in the laparoscopic box to introduce a fun, innovative, nice and enthusiastic way of Advance Skill Exercise in Laparoscopic Box Trainer through Modified Endoscopic Painting, Cross-Stitching, Miniature 3D Structure Painting and Bonsai Trimming.

The paper presents how the innovator supplements his training in laparoscopy by combining the art and the science of laparoscopy. Endoscopic art is a collective term for doing a miniature artwork inside the laparoscopic trainer box such as endoscopic painting, cross stitching and bonsai trimming. It is an art that unleased unlimited creative forms and expressions to the trainee making the skill exercise fun, relaxing and enthusiastic. It requires a modified laparoscopic box trainer equipped designed in such a way that it mimics advance procedure in laparoscopy. For instance, in endoscopic painting, the miniature canvas mimics the peritoneum as that in laparoscopic hernia repair that needed to be bluntly peeled down or of that that mimics the mesentery that needed to be grasped upward in order to be dissected. It still uses the modified laparoscopic brush for the dominant hand of the trainee to apply the color and a laparoscopic grasper for the non-dominant hand to control and manipulate the canvas and the rotating circular palette. Added new exciting exercises such as cross-stitching for knot tying skill exercise, miniature structure painting for 3 dimensional environment appreciation and bonsai trimming as cutting exercise. Materials are economical and readily available in a hobby shop.

Through the innovator's experience, art in endoscopic is a feasible and alternative way of training a surgeon in both basic and advance laparoscopic skills. It was not a boring procedure, unlike the basic laparoscopic box training exercise, since it does not involve repetitive movements. The tangible end result of the exercise is a miniature art masterpiece such as painting which is a rewarding experience.

P321

Biomolecular and Immunocellular Basis of the Effects of Peroperative Music on Sterile Surgical Inflammation Following Laparoscopic Surgery: A Randomized Pilot Study

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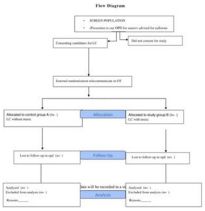
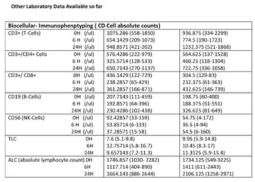
Introduction: We aimed to study the bio-molecular/ immunocellular basis of the effects of per-operative music on sterile surgical inflammation & its patient reported outcomes (PRO).

Methods and Procedures: This pilot triple blind randomized study was proposed for 20 (10 each for control & study group) unselected candidates of laparoscopic cholecystectomy, done (in an isoacaustic environment with or without standard peroperative music) under Bispectral index (BIS) guided standard anaesthesia depth, following standard universal clinical care, medication & day-care protocols with ethical compliance study points-BIS indexed Minimum Alveoler Concentration (MAC) of anaesthetic, peroperative surgical data/vitals, biomolecular-phenotypic-hematologic markers of sterile inflammation at 0 h(H0), 6 h(H6) & 24 h(H24) of surgery, & PRO.



Results: (16 of proposed 20 cases done. Independent anesthetic, clinical & PRO data stored in autolocked programs will be collated & analysed.

	Mean (range) H0/H6/H24	
	Group A (n=7)	Group B (n=9)
Inter Leukine 6 (pg/ml)-	5.764286 (3.19–8.12)/24.30571 (7.37–82.19)/11.59143 (6.34–17.52)	14.78875 (2.14–76.8)/14.6075 (5.17–33.38)/12.63571 (3.9-36.34)
HS-CRP(mg/dl)	1.97 (0.02-11)/0.585714 (0.08–1.45)/ 2.017143 (0.22–6.43)	0.48375 (0.03–1.23)/0.73125 (0.13–1.54)/2.355 (0.45–5.39)
TNF-alfa (pg/ml)	8.357143 (5.6–13)/13.14286 (5.2–37.3)/ 11.84286 (6.4–20)	11.1125 (6.6–22.7)/10.37143 (6.8–18)/10.77143 (7.1–15.1)
T Cells (%)		
CD3+T cell	71.22 (55.44–84.01) / 65.98857 (50.32–81.59)/71.77857 (59.23–84.67)	76.0725 (68.64–87.5)/73.89 (65.6-82.21)/74.19 (66.88–82.86)
CD3+/CD4+T cell	37.81571 (19.84–46.59) /38.27286 (31.28–44.34)/43.77 (35.61–49.35)	44.0075 (28.04–57.63) /44.255 (38.44–55.96)/44.61 (35.61–57.98)
CD3+/CD8+T cell	29.00429 (20.34–39.01) /26.22857 (17.61–34.85) /26.94714 (14.98–36.43)	26.56 (18.71–41.82) /25.32625 (14.73–33.64)/ 25.49125 (14.67–37.55)
CD19 B-Cells	14.52429 (7.42–24.48) /20.82714 (9.99–29.56) /19.67429 (8.5-28.78)	14.8425 (7.06–22.03) /16.37375 (11.24–25.2) /19.32625 (12.94–25.36)
CD56 NK Natural Killer Cells	7.672857 (1.86–17.96) /5.687143 (0.46–10.96) /.162857 (1.81–4.45)	3.61875 (0.4-13.68) /3.7 (0.6–9.14) / 2.81125 (0.51–7.38)
Imature Platelet Fraction	7.928571 (1.9–18.2) / 7.271429 (1.3–20.7) / 6.457143 (1.1–16.5)	4.55 (1.8–11) / 4.35 (1.7–12) / 4.3125 (1.6–9.5)
Neutrophil : Lymphocyte Ratio	2.311429 (0.67–3.83) / 11.48857 (5.2-30.33) / 3.088571 (1.57–6.15)	5.66375 (1.81–23.15) / 11.24 (1.84–23.75) / 2.42375 (1.67–3.89)


Other Laboratory Data Available so far

Biocellular- Immunophenptyping (CD Cell absolute counts)				
CD3+ (T-Cells)	0H	(/ul)	1075.286 (558-1850)	936.875 (334-2299)
	6 H	(/ul)	654.1429 (209-1073)	774.5 (190-1723)
	24H	(/ul)	940.8571 (421-202)	1232.375 (521-1868)
CD3+/CD4+ Cells	0H	(/ul)	576.4286 (222-979)	564.625 (137-1538)
	6 H	(/ul)	325.5714 (128-533)	460.25 (118-1304)
	24H	(/ul)	650.7143 (270-1137)	722.75 (336-1858)
CD3+/ CD8+	0H	(/ul)	436.1429 (122-729)	334.5 (129-83)
	6 H	(/ul)	238.2857 (65-429)	232.375 (81-363)
	24H	(/ul)	361.2857 (166-871)	432.625 (146-738)
CD19 (B-Cells)	0H	(/ul)	207.7143 (111-419)	198.75 (60-400)
	6 H	(/ul)	192.8571 (64-396)	188.375 (51-551)
	24H	(/ul)	230.4286 (102-438)	326.625 (81-649)
CD56 (NK-Cells)	0H	(/ul)	92.42857 (33-159)	54.75 (14-172)
	6 H	(/ul)	53.85714 (6-131)	96.5 (4-94)
	24H	(/ul)	37.28571 (15-58)	54.5 (6-160)
TLC	0H		7.6 (5.1-9.8)	9.06 (5.9-14.8)
	6H		12.75714 (5.8-16.7)	10.45 (8.3-17)
	24H		9.657143 (7.2-11.3)	11.3125 (5.5-15.4)
ALC (absolute lymphocyte count)	0H		1790.857 (1030- 2282)	1734.125 (549-3225)
	6H		1117.714 (404-890)	1411 (611-2443)
	24H		1664.143 (886-3644)	2106.125 (1258-2971)

Conclusions: At completion the data (anaesthesia, MAC. routine laboratory, clinical pathway &PRO) will be analyzed, presented & discussed

P322

Postoperative Pain Control Following Laparscopic Segmental Colon Resection; TAP Blocks Evaluation ONQ Versus Exparel

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Introduction: Surgery remains the mainstay of management for the majority of colon cancer. Newer surgical techniques aim to improve postoperative pain and recovery process. The purpose of our study was to study two different pharmacologic agents used in Transversus Abdominis Plane (TAP) blocks and evaluate their efficacy is augmenting postoperative pain control.
Methods and Procedures: 20 consecutive patients that had a biopsy proven colon adenoma or adenocarcinoma following colonoscopy were included in our study. The first 10 (cohort 1) successfully underwent laparoscopic segmental colon resections. Their postoperative pain was augmented with a TAP block using On-Q pain pump catheter, administering ropivacaine at 12 cc/hr. The next 10 patients (cohort 2) underwent successful laparoscopic colectomies and had their pain management augmented with Exparel (bupivacaine liposome injectable solution).
Each patient received a PCA (patient controlled analgesia) pump with hydromorphone with identical parameters.
The amount of PCA narcotic administered was measured over the immediate 20 h post surgery. The number of attempts to self-administer pain medication was also measured. The amount/frequency of breakthrough narcotic medication administered was also recorded. Patient length of stay (LOS) in the hospital was recorded.
Results: There were 20 consecutive patients that were included in our study. Cohort 1 consisted of 10 patients. The average BMI was 31.6 and average length of surgery was 120 min. The number of PCA attempts was 437, with an average administration of 6.74 mg of hydromorphone dispensed. The LOS was 4 days. Cohort 2 consisted of 10 patients. The average BMI was 31.8. The average operation lasted 120 min. The number of PCA attempts was 468, with an average administration of 6.64 mg of hydromorphone. The average LOS was 3.8 days.
Conclusion: Poor pain management can lead to patients not wanting to get out of bed, perform their incentive spirometry or take an active role in their care. TAP blocks provide yet another method of reducing postoperative pain. From our study, we conclude that there is not any statistical difference in using On-Q versus Exparel techniques. The advantage of On-Q pain pump catheters, it that it does allow for the medication of be given in a bolus form, or titrated to the benefit of the patient. On-Q, however, cannot be given pre-operatively, and it involves two foreign bodies that the patient has placed in their abdomen. Exparel, can be given in the pre-op setting, and involves single time injections, without indwelling catheters.

P323

The Management of Fluid Collection After Laparoscopic Distal Pancreatectomy

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Background: Recently, laparoscopic distal pancreatectomy (LDP) became the standard procedure for resection of left sided pancreatic mass. Fluid collections (FC) at the resection margin of the pancreatic stump after LDP are the frequent radiological finding. However, no recommendations exist regarding its management. The aim for this study is to define FC incidence and suggest efficient treatment of FC after LDP.
Method: Data of 1227 patients who underwent LDP between March, 2005 and December, 2015 were collected. This data was analyzed, regarding follow-up CT scan findings of FC at the resection margin. FC was defined when the longest diameter on CT scan was >3 cm. We compared demographic data between FC positive and negative group. Within the positive group, we also compared its intervention and observation group. The basic characteristics of this intervention group consist of symptoms, laboratory findings, CT scan.
Results: A follow-up with at least one CT image was available for 1217 patients. 812 patients showed FC (66.7%) in immediate postoperative CT or outpatient CT image. FC positive was more common in male patients and FC positive group show longer operative time, post operative hospital stay than FC negative group. 736 FC patients (90.6%) were observed without specific treatment. 76 FC patients (9.3%) need intervention treatment, almost of them complain nausea, vomiting or pain (67 patients / 88%). 61 patients of intervention group (80.3%) show the size of FC increase at follow up CT image. EUS guided stent insertion for gastrocyststomy was performed in 54 patients (71.1%) of intervention group.
Conclusions: It was found that not all FC after LDP need the additional treatment despite the fact that is frequently found. Almost patients who treated with intervention have some symptom with FC increase at follow up CT image. We noticed that out of all drainage procedures, EUS guided gastrocystostomy was most useful for our experiment.

P324

Exparel with Enhanced Recovery Protocol for Abdominal Wall Reconstruction

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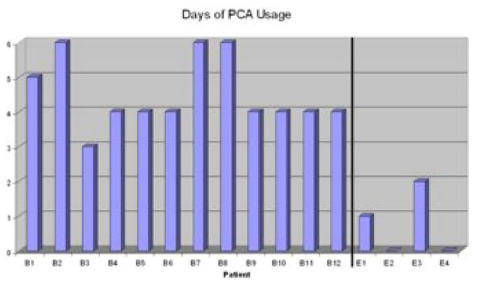
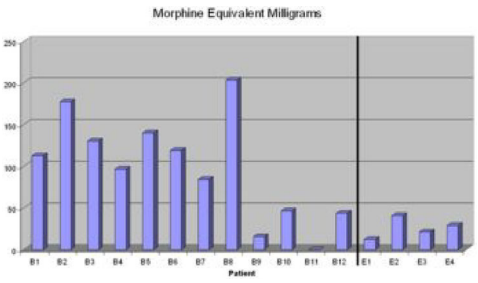
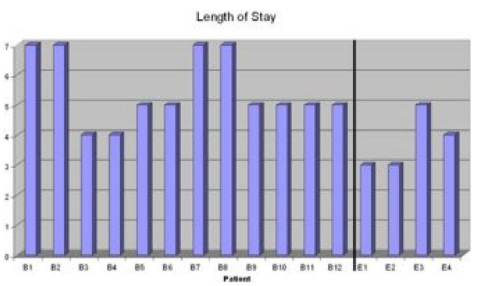
Introduction: Exparel offers extended local anesthesia, which can be additive to enhanced recovery pathways. These pathways have had favorable results seen in several surgical fields. Patients experience less pain and are discharged sooner. They return to activities and tolerate a regular diet more rapidly as well. We have devised our own enhanced recovery protocol and it was amended recently. Pre-operatively, we initiate patient education and perform routine testing. On the day of surgery, we follow guidelines recommended from pathways in other fields, such as colorectal and bariatrics. Most recently, we have altered our transversus abdominis plane (TAP) block to include liposomal bupivicaine instead of 0.25% bupivicaine. Our repairs are performed in a typical Rives-Stoppa fashion with Phasix mesh and either an endoscopic external oblique release or a transversus abdominis release. Post-operatively, our patients are given early enteral nutrition and are required to ambulate. The patients are discharged when tolerating a diet and ambulating with pain controlled on an oral regimen.
Method: We have prospectively collected data on all complex abdominal wall reconstruction from a single surgeon at this institution. We defined complex abdominal wall reconstruction as a hernia repair operation with a component separation. Between September, 2015 and August, 2016, there were 16 patients who underwent this procedure. Twelve patients underwent a TAP block with 0.25% bupivicaine and were listed in B group. Four patients underwent a TAP block with Exparel and were listed in E group.
Results: E group patients were on patient-controlled analgesia (PCA) devices shorter, used less non-PCA narcotics and had shorter inpatient stays. B patients used a PCA device for a mean of 4.6 days versus 0.75 days in E group ($p<0.0001$). B patients received non-PCA narcotics at a mean dose of 97.5 morphine-equivalent millgrams (mg) versus 25.5 morphine-equivalent mg in E group ($p=0.042$). B patients had a mean inpatient stay of 5.5 days versus 3.75 days in E group ($p=0.0175$). All of these results were statistically significant as listed.
Conclusion: Since we have started our enhanced recovery protocol, we have seen improved patient outcomes. We have added Exparel to our algorithm and observed that it is efficacious with patient outcomes continuing to improve. Physicians and surgeons are concerned about the cost of this medication. However, the cost of this drug is far outweighed by the money conserved with shorter-term PCA usage, less narcotic consumption and fewer inpatient days.







P325

Implementation of a Division-Wide Eras Program: A Dynamic Study Identifying Obstacles and Change Management to Improve Outcomes

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Background: Enhanced Recovery After Surgery (ERAS) initiatives are proven to accelerate recovery, improve patient outcomes, and reduce hospital costs. External pressures in the US to decrease cost, length of stay (LOS), and readmissions by implementing changes in payment have emphasized the need for ERAS. While awareness has grown, and tools to guide development of ERAS exist, there is little information on the implementation and audit process. Our goal was to describe the short-term outcomes and obstacles after implementation of a division-wide colorectal ERAS program, and steps devised for improvement.
Methods: A multidisciplinary team developed standardized educational materials and a program comprised of 22 care components spanning preoperative, intraoperative, and postoperative periods for elective colorectal resections. After senior-level buy-in and education for all patient-care team members, the program was implemented at an urban, tertiary-referral center. Prospectively collected data was entered into a divisional database, then analyzed for daily compliance and outcomes. Case analysis was performed to evaluate variables with poor adherence. 30-day outcomes were compared to a matched sample prior to ERAS implementation. Main outcome measures were adherence to ERAS elements and LOS and costs after implementation.
Results: 27 ERAS patients were evaluated in the 1st 30 days. Compared to the matched non-ERAS group, there was a significant decrease in mean LOS (3.70 [SD 1.51] vs. 6.05 [SD 3.92} days; p<0.01) and total direct hospital costs ($10,147 [SD $1,674] vs. $12,603 [SD $4,531]; p<0.01). ERAS patients were adherent to a median 17/22 elements (range, 14–20). Low adherence items (<70%) were preoperative volume/carbohydrate loading, TAP block placement, limited PACU stay, and diet and ambulation on the day of surgery. Adherence was lower for postoperative (78.15%) than preoperative (83.33%) and intraoperative elements (86.57%). To increase compliance, results were broadcast, with LOS and cost reductions highlighted. Teach-back methodology was employed, and processes developed to ensure TAP block placement. Audit reports were created to assess ongoing compliance and guide change management.

ERAS Element	n	%	
Preoperative			83.33%
Patient Counseling	27	100.00	
Oral/Mechanical Bowel Prep	23	85.19	
Preemptive Pain Management	25	92.59	
Preoperative Volume/Carbohydrate Loading	15	55.56	
Intraoperative			86.57%
Antibiotic Prophylaxis	27	100.00	
Minimally Invasive Approach	23	85.19	
TAP Block	16	59.26	
Goal Directed Intraoperative Fluid	27	100.00	
Opioid Sparing Pain Control	19	70.37	
PONV Prophylaxis	26	96.30	
No Abdominal or Pelvic Drainage	22	81.48	
No Nasogastric Tube	27	100.00	
Postoperative			78.15%
Limited PACU Stay (<240 minutes)	15	55.56	
DVT Prophylaxis (Started within 24 hours of Surgery)	27	100.00	
Diet on Day of Surgery Postoperatively	15	55.56	
Ambulation on Day of Surgery Postoperatively	16	59.26	
CBG Postoperative Day 1	20	74.07	
Foley Discontinued Postoperative Day 1	22	81.48	
Scheduled Opioid-free Multimodal Pain Control	24	88.89	
Scheduled Entereg	26	96.30	
Avoidance Of Patient Controlled Analgesia	25	92.59	
Restricted IV Fluids/ Early Hepblock	21	77.78	
ERAS vs. Non-ERAS 30-day Outcomes	**ERAS**	**non-ERAS**	**p-value**
Mean Length of Stay (LOS), days (SD)	3.70 (1.51)	6.05 (3.92)	<0.01
Mean PACU Time, min (SD)	279 (171)	408 (285)	<0.01
Mean Direct Costs, US Dollars (SD)	$10,147 ($1,674)	$12,603 ($4,531)	<0.01

Table 1: ERAS and non-ERAS Outcomes

Conclusions: The implementation of ERAS requires multidisciplinary education and compliance for success. Even early in implementation, significant benefits on LOS and costs are realized. Simple processes to identify outcomes and obstacles can facilitate successful change management. As increased adherence to ERAS elements is associated with faster recovery and lower complications, further study to increase adherence is warranted.

P326

Extending Enhanced Recovery to Operating Room: Outcomes for Operative Procedures Finishing After 7PM

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Background: While working to optimize outcomes, the impact of case timing and operative efficiency warrants investigation. Our goal was to determine if there is increased morbidity and mortality for elective colorectal procedures ending after 7 pm. Our hypothesis was that elective cases that end after 7 pm are associated with longer operative times, longer lengths of stay(LOS), and higher postoperative complications and readmission rates that comparable earlier cases.
Methods: ACS NSQIP was queried for elective inpatient colorectal resections from 1/1/15 −12/31/15. Procedures were stratified into those completed before 7 pm(standard) and after 7 pm(late). Univariate analysis was performed to identify differences in perioperative and outcome variables between the standard and late groups. Groups were evaluated on demographic variables to validate comparability. The main outcome measures were the expected versus actual complication rates, operative time, LOS, and readmission rate across groups.
Results: During the study period, 363 elective cases were studied: 294(81%) standard and 69(19%) late. The standard and late groups were similar in age, comorbidity, and surgeon experience. The mean BMI was significantly higher in the standard versus the late group (28.53 (SD5.78) vs. 26.17 (SD6.62); p=0.03). The primary diagnosis was diverticulitis in the late group(31.88%) and colon caner is the standard group(32.65%). The main procedure performed was an open low anterior resection in both groups (26.09% late, 21.77% standard). The operative time was significantly shorter in the standard versus late group(179.38 (SD100.66) min vs. 259.01 (SD106.89) min, p<0.01). The expected complication rate was 16.9% in the standard group, and 18.0% in the late group. The actual complication rate was 14.6% in the standard group, and 23.2% in the late group. Specifically, complications were higher for wound infections, urinary tract infections, deep vein thrombosis, C. Difficile infection, and sepsis. The mean LOS was significantly shorter in the standard group(5.89 (3.12) vs. 7.77 (6.59), p=0.04). Post discharge, the readmission rate was significantly lower in the standard compared to the late group(8.50% vs. 13.04%, p=0.03).
Conclusions: Elective colorectal procedures completed after 7 pm have higher than expected complication rates. Late cases were associated with longer operative times and higher readmission rates compared to a similar cohort finishing before 7 pm. As late case completion time appears to have a negative, preventable impact on patient safety and quality, efforts for more efficient workflow and scheduling are warranted. This administrative view demonstrates attention is needed at the institutional level to drill down on root causes on this matter.

Values	Before 7 (n=294)	After 7 (n=69)	p-Value
Mean Operative Time (min, SD)	179.38 (100.66)	259.01 (106.89)	0.01
Postoperative Complication (n, %)	43 (14.63%)	16 (23.19%)	0.05
Superficial Incisional SSI	17 (5.78)	7 (10.14)	
Deep Incisional SSI	3 (1.02)	5 (7.25)	
Organ/Space SSI	11 (3.74)	6 (8.70)	
UTI	1 (0.34)	4 (5.80)	
Transfusion Intraoperative/ Postoperative	11 (3.74)	9 (13.04)	
DVT Requiring Therapy	7 (2.38)	3 (4.35)	
C. difficile Infection	2 (0.68)	3 (4.35)	
Sepsis	5 (1.70)	5 (7.25)	
Mean Hospital Length of Stay (SD)	5.89 (3.12)	7.77 (6.59)	0.04
Readmissions w/in 30 days (n, %)	25 (8.50)	9 (13.04)	0.03
30 day Mortality	2 (0.68)	1 (1.45)	0.47

P327

Development of an Enhanced Recovery After Surgery (ERAS) Patient Kit for the Preoperative Period

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Background: To increase patient education, compliance with the preoperative elements of our Enhanced Recovery After Surgery (ERAS) program, and standardize care across practice providers, we sought to develop an Enhanced Recovery After Surgery preoperative patient kit. Our hypothesis was we could develop a cost effective product that could increase compliance and patient satisfaction for continuous quality improvement with our ERAS protocol.
Methods: An institutional multidisciplinary ERAS team developed a consensus on the necessary items for the preoperative surgical period. Items including antibiotics, bowel preparation, body cleansing, carbohydrate loading, and written education were packaged in a custom, branded box. The prototype was tested by patients, physicians, nursing, and ERAS advisory board members for feasibility, convenience, and perception. The feedback on the initial prototype was recorded after presentation to a multidisciplinary team at the institution's Family Patient Advisory Council.
Results: From the consensus meeting, a $9 \times 9 \times 6$in Gables Box with packaging paper branded with the institution's logo and colors were selected. The box contained Polyethylene Glycol 3350, Metronidazole, Neomycin, CHG Wash, a Gu® Hydration Packet and Energy Gel, our division's written patient manual for surgery, a 32 oz. branded mug, a whimsical stress ball, and brief directions for bowel prep and carbohydrate/ volume loading. The total cost for the ERAS preoperative patient kit was $46.81; total costs of all items separately were $110.91, a patient savings of $64.10. Positive feedback was received on the ease of use, packaging style, practice branding, production and time costs.
Conclusions: In response to a need to increase compliance with ERAS elements and patient satisfaction with the surgical experience, we found an institutional ERAS preoperative patient kit is feasible to create and cost effective for patients undergoing elective surgery. The product is easy to use, well received by patients and care team members, and has the potential to increase compliance of the ERAS protocol for both patients and physicians. Further study is warranted to monitor the impact of the product on patient outcomes once implemented into clinical practice.

P328

The Lymphocyte-to-Monocyte Ratio Predicts Postoperative Infectious Complications After Laparoscopic Colorectal Cancer Surgery

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Backgrounds: Although minimally invasive surgeries have been widespread, postoperative infectious complication (POI), which can increase length of hospital stay, medical cost, and worse survival, is still a major concern among colorectal surgeons. Recent studies demonstrated that simple and low-cost systemic inflammation- and immunologic-based scores (SIIS), such as Neutrophil-to-lymphocyte ratio (NLR) and platelet-to-lymphocyte ratio (PLR) could be prognostic factors for various cancers. There is recent evidence that relatively newly identified SIIS of the lymphocyte-to-monocyte ratio (LMR) is reported to be an independent predictor of long-term survival for patient underwent colorectal cancer surgery, and the predictive value is superior to established scores. However, the study evaluating LMR as a predictor of short-term postoperative outcomes is lacking. The aim of this study is to investigate the predictive potential of the preoperative LMR on postoperative infectious complications (POI) after laparoscopic colorectal cancer surgery.
Methods: This is a retrospective single-institutional cohort study at Department of Surgery, Nippon Medical School Chiba Hokusoh Hospital. Consecutive 211 patients underwent laparoscopic colorectal cancer surgery with primary tumor resection from Jan 2014-Aug 2015 were enrolled. Patients were categorized into two groups (non-POI: n=176) and POI: n=35). The relation of clinicopathologic variables and SIIS including NLR, PLR, and LMR with POI were analyzed and then multivariate logistic regression analysis was conducted. Receiving operator characteristic (ROC) curve analysis was used for determination of cutoff points of preoperative LMR.
Results: In univariate analysis of all patients, sex, body mass index, smoking, conversion to open surgery, surgery duration, transfusion, composite resection, blood albumin level, and preoperative LMR were significantly different between the groups. Other SIIS of NLR and PLR did not significantly differ. The lower LMR (cutoff 3.46), longer surgery duration, and smoking remained to be statistically significant for POI in multivariate analysis (LMR: odds ratio 3.97, 95% confidence interval 1.44–10.9, P=0.008). In the comparison of high and low LMR groups, the low LMR group had more advanced and aggressive tumor characteristics (size, depth, lymph node metastasis, and stage).
Conclusions: This is the first report that the lower LMR is a predictive factor for POI after laparoscopic colorectal cancer surgery, and it may provide additional information for treatment decisions to prevent POI.

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Acute Appendicitis Pathway: A Systemic Review

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Introduction: Despite the effectiveness of clinical pathways in reducing healthcare cost and minimizing variability in management of particular disease; there is no standardized pathways for common conditions such as appendicitis. This systematic review aimed to determine whether implementation of a pathway for acute appendicitis in surgical practice leads to improve patient care.
Methods: A systemic review was performed of PUBMED, MEDLINE and Cochrane Library from 1974 to December 2015.The inclusion criteria were human, appendicitis, clinical pathway, original article and English language. Abstracts of retrieved studies were reviewed and those meeting inclusion criteria were selected for full review. Thirty-seven of the identified studies comprised of 16,006 participants met the selection criteria.
Results: There was a clear definition of the appendicitis pathway within 30 articles. However, only 7 articles studied the effect of three components of pathways in their patients. The diagnosis of appendicitis was mainly based on clinical presentation and laboratory findings. 43% of the studies used US and/or CT scan for diagnosis of appendicitis. There was a clear definition for discharge criteria in 16/37 studies. Ten studies reported time of follow up for their patients, which ranged from 5 to 28 days. Operative time was the most commonly used outcome measure 25/37 (67.5%). Nine articles reported length of stay for non-complicated appendicitis, mean=1.3 days; and eight articles for complicated appendicitis, mean=6.26 days. Majority of studies investigated the accuracy of pathway in diagnosis of appendicitis by looking at incidence of normal appendix, mean=9.15%. 4/37 articles documented the mean cost of patient's care, mean=4,874.14 $.
Conclusions: There is a lack of standardized definition of appendicitis pathway components within the medical literature. In addition, few studies identify standards setting for discharge criteria for their patients. Nevertheless, these studies suggested that appendicitis pathway decreases duration of hospitalization and may prove useful as a means to minimize costs. Implementation of an evidence based appendicitis pathway is needed to standardized patients' care and improve outcomes.

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Patient Satisfaction of Post Operative Pain Management in the Colorectal Unit at a Tertiary Referral Hospital

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Introduction: Effective management of post-operative pain is key in improving the post-operative experience, reducing complications and promoting early discharge from hospital. We attempted to evaluate the quality of post-operative pain relief in colorectal surgery patients at St Thomas' Hospital
Methods: We used a patient questionnaire given to post-operative patients prior to discharge over a randomly selected two week period in March 2016. Our standards included that all patients should be pain free at rest, be informed of what their post-operative analgesia would be, should be satisfied with their pain management and feel that staff did everything they could to help control their pain.
Results: Twenty questionnaires were completed from twenty one patients. Overall, 90% of patients were satisfied with their post-operative pain relief and all twenty agreed that staff did everything they could. 19% of patients were not aware of their post-op analgesia regime and 20% said they were not aware of how often they could request analgesia. The results were presented at the anaesthetics department audit meeting and sent to the matron of the colorectal ward.
Conclusion: Patients counselling and engaging preoperatively can improve their satisfaction of post operative analgesia and pain management.

P331

Measuring In-Hospital Recovery After Colorectal Surgery: A Comparison Between Hospital Length of Stay and Time to Readiness for Discharge

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Introduction: Hospital length of stay (LOS) is often used as a measure of in-hospital recovery but may be confounded by organizational factors. Evidence suggests that the time to achieve discharge criteria (time to readiness for discharge (TRD)) provides a superior index of recovery in traditional care settings; however, enhanced recovery pathways (ERPs) may reduce care process variances and differences between LOS and TRD may become irrelevant. Our study aimed to contribute evidence for the construct validity of TRD and LOS as measures of recovery after colorectal surgery in the context of an established ERP.
Methods and Procedures: This study involved 100 consecutive patients undergoing elective colorectal resection (mean age 65, 57% male). Construct validity was evaluated by testing a priory hypotheses that LOS and TRD are longer in patients (1) undergoing open vs. laparoscopic surgery, (2) with lower vs. higher physical status, (3) with severe vs. no/less severe comorbidities, (4) with postoperative complications vs. no complications, (5) undergoing rectal vs. colon surgery, (6) older (≥75) vs. younger, (7) with stoma vs. no stoma and (8) with inflammatory bowel disease (IBD) vs. no IBD. Study design was guided by the COSMIN consensus on measurement properties.
Results: Median TRD and LOS was 3 days [IQR 2–4] and 3 days [IQR 3–5], respectively. 44% of patients stayed in hospital after TRD (median 1 day longer). For both TRD and LOS, 6 out of 8 hypotheses were supported (Table).
Conclusions: This study contributes evidence to the construct validity of TRD and LOS as measures of in-hospital recovery, suggesting that they can be interchangeably used in context of established ERPs. Our findings support the role of ERPs in decreasing process of care variances that impact LOS, allowing timely discharge once discharge criteria are achieved.

Hypothesis	TRD*		LOS	
	Mean difference (95%CI)	Hypothesis Confirmed?	Mean difference (95% CI)	Hypothesis Confirmed?
Open vs. laparoscopic	+5.1(+1.5,+8.5)	Yes	+5.0(+1.3,+8.6)	Yes
Lower (ASA≥3) vs. higher (ASA<3) physical status	+0.05(+1.5,+8.5)	No	-0.1(-4.2,+4.0)	No
Severe (CCI≥3) vs. no/less severe comorbidities (CCI<3)	-1.6(-5.3,+2.0)	No	-2.0(-5.8,+1.6)	No
Complications vs. no complications	+5.2(+2.4,+8.0)	Yes	+5.6(+2.8,+8.4)	Yes
Rectal vs. colon	+1.4(-1.4,+4.3)	Yes	+1.6(-1.3,+4.5)	Yes
Older (≥75) vs. younger	+2.3(-1.6,+6.2)	Yes	+2.5(-1.4,+6.5)	Yes
New stoma vs. no stoma	+2.8(-0.3,+6.0)	Yes	+3.0(-0.2,+6.2)	Yes
IBD vs. no IBD	+3.9(-0.4,+7.5)	Yes	+4.2(+0.6,+7.8)	Yes

CCI= Charlson comorbidity index, ASA=American Society of Anaesthesiologists score.
Mean difference ≥1 day was deemed clinically significant.
*Tolerance of oral intake, flatus, pain control, mobilization and no complications

P332

Incisional Negative Pressure Wound Therapy Following Colorectal Resection: Preliminary Report from a Single Site, Prospective, Randomized Control Trial

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Background: Superficial surgical site infection (SSI) is a preventable postoperative complication that impacts length of hospital stay, health care spending, and patient morbidity/mortality. Numerous trials have sought to establish perioperative protocols to reduce the incidence of SSI. Recently, literature has been produced on the efficacy of incisional Negative Pressure Wound Therapy (iNWPT) in orthopaedic, vascular, and cardiac surgical patient populations. Previous studies in general surgery have demonstrated a reduction of up to 50% in the SSI rate with the use of iNWPT. Currently there is no randomized data to support the use of iNWPT. Our objective is to examine the effect of iNWPT on wound complication rates in elective colorectal resections both open and laparoscopic. This will be accomplished in a single center, prospective randomized clinical trial.
Methods: This is a single-institution, prospective, randomized, open-label, superiority trial. Patients scheduled for elective colorectal resection with or without creation of an ostomy (open or laparoscopic) will be considered eligible. Exclusion criteria includes patients who are under 19, pregnant, immune compromised, allergic/sensitive to adhesive dressings, operations performed under an emergent basis, without an anastamosis(e.g. APR/Hartmann), for palliation or without a midline incision made for specimen extraction. Cases involving additional procedures at time of CRR (eg. hernia repair) will also not be included. Patients will be randomized to receive iNWPT or conventional dressings. Primary outcomes will be wound complications within the first 30 post operative days. SSI rate will also be reported as a subgroup analysis. Secondary outcomes will include length of stay, # of post-operative visits in the 30 day period, complications, wound vac specific complications and patient satisfaction. Data will be collected prospectively through our Enhanced Recovery After Surgery (ERAS) audit group.
Results: Currently recruitment is yet to start however we hope to present preliminary results at the upcoming SAGES meeting in March 2017.
Conclusions: We hope to show that iNWPT leads to a lower incidence of wound complications and should be integrated in to a standard ERAS care pathway.

P333

Endoscopic Management of Sleeve Gastrectomy Leaks: A Single Institution Experience

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Sleeve Gastrectomy has become an increasingly common operation in bariatric surgery. In fact, in 2014, sleeve gastrectomy comprised over 50% of bariatric operations in the United States. Post-sleeve gastrectomy leaks are a rare but feared complication, being associated with significant morbidity. This study was designed to review our institution's experience and successes with endoscopic management of sleeve gastrectomy leaks, and evaluate the potential for an algorithm or protocol. From November 2011 to August 2016, 20 patients with post-sleeve gastrectomy leaks were referred to our institution and managed primarily with endoscopic interventions. A retrospective chart review has been conducted assessing the characteristics of the sentinel operation, endoscopic findings, and management excluding operative revision. Of the 20 patients, two underwent open, thirteen laparoscopic, and five robotic-assisted sleeve gastrectomy. Four patients had undergone previous weight-loss surgery. Eight presented with early leaks within 1 week of surgery, 11 presented between 7 and 33 days post-op. Reviewing the available operative reports, bougie size ranged from 34 to 40Fr when described, and a variety of buttresses were used including fibrin sealant, omental patches, and over-sewing the staple line. The proximal staple line was the site of leak in 19 cases; one patient had synchronous proximal and distal fistulae. Treatment includes NPO, IV antibiotics, parenteral or jejunal nutrition, percutaneous drainage if appropriate, and a multidisciplinary approach. Endoscopic techniques used to assist closure include WallFlex stents, transgastric pigtail stents, bear claws, fibrin injections, marsupialization, and endoluminal suturing. Four patients only required one intervention. Fibrin injections were never the final step to closure. 19 patients healed after only endoscopic management, and only 1 patient underwent completion gastrectomy with esophagojejunostomy. The median time to closure in primary cases was 0.4 years with 4 interventions, compared to 1.2 years and 6 interventions for revisional cases. In conclusion, leaks following sleeve gastrectomy can be successfully managed with repeat endoscopic intervention. They most frequently occur at the proximal staple line and have a longer and more complex treatment course following revisional bariatric surgery. While the number was too small and the gastroenterology experience too varied to yet make a protocol, we unexpectedly noted a stark difference in the time to closure and number of interventions required when comparing revisional to primary bariatric surgery. This should be discussed with all sleeve gastrectomy pre-op patients who have previously undergone bariatric or foregut surgery, and perhaps earlier surgical intervention is warranted in the event of a leak.

P334 Endoscopically Assisted Transcervical Esophago-Gastrostomy Tube Placement for Non-operative Intestinal Obstruction: An Alternative to PEG Placement

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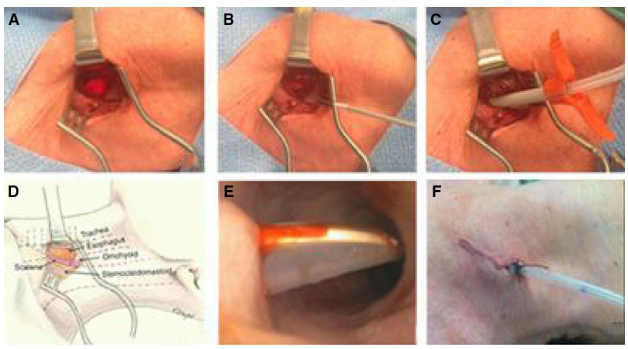
Introduction: Surgical gastrostomy, gastrojejunostomy, and percutaneous endoscopic gastrostomy (PEG) have been used palliatively for bowel decompression and feeding in patients with carcinomatosis. However, there are circumstances that make these methods contraindicated. Percutaneous transcervical esophago-gastrostomy tube placement has been reported as an alternative in such cases but previously reported techniques involve the use of specialized kits requiring rupture-free balloons (which are unavailable in the United States), fluoroscopy, and ultrasound.We present a hybrid technique for the placement of a cervical gastrostomy tube using endoscopic guidance, commonly available equipment, and techniques familiar to most surgeons.
Methods and Procedures: With the patient under general anesthesia, an esophagogastroduodenoscope is introduced and the esophagus, stomach, and duodenum are inspected. The endoscope is then withdrawn to 20–30 cm from the incisors and kept in place. A four cm incision is made in the inferior left neck anterior to the sternocleidomastoid muscle. Dissection is carried down to the cervical esophagus taking care to retract the carotid sheath posteriorly. Under palpation, the scope is withdrawn above the level of dissection and trans-illumination of the esophageal wall is performed (Fig. 1A). A Seldinger needle is used to introduce a guidewire into the esophagus under endoscopic guidance (Fig. 1B). A 16-Fr dilator and sheath are placed using the guide wire (Fig. 1C). A 14-Fr silicone nasogastric tube is introduced through the sheath into the stomach. Placement is confirmed endoscopically (Fig. 1E). The tube is secured to the skin and the incision is closed.
Results: This endoscopically assisted transcervical esophago-gastrostomy tube placement (EATEG) was effective in achieving palliation of intestinal obstruction in our patients. Our first patient experienced return of obstructive symptoms six weeks after placement due to the gastric tube refluxing and kinking in the esophagus. This resolved spontaneously. In the second patient, obstructive symptoms and dysphagia resolved with systemic chemotherapy and the EATEG was removed two months after placement.
Conclusion: In the long-term setting, a cervical exit point for a gastrostomy tube is more tolerable for patients and more socially acceptable compared to a naso-gastric tube. Unlike previously reported techniques, our hybrid method uses widely available materials and familiar methods to place EATEG safely and effectively. Placement by endoscopic assistance keeps dissection in the neck to a minimum.



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A Prospective Randomized Study of Intraperitoneal Instillation of Ropivacaine Versus Bupivacaine in Reduction of Post Operative Pain After Laparoscopic Cholecystectomy

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Introduction: The study was conducted to compare the efficacy of intraperitoneal instillation of Ropivacaine versus Bupivacaine for post operative pain relief after laparoscopic cholecystectomy and to compare the analgesic requirement and overall morbidity in patients with either of two interventions.
Material and Method: This prospective study was conducted in the Department of General Surgery, Govt. Medical College & Rajindra Hospital Patiala. 60 patients with symptomatic gall stones disease undergoing laparoscopic cholecystectomy were included with equal distribution either Group A (n=30 patients) received 0.5% of 30 ml (150 mg) of ropivacaine instillation at gall bladder bed ; Group B(n=30) received 20 ml of 0.5% bupivacaine hydrochloride at gall bladder bed and sub diaphragmatic space at the end of surgery. All cases were performed by experienced laparoscopic surgeons.
Intensity of pain was assessed on visual analogue scale (VAS) with evaluation at 6, 12, 24, 48 h postoperative. Analgesic requirements was assessed in terms of requirement of number of Inj. Diclofenac Sodium (75 mg) I/m. Nausea and vomiting was assessed depending upon the episodes, number & need for anti emetic medication.
Results and Conclusion: Intensity of pain was assessed on visual analogue scale (VAS) with evaluation at 6, 12, 24, 48 h postoperative.. There was found significant difference among both the groups in terms of VAS score, abdominal pain, shoulder pain and analgesic requirement at 12 h but no such significance was seen in 6, 24 and 48 h.
To conclude intraperitoneal instillation of Ropivacaine or Bupivacaine reduced post operative pain significantly and amongst two groups. Bupivacaine was better at 12 h as shown by decreased VAS score, decreased shoulder tip pain, decreased analgesic requirement. Otherwise at 6, 24 and 48 h this difference was not significant among two groups.

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Endoscopic Rescue of Early Percutaneous Endoscopic Gastrostomy Tube Dislodgement

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Objective: Percutaneous endoscopic gastrostomy (PEG) tube placement is the standard of care for establishing durable enteral access. Early PEG dislodgement occurs in <5% of cases but usually prompts urgent surgical intervention to reestablish the gastrocutaneous tract and prevent intraabdominal sepsis. To date, there is only a single literature reported case where successful endoscopic "rescue" of early PEG dislodgement negated the need for operative intervention. Here we report our experience with a series of PEG rescues.
Methods and Procedure: A retrospective review of prospectively collected cases was reviewed from two institutions. Patients with dislodged PEGs and hemodynamic instability or peritonitis were excluded from endoscopic intervention and underwent surgical intervention. Stable patients underwent PEG rescue in the operating room under general anesthesia. A diagnostic gastroscope was inserted per os and advanced to the stomach under carbon dioxide insufflation. The previous gastrostomy site was identified on the anterior wall of the stomach and a wire-guided dilating balloon was used to traverse the gastrotomy site with the endoscope. The peritoneal cavity was surveilled and gross contamination irrigated and suctioned. A looped guidewire was placed through the prior cutaneous incision and withdrawn through the gastrotomy tract retrograde and out of the mouth with the aid of an endoscopic snare. A new PEG tube was affixed to the wire and standard Ponsky 'pull' technique used to complete PEG replacement. Gastropexy with gastrointestinal T-anchors was performed in the majority of cases.
Results: Eight patients were identified in the databases. Average age was 68 ± 12 years. The most common indication for PEG placement was dysphagia. Early dislodgement occurred between postoperative day 0 and 7 and the average time to PEG rescue was 10 h post-dislodgement. Operative time averaged 95 min and time to reinitiating enteral feeding was 48 h. There were no complications related to endoscopy or PEG dislodgement. Two patients required subsequent conversion to a trans-gastric jejunal feeding tube for delayed gastric emptying.
Conclusions: PEG dislodgement is an uncommon but well recognized occurrence traditionally requiring urgent surgical intervention. PEG rescue permits safe re-establishment of the gastrostomy tract while avoiding laparoscopic or open surgical intervention in stable patients. In this series, patients tolerated the procedure well and were able to resume feeding shortly after intervention. Endoscopic rescue represents a feasible noninvasive option for PEG tube replacement.

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The Feasibility of Same Day Discharge Following POEM Procedure

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Introduction: Per oral endoscopic myotomy (POEM) is increasingly being used for esophageal motility disorders. A potential benefit over standard Heller myotomy is POEM's less invasive nature, resulting in quicker hospital discharge. Our objective was to assess the feasibility of same day discharge following POEM.
Methods and Procedures: All patients with esophageal dysmotility disorders were enrolled in a research ethics board-approved study. Pre-operative evaluations included manometry, 24-hr pH testing, endoscopy, and Eckhardt Symptom Score. POEM was performed on the anterior esophageal wall, dividing only the circular muscle fibers. All patients underwent a routine water-soluble contrast study 3–5 h following POEM. Discharge criteria included normal contrast study, ability to tolerate oral fluids, good pain control on regular acetaminophen and nutritional consultation. Patients were re-evaluated using the Eckhardt score on postoperative day 14.
Results: Eighteen patients underwent POEM procedure: fourteen with achalasia, one with nutcracker esophagus, one with jackhammer esophagus, and one with hypertensive lower esophageal sphincter. Mean operative time was 120 min (55–208 min). Two patients developed a mucosal tear that was repaired intraoperatively. Two patients experienced postoperative complications: one patient developed significant pneumoperitoneum and one patient experienced transient atrial fibrillation, with both conditions resolving without treatment. Sixteen patients (89%) were discharged the same day.
Conclusion: Same day discharge following POEM is feasible and safe.

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Cholangiogram Filling Defects in Biliary Pancreatitis: Not Always Secondary to Stone Disease

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We reviewed our experience with biliary pancreatitis from July 2015 – September 2016. A total of 132 cases of biliary pancreatitis were managed on the therapeutic endoscopy service. All were confirmed to be secondary to stone or sludge in the biliary tree at the time of ERCP except for two cases. We present these two interesting cases of non-stone related biliary pancreatitis.
The first case was an 85-year old female admitted with biliary pancreatitis. MRCP showed a thickened gallbladder and cholelithiasis with intrahepatic duct dilation. Differential included Mirizzi syndrome versus locally invasive gallbladder cancer. The hepatobiliary service favored stone disease given the presentation with pancreatitis with planned open cholecystectomy. Pre-operative ERCP was requested. Multiple filling defects were confirmed in the distal bile duct on cholangiogram. Sphincterotomy and subsequent bile duct clearance revealed tumor debris. Brushings of common hepatic duct narrowing confirmed adenocarcinoma. The patient was effectively palliated with a biliary stent.
The second case was an 82-year old female with admission for severe biliary pancreatitis. She underwent uneventful cholecystectomy following resolution of her pancreatitis. Recurrent admissions were subsequently managed by the medicine service, due to comorbidities. Upon re-referral to therapeutic endoscopy, she underwent ERCP. Initial cholangiogram images showed multiple large filling defects within the common bile duct. Due to the length of procedure, bile duct clearance was deferred. She underwent a small sphincterotomy and stent placement. She had uneventful recovery and subsequent discharge. She was readmitted with melena two weeks later, and EGD and ERCP confirmed hemobilia with no evidence of bile duct stones. CT Angiography revealed a right hepatic artery aneurysm decompressing into the biliary tree, which was successfully coiled by interventional radiology. Final diagnosis was recurrent pancreatitis secondary to blood clot within the biliary tree.
The majority of filling defects on biliary imaging are stones or sludge, but as these cases illustrate other causes are possible. Additional causes described in the literature include foreign bodies like clips, and parasites. These alternative etiologies may require different management than the standard cholecystectomy and bile duct clearance.

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Endoscopic Management of Complications After Foregut Surgery

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Background: The management of obstruction and leaks has been revolutionized by standard and newer endoscopic modalities. We retrospectively reviewed our prospective database of patients requiring complex endoscopic therapies Technical success as well as overall clinical improvement were carefully studied and reported.
Method: We performed a retrospective review of our Endoscopic database to identify patients having had foregut surgery that subsequently were diagnosed and treated for leaks or obstructions at our quaternary referral center. Data collected and analyzed included demographics, type of surgery, type of complications, endoscopic modality used, and overall technical and clinical success.
Result: From January 2012 to July 2016, 28 patients (14 males, Mean age 53.21 ± 12.22, Mean BMI 29.13 ± 8.28) met the criteria for this study. 13 patients had undergone bariatric surgery, 11 patients had upper gastrointestinal (UGI) cancer surgery, and 4 patients had other benign esophageal, gastric or duodenal operations. The diagnosis of leak was found in 19 patients and obstruction in 15. 13 patients had leaks alone. 11 patients had only obstruction and 4 patients had both a leak and obstruction.
The mean time to diagnosis of the complication was 37.3 ± 52.18 days (0-229) from index surgery. Time to first endoscopic treatment was 10.5 ± 20.86 days (0–50) after the complication was diagnosed. Treatment modalities varied but often included various types of stents. Forty-five stents and catheters were used; 40 self-expanding metal (stents SEMS), 2 salivary bypass stents, and 3 double pigtail catheters. Of the SEMS, the majority of SEMS were partially covered (74.4%). Stent complications occurred in 3 cases and included 1 migration, 1 malposition and one disruption of the covering of the stent. Each complication was successfully addressed endoscopically. All stents were subsequently removed without complication. Clinical endoscopic success was demonstrated in 22/26 (84.6%) patients. Average duration of endoscopic therapy was 45.34 ± 26.02 days. The mean number of sessions was 3.46 ± 1.9. Two patients required revision surgery. Two patients died with unrelated endoscopic therapies and secondary to nature of disease.
Conclusion: Endoscopic salvage therapy for obstruction and leaks following benign and malignant foregut surgery are highly successful and definitive when properly selected. Multi-modal and escalating endoscopic therapy is crucial to success and surgical intervention rarely may be required.

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Evaluation of Esophageal Anastomotic Stricture Dilations After Transhiatal Esophagectomy for Esophageal Cancer

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Introduction: Esophageal anastomotic stricture is a well described complication after transhiatal esophagectomy (THE). We have recently examined the management and provided treatment recommendations after the initial endoscopic therapy for esophageal stricture after THE. Here we expand upon those findings examining the effects of cancer stage, neoadjuvant treatment and post operative complications on esophageal dilations.
Methods: We performed a retrospective review of one surgeon's experience with esophageal dilations after THE between 2009–2013. Patient demographics: n = 43, age = 59, 95% male, 5% female. Patients with T3 lesions and/or node positive received either neoadjuvant chemotherapy or chemoradiation and restaged prior to surgical intervention. Two surgeons performed THE, either thru an open or laparoscopic approach, and one surgeon performed all endoscopic therapies.
Results: For all cases, average: number of dilations, time since surgery, time since first dilation and time between each dilation was: 3.67, 313 days, 197 days and 44 days, respectively. The effect of neoadjuvant therapy was evaluated. No neoadjuvant vs neoadjuvant therapy: number of dilations: 3.50 vs 3.88; time since surgery: 282 vs 343 days; time since first dilation: 189 vs 211 days; and time between each dilation: 39 vs 61 days. Post operative complications requiring intervention (eg wound infection/drainage, abscess, fistula) were also evaluated: number of dilations: 2.96 vs 5.07; time since first surgery: 270 vs 416 days; time since first dilation: 143 vs 318 days; and time between each dilation: 42 vs 77 days. For all cases, the time between the penultimate and final dilation was 105 days. For those patients undergoing multiple dilations (>3), the time between the penultimate and final dilation was 171 days. Additionally, for those receiving >3, there was no discernable difference in the number of days of between each dilation for those receiving neoadjuvant chemotherapy compared to those with post operative complications.
Conclusion(s): Our results demonstrate that patient's with higher stages of esophageal cancer who receive neoadjuvant modalities require more frequent dilations and a longer course of endoscopic management. Furthermore, a post operative complication after a THE, regardless of the cancer staging or neoadjuvant course, on average will double the number of dilations and total time of therapy.

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Novel Approach to the Removal of an Esophageal Impacted Food Bolus with Ewald Orogastric Tube and Irrigation

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The most common esophageal foreign body (FB) in adults in the Western world is impacted meat or other food. More than 80% of ingested FB pass without need for intervention. The mainstay of retrieval is via an endoscopic approach. Removal may be in a piecemeal or en-bloc fashion with the use of a variety of endoscopic tools including polypectomy snare, retrieval net, friction-fit adaptor or banding cap. If unable to retrieve the FB, it is recommended that the food bolus not be advanced to the stomach until after the distal portion of the esophagus is inspected, as the push technique may lead to perforation. During the use of the push technique a bolus of glucagon may be administered to allow relaxation of the lower esophageal sphincter (LES). The retrieval of impacted food bolus can be tedious and time consuming. We present a case in which a novel approach to the retrieval of food bolus was used in conjunction with the use of standard retrieval techniques.

A 62 year old female presented with complaints of epigastric pain, dysphagia, vomiting, weight loss and constant sensation of fullness. During work-up a chest x-ray showed air-fluid level of the esophagus suggestive of obstruction and she was taken for urgent esophagogastroduodenoscopy (EGD). The patient was intubated for airway protection. The endoscope was advanced and large amount of food bolus was encountered at 32 cm into the esophagus. Multiple attempts were made to retrieve the FB with the use of retrieval net and forceps, due to the degree of stenosis of the oropharynx an overtube was not utilized. The FB was being retrieved piece meal and was becoming difficult to remove due to adherence to the esophageal wall. Decision was made to advance the endoscope past the FB to examine the distal esophagus and stomach, which appeared to be in good shape, we then proceeded to administer glucagon and push technique, which were unsuccessful. The decision was made to proceed with continuous irrigation via the endoscope and suctioning via an Ewald orogastric tube. We began to administer multiple liters of sterile water irrigation with simultaneous suction on a 34 french Ewald tube. The Ewald tube tip always remained in view of the endoscope and food particles were continuously irrigated into the tube and removed via manual intermittent suction. In conjunction with standard techniques this approach made it possible to remove the entire FB in a timely manner.

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Routine CT Prior to PEG Tube Placement Does Not Reduce Complication Rates

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Background: Percutaneous endoscopic gastrostomy (PEG) tube is one of the most common methods of providing long term nutritional support to patients with a functional gastrointestinal tract. Some providers recommend obtaining a CT scan prior to performing PEG to rule out overlying viscera such as the transverse colon or left hepatic lobe. The purpose of our study was to evaluate if CT imaging prior to PEG tube placement resulted in a lower complication rate when compared to transillumination with visualization of the indentation of the operators finger alone.

Methods: A Retrospective chart review was performed on all patients who underwent PEG tube placement between January 1st, 2013 to June 30th, 2016. Those who underwent placement for reasons other than providing nutritional support, such as venting PEG, were excluded. Demographics, BMI, reason for PEG tube placement and if a CT scan was obtained prior to PEG tube placement were extracted. Statistical analysis was performed with Fischer exact test for categorical variables and Mann-Whitney-U Test for continuous variables.

Results: There were 133 patients who underwent PEG tube placement between Jan 1st, 2013 and June 30th, 2016. Of these 22 were venting PEG tubes for malignant bowel obstructions, leaving 111 patients meeting inclusion criteria, 38 patients had a pre-procedure CT (PPCT group) and 73 patients did not have a CT prior to the procedure (NCT group). There were no differences between the groups in regard to sex, BMI, or reason for PEG tube placement. The PPCT group was older (63.7 vs 53.4 years, $p<0.01$). When the PPCT group was compared to the NCT group there was no difference in the rate of bleeding events (2.6% vs. 0.0% p=0.34), need for operative intervention (2.6% vs. 5.4% p=0.66) and accidental PEG tube dislodgements (5.2% vs 5.4% p=1.0). The NCT group had one injury to a surrounding organ with a PEG tube placed through the colon. It should be noted that the operator in this case failed to transilluminate the abdominal wall prior to puncture.

Conclusion: Routine CT to evaluate for unfavorable anatomy such as overlying liver or transverse colon prior to PEG tube placement does not result in a reduced complication rate. Safe site selection utilizing the correct technique of transillumination of the abdominal wall and visualization of the indentation of the operator's finger is essential for safe PEG tube placement.

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Laparoscopic and Endoscopic Cooperative Surgery for Duodenal Submucosal Tumors

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Natural orifice transluminal endoscopic surgery (NOTES) is a minimally invasive surgery, but the procedures using only a flexible endoscope are technically demanding for gastrointestinal submucosal tumors. Meanwhile, surgical or laparoscopic resection sometimes results in inadequate resection because it is difficult to precisely recognize the border of tumor without an endoscope. Therefore, Laparoscopic and Endoscopic cooperative surgery (LECS) is one of ideal procedures in NOTES.

We have performed LECS for two patients with a duodenal submucosal tumor. Briefly, the tumor was resected endoscopically with 5 mm safety margin of a full-thickness duodenal wall with the aid of a laparoscope. Then, layer-to-layer suture closure of the duodenum was completed laparoscopically. The specimen was removed through the mouth in both cases. Both the tumors were resected en bloc with a negative surgical margin. Histologically, the first case was diagnosed gastrointestinal stromal tumor classified in the very low risk group in modified-Fletcher's criteria, and the second case was diagnosed carcinoid (neuroendocrine tumor G1). The tumor size was 15 mm and 8 mm, locating on the anterior wall of the descending part and the anterior wall of the duodenal bulb, respectively. The operating time was 154 min and 234 min, respectively, and estimated blood loss was less than 10 ml and 125 ml, respectively. The postoperative course was uneventful with no anastomosis leakage, stenosis, or bleeding in both cases. The length of postoperative hospital stay was 8 days each. We conclude that LECS can be safely and successfully performed even for small duodenal submucosal tumors.

P344

Bolus Somatostatin for the Prevention of ERCP Induced Pancreatitis: Systematic Review/Meta-analysis

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Background: Following diagnostic/therapeutic ERCP, pancreatitis can occur in up to 9.7% of cases. For the last two decades research has been done looking at potentially effective pharmacologic prophylaxis, with several meta-analysis looking at somatostatin administration peri-procedurally. While no conclusive answer has been found, sub-group analysis has pointed towards a potential benefit with bolus somatostatin administration. This meta-analysis is the first dedicated review looking at only bolus somatostatin administration for reduction of post-ERCP pancreatitis.

Methods: A systematic review and meta-analysis was performed on all studies involving patients undergoing ERCP, who received bolus somatostatin compared to no pharmacological prophylaxis. A literature search was conducted on MEDLINE, EMBASE, and CINAHL. Articles were appraised by two current senior general surgical residents in the Memorial University program.

Results: Four studies were included in the final systematic review/meta-analysis. Following tabulation of all four studies somatostatin bolus was found significantly reduce the incidence of post-ERCP pancreatitis (OR 0.27 [0.13–0.53]).

Conclusion: Bolus somatostatin injection during ERCP decreases the incidence of post-procedure pancreatitis. While this review has found this effect to be statistically significant, limitations in interpretation of these results arises due to the inherent methodological flaws within two of the included studies. Never-the-less an argument can be made that bolus somatostatin injection is a safe and effective measure to decrease the incidence of post-ERCP pancreatitis, and that further exploration into its use is warranted.

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Does Endoscopic Ultrasound Scope Design Influence Duodenal Perforation Rate?

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Background: The indications for Endoscopic Ultrasound (EUS) for both diagnostic and therapeutic purposes have greatly increased and it is more widely available. Little has been published on the risk of perforation. The true incidence and risk factors for perforation are not well characterized in the literature. Factors outlined are the patient's specific anatomic factors, older age and endosonographer's experience. The often less mentioned and critical predisposing factor is the scope itself. Compared to standard endoscopes, the larger diameter, longer non-bending distal end and the oblique view of the instrument may be factors that influence the perforation rate. The aim of this study is to examine the rate of perforation with the radial echo-endoscope (Olympus GF UE 160- AL5) since its introduction to our gastrointestinal and minimally invasive surgery department in 2010. This is compared to the perforation rate with the older version of the radial echo-endoscope (Olympus GF UM 160) and the older and newer linear echoendoscope.
Methods: EUS cases from 2002 to Aug 2014 of 3 endoscopists with more than two decades of combined experiences were retrospectively reviewed. A total of 807 EUS cases were performed: 543 cases with the old scopes (GF UCT 140ALS linear: 292 and GF-UM160 radial: 251 cases) from 2002 to 2009 and 264 cases with the new scopes (GF UE 160-AL5 radial: 70 and GF UCT 180 linear: 193) since 2010.
Results: Two duodenal perforations during intubation of the duodenal bulb occurred. Overall perforation rate since 2002 was 0.247% and 0.76% since 2010 when the GF UE 160-AL 5 radial echo-endoscope was introduced. No perforations were encountered with the other three scope models. Duodenal intubation with the old or new radial scope were identified (n=126); 101 for the old radial scope and 25 for the new radial scope. Between the two groups, the calculated relative risk of perforation for the new radial scope was 20.38 with 95% CI [1.00 to 411.88], z score 1.966, p=0.049 and the number needed to harm (NNH) 10.94 with 95% CI [6.518 to 33.965]. No anatomic alteration or luminal narrowing were identified in the patients who suffered the injury. Both duodenal perforations underwent laparoscopic modified graham patch.
Conclusion: From our experience, the radial echo-endoscope (Olympus GF UE 160-AL5) is associated with increased risk of perforation. It is possible that the distal tip shape, rigidity, length (at least 4 cm) and optical arrangement make intubation more traumatic at angulations.

P346

Endoscopic Management of Post-laparoscopic Sleeve Gastrectomy Stenosis

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Introduction: Laparoscopic Sleeve Gastrectomy's (LSG) is becoming an increasingly popular form of bariatric surgery, accounting for more than 50% of these procedures performed in the USA. Given this popularity, more is being understood about the complications associated with LSG, which, though uncommon, include the formation of strictures and stenosis. The purpose of this study is to establish a safe and effective protocol for the treatment of stenosis post LSG using endoscopic balloon dilatation.
Materials and Methods: This is a prospective review of 26 patients who had undergone LSG in Kuwait, followed by sleeve gastrectomy stenosis (SGS) and were then referred to the Amiri Hospital for endoscopic balloon dilatation from October 2008 up to June 2016.
Results: A total of 26 patients (4 males; 22 females) presented with symptoms of stenosis post LSG during the study period. The mean age of the patients was 34.6±10.8 years. The mean body mass index (BMI) at the time of surgery was 43±1.6 kg/m2. The median interval from the initial LSG surgery was 95 days. Nine patients had early presentation (≤3 months from surgery) while 17 presented late (>3 months). The patients were followed for a mean duration of 156±20 days from the last endoscopic balloon dilatation. A total of 23 (88.5%) patients had resolution of their symptoms. No adverse events were observed.
Conclusions: Gastric stenosis is a rare but potentially serious complication of LSG. Serial dilatation of SGS employing endoscopic balloons is a safe method of treatment, with high efficacy rate. This new method may offer a less invasive alternative to surgical revision. However, if endoscopic treatment fails, surgery is necessary.

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Laparoscopic Radical Right Hemicolectomy Using a Caucal-to-Cranial Approach

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With the continuous development of minimally invasive techniques, laparoscopic surgery has become the gold standard for colorectal cancer radical surgery. In laparoscopic radical right hemicolectomy, medial-to-lateral approach was widely accepted, but because of medial-to-lateral approach need the high requirements on anatomy technology, for the cases of obesity, mesangial hyperemia and edema,the operation is particularly difficult. Based on our previous clinical practice of laparoscopic surgery for colon cancer and understanding of surgical anatomy,the author puts forward laparoscopic radical right hemicolectomy using caudal-to-cranial approach(low-white borderline between right mesostenium and retroperitoneal is firstly cut as the entry to dissect the fusion fascial space between the visceral and parietal peritoneum,which is called caudal-to-cranial approach for right hemicolectomy), to evaluate the safety, feasibility and advantage.

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Safety, Efficacy, and Feasibility of Gastric Peroral Endoscopic Myotomy (G-POEM) for the Treatment of Gastric Outlet Obstruction

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Background: We sought to examine the safety, efficacy, and feasibility of gastric endoscopic pyloric myotomy (G-POEM) versus laparoscopic pyloric myotomy (LPM) for the treatment of gastric outlet obstruction secondary to vagal nerve injury. We also compared G-POEM to peroral endoscopic myotomy (POEM) for feasibility. As endoscopic surgery advances, the natural progression from POEM to G-POEM seems logical. G-POEM's utility would lend toward the treatment of gastric outlet obstruction (GOO). When caused by vagal nerve injury (VIN), aperistalsis of the gastric body occurs with a tonically contracted pyloris, resulting in symptoms such early satiety, nausea and vomiting.
Methods: With institutional review board approval a retrospective review of all G-POEM, POEM and LPM procedures performed between September 2015 and September 2016 were analyzed. G-POEM and LPM were performed only for GOO related to vagal nerve injury. Cases were reviewed for length of procedure, length of hospital stay, 30-day morbidity, and resolution of preoperative symptoms; classified as complete, partial or nonresponsive. Endoscopic instrument passes were recorded for G-POEM and POEM to assess for complexity. A case complexity survey was provided to the surgeon after each case. Data was calculated for mean and range.
Results: Two G-POEMs and 1 LPM were performed over this time interval. There was no significant difference in age, BMI, or comorbidities. There was no difference in length of stay between the two groups (G-POEM 1.2 vs LPM 1.5 days). There were no reported 30-day morbid events and no intraoperative complications. One G-POEM had complete resolution of symptoms, one G-POEM had partial resolution of symptoms, and the LPM experienced partial resolution of symptoms. Procedure length was greater in the G-POEM (116 and 134 min) compared to the LPM (47 min). There were 38 and 42 instrument passes for the G-POEM compared to the average of 19 (12–24 passes) for POEM. The case complexity survey had an average score of 9.6 (extremely complex category), while LPM had a score of 4.2 (below average complexity).
Conclusion: G-POEM is as safe and efficacious as LPM when compared for the treatment of gastric outlet obstruction secondary to VIN. However, the feasibility of this procedure should be further studied as G-POEM was found to have a longer operative time, greater instrument passes and had a case complexity score of extremely complex. G-POEM is thus as safe and efficacious as LPM, however this is an extremely complex endoscopic procedure and should be approached with caution.

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Clinical Management of Endoscopically Unresectable Colorectal Polyps

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Background: Resection of some polyps can present technical challenges to remove endoscopically due to their difficult location or size. Our aim was to show the management of polyps that are not suitable for endoscopic polypectomy which requires surgical intervention, and evaluate the malignancy incidence of these polyps.
Materials and Methods: Between 1996–2012, a total of 16996 colonoscopic examinations and 3875 polypectomies were performed at our Surgical Endoscopy Unit. From these polypectomies, 74 (3%) which were not suitable for endoscopic removal and required surgical intervention were included to the study. Polyp size, characteristics, location, histopathological fetures, final pathological results of specimens, and patient demographics were analyzed. Data were analyzed retrospectively from a prospectively maintained clinical database.
Results: The mean age of the patients was 55 years (range 15–89). The most common histological type was tubulovillous adenoma (41%), and the rest included, hyperplastic polyps (37%) and tubular adenoma (22%). The majority of non-resectable polyps were located at sigmoid colon (28%) and rectum (23%). Statistically the most significant result was the diversity of histopathological evaluation between biopsy and surgical specimen with p value of 0.04.
Conclusion: Our study results show a significant difference between biopsy and final pathology of surgical specimen for unresectable polyps. According to the difference between histopathological evaluation we recommend these patients to undergo radical surgery without an unnecessary preoperative endoscopic biopsy.

P350

Role of Self-Expanding Metal Stent (SEMS) in the Treatment of Complex Gastrointestinal Leaks- Single Center Experience in Southern Brazil

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Introduction: The use of covered metal stents (SEMS) has emerged as a valuable option in the management of patients with gastrointestinal leaks. In Brazil, due to high costs and relatively low availability and expertise, the use off SEMS is still uncommon. While traditional surgical management remain the standard of care in Brazil, patients referred for endoscopic treatment are usually in poor clinical condition and have complex large fistulas. We present our experience in the use of SEMS for gastrointestinal leaks in an emerging country environment.
Methods and Procedures: From 2009 and 2016, 12 consecutive patients with complex post-surgical GI fistulas were treated with SEMS in a single center. Data on demographics, location of the leak and outcomes were captured prospectively in a database and retrospectively analyzed.
Results: Two patients (16.67%) were treated with fully covered stent and 10 had partially covered stent. The mean age was 55,6 years old. Seven patients were male and five were female. The index operation were: an esophagectomy in five patients (41.67%) with a post-operative gastroesophageal leak; three patients (25%) had a RYGB with a leaking gastrojejunostomy (including one patient with also a leak from the angle of His); one patient had a resection of an epiphrenic diverticulum and had a staple line leak (8.3%); one patient (8,3%) had a leiomyoma resection with an postoperative esophageal leak; two patients (16.7%) had a low anterior resection of the rectum with postoperative colorrectal leak. All but one leak eventually closed (91,67%) with an average time for closure of 6.2 weeks after SEMS placement. One patient (8.3%) required surgical repair. Stent migration occurred in one patient with a fully covered stent. A second stent was placed in 2 patients (16.7%) due to persistent leak. One patient had also a collagen plug. Other adverse effects were: severe mucosal avulsion upon retrieval with stenosis requiring dilatations in one patient and gastric perforation at the distal edge of the stent in 1 patient.
Conclusions: Self-expanding metal stent is an acceptable option for the treatment of life-threatening large gastrointestinal post-operative leaks, but complications due to stenting are not infrequent.

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Initial Management of Esophageal Anastamotic Stricture After Transhiatal Esophagectomy for Esophageal Cancer

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Introduction: Esophageal anastomotic stricture is a well-known complication after transhiatal esophagectomy (THE), but there is limited data regarding the initial management and subsequent outcomes after stricture dilation. There is concern that dilating to larger diameters upon the initial encounter, specifically with high-grade strictures, will lead to increased risk for complications. We therefore reviewed one surgeon's experience with esophageal dilations after THE and provide data and treatment recommendations based upon these findings.
Methods: A retrospective review of patients who underwent esophageal dilations after THE between 2009–2013 at our institution was performed. Patient demographics were n= 43, age=59.31, 41 males, 2 females.
Results: For all cases, the average location, length, diameter of the stricture and number of days between surgery and the initial dilation were 20 cm, 1–2 cm, 6.3 mm and 106 days, respectively. Two dilations occurred within 1 month with the earliest dilation occurring within two weeks (13 days) of surgery.
Data were stratified with respect to stricture diameter and/or the ability to transverse the stricture with a pediatric or adult endoscope. Our results demonstrate a linear relationship between the diameter of the stricture and number of days from surgery to the first dilation: 1–5 mm: 63 days (n=14); 6–9 mm: 123 days (n=12); and >1 cm: 259 days (n=9); (p= 0.004). 86% of the dilations for strictures 1–5 mm occurred between post-operative day (POD) 31–60, of that subgroup all pinhole lesions (1 mm) occurred between POD 41–60. 58% of 6–9 mm strictures occurred between POD 31–90, while the remaining 42% occurred between POD 91–360. 78% of strictures>1 cm occurred between POD 91–360. We next examined the maximum diameter at which each sub-group was dilated. The majority (86%) of 6–9 mm and >1 cm strictures were dilated up to 20 mm on initial dilation. Even the smallest strictures (1–5 mm) were safely dilated up to 18 mm (57%) and 20 mm (36%).
In this study group there were no complications (ie perforation, bleeding, hematemesis, mediastinitis) after endoscopic dilation which required hospitalization or further surgical or endoscopic interventions.
Conclusion(s): Our results demonstrate that patients with smaller strictures required dilations sooner, within 1–2 months of surgery, when compared to larger diameter strictures. Interestingly, dilation up to 18–20 mm, even with smallest stricture sizes of 1–5 mm, resulted in no adverse sequlae. These results suggest that early aggressive endoscopic management of esophageal anastomotic strictures after THE can be safely performed.

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Esophageal Motility in 100 Patients with End-Stage Lung Disease

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Introduction: Advanced lung disease has been reported to be associated with gastro-esophageal reflux disease (GERD). Aim of this study is to assess the prevalence of esophageal motility disorders and pathological reflux in patients undergoing lung transplant.
Methods and Procedures: All patients who undergo lung transplant at our institution and entered in a prospective database. After IRB approval the database was queried to identify 100 patients who underwent non emergent transplant between Jan. 2015 to Jun. 2016 and had pre-operative esophageal testing available. Manometry studies were reanalyzed using Chicago Classification v 3.0.
Results: A total of 158 patients underwent non-emergent lung transplant during the study period of which esophageal manometry was available for 100 patients. Mean age was 60.8 ±9.9 years with 36 females and a BMI of 26±5.2. Fifty six patients had esophageal dysmotility: 3 achalasia, 3 EGJ outflow obstruction, 3 jackhammer esophagus, 1 distal esophageal spasm, 7 absent contractility, 35 ineffective esophageal motility, 4 fragmented peristalsis. EGJ morphology showed 61 type I, 18 Type II, 15 Type IIIa and 6 Type IIIb EGJ morphology.
Conclusions: There is a very high prevalence of esophageal motility disorders and pathological reflux disease in patients undergoing lung transplant at our center. These abnormalities need to be carefully evaluated when considering patients for lung transplantation.

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Employment of Esophageal Stent to Treat a Massive Iatrogenic Duodenal Defect After Laparoscopic Cholecystectomy

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A 40-year-old previously healthy Native American female was transferred to our university center for treatment of a duodenal perforation following elective laparoscopic cholecystectomy (LC). Three days after LC, she underwent exploratory laparotomy and a Graham patch repair for a reported post-pyloric ulcer in the first portion of the duodenum. Secondary to hemodynamic instability and septic shock, the referring surgeons placed a temporary abdominal closure device and transferred the patient to our facility for a higher level of care. During exploratory laparotomy, an uncontained leak was found to originate from a 1.5 cm duodenal defect, with no evidence of ulceration, in the area of the previous Graham patch. A large Malecot tube was introduced through the defect and secured with a purse-string suture. In subsequent abdominal explorations, despite placement of large abdominal drains and a duodenostomy tube, the defect continued to expand in size, with free extravasation of bile throughout the peritoneum. One month after Vicryl mesh abdominal closure, the patient continued to have a persistent, large duodenal fistula, in addition to C. difficile colitis, and multiorgan failure with need for hemodialysis and tracheostomy. We consulted our gastroenterology colleagues to discuss the possibility of stent placement to allow healing of the fistula, though this had been described only once in the literature for a similar indication. A through-the-scope (TTS) Taewoong fully covered 20 mm x 100 mm esophageal stent was placed under endoscopic and fluoroscopic guidance with a total of 6 endoclips placed at the proximal end to prevent stent migration. Post-procedure, she tolerated clear liquids by mouth with significant decrease in bile output. She was discharged home one month after stent placement. She returned with complaints of abdominal pain and was found to have stent migration into the proximal jejunum. It was successfully retrieved during EGD and no subsequent extravasation of contrast from the duodenum was noted on flouroscopy. She underwent abdominal wall reconstruction 5 months later and by one year after her initial injury she returned to work. In conclusion, unrecognized iatrogenic duodenal injuries sustained during LC, likely secondary to electrocautery, can be catastrophic. In cases of massive duodenal defects and high-output biliary fistula not controlled by duodenostomy tube placement or wide surgical drainage, endoscopic- and fluoroscopic- guided placement of a fully covered esophageal stent may allow for delivery of enteral nutrition and provide a life-saving option for this devastating complication (Fig. 1).

Fig. 1 Taewoong esophageal stent convering a massive duodental defect.

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Laparoscopic and Endoscopic Cooperative Surgery to Treat Gastric Tumor at Our Hospital

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In recent years, laparoscopic surgery for gastric cancer has progressed as a specialized surgical technique due to standardization of the technique, and outcomes are being clarified. Laparoscopic surgery has been used aggressively to treat gastric submucosal tumor as well. Reports of laparoscopic and endoscopic cooperative surgery (LECS) have been published of cases in which subtotal resection was difficult. The use of both laparoscopy and endoscopy enabled resection of these tumors. We have used combined laparoscopic and endoscopic surgery for stomach tumors at our hospital, but to perform LECS, we surgeons first met with internal medicine physicians, anesthesiologists, and surgical nurses, developed a manual, and have continued to update it. We report on the surgical indications, devices, patient's positioning, port locations, techniques, and results of 13 cases of LECS we have performed at our hospital to date.

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Paraesophageal Hernia Repair in the Emergency Setting: Laparoscopic T-Fastener Gastropexy for the High Operative Risk Patient with Obstructive Symptoms

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Background: Paraesophageal hernia (PEH) incidence increases with age, as these hernias are unusual before the sixth decade of life. PEH manifests itself mainly with obstructive type symptoms. In the emergency setting, most PEH repairs are done via laparotomy with adjunct gastropexy or gastrostomy tube (GT) placement. This adjunct to the repair can be performed expeditiously by laparoscopy using T-fasteners for anchoring and retraction of the stomach. We report our experience and laparoscopic approach for PEH repair in the emergency setting and how the presence of obstructive symptoms in the elderly patient with severe comorbidities can influence the repair technique.
Methods and Procedure: A retrospective review of elderly patients (≥75 years-old) with high operative risk (ASA≥3) that underwent PEH repair in the emergency setting from July 2014-July2016 was performed. Patients with obstructive symptoms in the absence of reflux type symptoms were included. Patients who underwent laparoscopic repair were identified. T-fastener, laparoscopic gastropexy is performed percutaneously by dislodging into the lumen of the stomach a nylon suture connected to a metal T-bar and leaving an external suture at the surface of the skin; for a GT, a guide wire is placed through the center of these fasteners, and a balloon catheter is placed over the guide wire. Three to 4 fasteners are require for anchoring.
Result: Thirteen patients underwent successful PEH repair, and all were classified as urgent/emergent upon admission. The mean average age was 83.5 years. Open procedure was performed in 69.3% of patients and 30.7% laparoscopically. In the absence of reflux type symptoms, both open and laparoscopic cases a GT or gastropexy were performed for fixation of the stomach. Crural closure was performed in four patients. There were no mortalities. One patient in the laparoscopic group required conversion of gastropexy into a GT for dysphagia. Faster recovery and shorter operative time was seen in the laparoscopic surgery group. Prolonged length of stay was related to post discharge institutionalization. All patients remained free of obstructive symptoms.
Conclusion: Laparoscopic reduction of hernia contents with adjunct gastropexy or GT should be considered in emergent cases for elderly patients with mainly obstructive symptoms. Cruroplasty should be done selectively. Laparoscopy for PEH repair is challenging and requires technical skills. T-fastener gastropexy or GT is safe and simple, obviates intracorporeal suturing, and may be used to improve physician comfort with laparoscopy and expedite the repair for this high –risk population.

P357

Gastric/Duodenal Bacterial Colonisation in a Swedish Population: Is There a Need for Changes in Antibiotic Prophylaxis?

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Introduction: Bacterial contamination is a concern during transgastric endoscopic ultrasound interventions and NOTES procedures. The human gastric bacterial flora has not been well characterised during modern times, taking the use of PPI into account. The aim of this study was to investigate the gastric and duodenal bacterial flora in patients with or without PPI treatment.
Methods: Patients referred for routine gastroscopy, without ongoing or recent antibiotic treatment, were included. Use of PPI's was recorded. Sampling for gastric bacterial culture was performed in the antrum of the stomach using a routine ERCP-cytology-brush. Duodenal sampling was performed in the second half of the study. For duodenal sampling a new brush was used in the bulb. Positive cultures were analysed for types and subtypes.
Results: 103 patients were included, 58 were on PPI medication. A total of 54 patients had positive gastric bacterial cultures, 41 of them were on PPI medication. Positive cultures were significantly more common among patients with PPI's (41/53) than among those without PPI's (13/50) ($p<0.0001$). Overall median age was 53 years (20–89). Median age was significantly higher among PPI-users (62 years vs 45 years $p=0.023$). Median age was also significantly higher among patients with positive culture (63 vs 42 $p=0.001$). Endoscopic findings: 50/103 patients had normal findings at gastroscopy, 17 had gastritis/gastric ulcer, 13 had esophagitis, 12 had duodenitis/duodenal ulcers and 11 had other findings. Bacterial growth was found in about 50% in each of these groups.
The dominating bacterial types were Streptococci of oral subtypes. Hemophilus influenzae and lactobacillus also occurred, indicating an oral and upper airway origin. Three patients had candidiasis. In 20 patients one bacterial species was found, 19 had two species, 8 had three, 8 had four and 5 had>4 species. Duodenal bacterial growth was seen in 29/52 patients, 25/52 had PPI medication. Significantly more positive cultures were found among PPI users, 22/25, than among those without 7/27 ($p<0.0001$). 22/52 had positive cultures at both locations with similar bacterial types in 17.
Conclusion: The gastric bacterial flora seems to be of mainly oral origin. Similar colonisation pattern was found in the duodenum. The incidence of positive bacterial culture strongly correlated with PPI use and seemed to increase with higher age. Patients with peptic ulcer perforations or undergoing upper GI-tract interventions should receive antibiotics covering the oral bacterial flora.

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Laparoscopic Sleeve Gastrectomy After Open Vertical Gastro Plastic, Our Experience

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We represent the results of a study we have undertaken in the past 3 years concerning bariatric procedure (sleeve gastrectomy) after a failed bariatric procedure (vertical gastroplasty). Unfortunately in our area there has been a long history of open bariatric procedures, namely vertical gastroplasty. These procedures have a high rate of failure. After a mean time of around 5 years, and a mean excess weight loss of less than 10%, these patients come to our clinic for consultation.

We had a total of 13 patients previously operated with vertical gastroplasty that we performed bariatric surgery on in the last 3 years. For all 13 patients we first performed a laparoscopic vertical gastroplasty reversal, and after a mean period of 65 days (between 30 and 97) we performed sleeve gastrectomy on all patients. We had a conversion to open sleeve gastrectomy because of adherence. One patient had to be reopperated (at 5 days postop) for a fistula, at the place the metal ring had been placed in the previous vertical gastroplasty, we performed a resleeve with the resection of the fistula. All patients had a good progression after surgery, and are loosing weight at a normal rate. The mean postop follow up is of 5 months. No fatalities

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Achalasia in Morbid Obesity: Outcomes of Surgical Management and Patient Satisfaction After Long-Term Follow-Up

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Introduction: We sought to describe outcomes related to symptom resolution and weight change following surgical intervention in obese patients suffering from achalasia.

Methods and Procedures: A retrospective chart review was performed of 252 consecutive patients receiving laparoscopic Heller myotomy with Dor fundoplication by a single surgeon over a twelve-year period. Nine (9) of these patients (4%) had a preoperative BMI>40 kg/m2. Five (5) of these morbidly obese patients responded to a follow-up survey evaluating symptom resolution, impressions of their disease management, and overall satisfaction. A paired *t*-test was used to compare mean pre- and post-operative weight changes.

Results: Follow-up duration ranged from 20 to 144 months. Preoperative Eckardt scores for these patients ranged between 2 and 6. There were no perioperative complications. All patients reported postoperative improvement of dysphagia. By the time of long-term follow-up, Eckardt scores ranged between 0 and 6, with 80% of patients reporting recurrence of symptoms. One (1) patient has since required pneumatic dilation to manage her symptoms. The average change in BMI was −0.96 kg/m2 and was not statistically significant (p= 0.72, CI: −5.8 to 7.7). 60% of patients were satisfied with the surgery, and 80% wished they had received a simultaneous bariatric procedure.

Conclusion: Laparoscopic Heller myotomy for achalasia in morbidly obese patients appears safe and to have comparable outcomes to patients with a normal BMI but does not appear to produce substantial weight change. The option of concomitant bariatric surgery should be discussed with patients preoperatively.

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Laparoscopic Hill Repair: 19 Year Follow Up

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Background: The open Hill repair for gastroesophageal reflux disease and hiatal hernia is remarkably durable, with a median 10 year reoperation rate of only 3% and satisfaction of 93%. No long-term data exist for the laparoscopic Hill repair (LHR).

Methods and Procedures: Patients who underwent primary LHR at Swedish Medical Center for reflux and/or hiatal hernia at least 5 years earlier (1992–2010) were identified from an IRB-approved data base. There were 554 patients who met inclusion criteria, including 457 undergoing repair for reflux and 97 for paraesophageal hernia. Two questionanaires were administered via mail to evaluate long-term quality of life using the 5-point validated GERD-HRQL scale (range 0–50, lower=better), a Swallowing score (range 0–45, higher=better) and a 5-point global satifaction score. Outcomes were defined by GERD-HRQL score, Swallowing score, resumption of proton pump inhibitor (PPI) therapy, need for reoperation, and global satisfaction with overall results.

Results: One hundred seven patient completed and returned the survey (62 lost to follow up, 102 deceased, 315 non-responders), of which 51.4% were male. The average age at the time of surgery was 49.7 years. Median follow up was 18.6 years. The average GERD-HRQL score (8.5) and the average Swallowing score (37.5) both indicated excellent symptomatic outcomes. Twenty-four percent of patients are using daily PPI's. Seven patients (6.5%) required re-operation for failure during the follow up period, 5 in the reflux group and 2 in the paraesophageal hernia group, and 1 underwent surgery for perforation resulting from esophageal dilation. Overall, 83% reported good to excellent results and 76% would recommend the operation to someone in their family with a simlar condition.

Conclusion: LHR shows excellent long-term durability and quality of life similar to the open Hill repair, with 83% good to excellent results at a median follow up of 19 years, and a reoperation rate of under 7%. It is surmised that Hill suture fixation of the gastroesophageal junction to the preaortic fascia may confer unique structural integrity compared to other repairs.

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The Pathophysiology and Treatment Results of Laparoscopic Surgery for Giant Hiatus Hernia

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Introduction: The aim of the study was to clarify the pathophysiology of giant hiatus hernia (GHH) with gastroesophageal reflux (GER) and to evaluate the treatment results of laparoscopic antireflux surgery (LARS).

Methods and Procedures: We performed LARS for 46 patients with GERD. Of those, 24 patients with GHH were enrolled into the study and those data were analyzed retrospectively. GHH was defined as the hiatus hernia in which more than 1/3 of the stomach was slipped to the mediastinum. Male/female ratio was 2/22. Mean age was 72.6 (39–86). All of 24 patients had some degrees of dysphagia symptom. The grades of reflux esophagitis (LA classification, O/A/B/C/D) were 14/4/0/5/1.Multichannel intraluminal impedance pH test (MII-pH) was performed in 11 patients before and after surgery. High resolution Manometry (HRM) was performed in 6 patients before and after surgery. The types of fundoplication (Nissen/Toupet/Dor/Collis-Nissen) were 2/19/2/1. In the recent 11 cases, the hiatus was closed using mesh in addition to the interrupted sutures. Data are expressed as means±standard deviation (SD). Statistical analyses were conducted with the use of paired t-test, and unpaired t-test depending on the type and distribution of the variable.

Results: The %time of all reflux at MII-pH (preoperative → postoperative) were 5.2± 5.4%→1.0±0.9%(p=0.08), the %time of acid reflux were 2.9±4.8%→0.4±0.4% (p= 0.16), the %time of non-acid reflux were 2.4±2.1%→0.6±0.6% (p<0.05). 7 of 11 patients (64%) indicated non-acid dominant reflux before surgery. The lower esophageal sphincter (LES) pressures on HRM (mmHg) were 15.3±7.6→27.3±8.0 (p=0.06), Integrated residual pressures (IRP) were 4.2±2.1→16.5±6.0 (p<0.05), and Distal Contractile Integral (DCI) were 1047±1019→1484±1551.

Conclusions: GHH was dominantly noted in old female patients. The mucosal breaks in the esophagus were mild. More than half of reflux indicated non-acid dominant reflux. LARS tended to increase the LES pressures, resulting in almost preventing GER. However, the care should be taken that LARS increased IRP which may cause the postoperative dysphagia. The indication of LARS for GHH should be considered based on the grades of non-acid reflux and the degree of dysphagia, in addition to the grades of acid reflux.

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Hiatal Hernia Correction: A Different Approach for Patients with Previous Sleeve Gastrectomy

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Introduction: Hiatal hernia is a common condition with a prevalence of 20% in general population, although symptoms are present in only 10% of the patients. It becomes problematic when is accompanied by gastroesophageal reflux disease (GERD). The most definitive management is still surgical, with restoration of the sphincter mechanism. Among obesity patients there is an increased risk of developing this illness because of the heightened intraabdominal pressure. On the other hand, once these patients lose weight, the hiatus may be widened with the disappearance of fat. The rapid growth of bariatric surgery has brought also the appearance of GERD in patients undergoing different operations, although the attention is centered in laparoscopic sleeve gastrectomy (LSG), since a high-pressure gastric conduit is created. Several techniques have been proposed to correct hiatal hernia and GERD, considering the altered anatomy. We present a technique based in Hill´s posterior gastropexy, described originally in 1967 for GERD with a whole stomach, but now part of the technique has been adapted to patients with LSG.
Objective: Describe and propose a surgical approach based on a part of the Hill technique, that can be used in patients with hiatal hernia and GERD after LSG.
Methods: Short case series in which a "Hill modified technique" is described for patients with past history of LSG as treatment to correct hiatal hernia and GERD. Surgical technique includes: 1. Posterior closure of the hiatus; 2. Achieving an intra abdominal esophageal length of minimum 3 cm and 3. Posterior fixation of the gastro esophageal junction to the preaortic fascia.
Results: In a period of three years, four patients underwent a hiatal hernia reduction followed by hiatal closure and posterior gastropexy. There wer not immediate complications and postoperative controls have shown satisfactory results, with no early or late complications associated to the procedure nor GERD-related symptoms. There was no need for antirreflux medication out of the standard protocol.
Conclusion: "Hill modified technique" seems to be a valid approach for the management of Hiatal hernia and GERD in patients with LSG.

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20 Year Outcomes: Laparoscopic Heller Myotomy Stands the Test of Time

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Background: The laparoscopic Heller myotomy (LHM) was first adopted in the United States in 1993 and since has become the gold standard for the treatment of achalasia. We present our 20 year outcomes of our initial consecutive patient cohort.
Methods: Patients were identified in a prospectively maintained IRB-approved database (1993–1997). Post-operative Eckardt scores and a 5-point validated system questionnaires were obtained via the telephone. Success was defined by the lack of re-intervention as well as 20 year Eckardt scores<3. All patients were invited to obtain an up-to-date esophagogastroduodenoscopy (EGD).
Results: Twenty-seven patients had a LHM (12 lost to follow-up, 4 deceased) during the specified time frame. Eleven patients were included in the study with a median follow-up of 20.2 years. Indications for LHM include achalasia (9) and diffuse esophageal spasm (2), with fundoplications being present in 9 patients. The rate of reintervention on either the stomach or the esophagus was 9.1%, with one patient requiring reoperation for a failed myotomy. The mean Eckardt score was 1, with all eleven patients reporting 20 year Eckardt scores<3. One-hundred percent of patients were satisfied with the results of their surgery and reported a significant improvement in their quality of life. Classic gastroesophageal reflux symptoms (heartburn and regurgitation) were only present in 2 patients. Proton-pump inhibitors were being used by 44% of patients with excellent symptom control. Six patients accepted our invitation for a repeat EGD (median follow up time 18.3yrs) with 4 patients having normal anatomy and 2 having LA grade A esophagitis (1 patient on PPI). Barrett's esophagus was not present in any of these patients.
Conclusion: Long-term results from our early experience with LHM are excellent and durable with only one patient requiring reintervention in 20 years. All patients in this study are satisfied with their operation and confirm it has led to a significant improvement in their quality of life.

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Fundoplication Versus Gastric Bypass as Optimal Treatment for GERD in Scleroderma Patients

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Introduction: Scleroderma is frequently associated with both gastroesophageal reflux disease (GERD) and simultaneous esophageal dysmotility. However, there is sparse literature on the ideal surgical approach due to the rarity of the disease. Tailoring surgical technique to the existing physiology of each patient is important, particularly in the setting of disease progression and failure of medical management. We aim to evaluate the perioperative and intermediate outcomes of varying surgical approaches in this challenging patient cohort.
Methods and Procedures: After IRB approval, scleroderma patients undergoing fundoplication or gastric bypass for treatment of GERD after failure of medical management were identified. Demographics, perioperative data, immediate complications, symptom improvement, and pulmonary function were retrieved and analyzed.
Results: Fourteen scleroderma patients who underwent surgical treatment of GERD from 2004 to 2016 were identified. Average BMI was 26. Seven fundoplications (2 Nissens, 4 Toupets, and 1 Dor), and 7 Roux-en-Y gastric bypasses (RYGB) were performed. No 30-day mortality was observed in either group. In the fundoplication group, 1 patient suffered from a myocardial infarction postoperatively. Two patients in the group had disrupted wraps 4 and 5 years after surgery, and another patient progressed to require an esophagectomy 1 year after fundoplication. In the RYGB group, there were no reoperations. There was one death in this group not related to the surgical intervention, but from previous injury and subsequent aspiration pneumonia after lung transplantation. The patient died of sepsis from ongoing pneumonia on postoperative day 34. Median follow-up for both groups was 17 months. Of the patients who had assessment of their GERD symptoms at follow up, 80% (N=5) in the RYGB group, and 33% (N=6) in the fundoplication group reported symptom improvement or resolution. Pulmonary function was tested postoperatively in patients with concurrent interstitial lung disease. Seventy-five percent (N=4) of RYGB patients showed improvement of their PFTs (FEV1), by an average of 45%, while all of the fundoplication patients (N=3) had worse outcomes (average FEV1 decrease, 19%).
Conclusion: In this single institution series, Roux-en-Y gastric bypass appears to be a safe and therapeutic option for scleroderma patients with severe GERD and esophageal dysmotility, resulting in improvement of both GERD symptoms and pulmonary function testing.

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Study of the Usefulness of a Novel U-Shaped Liver Retractor Covered with Gauze in Laparoscopic Surgery

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Introduction: Various techniques are used for retraction of the liver during laparoscopic surgery. We developed a novel U-shaped liver retractor and compared the usefulnesstility of our retractor with that of the Nathanson retractor in laparoscopic- assisted distal gastrectomy (LADG).
Methods: The retractor consists of double metal feathers (each 5-cm long and 1-cm wide each) covered with soft gauze. The double feather can opens in the abdominal cavity and to become U-shaped. In addition, the shaft has a small diameter (2.4 mm), resulting in a small scar on the abdominal wall. [Patients] From January 2014 to May 2015, 12 patients (7 males and 5 females) who underwent LADG with an U-shaped liver retractor (Group A) and 19 patients (11 males and 8 females) who underwent LADG with using a Nathanson retractor (Group B) were compared in respect of the operation time, amount of bleeding, postoperative liver function and postoperative length of hospital stay (since we have encountered cases that developed severe postoperative severe liver dysfunction has occurred withafter surgery using the use of the Nathanson retractor in our hospital, we changed the position of thise retractor is changed every 15 min for providing relief from ofcongestion; however, while using our new retractor, no intraoperative change of the retractor position for congestion relief is required with our retractor).
Results: There were no differences in the demographic characteristics between the two groups. In groups A and B, the operation times were 275.3 and 256.8 min (P=0.30) and the amounts of bleeding were 11.8 and 25.5 mL (P=0.31), respectively. In regard to the postoperative liver function, the serum GOT values were 78.1 and 50.4 IU/L, the serum GPT values were 68.9 and 55.9 IU/L, and the serum T-bil values were 1.15 and 1.04 mg/dL, respectively, in Groups A and B (P=0.10, 0.49 and 0.61, respectively). The postoperative lengths of hospital stay were 11.5 and 12.8 days in Groups A and B, respectively (P=0.83). Thus, there were no significant differences in the examined parameters between the two groups.
Conclusions: The results suggest that use of the novel U-shaped liver retractor during laparoscopic surgery is useful, especially because of the lack of need for frequent position changes to ensure as it necessitates less position change for safety and provide relief from congestion relief and the leaves only a small scar that results on the abdominal wall.

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Laparoscopic Paraesophageal Hernia Repair Improves Disease-Specific Quality of Life in Octogenarians

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Introduction: Traditionally, surgical repair has been recommended for patients with symptomatic paraesophageal hernia (PEH). While laparoscopic PEH repair (LPEHR) is safe and effective, controversy remains as to whether all populations benefit equally from elective repair, particularly the elderly. The objective of this study was to assess outcomes of LPEHR in octogenarians compared to younger patients.
Methods: We performed a review of all patients undergoing LPEHR between 2011 and 2016. The presence of a PEH was confirmed by endoscopy, barium esophagram, or computed tomography. OR time, length of stay (LOS), and complication rate were obtained through chart review. Disease specific quality of life was assessed using the Gastroesophageal Reflux Disease Health-Related Quality of Life (GERD-HRQL) questionnaire. Baseline and post-operative data were collected in the clinic setting. Data are maintained in an IRB approved database, and presented as incidence (%), mean±SD, or median (IQ range) as appropriate. A p-value of <0.05 was considered statistically significant.
Results: 207 patients underwent LPEHR during the study period. 177 patients were under 80 years of age, with an average of 63±12.2 years, and 30 were older than 80 years old, with an average age of 85.1±3.0 years. In the octogenarian group, 76.7% were female compared to 74% of patients under 80 (p=0.825). Octogenarians had a lower mean BMI (25.9±6.1 vs. 31.1±6.1, $p<0.001$), and 86.7% had an ASA classification of 3 or 4 compared to 68% of younger patients (p=0.05) The most common presenting symptoms in octogenarians were chest pain (57%) and early satiety (20%) and reflux symptoms (46%) and chest pain (33%) in younger patients (p=0.01). Operative time (108±35 min versus 108±32 min, p=0.94), estimated blood loss (p=0.25), and complication rate (27% versus 14%, p=0.10) were not statistically different between groups. Median LOS was 3 (2–33) days for octogenarians compared to 2 (1–37) days for younger patients ($p<0.01$). GERD-HRQL scores improved from 14 (1–33) to 2 (1–29, p=0.172) in octogenarians and 20 (0–50) to 3 (0–38, $p<0.01$) in younger patients.
Conclusion: LPEHR can be safely performed in octogenarians with improved disease specific quality of life in many patients; however, LPEHR is associated with longer hospital LOS and increased risk of complications compared to younger patients. Careful consideration should be given to a patient's symptoms and their impact on quality of life when weighing the risks and benefits of LPEHR in this patient population.

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Evaluation of the Antireflux Mechanism in a Porcine Ex-Vivo Stomach, Hiatal Hernia and Sleeve Gastrectomy Models

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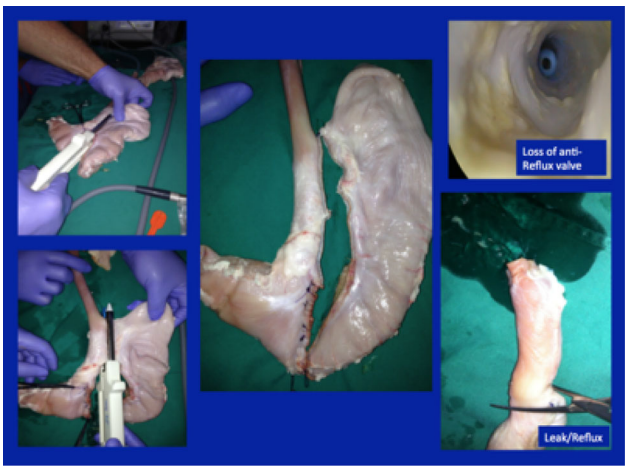
Introduction: Hiatal hernia, esophageal and gastric dysmotiliy are associated with reflux. Recently, there has been significant interest in understanding the etiology of "De Novo" reflux in sleeve gastrectomy, however this remains unclear.
Objective: To understand the physical and mechanical relationship of the different factors involved in the antireflux valve in a porcine model and the result of recreating a sliding hiatal hernia as well as a Sleeve gastrectomy.
Methods: Porcine stomachs and esophagus were harvested and taken to the laboratory. The models used were: 1) Porcine stomach and esophagus without any alteration, 2) Sliding Hiatal hernia model created after the sling and muscular fibers at the Gastroesophageal junction were divided, 3) His angle repair and 4) Sleeve gastrectomy model.
All models underwent two tests. The first test consisted on filling the stomachs, while lying horizontally on the table, with water through the duodenum up to distention. The intragastric pressure was monitored and registered at the moment of leakage. The sleeve gastretomy model was filled with 75 cc of water. If no leak was detected on the first test, a second test was performed, consisting on putting the model upside down.
Results: We observed that the distention of the fundus in a complete stomach generates pressure against the esophagus collapsing its lumen. The full stomach model did not leak on any tests. The Hiatal hernia model did leak after test one without even any measurable intragastric pressure. The model with His angle repair model did leak after, however the stomach required to be significantly distended. The Sleeve gastrectomy model leaked after the first test.



Conclusion: The mechanical properties of the His angle-sling fibers-fundus complex seems to be the main factor in avoiding reflux in the ex-vivo porcine models. This could potentially explain why sleeve gastrectomy procedure produces reflux per se.

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Single Centre Experience with Laparoscopic Paraesophageal Hernia Repair and Long-Term QOL and Pulmonary Function Outcomes

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Background: In patients with symptomatic type III paraesophageal hernia, laparoscopic hiatal hernia repair with partial fundoplication is an effective treatment option. Pulmonary symptoms can feature amongst others such as dysphagia, odynophagia, regurgitation, chest pain, and impairment of quality of life (QoL). The elective surgical repair of choice at our institute is a laparoscopic hiatus hernia repair with anterior 180 degrees fundoplication (LHR). We aimed to primarily document the effect of LHR on pulmonary function and QoL with secondary clinical and radiological recurrence outcomes.
Method: Patients who underwent LHR for symptomatic paraesophageal hiatal hernia at Peter Lougheed Centre in Calgary, Alberta from over a 8 year period from 2007 to 2015 were included our study. Patients' baseline characteristics including BMI, COPD comorbidity, smoking status, type of hiatus hernia, type of fundoplication, and hernia recurrences were analysed. Barium UGI radiogram at 1 year was analysed for radiological recurrence using descriptive calculations. Pulmonary function tests (PFT) done preoperative and between 6–12 months postoperative was compared using Wilcoxon signed rank sum test and paired t-test. Descriptive statistics was used perioperative quality of life (QOL).
Results: A total of 50 patients had complete data sets pre- and post-operatively. The average age of the patients was 64.2 (46–83) and an average BMI of 29.9 (18–43). 78% of patients were female with 42% smokers and only 4% had documented COPD. 94% of the hernia repair included a 180 degrees anterior fundoplication, 4% Toupet and 2% Nissen fundoplications. UGI Barium swallow studies between 6–12 months showed 87.5% of repairs were without recurrence. QOL survey at 12 months showed 97.3% of patients reported no issues.
Pulmonary lung function tests improved in 63% of Total Lung Capacity, in 76% of Vital Capacity, in 84% of FEV1, in 80% of FVC but only 46% of DLCO.
Conclusion: No significant associations were found between improvement of PFTs vs. Age, Gender, BMIM, COPD, smoking, operation type, or pre operative diagnosis. This case series from a single institute demonstrates that Laparosopic Paraesophageal hernia repair with anterior fundoplication results in objective improvement in pulmonary lung function tests and in our experience has a low recurrence rate of only 10% with very satisfactory symptom alleviation over the long term.

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Minimally Invasive Approaches for Benign Tumours of Esophagus: An Analysis of Our Experience

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Abstract
Leiomyoma is the most common benign esophageal neoplasm. Surgical enucleation is the treatment of choice benign tumours of esophagus with symptomatic, large, or ill-defined lesions. Minimally invasive approaches have been introduced and successfully applied for excision of such lesions. In this study, we present our experiences with three different minimally invasive approaches for excision of benign tumours of esophagus namely the Trans-thoracoscopic, transhiatal and transgastric approach.
We have managed 24 patients with benign tumors of the esophagus from 1995 to 2015 in our institute. 20 cases done via transthoracic approach for upper and mid thoracic lesions and our Thoracoscopic approach is standardized with the patient placed in the prone position and approached via a right thorax in all cases. 3 cases done via trans-hiatal approach for distal Lower esophagus tumour and 1 case was done via trans-gastric approach for esophagogastric junction benign tumour. Hospital stay was 3–5 days and there were minor postoperative complications in 2 patients. Mortality was nil. There were 21 patients with leiomyoma and 3 with GISTs, as proved by immunohistochemistry. Short and long-term follow up was satisfactory, with none of the patients having recurrences or other problems.

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Body Mass Index is Not a Risk Factor for Surgical Reintervention After Primary Absorbable Mesh Repair of Hiatal Hernia

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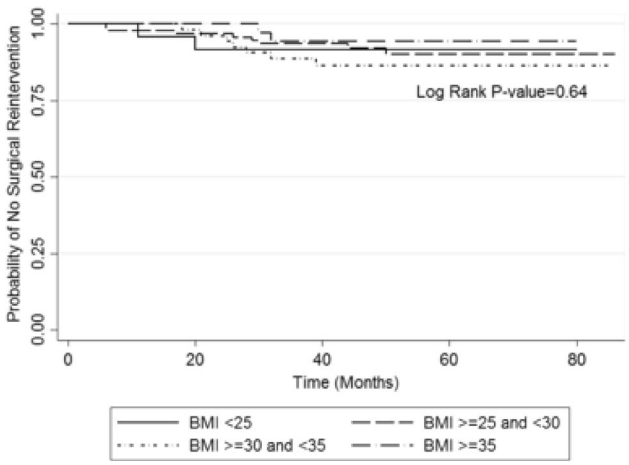
Introduction: Surgical intervention remains the optimal treatment for patients with paraesophageal hiatal hernia (PEH). In this study, we analyzed intermediate term (at least two-year) symptomatic outcomes and need for surgical reintervention, after primary repair with onlay mesh, of PEH to determine whether these variables correlate with body mass index (BMI).
Methods and Procedures: We retrospectively reviewed 378 patients who underwent primary PEH repair with onlay absorbable mesh, without Collis gastroplasty, at our center from 05/28/2009 to 12/31/2013. Patients were organized into groups based upon preoperative BMI: A (BMI≥35), B (BMI 30-34.9), C (BMI 25-29.9), and D (BMI<25). We administered a standardized, 5-point-scale survey for patients to report symptoms (0=no symptoms, 5=worst experienced) and satisfaction with surgical outcomes.
Results: In total, 378 patients underwent primary PEH repair during the study period. The mean age was 59.6±13.3 years, and 250 patients (66%) were female. The mean BMI of the entire cohort was 29.9±4.9. Group A included 63 patients (17%), Group B had 110 (29%), Group C had 155 (41%), and Group D had 50 (13%). All patients had primary repair without Collis gastroplasty, and an antireflux procedure was performed in 376 patients (205 Nissen, 167 Toupet, 4 Dor). Acid suppressants were discontinued within 2–4 weeks of surgery in 300/378 patients (79%; p<0.001). 218 patients (57%) were available for a mean follow-up of 52.3±13.8 months. Mean symptom survey scores were 0.7±1.1 for heartburn, 0.4±1.2 for dysphagia, 0.4±1.0 for regurgitation, and 0.5±1.1 for chest or epigastric pain. At intermediate follow-up, 24/218 patients required reoperation, and the probability of surgical reintervention did not vary based on BMI (Figure; p=0.64). In total, 176/197 (89%) patients reported satisfaction with their PEH repair, and no difference in satisfaction existed among BMI groups.
Conclusion: Clinical outcomes after primary repair of PEH with onlay absorbable mesh are excellent. The need for surgical reintervention does not appear to be related to pre-operative BMI.



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Linx® Magnetic Esophageal Sphincter Augmentation Versus Nissen Fundoplication for Gastroesophageal Reflux Disease: A Systematic Review and Meta-analysis

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Introduction: The LINX® magnetic sphincter augmentation system (MSA) is a novel surgical technique with short-term evidence demonstrating efficacy in the treatment of medically refractory or chronic gastroesophageal reflux disease (GERD). Currently, the laparoscopic Nissen fundoplication (LNF) is the gold standard surgical treatment for GERD. Our aim was to systematically review the literature and perform a meta-analysis comparing MSA to LNF.
Methods and Procedures: A search of MEDLINE, EMBASE, SCOPUS, Web of Science and the Cochrane Library using search terms "Gastroesophageal reflux or heartburn" and "LINX or endoluminal or magnetic" and "fundoplication or Nissen" was completed. All human, English language randomized controlled trials, non-randomized comparison studies, and case series were evaluated. 547 titles were identified through primary search and 197 titles or abstracts were screened after removing duplicates. Articles were selected by two independent reviewers based on the following inclusion criteria: (1) studies directly compared MSA with LNF; (2) studies included at least one primary outcome; and (3) enrolled at least 5 patients. Primary outcomes comprised ability to belch, ability for emesis, discontinuation of proton pump inhibitors, need for endoscopic dilation, procedural satisfaction, presence of gas/bloat and dysphagia. The quality of all included studies was assessed using the Methodological Index for Non-Randomized Studies. Meta-analysis was performed on primary outcome data.
Results: Five primary studies identified a total of 854 patients, of which 355 and 499 underwent LNF and MSA, respectively. Mean duration of follow-up ranged from 7 to 16 months for LNF and 6–12 months for MSA. Loss to follow-up was 9.0% for LNF and MSA groups. MSA was statistically superior to Nissen in preserving patients ability to belch (95.2 vs 65.9%, $p<0.00001$) and ability for emesis (93.5 vs 49.5%, $p<0.00001$). There was no significant difference between MSA and Nissen in postoperative dysphagia (33.5 vs 41.2%, $p=0.23$), gas/bloating (24.9 vs 47.9%, $p=0.15$), need for endoscopic balloon dilation (18.1 vs 5.5%, $p=0.11$), proton pump inhibitor elimination (82.6 vs 84.6%, $p=0.87$) and satisfaction with procedure (90.7 vs 87.5%, $p=0.11$). Operative time for MSA was shorter at 61.9 min versus 81.8 min for LNF.
Conclusion: Magnetic sphincter augmentation appears to be an effective treatment for GERD with short-term outcomes comparable to Nissen fundoplication. MSA has a favorable side effect profile for the majority of morbidities associated with GERD surgery. However, long-term comparative outcome data past one year are needed in order to strengthen this conclusion.

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Rare But Devastating: The Successful Management of Intrathoracic Complications After Bariatric Surgery

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Introduction: Anastomotic or staple-line leak remains a devastating complication following bariatric surgery. Though uncommon, intrathoracic complications following leak include a spectrum of disease ranging from relatively minor, such as sympathetic pleural effusions, to fistulous connections between the gastrointestinal tract to thoracic structures such as the pleural space, airways, and cardiac structures. These can result in devastating sequelae that often require multiple interventions for treatment.
Methods: We performed a retrospective chart review of patients with intrathoracic complications after bariatric surgery who were treated at our institution.
Results: We identified 9 patients with severe intrathoracic complications including 5 after laparoscopic sleeve gastrectomy, 2 after Roux-en-Y gastric bypass, 1 after vertical banded gastroplasty, and 1 after laparoscopic gastric plication. Severe intrathoracic complications included 4 esophageal or gastric fistulas to the pleural space; 3 fistulas to the pericardial space; and 1 fistula to the airway. All 5 pleural fistulas were to the left pleural space; 3 of 5 pleural fistulas required decortication and wedge resection or lobectomy in addition to tube drainage of the pleural space, and 4 of 5 patients required partial or completion gastrectomy with Roux-en-Y gastro- or esophagojejunostomy. All 3 patients with pericardial fistulas required completion gastrectomy with transhiatal esophagectomy and cervical esophagostomy. The one esophagobronchial fistula required a conversion of her sleeve gastrectomy to a completion gastrectomy with Roux-en-Y esophagojejunostomy as well as a lobectomy for control of her sepsis. All patients had eventual resolution of their thoracic complications with multidisciplinary therapy. There were no 30 day mortalities in our series.
Conclusions: Severe intrathoracic complications following bariatric surgery are sequelae of anastomotic or staple line leaks and manifest as fistulas to various cavities or organs which guides their management. These are morbid complications which often require multiple interventions across a spectrum of specialties for control of the fistulous connection.

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Watchful Waiting Versus Elective Laparoscopic Repair for Minimally Symptomatic Paraesophageal Hernias: A Cost-Effectiveness Analysis

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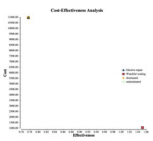
Introduction: In this study, we aimed to evaluate the management strategies of watchful waiting versus elective laparoscopic hernia repair for minimally symptomatic paraesophageal hernias (PEH). The current recommendation for minimally symptomatic PEHs is watchful waiting. This standard is based on a decision analysis performed in 2002 that only compared the two strategies on quality-adjusted life-years (QALYs). Since that time, the morbidity and mortality associated with elective laparoscopic hernia repair have decreased. Furthermore, a cost-effectiveness study for PEH repair has not been reported.
Methods: A Markov decision model was developed (using Tree Age ™ software) to compare the strategies of watchful waiting and elective laparoscopic hernia repair for minimally symptomatic PEH in a hypothetical cohort of 60 year-old patients. Input variables such as probabilities and utilities were estimated from a pooled analysis of published studies. Cost data were obtained from Medicare. The model was run for 20 1-year cycles. Outcomes for the two strategies were cost and QALY's. One-way sensitivity analysis was performed to examine the differential effects of individual variables on the outcome of the model.
Results: Elective laparoscopic hernia repair was dominated by the watchful waiting strategy with respect to cost and effectiveness. The variables which had the largest influence on the results were the probability of progressive symptoms leading to elective repair, and quality of life with a minimally symptomatic hernia.
Conclusion: Despite an improved safety profile for elective laparoscopic hernia repair, this study confirms that watchful waiting is the preferred approach for minimally symptomatic paraesophageal hernias.



P376

Laparoscopic Surgery for Gastrointestinal Stromal Tumor of the Stomach

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Introduction: Gastrointestinal stromal tumors (GISTs) are the most common types of mesenchymal tumors of the gastrointestinal tract, and these tumors occur most frequently in the stomach. Complete resection is the curative treatment for limited gastric GIST. Several reports shows laparoscopic resection appears to be a preferable choice. The aim of this study is to investigate the laparoscopic resection for gastric GIST in our institution
Methods and Procedures: From January 2011 and June 2016, five patients with gastric GIST underwent laparoscopic resection at our institution. The surgical outcomes were analyzed retrospectively.
Results: The patients consisted of two men and three women with a mean age of 67 years (ranging from 48 to 78). Mean tumor size was 4.5 cm (ranging from 2.6 to 5.6), with the following anatomic distribution: body in two, cardia, fornix, and antrum in one respectively. The operative procedures were 4 partial gastrectomy (two laparoscopic endoscopic cooperative surgery, one single incision laparoscopic surgery, and one laparoscopic intragastric surgery) and one laparoscopic proximal gastrectomy. Mean operating time was 304 min (ranging from 129 to 466), and mean blood loss was 29 ml (ranging from 3 to 120). There were no conversions to open surgery and no major intraoperative complications. The time to resumption of food intake was 4.2 days (ranging 2–6) and average length of postoperative hospital stay was 11.2 days (ranging from 5 to 17). Postoperative complications were intragastric bleeding and delirium. There were no recurrences and deaths because of gastric GIST.
Conclusion: Laparoscopic resection for gastric GIST is a safe and feasible procedure except for longer operative time because there were no major complications during perioperative period.

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A Single Institution's Experience Treating Barrett's Esophagus with High Grade Dysplasia

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Introduction: Barrett's esophagus (BE) is both a common disease and the single strongest risk factor for development of esophageal adenocarcinoma (EAC). It was long thought that BE progressed on a stepwise continuum from BE to BE with low-grade dysplasia (LGD) to BE with high-grade dysplasia (HGD) and finally EAC, but this relationship has recently come under question. HGD represents the highest-risk state for progression to EAC, yet there remains debate as to the optimal treatment algorithm and guidelines differ amongst subspecialists. Here we present a descriptive analysis of one institution's clinical experience treating BE with HGD.
Methods and Procedures: The host institution's Clinical Query 2 database was interrogated for all patients who underwent interventions on pathology-proven BE without restrictions on the date of intervention. Nine hundred and three subjects were identified, of which 137 had unequivocal pathological diagnosis of HGD at the time of intervention. Patient charts were evaluated for a series of standardized clinical questions and responses were captured in a REDCap database. Descriptive statistics including means and standard deviations as well as distributional plots were used to evaluate the data using Stata v14 (College Station, TX).
Results: There were no significant differences of the demographics and risk factors between patients undergoing endoscopic vs. surgical intervention excepting age, in which surgical patients were 5.9 years younger on average ($p=0.03$). Those who underwent radiofrequency ablation (RFA) exhibited a high rate of cure of both BE and HGD (69.3% and 89.3%, respectively) over a median follow-up period of 29 months. 28.9% of patients who underwent tissue-sampling interventions were upstaged to EAC after pathological review of the resection specimen. The post-intervention surveillance rate was 67.3% for patients treated with endoscopic therapies vs. 10% for surgical patients.
Conclusions: Ablative procedures are effective in eliminating both BE and HGD on follow-up endoscopic surveillance at rates similar to those previously reported. These data are encouraging for inferring long-term survival benefits from RFA of BE with HGD. Prospective longitudinal studies are needed to further evaluate the efficacy and durability of ablative therapies. This work demonstrates a paradigm shifting in favor of a more progressive role for RFA in the treatment of BE with HGD, and further suggests the need for coordinated multidisciplinary approaches involving both gastroenterologists and surgeons.

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Short Term Outcome of Using Crural Relaxing Incision without Mesh Reinforcement for Laparoscopic Repair of Large Hiatal Hernia

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Introduction: The most common cause of recurrence after hiatal hernia repair is crural tension. The most commonly used measure to minimize recurrence is biologic or synthetic mesh closure. However, mesh reinforcement is associated with many reported complications. Crural relaxing incisions were recently described to reduce crural tension.
Objectives: The aim of this study is to evaluate the short term outcome of adding crural relaxing incision during laparoscopic repair of large sliding and paraesophageal hiatal hernias in terms of the rate of recurrence.
Methods: Records were reviewed to identify patients who received a relaxing incision during laparoscopic repair of large sliding and paraesophageal hiatal hernias. The patients were followed clinically, endoscopically and radiologically at 3, 6 months and then annually.
Results: From March 2012 to January 2016, 46 patients underwent laparoscopic large sliding/PEH repair, and 12 patients (26.1%) received a relaxing incision to accomplish tension-free crural closure. The median age of the patients was 72 years (range 43–73 years) and 35 patients were females. PEH was diagnosed in 9 patients (75%) while 3 patients had large sliding HH. The relaxing incision was right-sided in all patients. All crural relaxing incision were reinforced with omentum and no mesh was used for reinforcement. All the procedures were completed laparoscopically and included a fundoplication. Collis gastroplasty for a short esophagus was not necessary in any patient. No major complications occurred. During a median follow-up period of 8 months, one patient (8.3%) had asymptomatic recurrent herniation, as shown endoscopically and radiologically.
Conclusion: The use of diaphragmatic crural incision during laparoscopic repair of large sliding and paraesophageal hiatal hernias is safe and may be associated with lower incidence of recurrence. Future prospective randomized trials on a larger population with long term follow-up are needed.
Keywords: Crural incisions, relaxing, sliding hernia, paraesophageal hernia, laparoscopic, antireflux surgery.

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Laparoscopic Repair with Mesh Reinforcement for Symptomatic Massive Diaphragmatic Hernia of Morgagni

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A 64-year-old obese female presented with nausea, vomiting and epigastric pain. Pertinent history included progressive dyspnea and idiopathic congestive heart failure requiring home oxygen and diuretics. Imaging revealed a massive diaphragmatic hernia of Morgagni with herniated transverse colon, stomach, duodenum, and omentum. Severe cardiac displacement into the left chest was also visualized. An illustration of the preoperative findings is illustrated in Fig. 1.
Laparoscopic repair of the hernia defect was performed with full reduction of the hernia contents and excision of the hernia sac. Primary diaphragmatic defect closure was performed. This was reinforced with synthetic absorbable mesh and transfascial tacking sutures. The patient was successfully extubated in the operating room. Following reduction, improved right lower lobe expansion and less cardiac mass displacement was noted on postoperative radiography. The patient tolerated a regular diet and was discharged home on post-operative day 4 on room air. During follow up at 3 months, the patient noted marked improvement in baseline dyspnea, with no further nausea or chest pain. She remained liberated from home oxygen.
First described by Morgagni in 1769 from autopsy, Morgagni-Larrey hernias are rare. They account for up to 3% of congenital diaphragmatic hernias. These may also be referred to as retrocostoxyphoid, retrosternal, substernal, or subcostosternal hernias. While usually identified and reported in children, most of these are identified incidentally in the adult population. Patients may commonly report epigastric pain, nausea, vomiting, or early satiety. The most common herniated visceral contents reported is omentum. The next most common include transverse colon (60%) and stomach (12%). While plain film may identify most defects, computed tomography (CT) is better at defining pertinent anatomy. CT has been reported as an accurate preoperative tool in 70 to 83% of patients. A Morgagni defect may be delineated from other cardiophrenic masses by the presence of radiating linear or curvilinear densities consistent with omental blood vessels.
Repair is indicated in most patients. Both transthoracic and transabdominal surgical repairs have been described. Most modern series describe the transabdominal approach as the most favored. Minimally invasive techniques by both thoracoscopic and laparoscopic methods are described. Most surgical series describe both primary and patch repairs with low morbidity, high success, and low recurrence rates up to 4 years.

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Effect on Gastroparesis Symptoms After Explantation of Gastric Electrical Stimulators

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Introduction: Gastroparesis is a chronic and debilitating disease, with an increasing prevalence in the United States. Prokinetic, antiemetic medications and behavioral modification are mainstays for therapy, but the failure rate remains high. For patients refractory to medical therapy, Gastric Electrical Stimulator (GES) may be considered. There are various indications for device removal. Outcomes of patients who have previously undergone GES therapy have not been studied after explantation.
Methods: An IRB approved, prospectively maintained database of 209 patients who have received GES at our institution was queried for patients who underwent explantation. Demographic data, pre- and post-operative symptomatology, as well as perioperative data were collected. All patients who eventually underwent explantation were included in this study.
Results: Twenty-two patients met inclusion criteria, which represents 11% of our total implants. Nineteen patients were female (86%). Nine patients had gastroparesis secondary to diabetes, while the remaining were classified as idiopathic. Age at implantation ranged from 21 to 74 years. Mean pre-stimulator BMI was 26 kg/m2 (range 16–40). The most common pre-implantation symptoms were nausea (86%, n=19), vomiting (82%, n=18), inability to finish a meal (68%, n=15) and chronic abdominal pain (64%, n=14). Routine follow up after stimulator insertion to a mean of 12 months (range, 1–73) showed improvement or resolution of nausea in 59% of patients (n=13), vomiting in 55% (n=12), and abdominal pain in 27% (n=6).
Average time to explantation was 44 months (range 1–149). Indications for stimulator explant included: failure of symptomatic relief (50%, n=11), generator and/or lead infection (18%, n=4), lead erosion (14%, n=3), generator pain and/or discomfort (14%, n=3), and patient complaint of shocking sensation (5%, n=1). Two of the patients in the failure of relief group had their devices removed as part of a small bowel transplant. Three patients underwent conversion to Roux-en-Y gastrojejunostomy (RYGJ) and three had new enteral access placed at the time of device removal.
Post-operative data was available for eighteen patients. Twelve patients (67%) suffered from nausea, seven (39%) reported continued emesis, four (22%) were unable to finish a meal, and eight (44%) reported chronic abdominal pain. Notably, two of the patients who reported no further symptoms were from those who were converted to RYGJ.
Conclusion: GES has shown efficacy in the treatment of gastroparesis. Indications for explantation are variable, but may occur in over 10% of patients. Some patients may maintain symptomatic improvement even following explant.

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Lessons Learned from Patients Presenting for Reflux Surgery

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Objective: To demonstrate the importance of a complete and thorough work up of gastroesophageal reflux disease (GERD) and the success and effectiveness of a new anti-reflux procedure with magnetized sphincter augmentation (LINX reflux management system).
Background: GERD is a chronic digestive disorder affecting 20% of U.S. adults. Standard treatment has been lifestyle change, proton pump inhibitors, or alternative surgical management with a Nissen fundoplication.
Methods: 20 patients presented for treatment with medically refractory GERD. A complete work up included a gastroesophageal reflux disease – health related quality of life (GERD HRQL) questionnaire, endoscopy, esophageal manometry, 24 h ambulatory pH study, and barium swallow. The GERD HRQL questionnaire consists of 10 questions assessing the severity of GERD symptoms on a scale of 0–5 with 0 being symptoms never experienced to 5 being the symptom is incapacitating and occurring daily despite medical treatment. The esophageal pH monitoring was done in a consecutive 24 h period to record the esophageal pH. Endoscopy, barium swallow, and esophageal manometry assessed the mucosal surface and peristalsis of the esophagus. Post-operatively patients completed the GERD-HRQL and questions about satisfaction and PPI use at 3 months and 6 months
Results: Due to proper pre-operative work up 4 of the 20 patients were found to have contraindications to the new anti-reflux procedure with magnetized sphincter augmentation (LINX reflux management system). Two of these patients were found to have achalasia, one had scleroderma, and one had esophagogastric junction outflow obstruction status post a Nissen fundoplication. Pre-operatively, the mean GERD-HRQL total was 33 while on PPI therapy. All 8 patients (100%) were "dissatisfied" with their pre-operative condition while taking PPIs either daily or twice daily. Post-operatively, the mean GERD-HRQL total was 6. This was an 82% decrease in mean GERD-HRQL total. 7 out of 8 patients (87.5%) reported feeling "satisfied" and 1 reported feeling "neutral." 7 out of 8 patients were completely off PPIs at follow up.
Conclusions: Proper pre-operative work up with GERD HRQL questionnaire, esophageal manometry, 24 h ambulatory pH study, and barium swallow is imperative to assessing success with the LINX reflux management system. The LINX reflux management system increases patient satisfaction and quality of life and decreases PPI use at 3 months and 6 months. Long-term effects cannot be made at this time but the study will continue.

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Trends and Outcomes of Esophagectomy in the United States, Data from the ACS-NSQIP, 2008–2014

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Introduction: The objective of this study is to examine the trends and outcomes of esophagectomy after implementation of ACS-NSQIP.
Methods and Procedures: The American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database between 2008 and 2014 was used to obtain and analyze data for patients with esophageal cancer who underwent partial esophagectomy or total esophagectomy. Main outcome measures included 30-day mortality, serious morbidity, and length of stay. Outcomes were analyzed according to the first half of the study period (2008–2011) compared to the latter half (2012–2014).
Results: From 2008 to 2014, 4,667 esophagectomies were performed for esophageal cancer, of which 2,130 were total esophagectomies and 2,537 were partial esophagectomies. The proportion of partial esophagectomies has risen from 33% in 2008 to 57% in 2014. Partial esophagectomy was the predominant operation after 2010. When comparing the first half of the study period (2008–2011) to the latter half of the study period (2012–2014) there was an overall reduction in average length of stay from 15.6 days to 13.3 days. However, there was no significant improvement in serious morbidity or 30-day mortality between the two time periods; 36.3% vs 35.4% (p=0.5476) for serious morbidity and 3.2% vs 2.3% (p=0.578) for 30-day mortality.
Conclusion: From 2008 To 2014, there was an increase in the proportion of partial esophagectomies performed for esophageal cancer. There has been an overall reduction in average length of stay; however no notable improvement in serious morbidity or mortality since ACS-NSQIP has been implemented. Further quality improvement initiatives should be implemented to reduce the morbidity and mortality associated with esophagectomy.

P383

Combined Robotic Thoracoscopic and Laparoscopic Resection of Large Epiphrenic Diverticulum

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Esophageal epiphrenic diverticulum can at times pose a difficult surgical challange. Large size, positioning within the right chest and other specific conditions can make a solely abdominal approach infeasible. This case report describes a case of a patient with a large epiphrenic diverticulum mostly postioned within the right chest that was managed with a combined robotic-assisted thoracocscopic and laparoscopic approach.

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Indocyanine Green in Esophageal Surgery, A Systematic Review and Meta Analysis

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Introduction: Florescence angiography with indocyanine green (ICG) has been approved for clinical use since the 1950s. The purpose of this study was to determine the predictive value of fluorescence angiography with ICG for anastomotic leaks after esophagectomy.
Methods and Procedures: A systematic review and meta analysis was performed for studies evaluating florescence angiography using ICG with esophagectomy to predict postoperative anastomotic leaks.
Results: Sixteen studies were included in the systematic review including 490 patients undergoing esophagectomy and ICG evaluation. Sufficient data for meta analysis was found in fourteen studies with 424 patients. There were 56 (13.2%) leaks reported and the pooled sensitivity for detecting leaks was 0.55 (95% CI 0.23 to 0.81) and the pooled specificity was 0.94 (95% CI 0.84 to 0.99). The pooled log diagnostic odds ratio (DOR) was 3.16 (95% CI 1.44 to 5.16) and the summary receiver operating characteristic (ROC) area under the curve (AUC) was 0.85 (95% CI 0.53 to 0.98).
Conclusion(s): Florescence angiography with indocyanine green is a useful test to predict, and potentially prevent, postoperative anastomotic leaks after esophagectomy.

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Primary Duodenal Malignancies: 2 Year Experience at a Tertiary Hospital

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Introduction: Malignant tumors of the duodenum are extremely uncommon. This cohort presents two year experience of a tertiary hospital.
Patients and Methods: From April 2014 till April 2016 we received 8cases of cancer duodenum at the GIT surgery unit general surgery department, Tanta university hospital. Preoperative work up included upper GI endoscopy and biopsy, CT abdomen (digital angiography in cases with suspected vascular invasion), Tumour markers and assessment of fitness for surgery. Deranged parameters due to repeated vomiting or malnutrition were corrected before surgery. One case received neoadjuvant chemotherapy with impressive tumour regression that enables surgical excision.
Results: Eight patients, 4 males and 4 females with mean age of 53.25 ± 8.3, range from 35 to 62y. The presenting complaints in order of frequency were vomiting in 6 patients (75%), upper abdominal pain in 4 patients (50%), weight loss in 3 patients (37.5%) and jaundice in 2 patients (25%). The tumour was in the second part in 3 cases, in the fourth part in 2 cases, one case in the first, one case in the third and multiple nodules in all parts of the duodenum in one case. The gross pathology was ulcerating mass with stricture in 5 cases, mass in 2 cases and multiple nodules in one case while the microscopic type was adenocarcinoma in 7cases and Neuroendocrine tumor in one case. Four cases were submitted to Whipple operation, three cases were submitted to segmental resection and one case palliative bypass. The tumour was T4 in 6 cases and T3 in one case. Lymph nodes were positive in 4 cases (range 2–4 nodes) and negative in 3 cases. No distant metastasis at the time of surgery. The mean follow up was 10.3 ± 9.2 months and the mortality was one case 12.5%.
Conclusion: Surgical excision is possible and could be curative provided the tumour is resectable in case of primary duodenal malignancy.

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Mitochondrial Myopathy Effects on Gastrointestinal System

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Introduction: Mitochondria is a small energy producing structure of a cell. Mitochondrial myopathy (MM) is clinically mixed disorder which can affect various systems besides skeletal muscle. MM starts with muscle weakness or exercise weakness. This study is aimed to see effects of MM on gastrointestinal system likes gastroesophageal reflux disease (GERD) and gall bladder issues.
Methods: This was a retrospective chart review study using the quantitative data. Between May 2011 and June 2016, 124 patients who underwent muscle deep biopsy for confirming the MM at Buffalo General Hospital were included in this study. The data were analyzed using SPSS version 21.
Results: Out of 124(79% female, 21% male) mitochondrial myopathy patients, 40.3% and 21% patients were suffering from GERD and gall bladder issues respectively. 24.2% and 48.4% patients had obstructive sleep apnea (OSA) and fatigue respectively.
Conclusion: MM causes muscle weakness which results in affecting gastroesophageal system causing GERD and gall bladder issues. It causes OSA and fatigue as well.

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Comparison of Two Buttressing Materials for Gastric Sleeve Resection: Clinical Outcome and Complications

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Introduction: Buttressing material is commonly used to minimize staple line bleeding after gastric sleeve resection. We have been using the Goreâ Seamguardâ staple line reinforcement (67% PGA and 33% TMC=Maxon) together with Covidiens tri-stapler, purple cartridge. The Seamguard needs to be manually loaded on to each cartridge. During 2015 a new Covidien cartridge with a preloaded buttressing material (100% PGA) was introduced in Sweden. The PGA has a more rapid degradation, 15 weeks, compared with 6–7 months for PGA-TMC. Previous studies indicate that rapid degradation induces more local inflammation. In order to shorten operation time, we changed our practice and started to use the preloaded cartridges. After 6 months we evaluated the clinical outcomes and complication rates comparing the two materials.
Methods and Procedures: All patients were operated by the same two experienced laparoscopic surgeons. The preloaded Covidien cartridges were used in 28 consecutive patients operated during the fall of 2015. The outcome of these patients was compared with the previous 42 consecutive patients operated with Seamguardâ buttressing. Operating time, number of cartridges, hospital stay and complications were recorded.
Results: The groups did not differ concerning age, BMI or gender. Number of cartridges used did not differ. Mean operating was 46 min for the preloaded cartridges and 48 min for the Seamguard buttressing, showing no significant difference. Hospital stay was significantly longer for the patients operated with the preloaded cartridges, compared with Seamguard (1.7 days vs 1,3 range) (p=0.022). The longer hospital stay was due to more postoperative pain, nausea and delayed oral intake. No patients had staple line bleedings. In the preloaded group 4/28 patients returned to the hospital with leaks at the angle of Hiss with delayed onset, one patient after 1 week, one after 1 month, one after 3 months and one after 6 months. In the Seamguard group 2/42 patients returned with leaks, one acute leak after 2 days and one delayed after 3.5 months. (no significant difference in leak rate)
Conclusions: The faster degrading material (100% PGA) induces more acute inflammation which might result in immediate postoperative nausea and pain leading to longer hospital stay. There was also a tendency towards a higher incidence of delayed leakages in this group, which might be induced by the initial higher grade of inflammation and subsequent faster degradation.

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Feasibility of Laparoscopic Gastrectomy for Elderly Patients

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Background: With advancement of aging society, surgical cases for elderly patients are now increasing. The aim of this study was to evaluate the feasibility of laparoscopic gastrectomy (LG) for gastric cancer (GC) in the patients aged 80 years or more.
Method: 324 patent who underwent LG were enrolled in this study. Super-elderly patients were defined as those aged 80 years or more :super-elderly group (n=24), non-super-elderly group (n=300). Clinicopathological data and surgical outcomes after LG were compared between super-elderly and non-super-elderly groups. Our surgical indication for was defined as Fev1.0% ?40% or EF ?40%.
Results: In all 324 patients, 24 patients had postoperative stasis, 12 patients had pancreatic fistula, 9 patients had respiratory complication, 6 patients had leakage. Patients with steroid use or cardiac co-morbidity had tended to have postoperative complications. Surgical data and the prevalence of postoperative complications did not differ significantly between the two groups. No mortality was observed in the super-elderly and non-super-elderly group. Six patients of not indicated LG due to severe co-morbidity (Fev1.0% ?40% or EF ?40%) underwent open surgery, and had no postoperative complications. Eight patients underwent limited operation (D2→D1, D1+→D1), and had no cancer related death.
Conclusion: Laparoscopic gastrectomy for GC in elderly patients was a feasible option even in super elderly patients aged 80 years or older with accurate selection.

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Laparoscopic Management of Esophageal Diverticula: An Analysis of Seventeen Years of Experience

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Background: Diverticula of the mid and distal esophagus are relatively rare presentations in a patient complaining of dysphagia. Management is further complicated by the underlying pathology and thus controversies still exist. In this context our objective through this study was to evaluate the outcomes of laparoscopic management of the mid and distal esophageal diverticulae and share our experience over the past seventeen years.
Methods: A retospective review of prospectively maintained database was conducted including all the patients who underwent laparoscopic surgery for symptomatic diverticula at our hospital from 1997 till 2015. All the clinico-pathological parameters, operative and post-operative parameters were recorded and analysed. Also, the quality of life in terms of dysphagia was evaluated during the follow up.
Results: Sixty eight patients (40 males, 28 females) with a mean age of 42+9.4 years underwent laparoscopic management of esophageal diverticula during the study period. The most common presentation was dysphagia (60/68, 88%) while the most common site was lower esophagus (epiphrenic diverticulum, 48/68, 71%). Laparoscopic management was done either through the trans-hiatal approach (n=34), thoracoscopic approach (n=26) or a combined approach (n=8). Post-operative leak was detected in three patients (4%) that required laparoscopic correction while there was no mortality. All the patients had significant improvement in the dysphagia during follow up.
Conclusion: Laparoscopic management of diverticula of the esophagus is faesible, safe and effective. However, this procedure is technically demanding and should be performed only by surgeons with sufficient experience advanced laparoscopic gastrointestinal surgery.

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Association of Esophageal Motility and Gastro-Esophageal Reflux with Underlying Disease in Patients with End-Stage Lung Disease

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Introduction: There is a high prevalence of esophageal dysmotility and pathological reflux in patients with advanced lung disease. Aim of this study is to understand the association of esophageal motility disorders and 24 Hr pH scores with underlying pulmonary disease.
Methods and Procedures: All patients undergoing lung transplant at our institution are prospectively entered in a database. After IRB approval the database was queried to identify 100 patients who had pre-transplant esophageal HRM and 24 Hr pH study. Underlying pulmonary disease was classified using UNOS criteria. Two major groups were restrictive (RLD) and obstructive (OLD) lung disease. Esophageal manometry studies were reanalyzed using Chicago v 3.0 classification.
Results: The 100 patients with complete esophageal studies underwent lung transplant between Jan 2014 to July 2015. Mean age was 60.8±9.9 years with 36 females and a BMI of 26±5.2. 58 patients had RLD and 39 patients had OLD. There was no difference in prevalence of esophageal motility disorders (60.3% vs 56.2%) and manometric hiatus hernia (31% vs 43.6%) between RLD and OLD groups. However, there was a significantly higher prevalence of pathological reflux between the groups: 45% vs 18% (p=0.004) between RLD and OLD. Gastric emptying study showed statistically no difference in prevalence of gastroparesis (6.3% vs 0%) between RLD and OLD.
Conclusions: There is significantly higher prevalence of pathological reflux disease in patients with RLD compared to OLD. This difference probably represents a fundamental difference in respiratory mechanistic derangement between RLD and OLD.

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Surgical Treatment of the Giant Hiatal Hernia, A Single-Center Experience

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Introduction: All symptomatic giant hiatal hernias, defined as any hiatal hernia where more than 30% of the stomach is placed intrathoracically, should be addressed with elective surgery, significantly reducing the risk of complications. Symptoms of incarceration require immediate emergency surgery and occur in less than 2% per year.

The purpose of this study was to evaluate perioperative data, outcome and patient satisfaction in patients undergoing emergency or planned surgery for giant hiatal hernia in a Danish centre.

Methods and Procedures: This retrospective study was performed using patient records of all patients undergoing emergency (E) or planned (P) primary laparoscopic repair for giant hiatal hernia at a single center over a six-year period. Demographics and characteristics of hiatal hernia and surgery were registered. Admission length, complications and readmission within 30 days were registered. All patients were subject of GERD-HRQL follow-up six months postoperatively, assessing patient satisfaction, dysphagia, reflux and reoperation.

Continuous and categorical variables were compared using student's t-test and Chi2-test. Spearman's correlation was calculated and reported if >0.3 and $p<0.05$.

Results: The study included 92 patients (E:11 & P:81). There was no differences in age, sex, BMI, size of the hiatal defect, the use of mesh-reinforced crural closure or gastropexy, or complications and readmission within 30 days, when comparing planned and emergency surgery.

There was a statistically significant difference in type of hiatal hernia (E:72.7% Type 3 & 27.3% Type 4 VS P:100% Type 3, $p<0.01$), fraction of stomach placed intrathoracically (E:83.3% VS P:63.3%, $p<0.01$), duration of surgery (E:168 min VS P:212 min, $p<0.01$) and admission time (E:2.3 days VS P:3.7 days, $p=0.01$). At follow-up there was no difference in occurrence of reflux, reoperation or patient satisfaction. There was however a significant difference in postoperative dysphagia (E: 27.3% VS P:7.4%, $p=0.04$).

The size of the hiatal defect and operating time both had a positive correlation with the fraction of stomach displaced intrathoracically. Emergency surgery had a positive correlation with admission time and postoperative dysphagia ($rs=0.31$, $p=0.01$ & $rs=0.31$, $p=0.04$). Reoperation had a positive correlation with rehospitalisation ($rs=0.33$, $p=0.01$) and a negative correlation with the use of gastropexy during primary surgery ($rs= -0.34$, $p=0.01$).

Conclusion: Planned as well as emergent laparoscopic repair of giant hiatal hernia is feasible, safe and effective with no mortality and no considerable morbidity and patient satisfaction is high six months postoperatively. Further follow-up is required to assess development of long-term adverse effects of surgery.

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Our Practical Procedure in Laparoscopic Nissen Fundoplication for GERD Patients

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Introduction: Laparoscopic techniques in anti-reflux surgery for GERD patients are still considered complicated by many surgeons. We have simplified it and established our practical procedure.

Surgical Procedure:

Setting

Our 5-trocar setting with patients in the reverse Trendelenburg's position is as follows: 12 mm trocar just below the navel (A), 5 mm trocar at the upper right abdomen for pulling up lateral segment of the liver, 5 mm trocar at the upper right abdomen, 12 mm trocar at the upper left abdomen (B), 5 mm trocar at the middle left abdomen (C).

Step 1

Under laparoscopic view, left part of the lesser omentum was cut with preserving the hepatic branch of vagus nerve. The right crura has been dissected free, and the esophagus is recognized. The soft tissue at the posterior side of the abdominal esophagus was carefully dissected. Then the left crus of the diaphragma was recognized from the right side. In this part of the procedure, laparoscope uses trocar (A), the assistant uses trocar (B) to pull the stomach to left lower side and the operator's right hand uses trocar (C).

Step 2

The branches of left gastroepiploic vessels and the short gastric vessels were divided with LCS. The left crus of the diaphragma was exposed and the window at the posterior side of the abdominal esophagus was widely opened. In this part of the procedure, laparoscope uses trocar (A) at the beginning of dividing left gastroepiploic vessels, trocar (B) when dividing short gastric vessels.

Step 3

The right and left cruras are sutured with interrupted stitches to reduce the hiatus. From the right side, the stomach is grasped from behind the esophagus. Then the fornix of the stomach is pulled to obtain a 360 degree "stomach-wrap" around the esophagus (fundoplication). Using 2−0 non-absorbable braided suture, stitches are placed between both gastric flaps.

Results: We have performed this procedure in 84 cases. The mean operation time was 115 min. A favorable outcome was assessed by radiograms performed during hospital stay.

Discussion: We have established a simple and practical procedure which need less time and just 2 surgeons (the operator and the assistant (scopist)).

The results of the laparoscopic Nissen fundoplication were good.

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Laparoscopic Heller Cardiomyotomy with and without Dor Fundoplication: Randomized Controlled Trial

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Introduction: The type of anti-reflux procedure to be used as an adjunct to laparoscopic Heller cardiomyotomy (LHCM) for oesophgeal achalasia is controversial. We compared results of LHCM with and without Dor fundoplication in a randomized controlled trial.

Methods and Procedures: From 2009 to 2014, 42 patients undergoing LHCM were randomized to receive Dor fundoplication (group I, 20 patients), or no anti-reflux procedure (group II, 22 patients). Primary outcome measures were: rates of recurrences and gastro-esophageal reflux. Secondary outcome measure was operative time. Symptomatic outcomes were evaluated using modified Mellow and Pinkas dysphagia scale, and GERD-HRQL questionnaire. Objective outcomes were evaluated by barium swallow study and 24h pH study. Time frame was 2 years.

Results: There were no significant differences between groups in respect to age, gender, and preoperative dysphagia scores. All procedures were completed without mortality and serious complications. Mean operative time was higher in Dor group (130 vs 92 min, $p<0.05$). Mean follow-up period was 25.4 months (range, 24–28 months). Complete relief of dysphagia, confirmed by barium swallow, was observed in 17 patients (85%) from group I (i.e., with Dor fundoplication), and in 21 patients (95.5%) from group II (i.e., without fundoplication), $p>0.05$. There were no statistically significant differences in dysphagia score (0.8 vs 0,3,) and GERD-HRQL score (1.9 vs 2.4, $p>0.05$). Mean DeMeester score was higher in group II, but also have not gained statistically significant difference (23.4 vs 42.1, $p>0.05$).

Conclusion: Laparoscopic Heller cardiomyotomy can be performed without Dor fundoplication with similar results in relief of dysphagia and prevalence of gastro-esophageal reflux.

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Evaluation of Esophageal Motility According to the Chicago Classification in Patients with Epiphrenic Diverticula and Outcomes After Surgery

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Introduction: Epiphrenic diverticula arise secondary to functional or mechanical esophageal outflow obstruction. Patients often have underlying esophageal motility disorders; however due to their rarity, few series have described results of high-resolution manometry in such patients, and no studies have categorized patients according to the current Chicago Classification of esophageal motility disorders.
Methods: A single-institution database was retrospectively examined. Patients with preoperative manometry who underwent operations for esophageal diverticula were included. Patients undergoing surgery for pharyngeal (Zenker's) diverticula and those with mechanical obstruction as the etiology of their esophageal diverticula were excluded. Results of pre and postoperative manometries were interpreted using version 3.0 of the Chicago Classification.
Results: From September 2007 to July 2016, 10 patients underwent operations for epiphrenic diverticula. Five were female and the median age was 64 years. The most common presenting symptoms were dysphagia (80%) and regurgitation (80%). All diverticula were in the distal third of the esophagus and ranged 1-7cm in diameter. On preoperative manometry, 2 patients had normal motility and 8 had disorders of esophagogastric junction (EGJ) outflow. Categorizing those 8 patients based on esophageal body activity, 4 had type II achalasia and 4 had EGJ outflow obstruction with preserved peristalsis. Of the 4 with preserved peristalsis, 3 exhibited hypercontractile swallows. A preoperative hiatal hernia was present in 50% of patients (all Type I, median axial length 3 cm). Seven patients underwent laparoscopic diverticulectomy, Heller myotomy, and partial fundoplication. One patient underwent left thoracotomy, diverticulectomy, myotomy, and Belsey fundoplication. One had an endoscopic myotomy and laparoscopic diverticulectomy and partial fundoplication performed concurrently. One patient underwent endoscopic myotomy without diverticulectomy. Myotomy length ranged 3-20cm, in all cases beginning proximal to the diverticulectomy and ending distal to the EGJ. Median length of stay was 2.5 days. Two Grade IIIb complications occurred: a contained esophageal leak that resolved with endoscopic stenting and a left pleural effusion without leak that resolved with tube thoracostomy. At median 10 month follow-up, 7 patients had resolution of dysphagia and 2 had infrequent (less than weekly) dysphagia. One patient had recurrence of daily dysphagia that responded to endoscopic dilation. Four patients had postoperatively manometry with 75% demonstrating resolution of EGJ outflow obstruction.
Conclusions: In this series, 40% of patients with epiphrenic diverticula had achalasia according to the Chicago Classification and the frequency of hiatal hernia was higher than expected. Patients with epiphrenic diverticula may represent a unique subpopulation of patients with esophageal motility disorders.

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Outcomes of Paraesophageal Hernia Repair in Octogenarians

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Introduction: As life expectancy of Americans increases, there has been an increased incidence of elderly patients presenting with symptomatic and asymptomatic paraesophageal hernias. The aim of this study is to evaluate outcomes following paraesophageal hernia repair in patients age 80 and older and compare to younger patients.
Methods and Procedures: The Nationwide Inpatient Sample was reviewed for all patients from 2008 to 2013 with ICD-9 diagnosis and procedure codes associated with paraesophageal hernia repair. Patient demographics, length of stay (LOS), patient disposition at discharge, and in-hospital mortality rates were evaluated in octogenarians and patients younger than 80.
Results: A total of 38,053 adult patients in the United States who had undergone paraesophageal hernia repair were reviewed with 2,601 (6.8%) age 80 or older. 33,378 (87.7%) of the repairs utilized a laparoscopic (N=32,930) or thoracoscopic (N=448) technique and 4,675 (12.3%) underwent a laparotomy (N=3980) or thoracotomy (N=695). Overall 18.6% of the repairs were urgent or emergent, and this was more common in octogenarians, where 53.4% of repairs were non-elective. Median LOS was 2 days (IQR 1–3) in patients under 80 years old, and 7 days (IQR 3–12) in the older group. The overall in-hospital mortality rate was 0.69%; mortality was significantly higher in octogenarian patients (5.04% vs. 0.38% $p<0.0001$). There was a significantly higher mortality rate in octogenarian open repairs compared with minimally invasive (9.7% vs. 2.6% $p<0.0001$). In the older patient population, 38.6% were discharged to a short term hospital, skilled nursing, or other type of facility, but only 3.0% were discharged to a care facility in the younger patient group. Within octogenarians, significant differences were observed between the non-elective and elective repairs in mortality rate (8.0% vs. 1.6%, $p<0.0001$), LOS (10 days (IQR 7–16) vs. 3 days (IQR 2–6) $p<0.0001$), and rate of disposition to another health care facility (54.0% vs. 20.9% $p<0.0001$).
Conclusions: Paraesophageal hernia repair after the age of 80 is associated with significant risk of mortality, increased length of stay, and non-home disposition, especially when surgery is urgent or emergent. The risks of both operative and nonoperative management should be part of the discussion with elderly patients with paraesophageal hernias. Elective laparoscopic repair appears to offer the best outcomes for octogenarian patients who undergo operative management of their paraesophageal hernias.

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Long-Term Patient Outcomes After Cruroplasty Reinforcement with Biologic Mesh for Hiatal Hernia Repair

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Introduction: Laparoscopic hiatal hernia repair with Nissen fundoplication and primary cruroplasty, recurrence can be as high as 50% long term. Mesh has been used to reinforce the repair in an attempt to reduce the recurrence. Initial reports using biologic mesh have been promising showing an improvement in patient's symptoms and a reduction in recurrence rates in the short-term. This study presents our experience concerning hiatal hernia repair reinforced with biologic mesh, limited to Surgisis mesh, with long-term follow-up.
Methods: A retrospective analysis of all patients who underwent a Nissen fundoplication with mesh placement from January 2000 - January 2015 was performed. Post-surgical interventions were also identified. Subsequently, a phone interview was performed specifically relating to recurrent symptoms including post-prandial pain, regurgitation, heartburn, dysphagia, and increasing antacid use.
Results: A total of 87 patients were identified during this time period. Follow-up was attained in 46 patients; however 10 of these had biologic mesh placed other than Surgisis, and were therefore, eliminated from this study. The average hernia size was 5 cm with 25 patients who had a large defect measuring>6 cm. The large majority of patients (97%) had a significant improvement in their symptoms. Eighteen patients (50%) reported taking a single daily antacid. One patient experienced severe dysphagia and vomiting post-operatively requiring multiple EGDs with dilation. There were 5 documented cases of a slipped Nissen and 6 patients with radiologic evidence of hiatal hernia recurrence. However, neither of these radiologic findings correlated to recurrent symptoms. Eight patients required EGD with dilation. There were no complications of mesh erosion reported. Patients had an average follow-up of 6.7 years (ranging 3.6–10.9 years). Overall, 94% of patients would choose to have the surgery again.
Conclusion: Our experience regarding patients who underwent hiatal hernia repair with biologic mesh placement has produced promising results in the 10 year follow up. Symptomatic improvement was overwhelmingly reported, and there were no complications of mesh erosion during this time interval. Post-operative dysphagia occurred in 22% of patients, which resolved with EGD and dilation. However, 0 patients required surgical revision.

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Laparoscopic vs. Robotic Paraesophageal Hernia Repair

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Background: Laparoscopic Paraesophageal hernia (PEH) repair is considered the standard approach. Over the course of the last decade, robotic PEH repair has been an emerging and innovative approach, providing the surgeon with 3D visualization and articulation of instruments for better dissection of the hiatus.
Materials and Methods: A retrospective review of all the PEH repair cases performed in our center during the course of the past 10 years was performed. A total of 342 patients were reviewed, Demographic data, comorbidities, preoperative symptoms, operative details (type of hernia, operative time, American Society of Anesthesiology (ASA) classification, perioperative complications) and outcomes (length of stay, number of recurrence, post operative symptoms and follow up) were collected for analysis. Student's t-test, Pearson's chi-square test, Fisher's exact test, and the Mann-Whitney test were used for comparisons between robotic and laparoscopic study groups. P-values less than 0.05 were considered statistically significant. All analyses were carried out using R statistical software
Results: A total of 342 patients underwent PEH repair; 80 patients underwent robotic approach and 262 laparoscopic approach. Patients were similar between groups in demographics, comorbid conditions, and pattern of preoperative symptoms. Type III hernias were more common in the robotic group (80.2% v 62.5%). Operative time was similar in both groups (198.4 vs. 188.8; p=0.255). Complications, recurrence, and postoperative symptomatology was also similar between groups. Length of stay was significantly lower after robotic repair (2.4 vs. 3.2; p=0.015). Mean follow-up was longer for the laparoscopic group (14.4 vs. 8.1 mos; p<0.001). Subgroup analysis of patients undergoing repair of recurrent hernias demonstrated a longer operative time robotically (238.0 v 193.8 min; p=0.013) and no difference in LOS (3.1 v 3.1 days; p=0.983).
Conclusion: Although all other outcomes were comparable, this study demonstrates the robotic approach to primary PEH repair is associated with a considerably shorter length of hospital stay compared to standard laparoscopy. There appears to be no advantage to robotic repair of recurrent PEH over that of standard laparoscopy.

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Completion Gastrectomy with Esophagojejunostomy for Management of Benign Foregut Surgery Complications

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Introduction: Reoperative foregut surgery has high complication rates. Completion gastrectomy with resection of diseased organ may be necessary as a definitive procedure. Literature evaluating outcomes after completion gastrectomy with esophagojejunostomy (EJ) for benign diseases is limited. We present an experience of proximal gastrectomy requiring EJ in the setting of benign disease over the past 13 years at a single tertiary referral center.
Methods and Procedures: All patients who underwent total, proximal, or completion gastrectomy with EJ for benign foregut surgery complications were retrospectively identified from January 2003 to December 2015. All cancer operations were excluded. There were 23 patients who underwent EJ either open or laparoscopically. Statistical analysis was performed using JMP 13 and $p<0.05$ was considered statistically significant.
Results: Thirteen patients underwent laparoscopic EJ and 10 had an open EJ. The index operations included 12 anti-reflux, 9 bariatric, and 2 peptic ulcer disease surgeries. Seventy-eight percent of patients had surgical or endoscopic interventions prior to EJ. Mean previous interventions (surgery and endoscopic) prior to EJ was 3 ± 0.8 times and median interval to EJ was 25 months (IQR 9–87). One laparoscopic EJ case was converted to open due to significant adhesions. Roux reconstruction was completed antecolic in 13 patients, and retrocolic in 9 patients, and one was unrecorded. Two patients developed postoperative marginal ulcers.
Comparison between them showed similar operating times, estimate blood loss, and complication rates. Laparoscopic EJ demonstrated significantly shorter length of stay ($p<0.001$), less postoperative ICU days (p=0.002), and less readmissions (p=0.024). Postoperative nutrition therapy was required after all open EJ and only 50% of laparoscopic EJ. Majority of these were receiving enteral nutrition. The overall complication rate was 65% with 35% classified being severe (Clavien-Dindo>III) and no 90-day mortalities.

Table

	LEJ (13)	OEJ (10)	P
Operation Time (min)	2241.6 ± 22.8	279.6 ± 31.1	0.34
Length of Stay (days)	6.5 ± 1.6	17.2 ± 1.9	<0.001
ICU stay (days)	0.1 ± 0.1	4.8 ± 1.4	0.002
Readmission	2 (15.4%)	6 (60%)	0.024

Conclusions: Our series demonstrates that EJ is a reasonable option for reoperative foregut surgery. The laparoscopic approach appears to be associated with decreased length of stay and readmissions.

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Lymph-Node Dissection (L.N.) Along the Left Recurrent Laryngeal Nerve After Esophageal Stripping and Safe Anastomotsis in VATS-E

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Background: The working space in the upper mediastinum is limited and lymph-node(L.N.) dissection along the left recurrent laryngeal nerve is difficult despite of a clear operative view of the middle and lower mediastinum in prone position VATS-E(Video-Assisted Thoracoscopic Surgery of Esophagus). Anastomosis by a circular stapler in the narrow neck field is difficult. We report our technique of the L.N. dissection along the left recurrent laryngeal nerve and safe anastomosis.

Methods:

(1) Patients

One hundred ten patients (27 in left lateral and 83 in prone position), with esophageal carcinomas underwent VATS-E, respectively.

(2) Methods

i) VATS-E in prone position

At first the patients are fixed at semi-prone position and esophagectomy is performed in prone position that can be set by rotating and 5 ports are used at the intercostal space (ICS). Esophagectomy and the L.N. dissection are performed with pneumothorax by maintaining CO2 insufflation.

ii) L.N. dissection around left recurrent laryngeal nerve

Working space at the left upper mediastinal area for L.N. dissection around recurrent laryngeal nerve is limited in prone position. To obtain the space the residual esophagus is stripped in the reverse direction and retracted toward the neck after the stomach tube is removed through the nose.

iii) Anastomosis

At first the circular stapler is introduced into the gastric conduit and joined to an anvil, and close a little. And then a joined anvil is placed into the proximal esophagus and secured by means of a pursestring suture. The gastric conduit opening is closed by a linear stapler, and the anastomosis is completed.

Results:

1. Mean estimated blood loss was 38 ml of chest procedure in prone position and mean chest operative time 305 min.
2. The rate of permanent recurrent laryngeal nerve paralysis was 2.6%, and anastomotic leak and postoperative pneumonia was 4.2% and 3.5%, respectively.

Discussion:

1. L.N. dissection along the left recurrent laryngeal nerve after esophageal stripping is available in prone position of VATS-E.
2. Our anastomotic technique is safe.

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Does Esophageal Manometry Influence Surgical Decision-Making for Operations at the Gastroesophageal Junction?

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Introduction: This single institution retrospective study was performed to determine the percentage of cases in which the results of esophageal manometry altered the intended surgical plans for foregut surgery.

Manometry is potentially helpful in avoiding the performance of antireflux surgery in a patient with undiagnosed achalasia. More commonly, a patient who appears to be an excellent candidate for a Nissen (360 degree) fundoplication can be found at manometry to have significant impairment of esophageal function and can be considered for a partial fundoplication. However, esophageal manometry is not available in every institution, it is often an unpleasant exam for the patient, and requires specific expertise from the staff and physicians who both perform the exam as well those that interpret the results. For these reasons and others, there is often debate regarding the value of esophageal manometry.

Methods and Procedures: Data was gathered on all manometry studies performed at a single institution from 2012 through 2016. Data on manometry results, diagnosis, preoperative assessment and other GI workup including Upper GI x-rays, 48 h pH studies, Demeester scores, upper endoscopy and biopsy reports were reviewed. Those patients who were further evaluated by the surgeon who performs the vast majority of foregut cases at a single institution were included in final analysis. Patients who underwent manometry at outside institutions prior to presentation, or manometry at our institution but had further evaluation and surgery at other hospitals were excluded. A determination was then made by a single surgeon, blinded to the patient identity and without knowledge of the manometry results, for the most appropriate procedure. Manometry results were then exposed and the procedural plans were revised as needed with subsequent correlation with the actual procedure proposed and performed for each patient. These alterations in the surgical plans due to manometry results were then evaluated.

Results: Of 299 manometry studies identified, 114 were completed and reviewed by a single surgeon. Within that group 45 underwent Nissen fundoplication, 39 patients underwent Toupet fundoplication, and 12 underwent Heller Myotomy with Dor fundoplication. Overall, in 52% of cases (59 patients) manometry was found to have altered the planned procedure.

Conclusion: This retrospective, single institution study demonstrates that results from esophageal manometry influenced and altered surgical decision-making with an experienced foregut surgeon despite having the results from other diagnostic modalities available.

P401

Surgical Repair of Antral and Duodenal Webs: The Critical Role of Endoscopy

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Introduction: Antral and duodenal webs are mucosal structures, varying from fenestrated diaphragms to partial mucosal crescents, located along the enteral wall. Patients present with varying degrees of gastric outlet obstruction manifesting as vomiting, failure to thrive, or respiratory symptoms. The prevalence is unknown, and diagnosis is difficult. Patients often undergo multiple diagnostic tests and prolonged failed medical therapy.
Methods: We conducted an IRB-approved institutional case review of 16 infants and children with antral and duodenal webs from 4/1/2005 to 4/1/2015.
Results: There were 7 males and 1 female, with an average age of 44 months at diagnosis. Symptoms included vomiting, failure to thrive, abdominal pain, and abdominal distention. Diagnosis was established by a combination of fluoroscopy and esophagogastroduodenoscopy (EGD) in all patients.
In our first four patients, diagnostic EGD was performed several days prior to surgery; laparotomy was then accomplished without endoscopic guidance. Intraoperative localization of the web is challenging as gastric rugae in a non-distended stomach may assume the appearance of an antral web. Subsequently, four patients had laparotomy with on-table intraoperative EGD to identify the web. However, we found that an open abdomen makes upper endoscopy challenging, and can alter the endoscopic appearance of the web. In fact, one patient required operative web re-excision with pyloroplasty for persistent gastric outlet obstruction after web resection and pyloromyotomy. This prompted a thoughtful discussion for transition in our practice to preoperative EGD with endoscopic identification and marking of the web with methylene blue or endoscopic clips immediately before our incision for web excision. We utilized this technique recently and it has facilitated our operative web resection significantly.
Resection of the web entailed mobilization of the duodenal C-loop, a gastrotomy traversing the antrum and pylorus, resection of the web, and reapproximation of the mucosa. If the web is close to the pylorus, Heinecke-Mikulicz pyloroplasty may be required.
One patients (12.5%) underwent web resection only. Two patients (25%) underwent web resection with pyloromyotomy. Five patients (62.5%) underwent web resection with Heinecke Mikulicz pyloroplasty.
Nasogastric decompression is accomplished for three days. After a contrast study demonstrates anastomotic integrity, feeds are initiated. Average length of stay is 7.4 days.
All 8 of our patients had confirmed pathologic diagnosis of antral web.
Conclusion: Antral and duodenal webs should be considered in the differential diagnosis for a vomiting child. EGD is necessary for diagnosis and operative localization of the web.

P402

Laparoscopic Damage Control in Type IV Paraesophageal Hiatal Hernia After Minimally Invasive Esophagectomy. Case Report IV Level Institucion in Colombia

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Introduction: Paraesophageal type Iv hiatal hernia after three field minimally invasive esophagectomy is a rare complication, the incidence is 0,8% and is related with wide disecction of the hiatus before rise the stomach into the thorax. damage control had been describe for trauma with good results, some articules described damage control in peritonitis but use it in no trauma or peritonitis patient and by laparoscopy is new.
Main: demonstrate the effectiveness of laparoscopic damage control in nont raumatic pathology or peritonitis
Methods and Result: 65 y/o female patient with antecedent of left thoracotony Heller Miotomy 20 years ago and radiologic findings of megaesophagus and severe regurgitation. I operated this patient in february: Three fields minimally invasive esophagectomy in prone,9 moths later the patient feel abdominal pain and dysnea, the CTSCAN report bowel into the left thorax and lung collapse. the patient was intubated and transferred to ICU.
I schedualed for laparoscopy, surgical findings were double loop incarceration into the hiatus with bowel necrosis. I reduced the content open the hiatus with scissors and close the defect. as soon as reduced the hernia, the patient turned inestable, MAP<50 requiered high dosis of epinephrine and metabolic acidosis, we decided make a damage control, ligate the bowel and stabilize the patient. 30 h later without acidosis, low doses of norepinephrine returned for laparoscopic second look and anastomosis. 24 extubated, no vasopresor, 72 h oral intake and 5 days later return to her home.
Conclusion: Damage control has been demonstrated in trauma surgery be an effective tool to reduce morbidity and mortality. use in laparoscopy and nontraumatic pathologies has not been reported but are also provided satisfactory results in addition to the benefits of minimally invasive surgery in the recovery of the patient.

P404

Defining GERD Based on Economic Burden of Disease: An Analysis of Claims Data

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Introduction: GERD has a spectrum of consequences affecting over 60 million Americans with over $10 billion in expense. Clinical sequellae range from quality-of-life altering symptoms, to chronic tissue damage leading Barrett's esophagus. How to best manage GERD remains controversial depending on how the condition is defined and what is identified as an appropriate outcome (e.g, quality-of-life v. prevention of disease progression). Economic burden is one way to understand GERD and may provide a useful classification for decision making. Herein is an analysis of GERD direct medical costs fromclaims data rather than charges or costs.
Methods: All medical claims matching a select group of 327 HCPCS and 33 Diagnosis Codes paid from 1/1/2001-12/31/2011 by a large commercial managed-care database covering 82 million lives was interrogated. Patients included met criteria: a) 6-years continuous claims, b) at least 3-years of PPI use during 6-year period, c) complete PPI pharmacy claims data. This yielded 165,546 unique patients for analysis. This cohort was further classified: A) single daily dose of PPI (SDPPI), B) stable daily double dose PPI (SDDPPI), C) Escalating double dose (EDDPI) without Barretts, D) EDDPPI with Barretts. Dollar amount of paid claims for the entire 6-year period was calculated for each group using a Conservative Definition (GERD as the primary or secondary diagnosis) and a Broader Definition (GERD-related disease as the primary diagnosis (e.g., laryngitis or asthma).

RESULTS: CONSERVATIVE GERD DEFINITION

	No. Patients	%	Total costs ($)	Cost/Patient ($)	Avg. Annual Cost ($)	PPI % of Cost
Class A	112,473	68%	1,034,092,189	9,194	1,532	69.4
Class B	3,262	2%	56,416,561	17,295	2,883	67.4
Class C	45,152	27%	593,502,925	13,145	2,191	66.9
Class D	4,659	3%	95,073,718	20,406	3,401	52.4
	165,546	100%	1,779,085,350	10,747	1,791	67.6

BROAD GERD DEFINITION

	No. Patients	%	Total Cost ($)	Cost/Patient ($)	Avg. Annual Cost ($)	PPI % of Cost
Class A	112,473	68%	1,601,953,933	14,243	2,374	44.8
Class B	3,262	2%	90,261,427	27,671	4,612	42.2
Class C	45,152	27%	974,510,309	21,583	3,597	40.7
Class D	4,659	3%	127,448,353	27,355	4,559	39.1
	165,546	100%	2,794,173,995	16,879	2,813	43.0

Summary: Compared to patients on SDPPI, need for DDPI and/or the presence of Barretts esophagus leads to increased cost of GERD care.
Conclusion: Classifying GERD based on economic burden provides another way to characterize GERD. Understanding the relationship between more clinically advanced GERD and cost of care will help guide the most cost effective delivery of care for GERD.

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Laparoscopic Repair of Symptomatic Type IV Paraesophageal Hernia Following Esophagectomy

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Background: Paraesophageal hernia (PEH) following esophagectomy is an uncommon but potentially lethal complication. With increasing utilization of minimally invasive esophagectomy, the incidence of these hernias may be increasing. There is limited published data regarding the management of these hernias, and the optimal approach to their repair remains uncertain. The aim of this study was to evaluate a single institution experience with laparoscopic PEH repair in this population.
Methods: We performed a retrospective review of all patients undergoing PEH repair between 2012 and 2016 and included patients with a history of esophagectomy. The data analyzed included demographics and preoperative, perioperative and postoerative details.
Results: Five patients underwent laparoscopic repair of a symptomatic PEH following esophagectomy during the study period. All patients were male with an average age of 54±17 years. Mean body mass index was 21.4±2.6 kg/m2, and four had a history of smoking. All patients had adenocarcinoma of the distal esophagus, and 4 underwent neoadjuvant chemoradiation. The esophagectomy was performed laparoscopically in three patients and in an open fashion in two. The median interval to PEH repair was 30 (5–83) months. The most common presenting symptoms were abdominal pain (n=3), dyspnea (n=2), and nausea and/or vomiting (n=2). PEH was diagnosed in all patients by a CT scan. The herniated organs were the small bowel and colon in all patients. Four patients underwent urgent or emergent surgery due to acute hernia incarceration. The PEH repair was performed laparoscopically in all patients with an operative time of 83±49 min. Primary [RK1] crural approximation was performed using interrupted sutures. There were no mortalities in this series. Two patients developed complications: 1) an enterotomy created during hernia reduction which was identified and repaired during PEH repair, and 2) postoperative peritonitis due to a missed enterotomy that required re-exploration and small bowel resection. The median length of stay was 7 (2–21) days. The median follow-up was 4 (2–45) months[PK2]. All patients reported symptomatic improvement following hernia repair. Four patients underwent surveillance CT scan during the follow-up period, and a small asymptomatic recurrence was identified in one patient.
Conclusion: PEH following esophagectomy is a potentially serious complication that may occur following open or laparoscopic esophagectomy. Laparoscopic PEH repair is a safe, feasible, and effective treatment option for these patients that provides excellent symptomatic outcomes. Early identification of these hernias is important owing to the high risk of complications in patients presenting with incarcerated PEH.

P406

Laparoscopic Wedge Resection for Gastrointestinal Stromal Tumor in the Elderly

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Background: Gastrointestinal Stromal Tumors (GIST) are the most frequent mesenchymal gastrointestinal tumors and represents the 0.1–3% of all gastrointestinal malignancy. The management of GISTs is based on surgical resection, because it is the only therapy that has showed to be potentially curative. Fortunately, this tumors show low lymphatic node involvement. That is why, in many GISTs lesions, optimal oncological resection can be achieve making wedge resections. Laparoscopic surgery for gastrointestinal stromal tumors has been evolving rapidly over the past decade. The aim of this study is to describe our experience in terms of feasibility and safety of laparoscopic resection of gastric GISTs independently to tumor size and its effect on oncologic outcome in an elderly population.
Materials and Methods: A retrospective analysis was performed from a prospective collected database at a tertiary hospital from January 2002 to May 2016.
Results: A total of 23 patients>60 years old underwent laparoscopic wedge resections for gastric GIST. The mean age was 70.6±9 years-old with a mean BMI of 26.5±4 kg/m2. Symptomatic presentation was observed in 60.1% of the cases.The most common symptom was epigastric pain 34.7% and bleeding as; anemia in 17.3%%, melena and hematemesis in 4.3% each one. GIST was located in the upper third of the stomach in 6 cases, 14 in the middle third and 3 cases in the lower third. The mean size of the tumors was 5.5±cm (range 3.0–16.0 cm). Neoadjuvant therapy was indicated in 4 cases, all of them with tumor size>10 cm. In this group the size changed from 12.2±3.8 cm to 4.4±1.7 cm, achieving a 63.9% tumor size reduction. All cases were done laparoscopically without tumor rupture and no conversion. The mean operative time was 90.6± 38 min. No intraoperative complication neither 90-days mortality was observed. Negative resection margins was achieved in 100% of cases. The mean follow-up was 36.7 months (range 5–84). We had 1 case (4.3%) of early postoperative complication with a stenosis that needed a subtotal gastrectomy performed by laparoscopy. No recurrence was identified during follow-up. The tumor-related survival during follow-up was 100%.
Conclusion: Laparoscopic wedge resection for gastric GISTs is feasible, safe, and effective on long-term oncological outcome for elderly patients. The use of neoadjuvant therapy can help to achieve organ-sparing resections.

P407

Further Evidence of the Usefulness of the Two-Tape Traction Method for Lymph Node Dissection During Thoracoscopic Esophagectomy for Esophageal Cancer

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Introduction: The purpose of this study was to closely examine the usefulness of the two-tape traction method for traction of the upper esophagus during lymph node dissection (LND) in esophageal cancer patients undergoing thoracoscopic esophagectomy, since LND, especially for the upper mediastinal nodes, was difficult.
Patients and Methods: We retrospectively reviewed the database of 274 patients with thoracic esophageal cancer who underwent thoracoscopic esophagectomy in the prone position between September 2009 and August 2016. Chronologically, three methods were adopted for traction of the upper esophagus, as follows: Method A (no traction) during the first term; Method B (traction with a single thread) during the second term; Method C (traction with two tapes) during the third term. The number of dissected lymph nodes, the intraoperative factors, and the incidence of adverse events were compared among the three methods using one-way ANOVA, Tukey's test, Games-Howell's test or chi-square test.
Results: The mean age of the patients was 66.5 years, and there were 223 male and 41 female patients. Method A, Method B and Method C for esophageal traction were applied in 54, 104, and 116 patients, respectively. The mean number of dissected lymph nodes around the right recurrent laryngeal nerve was higher for Method C (3.4) than that for Method A or Method B (2.1, 2.4) ($P=0.001$, $P<0.001$). The number of dissected nodes around the left recurrent laryngeal nerve was higher for Method C (4.3) than that for Method A or Method B (2.5, 2.7) ($P=0.001$, $P<0.001$). The number of nodes dissected from the upper mediastinum was higher for Method C (12.9) than that for Method A or Method B (6.9, 8.9) ($P<0.001$, $P<0.001$). The number of nodes dissected from the chest was higher for Method C (27.7) than that for Method A or Method B (20.3, 22.8) ($P<0.001$, $P=0.002$). There were no differences in the thoracoscopic time or blood loss during the thoracoscopic procedure among the three methods. There were also no differences in the rate of recurrent laryngeal nerve palsy or postoperative pneumonia either among the three methods.
Conclusions: These results suggested that the two-tape traction method during mediastinal LND was useful as it allowed a stabler and wider operating space to be created, enabling a larger number of lymph nodes to be dissected with no increase in the incidence of thoracoscopy-related adverse events.

P408

Two-Stage Explantation of a Magnetic Lower Esophageal Sphincter Augmentation Device for Esophageal Erosion

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Introduction: Implanting a magnetic lower esophageal sphincter augmentation device (Linx, Torax Medical) has become an increasingly common option in the surgical management of gastroesophageal reflux disease. As the enthusiasm for placing this device increases, experience in the management of device-related complications—including erosion—is necessary.
Methods: We report a staged approach to Linx removal in a 64-year-old female with symptoms of odynophagia secondary to partial erosion of a Linx device into the esophagus.
Results: The patient had a 12 bead Linx device placed in 2011 at an outside international facility. In late 2013, she began experiencing symptoms of odynophagia. An esophagogastroduodenoscopy at our institution in October 2015 demonstrated two metallic beads eroding through the distal esophageal lumen. An elective endoscopic removal of the two visible beads was performed. A postoperative esophagram confirmed that there was no resulting esophageal perforation. The patient noted mild improvement in her symptoms. After a twelve-week period to allow for complete healing, the remaining ten beads of the Linx device were explanted laparoscopically without complication. No further procedures were undertaken. At two months' follow-up, the patient noted complete resolution of her symptoms.
Conclusion: Transmural erosion of the Linx device into the esophageal lumen is a rare occurrence, with only five such reported complications in the published literature. We present the first account of Linx explantation for esophageal erosion in the United States. We demonstrated that a staged laparo-endoscopic approach to Linx removal in these cases is feasible with minimal morbidity.

P409

Stent Treatment or Surgical Closure for Perforated Duodenal Ulcers, Preliminary Results from a Swedish Randomized Controlled Trial

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Introduction: Standard treatment for perforated duodenal ulcer is surgery. We have used stent treatment in patients with high co-morbidity with good results. The aim of this study is to compare surgery with stent treatment for perforated duodenal ulcers in a randomized clinical trial. Here we present preliminary data from our ongoing trial sponsored by the SAGES foundation
Methods: All patients presenting at the ER with clinical signs of perforated duodenal ulcer and free abdominal air on a CT-scan, during December 2014 to August 2016, were asked to participate in the study. Treatment was randomized to sutured closure or stent treatment. Age, ASA-score, method of treatment, time to operation, operation time, complications and hospital stay were recorded.
Laparoscopy was performed in all patients to establish the diagnosis. Surgical closure was performed with standard open or laparoscopic techniques. For stent treatment a peroperative gastroscopy was performed and a partially covered duodenal stent (Hanaro, MI-tech) was placed over a guide-wire to cover the perforation. All patients received antibiotics and an abdominal drain was placed.
Results: 15 patients were randomized. Four patients did not have a duodenal perforation at laparoscopy and were excluded. 11 patients were included, 5 were treated with surgical closure and 6 with a duodenal stent. Median age was 75 y (23–89) in the surgical group and 81,5 y (73–87) in the stent group (non-significant). Median operation time was 96 min (82–137) for surgery and 67 min (60–107) for stent treatment, including laparoscopy (non-significant). The ASA-score was significantly higher in the stent group (median 3 (2–3)) vs surgery median 1 (1–4)) (p=0,01, C2 test). Median hospital stay was 7d (2–17) in the surgery group and 8d (3–24) in the stent group (non-significant). 2/5 patients in the surgical group had a complication, one patient had a suture-line leakage, treated with a duodenal stent and one had postoperative fever. In the stented group 2/6 patients had a complication, one intraabdominal abscess and one patient had multi-organ-failure and died on POD 1. This patients' treatment had been delayed by several days. All patients with complications had>24 h from symptom onset till time for laparoscopy.
Conclusions: These preliminary data indicate that stent treatment seems to be as safe and efficient as acute surgery for perforated duodenal ulcer with a tendency towards shorter operation time. The most important factor for a good outcome without complications seems to be the time factor from onset till treatment.

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The First Telemedicine Network of the Philippines "Beyond Borders"

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The Philippines is one of the world's largest archipelago nations situated in the southeast of mainland Asia in the western rim of the Pacific Ocean, with diversified population and resources, and is still classified as a developing country despite its economic growth. The archipelagic topography of our country presents a challenge in communications, infrastructure development and service delivery, including healthcare and education. The objectives of this paper/ presentation are: (1) to present the current status of telemedicine in our institution, St. Luke's Medical Center, how we have grown and established the First Telemedicine Network of the Philippines and (2) to increase social awareness in our country on how Telemedicine could make that big of an impact on our healthcare system and education.
The Minimally Invasive and Robotic Surgery Center (MIRSC), in collaboration with the Institute of Surgery, St. Luke's Medical Center - Quezon City (SLMC-QC), Philippines, Kyushu University, Fukuoka Japan, the Telemedicine Development Center of Asia (TEMDEC) and Advanced Science and Technology Institute (ASTI) of the Department of Science and Technology (DOST), has initiated the development of a nationwide telemedicine network community in our country. Telemedicine Network of the Philippines (TNP) was established and held its first teleconference network meeting last May 18, 2016. This network is the first to simultaneously connect hospitals across the country utilizing the network server established by the DOST. With MIRSC, SLMC-QC, initiating and leading this network, we were able to connect to six other hospitals/ training institutions (Veteran's Memorial Medical Center, National Kidney & Transplant Institute, University of Cebu Hospital, Baguio General Hospital, University of the Philippines – Manila / Philippine General Hospital and Davao Doctors Hospital). Another milestone in Philippine Telemedicine was achieved last July 9, 2016 when the First Philippine Telemedicine Network Symposium was held in our institution, where didactics, tutorial workshops, demonstration of the essential needs and discussion of common technological issues in telemedicine were addressed.
TNP aims to provide a continuous collaborative medical education, and eventually, to utilize technology in the future as a way to reach out to our patients.

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High Frequency Ventilation Eliminates the Need for Respiratory Motion Correction in Image Guided Surgery

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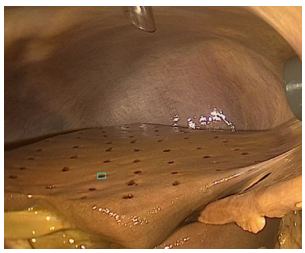
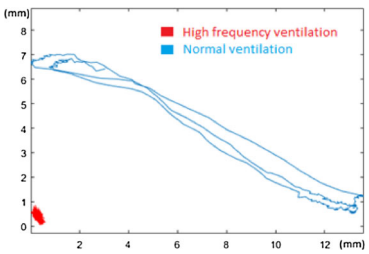
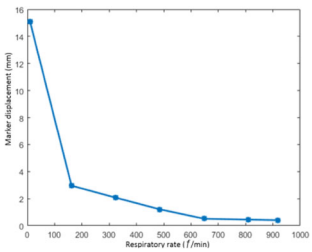
Introduction: Minimally invasive solid organ surgery, such as hepatectomy, are high-risk procedures that may be aided using image guidance. This mode of computer aided surgery can help a surgeon to avoid critical structures, achieve an adequate resection margin, and maximize organ preservation. The technique requires fusing a preoperative imaging set (CT or MRI) with the live intraoperative laparoscopic images, rendering the target organ to appear transparent. A significant challenge to achieving accurate image fusion is correcting for respiratory motion.
Hypothesis: High-frequency ventilation (HFV) will minimize the effect of respiratory motion on image guided surgery.
Method: We compared standard ventilation versus HFV on a cadaver during simulated minimally invasive liver surgery. Landmark points on the liver's surface were created to allow tracking during different video frames (Figure A). The cadaver was then ventilated using varying modes of conventional ventilation (tidal volume, respiratory rate) versus varying frequencies of HFV. Novel tracking software was used to analyze the videos and record the trajectories of the liver markers throughout the respiratory cycle. The liver's motion was measured in millimeters (Figure B) and, in the case of HFV, plotted against respiratory rate (Figure C).
Results: Displacement of the liver markers from full inhalation to full exhalation was 15 ± 2 mm using the lowest respiratory rate during standard ventilation (tV=800 mL, rate=10 b/min, PEEP=10 cmH2O). When using HFV, the displacement decreased as rate increased with a clinical plateau at greater than 648 breaths/min or 10.8 Hz (Figure C). Above this frequency, the markers appeared stagnant on the laparoscopic view.







A. Markers on the liver's surface (B) Displacement (mm) of liver markers (C) Displacement versus respiratory rate

Conclusion: Many image-guided surgery techniques suffer from respiratory motion artifacts. Numerous researchers have attempted to correct for breathing motion using sophisticated computational methods. High-frequency ventilation (HFV) eliminates respiratory motion and can be maintained for many hours. It has the potential to revolutionize image guided surgery.

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Real-Time Image Processing Method for Laparoscope Defogging

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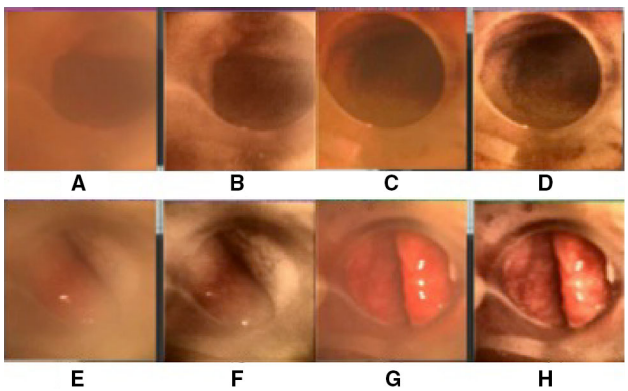
Introduction: The proposed image processing method aims to develop the real-time image processing method for endoscope defogging. Minimally invasive surgery (MIS) is the current surgical trend because MIS can provide a lot of advantages to both patients and surgeons, including less bleeding, less scar and higher surgical quality. Due the development of surgical technology, MIS uses smaller and smaller diameter endoscope, for example, 4 mm for laparoscope. Image quality of endoscope is a very import issues. In current surgical situations, endoscope fogging sometimes happens and makes the surgery not smoothly. There are several methods used currently to avoid fogging, such as applying anti-fogging agent or heating, however, those procedures must be frequently applied during the surgery. On the other hand, some image-based processing was proposed to defog. Since several images are needed for those image-based processing methods, those algorithms are not suitable to apply in MIS. Therefore, the proposed image processing defogging method is based on single image calculation and is real-time.
Methods and Procedures: The proposed image processing method includes several procedures, starting from exposure control, harsh environment judgment, histogram redistribution, and new pixel interpolation by probability transfer function. The captured endoscope image is divided into several segments to calculate the average brightness. Harsh environment judgment is taken image contrast value after exposure control of brightness to separate fogging area. Image histogram will be redistributed to equalize fogging area pixel value into the average value so that the fogging situation will be removed. Then the pixel interpolation will be performed to fill the removed area. A transfer function is used based on the probability distribution of each segment. In order to achieve real-time operation, the algorithm is implemented on parallel processing.
Results: The proposed image processing method is implemented on Nvidia® Tegra X1 platform which contains Quad-core ARM® Cortex®-A57 MPCore Processor and 256 CUDA cores for parallel processing to achieve Full HD 30 Hz image output. Figure 1 shows the defogging results based on the proposed image processing method where (a)(c)(e)(g) are images with fogging and (b)(d)(f)(h) are defogging results accordingly based on the proposed method. A clear image is obtained without the fogging.



Conclusions: The proposed image processing method is based on single image and can be real-time implemented for endoscope defogging during minimally invasive surgery. Parallel processing architecture is applied to achieve Full HD 30 Hz performance. Defogging results show the possibility in real clinical applications.

P414

Preliminary Report of Clinical Usage of Ultra-high Definition (8 K) Laparoscope

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High-resolution imaging (>2 K) has propelled comprehension of the anatomic structures in laparo-endoscopic surgery, and surgeons can even recognize the structure that has not been described in the textbook of surgical anatomy. This is particularly invaluable in cancer surgery and laparoscopic surgery has reportedly been better in the long-term results (survival). Although scientific investigation is lacking, the 3-D laparoscope system is also available for improvement of anatomical comprehension. The 8 K video-system is expected to further extend the advantage of the high resolution imaging system, including endoscopic microsurgery. We had a chance to use 8 K laparoscope in a clinical setting. Two cases of laparoscopic cholecystectomy were performed using this system. Although the system weighted 2.2 kg, the image displayed on the 85 inch LCD was amazing. Two different membranous layers around the gallbladder were clearly identified. The 8 K video-system needs to be further refined, it must stimulate development in instrumentation and surgical technique. Laparoscopic microsurgery could be clinically performed. It also seems possible to observe the whole abdominal cavity with a camera fixed to the umbilicus. Also by utilizing the wide size of CMOS,a combination of normal and specialized light property (e.g. infrared) can also be simultaneously displayed on the monitor.

P415

Novel Endoscopic Marking Clip with an IC Tag and Receiving Antenna to Detect Localization During Laparoscopic Surgery

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Background: Conventional tattooing using India ink for preoperative marking during colonoscopy has been widely used to identify an objective location which should be surgically resected. However, the ink used in this method can spread into the abdominal cavity and induce peritonitis. Therefore, we developed a new marking method using an endoscopic clip with an integrated circuit (IC) tag to accurately identify an objective location. We applied the novel method in laparoscopic surgery using a porcine model and also evaluated it with resected human gastrointestinal tissue.
Materials and Methods: We developed a novel IC-tip-embedded IC tag. The size of the IC tag was 5 mm × 3 mm × 1 mm, which allowed it to pass through a forceps aperture in a gastrointestinal endoscope. The IC tip was covered with a polyethylene film band for grasping an endoscopic clip edge. An endoscopic clip was used to attach and keep the endoscopic clip with the IC tag on the mucosal epithelium at the objective location. The IC tag connected with the coiled antenna can be sensed with sound in an electromagnetic field reacting to the electric wave emitted from the induction coiled antenna. The receiving antenna was designed to be able to pass through a 12-mm trocar in laparoscopic surgery and linked to a personal computer through a reader-writer, which makes a sound upon detection of the IC tag. We placed an endoscopic clip with an IC tag through a forceps aperture in the gastrointestinal tract, by using a porcine surgery model. After the endoscopic procedure, we performed laparoscopic surgery and approached the receiving antenna in the abdominal cavity to detect the IC tag through the porcine intestine. In an ex vivo examination with human colon tissues, the clip with the IC tag was placed on the mucosal surface to determine its ability to be detected. The receiving antenna near the serosal side of the human colon segment accurately detected the clip with the IC tag.
Results: We detected the clip with an IC tag with a detection device, by using a laparoscopic surgery model in vivo. We also confirmed its usefulness in five of five (100%) human colon tissue samples tested ex vivo.
Conclusions: We developed a novel marking device using an IC tag to identify an objective location. We successfully demonstrated the usefulness of the clip with the IC tag and the antenna device.

P416

Integration of Patient-Based Immersive Virtual Reality, Holographic Augmented Reality, and Bio-elastic 3D Organ Printing for Image Guided Laparoscopic Surgery

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We developed an integrated surgical navigation system of patient-based immersive virtual reality, holographic augmented reality, and bio-elastic 3D organ printing replication for laparoscopic surgery.
At first, by reconstructing the patient-specific 3D surface models of each organs out of the patient's MDCT images, immersive virtual reality navigation system was developed using side-by side volume rendering. Second, we also developed a holographic augmented reality system by sensing the user's hand or arm position using motion sensor and 3D grasses. We developed a new spatial imaging system by interactive superimposing 3D hologram and 3D printing technology by tracking the user's head and hand/arm position.
Finally we integrated these navigation systems and hybrid multi-material 3D-printed injection molding technology for manufacturing bio-elastic organ replicas for actual model-guided surgery.
We will report Illustrative examples and beneficial applications of the VR/AR devices (HMD, 3D tablet, and motion sensor) of these integration and benefits in surgical planning, surgical simulation, and image guided surgery. It allowed the user to manipulate the spatial attributes of the virtual and real printed organs, which can enhance spatial reasoning and augmented tangibility.

P417

Stray Energy Transfer During Single Incision Surgery: Robotic Platform is Superior to Laparoscopic

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Introduction: Stray energy transfer during use of the monopolar "Bovie" is recognized as a cause of potentially catastrophic complications during laparoscopic and single incision surgery. Recent data suggests single incision laparoscopic surgery to carry additional risk in comparison to traditional laparoscopic surgery through capacitive and antennae coupling. While SILS is declining in use, both traditional robotic surgery and single incision robotic surgery are rapidly increasing. This is echoed by the startling increase in the reporting of energy-related adverse events during robotic surgery. The purpose of this study is to compare stray energy transfer with each approach and configuration.
Methods and Procedures: In a laparoscopic trainer box, the monopolar instrument was activated using both robotic instrumentation (da vinci® system) and laparoscopic instrumentation, each in the traditional and single-incision configurations. In all set-ups, energy was delivered through an L-hook using 30 watts of coagulation mode and a five second activation period. During energy activation to the L-hook, each nonelectrical instrument (camera and grasper) tips were placed adjacent to the simulated tissue. The primary outcome variable was an increase in simulated tissue temperature (°C) placed adjacent to the non-electrical grasper and camera tips. Temperature was measured with a thermal camera.
Results: In the traditional configuration, the laparoscopic platform transfers more unintended energy than the robotic platform at the camera telescope ($p<0.001$) but not at the assistant grasper ($p=0.6$). In the single-incision configuration, the laparoscopic platform transfers more unintended energy than the robotic platform, both at the camera telescope ($p<0.001$) and the assistant grasper ($p<0.001$) (Table 1).
Conclusions: In contrast to single-incision laparoscopic setups, single-incision robotic surgery appears to be protective from thermal injury due to stray energy transfer. This is likely due to the changes in instrumentation with the single-incision robotic platform utilizing semi-rigid instruments. Also in contrast with laparoscopy, the assistant grasper is the highest risk for thermal injury due to stray energy. Surgeons can use this data to help avoid clinical scenarios which promote stray energy transfer.

Table 1 Thermal increase by configuration and instrument.

Setup	Camera Telescope Temperature Increase (°C)	Assistant Grasper Temperature Increase (°C)
Traditional Robotic Surgery	2.3±3.6	18.3±5.8
Single-Incision Robotic Surgery	0.1±0.1	0.1±0.1
Traditional Laparoscopic Surgery	39±10	20±10
Single-Incision Laparoscopic Surgery	41±12	38±9

P418

Efficacy of Using a New Device to Insert Adhesion Barrier Film in Reduced Port Surgery

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Objective: We describe our experiences of using an effective new device to insert adhesion barrier film during reduced port surgery. In Japan, there are many cases of both gastrectomy and postcholecystectomy. When we perform distal gastrectomy, if patients have already undergone cholecystectomy, they might also have severe abdominal adhesions. Seprafilm is a mechanical bioresorbable adhesion barrier that is an effective tool to avoid surgical adhesions. Its placement is also simple and easy in open surgery. Its placement in laparoscopic surgery, however, is not always simple or easy, especially in reduced port surgery. We believe that it is very important to avoid adhesions not only of laparotomy wounds but also in the area of the cholecystectomy. Sepralap is a new device for winding up Seprafilm prior to inserting it through a 5-mm laparoscopic trocar to make the operation simpler and easier.
Materials and Methods: A 37-year-old man with gallbladder polyps underwent laparoscopic cholecystectomy by reduced port surgery. Our reduced port surgery was constructed with the umbilical single-incision method with multi-port glove platform, and with two puncturing ports with needle-like forceps. The multi-port glove platform was equipped with 12-mm and 5-mm trocars. Two 2.4-mm Endo Relief needle-like forceps were inserted through each of the two puncturing ports. After cholecystectomy, we used the Sepralap to insert a quarter pack (97.35 cm * 6.35 cm) of Seprafilm into the abdominal cavity through the 5-mm trocar and placed the Seprafilm in the area ablated for the cholecystectomy.
Results: Insertion of Seprafilm by Sepralap was smooth, simple, and easy. We could insert it without crack. The Seprafilm was easily released from the Sepralap and was also easily positioned on the ablated area of the liver bed. There were no complications or difficulties.
Conclusions: Surgical adhesions do not always occur at the site of the incisional scar on the abdominal wall; they may also occur by avulsion at the liver bed during cholecystectomy. Sepralap allowed Seprafilm to be inserted smoothly and easily into the abdominal cavity through a 5-mm trocar without crack. Sepralap might make the effectiveness of Seprafilm for adhesion avoidance in incisional wounds of the abdominal wall also available to many kinds of laparoscopic surgical sites, such as at the suture site in the peritoneum during transabdominal preperitoneal hernia repair.

P420

Levita™ Magnetic Surgical System: First U.S. Experience from a Single Institution

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Introduction: Magnet assisted surgery is a new platform within the field of minimally invasive surgery. The Levita™ Magnetic Surgical System, the first magnetic surgical system to receive Food and Drug Administration (FDA) approval, includes a deployable, magnetic, five centimeter bowel grasper and an external magnet that is used to manipulate the grasper within the peritoneal cavity. This system is approved for patients undergoing laparoscopic cholecystectomy with a body mass index (BMI) less than 34 kg/m2. Herein, we detail the first U.S. experience with the Levita™ Magnetic Surgical System during laparoscopic cholecystectomy.
Methods: The Levita™ Magnetic Surgical System was used on consecutive patients undergoing laparoscopic cholecystectomy at our institution from June 2016 through July 2016. Baseline patient characteristics, operative time, and perioperative details were collected.
Results: A total of six patients underwent laparoscopic cholecystectomy with the Levita Magnetic Surgical System during the defined study period. The mean age at the time of surgery was 49.5 years, the mean BMI was 30.8 kg/m2, three (50.0%) patients were male, and three (50.0%) patients had a history of previous abdominal surgery. Cholecystectomy was indicated for chronic cholecystitis in 3 (50.0%) patients, symptomatic cholelithiasis in 2 (33.3%) patients, and biliary pancreatitis in 1 (16.7%) patient. The average operative time was 60.3 min. The use of the Levita™ Magnetic Surgical System allowed the operating surgeons to eliminate the right lateral trocar without an increase in operative time. There were no perioperative complications. Four (66.7%) patients were discharged to home on the day of surgery and two (33.3%) were discharged to home on postoperative day number one. Surgeons reported that the magnetic grasper was easy to use and provided adequate tissue retraction.
Conclusions: The Levita™ Magnetic Surgical System appears safe and feasible in patients undergoing laparoscopic cholecystectomy. Routine use of this system may facilitate a reduction in the total number of laparoscopic trocars used, potentially leading to less tissue trauma and improved cosmesis. Additional studies are needed to determine the applicability and utility of this system for other general surgery cases.

P421

In Vivo Experience with a Novel Miniature Endostapler in Laparoscopic Nephrectomy

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Introduction: Surgical endostaplers are used to simultaneously divide and staple tissue, creating hemostatic transections in a variety of surgical applications. In particular, endostaplers are well suited to laparoscopic approaches due to their maneuverability and reach. However, most commercial endostaplers have large diameter shafts and their articulation may be insufficient to allow perpendicular approach to blood vessels. To address these limitations, this report describes the use of a more flexible, miniaturized endostapler for nephrectomy in a porcine model.
Methods and Procedures: Laparoscopic removal of the right kidney using the Dextera MicroCutter Stapler (5 mm diameter) or a conventional endostapler (12 mm diameter) for transections of the vasculature and ureters was undertaken in four pigs for each endostapler. Intraoperative complications, such as bleeding at the staple line, were captured. Animals were survived for a minimum of 34 days followed by gross evaluation and histological examination of the stapled sites.
Results: The MicroCutter was used for 9 vascular transections and the control device for 10; the vessels were 3–8 mm in diameter. Each device was also used to transect four ureters. There was no post-transection intraoperative bleeding at any of the blood vessels including during induced hypertension. The surgical time was 30–60 min for both devices, and resulted in minimal blood loss. There were no adverse events and no conversions to open procedures. All animals were healthy at sacrifice, and samples from the MicroCutter and control devices were histologically indistinguishable.
Conclusion: The MicroCutter device functioned as intended and achieved hemostasis in all applications. The MicroCutter's small size and flexibility (80° of articulation) may lend itself particularly well to the vessels in the renal hilum and improve outcomes by reducing the burden of dissection. Additionally, its slim jaws may maximize the length of retained vascular stump, which is important in donor nephrectomies.

P422

Indocyanine Green Fluorescence Angiography During Laparoscopic Surgery for Rectal Cancer

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Introduction: Anastomotic leakage after rectal surgery is one of the severe complications and the major cause of this is inadequate perfusion of the colonic tissue.
Aim: The aim of this study was to evaluate the safety and the efficacy of intraoperative assessment of colonic perfusion using indocyanine green (ICG) fluorescence angiography.
Methods: ICG fluorescence angiography was performed in rectal cancer patients who underwent laparoscopic surgery from June 2016 to August 2016. Fluorescence imaging system, IMAGE1 SPIESTM (KARL STORZ, Germany) was used in all the cases. Prior to resection of proximal site, ICG (5.0 mg) was injected intravenously and the blood perfusion of the planned transection point was assessed by the surgical team as "sufficient", "insufficient" and "absent". Any changes of surgical plans according to the results of ICG fluorescence angiography and time to perfusion after injection of ICG were recorded.
Results: A total of 34 patients were enrolled. Twenty-four patients (70.6%) were male, the median age was 61 years (range, 31–73) and the median BMI was 22.8 kg/m2 (range, 16.7–30.5). Two patients (5.9%) received preoperative chemoradiotherapy and 5 patients (14.7%) received preoperative chemotherapy. Thirteen patients (38.2%) underwent anterior resection and 21 patients (61.8%) underwent intersphincteric resection. The median height of anastomotic site was 3.0 cm (range, 0–8.0) from the anal verge. Diverting stoma was created in 27 patients (79.4%). No side effects related to the injection of ICG was observed. Twenty-six pateints (76.5%) were assessed as "sufficient", 5 patients (14.7%) were "insufficient" and 3 patients (8.8%) were "absent". Median time to perfusion was 50 s (range, 21–107) in "sufficient" group and 123 s (range, 77–156) in "insufficient" group, respectively. Eight patients (23.5%) were assessed as "insufficient" or "absent" and transection line was moved to more proximal site; no anastomotic leakage occurred in these patients. Anastomotic leakage (Clavien-Dindo grade IIIa) occurred in 1 patient (2.9%); in this case, the perfusion was assessed as "sufficient", however, time for perfusion was delayed (107 s).
Conclusions: ICG fluorescence angiography is a safe and useful technique for intraoperative assessment of colonic perfusion during surgery for rectal cancer.

P423

Continuous Dissection Using Ultrasonic Shears with the Short-Pitch Technique Potentially Increases the Risk of Thermal Injury During the Surgery

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Background: Ultrasonic technology uses high-frequency mechanical vibration to combine cutting and coagulating. It results in precise dissection with less bleeding in various surgical procedures, including laparoscopic gastrectomy (LG). However, thermal injury caused by ultrasonic shears can lead to fatal complications in LG. Thus, it is important to safely manage the blade temperature of ultrasonic shears. There are two handling techniques for ultrasonic shears: the short-pitch technique and the full-pitch technique. The short-pitch technique is a technique to fire the shears with blades closed when a small amount of tissue is present in the distal 1/4 of the blade. This technique is appropriate for precise dissection including lymph node dissection in LG. The full-pitch technique allows for the dissection of tissue using the entire ultrasonic shear blade, which is applicable for fast and rough cutting. Many reports have demonstrated the thermal profile using ultrasonic shears. However, no report has focused on the thermal profile difference in device handling, which provides valuable information for actual clinical usage. In this study, we examined the blade temperature using the two different techniques and evaluated the safety of ultrasonic shears.
Methods: Using an ex vivo benchtop, the safety of the short-pitch and full-pitch techniques was compared with respect to the blade temperature using an infrared camera. The cutting speed and the blade temperature were measured during and after continuous dissection of a defined length of muscle (10 cm in length) under an axial tension of 20 g on the muscle with maximum power mode (Harmonic scarpel, Ethicon). The time required for the temperature to decrease to 60 °C after activation was also recorded. The lateral thermal spread was assessed by infrared camera.
Results: Ex vivo tests of the short-pitch technique demonstrated significantly higher blade temperatures, longer times for returning to baseline, and wider lateral thermal spread than the full-pitch technique after the completion of cutting 10 cm (341 ± 28.3 °C and 211 ± 6.6 °C, respectively, $P<0.001$; 77 ± 4.1 s and 35 ± 2.1 s, respectively, $P<0.001$; 2.4 ± 0.6 mm and 1.8 ± 0.5 mm, respectively, $P<0.001$).
Conclusion: Although the short-pitch technique enables us to ensure precise lymph node dissection in LG, continuous dissection using the short-pitch technique increases thermal injury during surgery. Careful attention should therefore be paid to prevent thermal injury by ultrasonic shears during surgery.

P424

In-Line Radio Frequency Ablation: Our Solution to Treat Liver Surface Lesions Not Amenable with Routine RFA Probes

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Background: Radiofrequency ablation has emerged as an alternative therapy for treatment of HCC and liver metastases that are unresectable (Extra-hepatic disease ruled out), HCC patients as a bridge for liver transplantation and also Recurrent HCC (following limited resection. Though RFA has advantages of being widely available and achieves high rates of local control, it has inherent limitation of not suitable for surface lesions. We propose our technique and results to overcome this shortcoming of RFA making it a safe, feasible and reproducible technique.
Methods: It is a retrospective analysis of prospectively maintained database of 13 patients, who underwent laparoscopic RFA for various indications during 2011 to 2016.
Results: Of the 13 patients who underwent laparosocpic RFA, 11 were males and 2 were females. The mean age was 64.8 years (range 51–74 years). The etiology was attributable to HBV, alcohol, HCV in three, six and two patients respectively. Two other patients had cryptogenic cause. Total number of lesions managed were 32 as some patients had multiple lesions. Among these, twelve lesions were sub-capsular and were managed exclusively with Habib probe. Eight patients had both sub-capsular and deeper lesions (20 in total). These patients were managed with Habib probe for the superficial lesions and the coneventional Umbrella probe for deeper lesions. Post-operatively transient raised LFT was seen in 4 patients and post-procedure pyrexia in two. Tumor recurrence was seen in a total of 2 lesions managed with Habib probe and four lesions with both habib and umbrella probes. The mean post RFA perios for recurrence was 21.4 months.
Conclusion: Use of In line RFA (Habib probe+Conventional probe) increases the number of Lesions amenable for Ablative therapy. Outcomes of Conventional RFA and In line RFA (Habib Probe) are comparable. However, studies involving large sample size are required to recommend routine use of this technique.

P425

Novel Method for Quantitative Analysis of Tissue Ischemia Using ICG: Animal and Human Models

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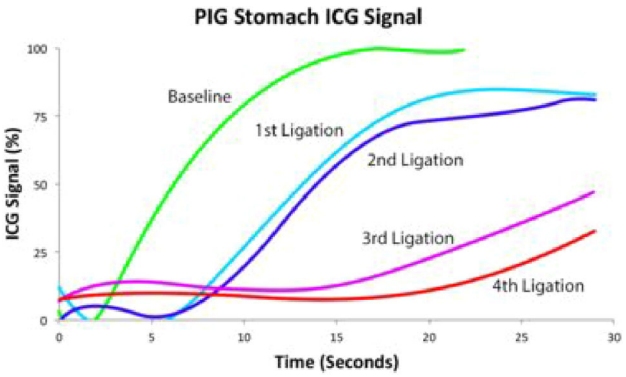
Introduction: Indocyanine Green (ICG) fluorescence imaging has gained popularity in recent years to evaluate intraoperative tissue perfusion. However there are no standards across platforms and almost no relevant numerical measurements. As a result, surgeons are often unable to decipher the clinical significance of intra-operative fluorescent images. In this study, we investigate the possibility of using time based relative intensity scale to obtain quantitative data in measuring ischemia.
Method: For this study, we developed a novel computer algorism for filtering and analyzing focal ICG signal as a function of time. We tested the algorism in pig models by serially ligating blood supply from the stomach in 20-minute intervals followed by ICG angiography. This data is compared to pig undergoing sham surgery with the same ICG intervals. Imaging data is collected on the greater curve of the 15 cm below the GE junction. Ligation patterns are: the gastroepiploic arteries (1st Ligation), short gastric arteries (2nd ligation), left gastric artery (3rd ligation), and right gastric artery via distal gastrectomy (4th ligation). Then we retrospectively examined ICG angiography footage from patients undergone sleeve gastrectomy to evaluate the fluorescent signal at the resection staple line.
Results: The ICG signal intensity of pig stomach after serial blood vessel ligation is seen in the following graph after polynomial fit. Descriptive values of the curve are in the following table.



	Time to Signal Max	Max Rate of Signal Increase	Time to Max Rate of Signal Increase
No Lig.	18.67 sec	11.6	3.4 sec
1st Lig.	24.73 sec	7.1	7.1 sec
2nd Lig.	29.33 sec	7.4	6.7 sec
3rd Lig.	54.16 sec	3.8	20.8 sec
4th Lig.	60.00 sec	2.7	43.2 sec

These distinct numerical trends are reproducible when compared to the sham surgery pig at each 20 min mark.
In human, we evaluated the before and after ICG footage of a patient undergoing sleeve gastrectomy using the same software. The tissue near the staple line had a 45% increase in time to maximum (9.5 to 13.8 s), a 35% decrease in max rate of signal increase (17.5 to 11.2), and a 22% (5.1 to 6.3) increase in time to max rate of signal increase, similar to findings of mild ischemia in the pig model.
Conclusion: We present a reliable method for analyzing relative ICG signal to produce quantitative measurements of tissue perfusion. This program can be used on any digital image file and is therefore not limited by commercial devices. Larger population study will be required to find out the exact numeric cutoffs for clinical significant outcomes.

P426

Comparison of Traditional Blunt vs Novel Trocar Knife Spreading for Specimen Extraction Following Sleeve Gastrectomy: A Preliminary Analysis

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Introduction: Laparoscopic sleeve gastrectomy (LSG) has moved to the forefront as a primary bariatric operation and postoperative recovery has been reduced to a single day hospital stay at many centers. Often, the limiting factor for patients is pain at the extraction site due to the spreading of the fascia. We developed a technique of sharp dissection of the fascia using a specially designed trocar knife to attempt to reduce the pain that is experienced and enhance the recovery process.
Methods: This study is an interim analysis of a project approved by Methodist Institutional Review Board and is designed to randomize 100 patients undergoing LSG as their primary bariatric operation at a single institution. Patients are randomized to four groups: Blunt dissection versus Sharp dissection (trocar knife) with and without local anesthetic.. Intra-operatively collected data during each operation includes specimen extraction time and fascial closure time. Post-operatively, the McGill Pain Scale short form and the Wong Baker visual pain scale are used to assess post-operative pain at Day 1, Day 2, Week 2, Week 6, and Month 3. For preliminary analysis, categorical variables were analyzed using Fisher's Exact and continuous variables were analyzed using Kruskal-Wallis Tests. To compare groups over time, repeated measure MANOVA test was performed.
Results: A total of 42 subjects have been enrolled: Blunt with local (n=9); Blunt no local (n=14); Sharp with local (n=8); Sharp no local (n=11). Median time to extraction was 39 s (interquartile range 30–58) and time to closure was 57 s (Interquartile range 50–76). Time to extraction was faster with Blunt with local compared to other groups (p=0.0146). Time to closure was similar among groups. Pain assessments were similar across the four groups. There were no differences in post-operative pain when comparing groups over each timepoint.
Conclusions: Interim analysis demonstrates that operative and post-operative measures (patient pain assessments) are similar between Blunt and Sharp dissection with and without local anesthetic. Sharp dissection using the trocar knife is equivalent to standard Blunt dissection practices. Further analysis of BMI correlation with pain responses will help to stratify patients who will respond better to trocar knife usage. We plan to continue enrollment until the study goal is reached and repeat analysis at that time.

P427

Cost Saving and Infectious Waste Minimization in Laparoscopic Appendectomy Using Double Ligation Clips for Closing the Appendiceal Stump

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Introduction: There are various devices to close appendiceal stump in laparoscopic appendectomy (LA), such as linear stapler, endo-loop, intracorporeal ligation, polymeric clip, and bipolar endocoagulation. While these were reported to be safe for closing stump, linear stapler has some drawbacks as it costs highly and produces some infectious waste. We report our initial experience with using 16.2 mm-long double ligation clips for closing the stump compared with a linear stapler in LA.
Methods: From August 2014 to July 2016, consecutive patients undergoing LA in our hospital were included in this study. The patients were divided into two groups based on periods. Before August 2015 (pre group), the stump was closed using a linear stapler. Appendiceal artery was ligated with double clip technique with metallic clips, or ligated with vessel sealing device. In the last 12 months (post group), the closure was done using titanium double-shanked clips (DS-ClipTM: size -XL). Two groups were retrospectively compared with regard to patients' background, clinical outcomes, procedural costs and infectious waste. The costs and waste were compared with the differences of the disposal devices used for closing the appendiceal stumps and ligating vessels between the pre group and the post group.
Results: A total of 36 consecutive patients were included for analysis (22 patients in the pre group and 14 in the post group). The median age of all patients was 35, including 19 males (53%). There were no significant differences between both groups with regard to patients' backgrounds and clinical outcomes, except for the median age. No patient was converted to open procedure. In the post group, double ligation clips were used for 13 cases (93%) to close appendiceal stumps. One patient (7%) required a stapler for closing the stump due to severe inflammation. After application of the ligation clips, 82% reduction of procedural costs were attained and 10.2 kg of infectious waste were reduced compared to those associated with linear stapler usage.
Conclusion: Using a large double ligation clip for closing the appendiceal stump can reduce procedural costs and infectious waste in comparison with a stapler without compromising on safety in laparoscopic appendectomy.

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Intraoperative Evaluation of Lymph Node Status for Gastric Cancer Using MEMS-Based Three-Dimensional Optical Coherence Tomography: A Pilot Study

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Background: Accurate evaluation of lymph node metastases is critical for staging gastric cancer and thereby guiding treatment strategies. Currently routine clinical approaches involve the surgical disruption and removed lymphoid nodes for histological analysis. While these techniques have limitations in the sensitivity to detect very small metastatic deposits, improvements need to be made to better assess the micro-architecture of lymph nodes, minimize or eliminate lymphatic disruption complications, and provide immediate and accurate intraoperative feedback for in vivo cancer staging to better guide surgery. In contrast to all other imaging techniques that either require resection, bisection, and disruption of lymph nodes, or offer insufficient resolution to visualize morphology in situ, micro-electro-mechanical system (MEMS)-based three-dimensional optical coherence tomography (3-D MEMS OCT) imaging can be performed through the intact capsule of surgically-exposed lymph nodes that can remain in situ.
Methods: A unique MEMS optical scanning technique was used to make miniature OCT probes that can facilitate intraoperative utility. We evaluated the use of 3-D MEMS OCT, a high-resolution, noninvasive, label-free imaging modality for the intraoperative assessment of lymph node for gastric cancer. The ROC curve of diagnostic study was used to analyze intraoperative OCT lymph node images for presence of metastasis, using postoperative pathologic result of formalin-fixed paraffin embedded (FFPE) sections of harvested lymphoid nodes as the gold standard.
Results: Our preliminary findings suggest that intraoperative OCT imaging of lymph nodes using the MEMS OCT probe is an appropriate, label-free, non-invasive, real time alternative to the histological analysis of FFPE sections, potentially offering faster interpretation and results to empower superior intraoperative decision-making.
Conclusions: Intraoperative OCT enabled by MEMS technology has strong potential to supplement current gold standard diagnostic technique with real-time in situ assessment of lymph nodes micro-structural changes for intraoperative staging of cancer, and thus guide surgical treatment strategies.

P429

Predicting Post-operative Outcomes: Utilisation of Wearable Activity Sensors

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Introduction: Physical activity is an important component of enhanced recovery (ERAS) in the peri-operative period, but may have further utility than currently known. Advances in technology have made way for small, light-weight, body worn sensors that can objectively monitor physical activity outside of the laboratory setting. The aim of this study is to quantify patient activity levels pre and post-operatively and correlate these with patient outcomes.
Methods: Thirty-four patients undergoing elective colorectal surgical procedures were recruited. Patients used a wrist-worn activity monitor (AX3, Axivity, Newcastle, UK) pre-operatively at home and post-operatively on the ward until discharge. Activity levels were recorded and presented as time (mins) spent in light, moderate or vigorous activity. Patient demographics and clinical details were also collected. Associations between activity levels and patient outcomes were assessed using SPSS Statistics (v23, IBM Corp, Armonk, NY).
Results: A statistically significant negative correlation was found between physical activity on post-operative day one and length of hospital stay (rs = -0.466, p=0.02). A positive correlation was found between activity levels on post-operative day one and activity levels on post-operative days two to five (rs 0.491–0.811, $p<0.05$). Activity levels on post-operative days two to six also negatively correlated with hospital length of stay (rs -0.467 – -0.681, $p<0.05$). The mean percentage return to baseline activity on the last full day before discharge was 30% (SD 26%). There was no significant correlation between pre-operative activity levels and length of stay (rs = -0.323, p=0.107).
Conclusion: This study quantifies the fractional return to baseline activity levels at the time of discharge, suggesting that much of recovery occurs in the community setting. There is also a moderate negative correlation between post-operative activity and hospital length of stay. This may act as a useful predictor of patient outcomes and enables extra support and clinical input to be given to optimise recovery. Although no significant correlation was found between pre-operative activity levels and length of stay, a predictive model may be feasible through further consideration and adjustment based on patient and operation variables.

P430

New Minimally Invasive Surgical Approaches: Notes, Single Port, Minilaparoscopy, Robotic Surgery: Which is the Preferred Choice Among Patients? Preliminary Results

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Introduction: Many techniques have been developed over the years such as conventional open surgery, conventional laparoscopy, minilaparoscopy, single incision laparoscopic surgery, natural orifice transluminal endoscopic surgery (NOTES), and robotic surgery, for different types of disease. But the great question still haunts every surgeon: which one is preferred amongst patients?
Objective: To identify the preference among patients of the following surgical approaches: open surgery, conventional laparoscopy, minilaparoscopy (MINI), Single incision laparoscopic surgery (SILS), natural orifice transluminal endoscopic surgery (NOTES), and robotic surgery.
Methods: An online questionnaire was filled by 51 medical students of different years in medical school. Before answering the questionnaire, they watched an online video showing the different techniques, its advantages and disadvantages. The questionnaire consisted of eleven questions about the hypothetical situation where the participants were going to be submitted to an elective cholecystectomy and they could decide which technique they would prefer.
Results: The mean age was 22,92 (19–28) years old and the group was composed of 25 women and 26 men. Six (11.76%) participants said they would consider an open surgery. Among all approaches, the most popular was MINI (68.62%), and the second choice was SILS (27.45%), and conventional laparoscopy (27.45%). If only MINI, SILS, NOTES and robotic surgery were the available options, MINI was the chosen technique (76.47%). Restricting the methods only to robotic surgery, SILS and MINI, 78.43% chose the latter. The transoral route (56.86%) was the specific NOTES route chosen by the students. The majority of participants (56.86%) chose safety as the most important factor to guide their decision. And 40 (78.43%) students wouldn´t consider NOTES or SILS as therapeutic options unless they show their safety and efficacy.
Conclusion: Among the available surgical approaches, minilaparoscopy tends to be the preference among participants who considered safety the most important aspect. However, the study continues collecting data and a full statistical analysis will be performed with a considerable number of participants to identify if there is relation between the following variables: sex, age, year in medical school, and chosen technique.

P431

Artificial Palpation with Da Vinci Surgical Robot Using a Novel Haptic Feedback System

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Introduction: We aim to carry out a feasibility study testing the use of haptic feedback in robotic surgical systems in discerning anatomical structures of different firmness. Surgeons frequently rely on tactile feedback during laparotomy for localization of critical vascular or neural structures imbedded within soft tissue. We hypothesize that this capability can be simulated with haptic feedback on a surgical robot.
Methods: A haptic feedback system compatible with da Vinci surgical robotic system was developed transmitting forces from piezoresistive sensors mounted on robotic instrument tips to surgeon's fingertips via balloon actuators. A phantom was fabricated by burying a plastic tubing within a rectangular sponge without causing significant surface deformity. 19 subjects of variable robotic experience were asked to localize the hidden tubular structure using the da Vinci surgical robotic system under three conditions, 1) without haptic feedback, 2) with normal force haptic feedback using pneumatic actuators alone, and 3) with bi-modal haptic feedback, whereby a vibratory component was added and used to warn the user of excessive forces. Repeated-measures ANOVA and McNemar's test were used to compare task completion time and localization accuracy, respectively.
Results: Mean task completion time and standard errors for trials under the three different feedback conditions were 112.35 +/- 18.62, 97.51 +/- 15.27 and 63.00 +/- 12.11 s, respectively. The decrease in task completion time did not reach statistical significance with use of pneumatic normal force feedback alone ($p=0.762$), but bi-modal haptic feedback use was associated with significantly decreased task completion time ($p=0.003$). Out of the 19 subjects, 6, 12, and 17 subjects were able to accurately localize the imbedded tubular structure without haptic feedback, with pneumatic normal force feedback alone, and with bi-modal feedback, respectively. Similarly, the increase in discriminatory power was statistically significant only when bi-modal haptic feedback was provided ($p=0.0009$), but not with pneumatic normal force feedback alone ($p=0.058$).
Conclusion: Preliminary results from our phantom experiment indicated that haptic feedback in robotic surgery can be helpful with both shortening task time and increasing accuracy in discerning structures hidden in soft tissue. Future studies with larger sample size will help characterize this novel application of haptic feedback in surgical robots.

P432

Control of Inferior Vena Cava Bleeding During Laparoscopic Surgery Using a Double Balloon-Equipped Central Venous Catheter: Proof of Concept in the Live Porcine Model

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Introduction: Iatrogenic inferior vena cava (IVC) injury during laparoscopic surgery is rare but potentially life-threatening. The aim of this experimental study was to assess the hemostatic ability of a new device, double balloon-equipped central venous (DB-CV) catheter for IVC injury.
Methods: The DB-CV catheter consists of a triple-lumen sphincterotome combined with two dilating balloons 25 mm in diameter. The procedures were performed in 5 pigs. The DB-CV catheter was inserted via the right femoral vein. For the IVC occlusion test, the placement of the balloons was confirmed by indocyanine green fluorescence imaging, and haemodynamic data were recorded. For the IVC injury test, a 3- to 4-mm circumferential incision was created in the IVC and hemostasis was started using balloon inflation 5 s after the injury.
Results: Haemodynamic change was minimal with 20 mmHg reduction of mean arterial pressure by the IVC occlusion. All bleeding from the IVC injuries was successfully stopped by direct compression of one dilated balloon, with a mean time for hemostasis of 69 s and blood loss of 32 ml. Subsequently, placement of two balloons, one on each side of IVC injury, made it possible to suture the injured IVC.
Conclusions: Balloon occlusion using DB-CV catheter provides a rapid hemostatic effect that could control the dangerous condition of massive hemorrhage from IVC.

P433

Surgical Smoke as Potential Biohazard: Is Viral DNA Contained?

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Introduction: It is widely known that surgical smoke (SS) generated by energy devices e.g. electrocautery (EC) and laparoscopic coagulating shears (LCS), includes harmful chemicals such as aldehydes and NOx. It has been recommended to recover SS actively from the point of view of risk management. However, details are not known whether SS contains viable tumor cells and/or infectious substances such as bacteria and virus. This study was aimed to clarify whether SS contains potentially bio-hazardous components such as tumor cells and viral particles.
Materials and Methods: [Tumor study] This was an ex-vivo animal study. Liver cell carcinoma cell line "PLC/PRF/5" were implanted subcutaneously in Nod/SCID mice (n= 5). Tumors were intentionally ablated for 3 min to generate SS using EC or LCS. SS was bubbled in nuclease-free water (Ultra DW, GIBCO) via a semi-closed system with negative pressure of 10 kPa. DNA was then extracted from the recovered fluid, and polymerase chain reaction (PCR) was carried out using specific primers to amplify the sequence within HBs gene of PLC/PRF/5 (200 bp), those grossly band was confirmed by electrophoresis. [Virus study] This was IRB-approved, ex-vivo study using human samples. The surgically resected fresh liver samples with HBV infection were used (n=6). SS was generated by ablating non-tumorous component of the resected liver with EC or LCS in the bench-top setting. SS recovery process was performed in the same manner as Tumor study. Detection of HBV-DNA and HBs antigen in the bubbled fluid, was attempted using standard PCR method or CLIA/CLEIA method, respectively.
Results: [Tumor study] The bubbled samples were PCR positive in 80.0% (3/5) after EC activation, and 100.0% (5/5) after LCS activation, respectively. [Virus study] In serum HBV-DNA-positive liver samples (n=3), HBV-DNA was positive in 88.9% (8/9) after EC, and 77.8% (7/9) after LCS activation, respectively. In serum HBV-DNA negative liver samples (n=3), no HBV-DNA was detected. HBs antigen was negative in all bubbled fluids.
Conclusions: Fragmented tumor DNAs were detectable in SS generated by EC and LCS. Host-derived HBV-DNA was also detectable in SS generated by both EC and LCS. These data suggest that SS is oncologically and virologically bio-hazardous. Care should be taken not to expose SS to patients and operating room personnel.

P434

Three-Dimensional Modeling of Complex Visceral Malrotation Following Posttraumatic Diaphragmatic Hernia

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Introduction: Three-dimensional (3D) modeling of complex vascular anatomy has been previously shown to be feasible and beneficial to the surgeon for operative planning. We present the unique case of a 52 year old male with a distant history of high speed motor vehicle collision, who presented with weight loss and worsening dysphagia. Subsequent workup revealed a large left-sided diaphragmatic hernia with complex visceral malrotation as a cause of his worsening symptoms. We hypothesize that this technology could be feasible for modeling anatomy of complex intraabdominal pathology with multiple organ system involvement, as a guide for operative repair.
Methods and Procedures: Computed tomography (CT) scans of the patient's torso were obtained pre and post diaphragmatic hernia repair. All relevant thoracic and abdominal organs were segmented from each scan within the framework of the Medical Imaging Toolkit (MITK). 3D models of the patient's torso before and after operative repair were printed on a Stratasys 3D printer.
Results: 3D models encompassing the relevant intraabdominal anatomy were created representing the patient's pre- and postoperative anatomical configurations. The patient underwent laparotomy, extensive lysis of adhesions, and diaphragmatic hernia repair with mesh. These models correlated well with intraoperative findings.
Conclusions: 3D modeling of intraabdominal anatomy is feasible and useful for operative planning in patients with complex anatomical aberrations.

P435

Single Port Surgery Plus One Puncture (POP-SPS): A Novel Less Invasive Transabdominal Preperitoneal Repair for Groin Hernia

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Introduction: For the transabdominal preperitoneal repair (TAPP) for inguinal hernia, single port surgery (SPS) has been reported to reduce the abdomnal wall damages. So that, we introducced the SPS plus one puncture (POP-SPS) method as a new procedure.
Patients and Methods: From May 2014 to August 2016, 123 cunsecutive TAPP patients were retrospectively investigated. There rere 92 single side inguinal hernia and 31 had both sides. As the POP-SPS TAPP, we use two 5 mm ports (1 for the scope and i for the forceps) through an umbilical multi-channel port and additional 2.4 mm needle instruments is pierced above the pubic bone. A 5 mm flexible scope allowed us to keep the triangular formation easily. We studied the safety and usefulness of this method from the viewpoints of operation and the complications.
Results: Median operation time of single side hernia was 77 min (38–152) and the bilateral case was 139 min (91–269). Three cases needed one or two additional 5 mm ports, and one case with severe preperitoneal adhesion due to the previous prostate cancer surgery was converted to open method because of the venous bleeding. Other complications were 1 spermatic cord injury and 1 postoperative seroma that required the percutaneous puncture. Umbilical scars and the pierced needle instrument scars became gradually invisible within 1 or 2 months. There were no incisional hernia nor wound infections in our series. These data was comparable ti the conmventional laparoscopic hernia repairs in our facility.
Conclusions: Operation scars of POP-SPS had better cosmesis then the conventional TAPP or SPS TAPP, and there were no difference between POP-SPS TAPP and conventional method in operation time and the complication rate. POP-SPS TAPP was demonstrated as a novel minimally invasive approach for laparoscopic inguinal hernia repair.

P436

Microlaparoscopic Surgery is Safe in the Bariatric Population: A Single Surgeon's Experience

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Introduction: Microlaparoscopic or "mini" laparoscopic instruments have been utilized in urology and obstetrics and gynecology for almost two decades. In the field of general and bariatric surgery, however, there remains limited use of such instruments despite the potential for decreased postoperative pain, decreased narcotic use and faster return to daily activities with smaller incisions. Through this study we hypothesize that the utilization of microlaparoscopic trocars and instruments, defined as instruments 3 mm in diameter or less, is a safe and effective method for surgery in the bariatric population.
Materials and Methods: A single center retrospective study was conducted, looking at patients who underwent roux-en-Y gastric bypass (RYGB) or sleeve gastrectomy, performed with the microlaparoscopic technique. This was defined as the utilization of three 3 mm ports, and one 15 mm port for stapling and specimen extraction. Patient demographics, intraoperative and postoperative complications, operative details and postoperative course were recorded for all patients.
Results: A total of 448 patients underwent microlaparoscopic bariatric surgery at our institution from July 2008 to July 2016, of which 262 underwent RYGB and 186 underwent sleeve gastrectomy. The median BMI for the groups was 46 and 44, respectively, and the maximum BMI was 75 and 80, respectively. There were 8 instances of the need to upsize trocars (1.7%) and no cases were converted to open. Intraoperative complications occurred in 4 patients (0.9%) undergoing RYGB, and no sleeve gastrectomy patients. The median length of stay was 2 days for RYGB patients and 1 day for sleeve gastrectomies. A total of 26 patients were readmitted within 30 days, 19 RYGB patients (7.2%) and 7 sleeve gastrectomies (3.7%).
Conclusions: The utilization of microlaparoscopic instruments is safe and effective in the bariatric population. Length of stay, postoperative complication rates and readmission to the hospital are acceptable and comparative to traditional laparoscopic approaches for these procedures.

P437

A Ground Truth 3D Video Data Set for Augmented Reality Robotic MIS Algorithms

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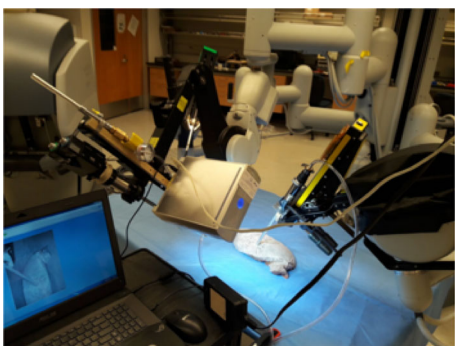
Introduction: Augmented reality (AR) is an emerging visualization technology that can enhance intraoperative imaging during robotic surgery by superimposing preoperative studies into the camera display. The biggest challenge of this is the lack of accurate modeling for soft tissue in 3 dimensions. Current operative video recordings only capture image feed without measurements of force or tissue surface location (ground truth 3D data), thus limiting the modeling capabilities. The system resolutions are also too low to explore tradeoffs in system accuracy and speed for practical clinical applications. Our goal is to measure ground truth values for soft tissue manipulation and use it to create a clinically relatable AR model.
Methods and Procedures: A porcine liver was used as a homogenous soft tissue model. Mechanical manipulation and incision on the liver is performed using a custom hydraulic tool attachment to the DaVinci S ? robotic surgical system (+/- 0.01 mm accuracy). A laser scanner is used to sequentially scan the porcine liver (0.025 mm accuracy up to 1732 dpcm), while a pressure gauge (+/- 5mpa) measures the applied force. These scans are pre-registered to a color video feed using an Iterative Closest Point method. We use three levels of tissue preparation to stress example AR registration algorithms (Table 1).
Results: The scanner and hydraulic actuator were mounted to a camera and endowrist arms of a Davinci system (see Fig. 1). 1.5 kg of porcine liver was scanned at a rate of 1 frame per 45 s. The hydraulic actuator was graduated at 1 mm per frame. The data sets were tested in pairs of video frames with three registration algorithms (Table 2). Talc powder coated tissue was found to give the best average convergence time and the most accurate registration in our experiments.

Data	Tissue prep	AR stressed
1	Unmarked	3D reconstruction
2	Fiducial marks	3D recon / reg
3	Powder coated	3D registration

Table 1 tissue prep to AR stress mapping

Algorithm	T(S)	MSE
Sparse	26.9	2.4e-4
Simple	102.7	2.5e-4
non-rigid	30.0	2.2e-4

Table 2 AR algorithm Stress tests



Conclusions: Benchmark values for soft tissue in robotic surgery were easily and effectively collected through our testing algorithm. This is the first time data of this high resolution is reported in the literature. AR developers can now use these values to explore and validate algorithmic, software, and hardware methods for tissue reconstruction in clinical practice.

P438

Initial Experience of Electro Stimulation Device (Endostim®) Therapy on Patients with Recurrent GERD After Fundoplication Failure. Preliminary Report

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Introduction: GERD is a high prevalent progressive condition. Laparoscopic Nisen Fundoplication (LNF) is used as treatment for GERD. Nonetheless, 15–20% of these patients will present symptomatic failure, whereas 4–7% of these dissatisfied patients will undergo Re-Operation (Re-Do) due to symptoms or complications. Percentage of failure may increases with each Re-Do up to 35–50% pending upon number of re-operations. To offer procedures that effectively control symptoms, potentially improve physiology, safer to perform and could avoid long-term intra-abdominal reoperations is significant. EndoStim Therapy (EST) has been used to treat patients with GERD. However, its use in Re-Do patients has not been reported yet. The first goal of the present study was to evaluate safety and feasibility in Re-Do conditions, and then extend over time the results to control GERD. Preliminary report is presented.
Methods and Procedures: A retrospective review from a GERD center's prospective database was performed. From April 2015 to September 2016, 5 patients with recurrent GERD after LNF accepted being included. Past Clinical History, Barium Swallow x-Rays, High Resolution Esophageal impedance pH monitoring (pHMI), High Resolution Manometry (HRM) and GERD-HRQL Questionnaires were performed. A laparoscopic placement of stitch electrodes at the Lower Esophageal Sphincter with closure of Hiatal Hernia was done with follow-up at 1, 3, 6 months after procedure. Clinical interview and GERD-HRQL Questionnaires applied. Barium Swallow x-Rays, Complete Physiological Test and Endoscopy were performed at 3rd postoperative month.
Preliminary Results: Trans-operative complications and mortality weren't reported. One patient developed post-operative small seroma resolved medically. Previous GERD-HRQL Scores got a mean of 41.2 ± 16.2, median at of 46; posterior scores had a mean of 12.75 ± 14.99, median at 11. Base DeMeester Score reported a mean of 107 ± 38.54, median at 109.4, Number of Reflux Episodes mean of 102.33 ± 28.04 and a median at 96; post-EST DeMeester score mean was 17.27 ± 3.03, median at 18.1, the mean of the Number of Reflux Episodes was 56.33 ± 24.10, median at 50. Base HRM reported a Distal Contractility Index (DCI) mean of 453.73 ± 500 mmHg, median at 368.9 mmHg and an Integrated Relaxation Pressure (IRP) mean of 1.7 ± 5.7 mmHg, median at 3.5 mmHg; posterior HRM results were a DCI mean of 422.4 ± 389.1 mmHg, median at 501 mmHg and mean IRP of 5.46 ± 2.45 mmHg, median at 5.6 mmHg. No abdominal distention/dysphagia and normal emesis/eructation capacity reported.
Conclusions: EST looks safe and feasible therapy to perform for Re-Do patients. Initial data shows could improve GERD symptoms. Increase sample size and further follow up to support any conclusions are mandatory.

P439

Laparoscopic Spleen-Preserving Distal Pancreatectomy in Patients with Low-Grade Malignant Tumors

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Background: Minimally invasive surgery has become increasingly accepted as a technique for benign or low grade pancreatic tumors. It is generally pointed out that spleen salvage can eliminate the risk of overwhelming infections and maintain immunological functions.
Here we report our recent experiences of laparoscopic spleen-preserving distal pancreatectomy.
Method: A total of 7 patients underwent this procedure. After inserting a camera port, three working trocars were positioned. The body and tail of the pancreas were exposed by opening the lesser sac. The gastrocolonic, gastrosplenic, and splenocolonic ligaments were divided with ultrasonic scalpel and, followed by resection of the short gastric vessels with vessel sealing system. After exposure of the pancreas, the splenic artery was carefully mobilized, and the dissection between the pancreas and splenic vessel was continued. Following the creation of a posterior window, the body of the pancreas was transected with 60 mm Endo-GIA. The distal part of the pancreas was further mobilized and completely dissected while preserving the spleen and its vessels.
Results: Laparoscopic spleen-preserving pancreatectomies were successfully completed in all patients without conversion to open surgery. Reduced port surgery was performed in three cases with excellent cosmetic satisfactions. On average, operative time was 225 min. The mean blood loss was 128 ml and the mean postoperative hospital stay was 15days. Only one patient developed grade1 pancreatic fistula. Pathologically, there were 4 neuroendocrine tumors and 3 cystic tumors.
Conclusion: Laparoscopic spleen-preserving distal pancreatectomy is feasible and may be preferable to maximize the advantages of a minimally invasive approach in selected patients with pancreatic tumors.

P440

Laparoscopic Repeat Hepatectomy for Cases of Recurrent Liver Cancer Following Open Hepatectomy

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Background: With the improvement in treatment outcomes for patients with liver cancer, there have been an increasing number of cases of repeat hepatectomy. Technological innovation and data accumulation on surgical cases are making it possible to use laparoscopic hepatectomy to treat even cases with postoperative adhesions or cicatricial changes. We investigated the treatment outcomes of laparoscopic repeat hepatectomy for cases of recurrent liver cancer following open hepatectomy.
Methods: A total of 260 cases underwent laparoscopic hepatectomy at our facility as of September 2016. Of these, we retrospectively analyzed 13 cases of recurrent liver cancer that underwent laparoscopic repeat hepatectomy following open hepatectomy.
Results: The subjects included 11 males and 2 females. The median age was 70 (54–88) years. There were 9 cases of hepatocellular carcinoma, 3 cases of metastatic liver cancer and one case of cholangiocarcinoma.; 5 cases had hepatitis B, 4 had hepatitis C, and 4 had neither. Grade A/B liver damage was noted in 12/1 cases undergoing initial surgery and in 11/2 cases undergoing repeat hepatectomy. Three cases (23.1%) were histologically diagnosed with liver cirrhosis. The surgical procedure performed was lateral segmentectomy in 1 case, S3+4 subsegmentectomy in 1 case and partial hepatectomy in 11 cases(anatomical resection was performed on 5 of these cases by treating the cancer-bearing Glisson's sheath in advance). Six cases underwent resection in the same segment (medial segment: 2 cases, anterior segment: 4 cases) at both initial surgery and repeat hepatectomy. Despite the inclusion of some cases with severe adhesion, median surgical duration was 377 (212–885) min and median blood loss was 200 (trace-870) g. In terms of postoperative complications, we noted 2 cases of bile leakage and 1 case of portal vein thrombosis. However, good outcomes were achieved, with a median time to resumption of oral feeding of 2 (2–4) days postoperatively, and a median postoperative stay in hospital of 11 (6–46) days. The median recurrence-free period over a median observation period of 29 months was 14 (1–37) months for hepatocellular carcinoma and 22 (10–29) months for metastatic liver cancer.
Conclusions: Laparoscopic hepatectomy was performed safely in cases of recurrent liver cancer following open hepatectomy, resulting in good treatment outcomes. However, the indication should be carefully considered as the level of difficulty varies depending on the tumor location and resection area.

P441

Laparoscopic Resection and Outcomes of Cystic Neoplasms of Pancreas: Tertiary Care Centre Experience from South India

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Introduction: Tthe management of cystic neoplasms has changed in recent years as a result of better diagnostic options, surgical expertise along with technological and technical innovations and international guidelines.
Method: Retrospective analysis of a cohort of 47 patients operated for cystic pancreatic neoplasms during a five -year period (January 2011– October 2015) in GEM Hospital and research centre, Coimbatore, India. Patient managed conservatively were excluded from study.
Results: The 47 cases included 39 female and 8 male patients and the average age was 37.3 years (range 11 to 78). A pylorus-preserving pancreaticoduodenectomy was carried out in 13 patients, distal pancreatectomy was carried out in 27 patients, and median resection carried out in 4 patients and enucleation was carried out in 3 patients. Two procedures were converted to open technique .Final histopathology revealed 5 intraductal papillary mucinous neoplasms, 7 serous and 19 mucinous cystic neoplasms, 15 solid pseudopapillary neoplasms, and one pseudocyst. 4 cases displayed high grade intraepithelial neoplasia and 2 cases displayed invasive cancer. Overall postoperative morbidity and mortality were 37% and 2.12%. Fistula rate was 9% (type B and C).The preoperative diagnosis of a specific cystic tumor was accurate in 71% of patients.
Conclusion: In all symptomatic and large neoplasms (>3 cm in mucinous tumour) resection is recommended, type of surgery depends on size and location of tumour; laparoscopy can be tried in advanced centre by experienced surgeon. Laparoscopic pancreatic surgery is safe and feasible.

P442

Bioinformatics Identification of Rare Codon Clusters in HBV Genome and Evaluation of RCCs in HBV Proteins Structure of Hepatitis B Virus

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Background and Objectives: Hepatitis B as an infectious disease has eight main genotypes (A–H). The aim of this study is to identify rare codon clusters (RCC) in proteins structure of HBV.
Materials and Methods: For detection of Protein Family Accession Numbers (Pfam) of HBV proteins; UniProt database and Pfam search tool were used. Obtained Pfam IDs were analyzed in Sherlocc program and RCCs in HBV proteins were detected. Furthermore, the structures of TrEMBL entries proteins were studied in PDB database and 3D structures of the HBV proteins and locations of RCCs were visualized and studied using Swiss PDB Viewer software®.
Results: Pfam search tool have found nine significant hits and 0 insignificant hits in 3 frames. Results of Pfams studied in the Sherlocc program show this program not identified RCCs in the external core antigen (PF08290) and truncated HBeAg protein (PF08290). By contrast the RCCs were identified in hepatitis core antigen (PF00906), large envelope protein S (PF00695), X protein (PF00739), DNA polymerase (viral) N-terminal domain (PF00242) and protein P (Pf00336). In HBV genome, seven RCCs were identified in hepatitis core antigen, large envelope protein S and DNA polymerase proteins as well as protein structures of TrEMBL entries sequences found in Sherlocc program outputs are not complete.
Conclusion: Based on situation of RCCs detected in the structure of HBV proteins, it was found that mentioned RCCs are critical in HBV life cycle and can be considered as drug targets. The results of this study provide new and deep perspectives about structure of HBV proteins for further researches and designing new drugs for treatment of HBV.
Keywords: Codon, Hepatitis B virus, Computational Biology

P443

Changing Pattern in Laparoscopic Internal Drainage of Pancreatic Pseudocyst: Experience from a Tertiary Centre in South India

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Background: Management of pancreatic pseudocyst (PPC) has gone through major changes from open to laparoscopic and then to endoscopic internal drainage. PPC which are amenable for cystogastrostomy (by virtue of their location) are being managed in increasing numbers by endoscopic methods and those in other locations are still managed by surgical methods mainly by jejunal drainage.
Data of period I has already been published. Of 82 cases in period II, 14 cases were managed by endoscopic internal drainage which were excluded. Remaining 68 cases(period II) were considered for analysis.
Laparoscopic cystogastrostomy (LCG) was done in 42 cases (61.7%), and laparoscopic cystojejunostomy (LCJ) in 19 cases (27.9%), laparoscopic external drainage in 5 cases (7.3%).The mean operating time was 118 min in LCG group and 150 min in LCJ group. All the cases were successfully operated without any significant intraoperative complications. Intra operataive blood loss was <50 ml. There were no conversions to open surgery. Mean hospital stay was 5.5 days.
Methods: Patients who underwent intervention for PPC at our centre from 1994 to August 2015 were divided into two time periods. Period I(1994–2006) and period II(2007–2015). Data of two groups was analysed from a prospectively maintained data base.
Results: There were a total of 190 patients who were offered intervention for pseudocyst of pancreas between 1994 to 2015. Period I had a total of 108 patients and Period II has 82 patients. We had post op complications in 3 patients in LCG group- two bleed and one leak. We had recurrence in 1 patient and no mortality. In our previous series, between 1994–2006, of the total 108 cases, LCG was done in 90 cases (83.4%) and LCJ was done in 8 cases (7.4%).
Conclusion: Our experience in two different time period showed that there is increasing proportion of Laparoscopic Cysto-Jejunostomy being done now, which requires more advanced laparoscopic skills then Cysto-Gastrostomy.

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Laparoscopic Management of Chronic Calcific Pancreatitis: A Fifteen Year Experience of a Tertiary Care Center from South India

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Introduction: Chronic pancreatitis is managed using non-operative techniques with surgery limited only to selected patients. Modified Puestow and Frey's procedures are frequently performed surgeries for chronic pancreatitis in tropical countries like India with prime aim to control the unremitting abdominal pain. Laparoscopic approach is a path less travelled as it is tedious. We present our long term experience in the laparoscopic management of chronic pancreatitis.
Methods: This is a review of prospectively maintained database from single center from 1998 till 2015. Indications for laparoscopic lateral pancreaticojejunostomy included patients presenting with unremitting abdominal pain along with dilated pancreatic duct obstructed by intraductal stones. Patients with predominant head disease underwent Frey's procedure. The clinico-pathological data, operative variables and post-operative morbidity are analyzed. Patients were followed up at 1, 3, 6 and 12 months following the surgery.
Results: Forty seven patients underwent laparoscopic surgery for chronic calcific pancreatitis during this period with a mean age of 33.95 years (range 14–60) and female to male ratio of 1.94:1 (31vs16). The mean pancreatic duct diameter was 9.87 mm. Thirty five patients underwent laparoscopic LPJ (Group A) and twelve underwent laparoscopic Freys procedure (Group B). Two patients from laparoscopic LPJ group and three from laparoscopic Freys group were converted to open in view of non-identification of pancreatic duct (n=2), extensive peripancreatic collaterals (n=1) and intra-operative hemorrhage (n=1). The other patient was intraoperatively diagnosed of carcinoma of head of pancreas by frozen biopsy and hence underwent open pylorus preserving pancreato-duodenectomy. The mean operative time was 237.35 min (214.7 min for group A and 260 min for group B) and mean blood loss was 200.7 ml (168.7 ml for group A and 232.7 ml for group B). Post-operatively the patients were discharged after a mean hospital stay of 6.8 days. There were no major postoperative complications. Five patients lost to follow-up, 83.3% of the patients at follow up had significant pain relief at the end of 12 months while the remaining 16.7% experienced recurrence of pain.
Conclusions: Laparoscopic approach is safe, effective, and feasible for management of chronic pancreatitis with post-operative pain relief comparable to the open technique. It offers the advantages of minimal invasive surgery like i.e. shorter hospital stay; faster return to a regular diet, ambulation, and work; lower incisional hernia rates; as well as better cosmetic results. However it is applicable only in selected patients and requires surgeons highly experienced in open pancreatic surgeries and advanced laparoscopic gastro-intestinal surgeries.

P445

Comparative Analysis of the Perioperative and Oncologic Outcomes Between RA-LDP and LDP

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Background: Robotic surgical systems provide motion stabilization by improved dexterity of wristed instruments, and magnified three-dimensional (3D) imaging. However, the effectiveness of this method remains uncertain in the era of distal pancreatectomy.
Aim: This study compared the perioperative and early oncologic outcomes between robot-assisted laparoscopic distal pancreatectomy (RA-LDP) and conventional laparoscopic distal pancreatectomy (LDP) performed by single surgeon.
Methods: The clinicopathologic features of 85 consecutive patients who underwent minimally-invasive distal pancreatectomy from October 2015 to August 2016 were retrospectively reviewed.
Results: Twenty six patients underwent RA-LDP and 59 had LDP. The median operative time was longer and procedures' cost was higher in RA-LDP group. There was increased frequency of spleen-preserving pancreatectomies in RA-LDP. There were no significant differences in operative blood loss, postoperative morbidity including pancreatic fistula, and postoperative hospital stay. There were no postoperative mortality. Compared with LDP for pancreatic cancer, RA-LDP had higher number of harvested lymph nodes and higher rate of R0 resection.
Conclusion: RA-LDP had similar perioperative outcomes compared with LDP. However, it was associated with high rate of spleen preservation. The oncological outcomes were superior for RA-LDP in terms of improved lymph node clearance and the rate of margin negative. RA-LDP can be safely adopted for left-sided pancreatic tumors by appropriate patient selection.

P446

Laparoscopic Pancreatico-Jejunostomy: Stapled & Sutured Techniques

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Introduction: Chronic Pancreatitis is fairly common in South-east Asian countries. There are considerable differences in morphology of South-East Asian patients' pancreas when compared to the west. We observe main pancreatic ducts which are more dilated, having fewer strictures, but more calculi.
Modified Puestow's Procedure is the gold standard drainage procedure for chronic pancreatitis. Laparoscopically, the pancreatico-jejunal anastomosis is usually performed in sutured manner. Endostapler anastomosis has been described once earlier by Glaser et al in 2000. However, there are no guidelines at present concerning its use.
Materials and Methods: Over a period of 8 years, 26 cases of chronic pancreatitis who were deemed to benefit from surgical intervention, were enrolled for laparoscopic pancreaticojejunostomy. Pre-operative radiological evaluation of main pancreatic ducts was performed & those with ducts larger than 10 mm diameter (i.e. large enough to permit insertion of endostapler anvil) were planned for endostapler anastomosis, while the remainder were completed with purely sutured technique.
Results: The procedure was undemanding, and reduced operating time in the selected cases. They suffered from no significant complications & had an uneventful post-operative recovery. Only a single case with duct larger than 12 mm was converted to an open procedure due to finding of an abnormally supple pancreas which hindered duct localization in absence of laparoscopic ultrasound. Patients were followed up for a minimum 6 months post-operatively & were found to remain symptom free with improvement in digestive function evidenced by weight gain.
Conclusion: We opine that endostapler pancreatico-jejunostomy is a viable alternative in grossly dilated ducts with diameter of haed and body more than 12 mm. It serves to reduce operative times and is technically less challenging. In our small sample size, we did not observe any detrimental effects. Further evaluation of the procedure has potential to reveal a diminished complication rate.

Table 1. Classfication of MPD according to mean diameter at head & body, with suitable anastomotic technique **(JJ Hospital Classification)**

Grade	Mean diameter of MPD at head and body	Preferred Anastomosis
I - Mild	< 8 mm	Sutured
II - Moderate	8-12 mm	Sutured > Endostapler
III - Severe	> 12 mm	Endostapler

Table 2. Our series of 22 patients who underwent Laparoscopic Modified Puestow's Procedure revealed MPD diameter of 12mm is condusive to endostapler anastomosis without significant complications

Procedure	Number of cases(n)	Mean diameter of head and body(cm)	Operative Time(mins)	Major complications (%)	Minor complications (%)
Endostapler PJ	06	1.425	175	0	16
Sutured PJ	16	0.793	213	18.75	12.5

P447

Indocyanine Green Fluorescent Imaging for Prevention of Bile Leakage After Laparoscopic Deroofing for Giant Hepatic Cyst

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Background and Aim: Though laparoscopic deroofing is widely applied for the management of symptomatic giant hepatic cysts, bile leakage remains as the most troublesome and common complication. Herein, we verified the feasibility of indocyanine green fluorescent imaging (IGFI) for identifying intrahepatic biliary branches and avoiding bile leakage after deroofing of giant hepatic cysts.
Methods: For patients with symptomatic hepatic cysts, preoperative multi-detector row computed tomography (CT) and prolonged drip infusion CT cholangiography (DIC-CT) were routinely performed in our department to deny possible malignancy or communication between the cysts and the biliary tract. IGFI system used in this study consists of a charge-coupled device camera (410,000 pixels) and a xenon light source (Olympus Medical Systems, Tokyo, Japan).
Case: A 70-year-old woman with complaints of abdominal distension and persistent abdominal dullness was referred to our department to undergo laparoscopic deroofing for giant hepatic cysts. Immediately after endotracheal intubation, 1 ml of indocyanine green (2.5 mg) was intravenously administered. Under four-trocar setting, the fluid contents of the cysts were completely aspirated by a double balloon catheter (Hakko, Tokyo, Japan). Then, laparoscopic deroofing of the cyst wall was performed mainly using a vessel sealing device under the normal view mode. IGFI mode was occasionally used to identify the biliary branches on the cyst wall. After completion of wide deroofing, a flat drain was placed in the left subphrenic space.
Results: Laparoscopic deroofing was successfully completed for two giant cysts without any intraoperative complications. The operation time was 196 min, and the amount of intraoperative blood loss was minimal (uncountable) due to the effective use of the vessel sealers. Since IGFI mode definitively enabled the detection of even small biliary branches on the cyst wall, they were securely stapled and transected. The patient was uneventfully discharged on the fifth postoperative day.
Conclusion: IGFI enabled real-time identification of intrahepatic bile ducts, thus contributing to the prevention of bile leakage after laparoscopic deroofing of giant hepatic cysts.

P448

Biliary Cystadenoma in Left Liver with a Solid Component Extending into Hilar Biliary Confluence

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A 52 year old woman presented with abdominal discomfort and jaundice for 1 month. Discomfort was in upper abdomen, did not have any periodicity and was non-radiating. She noticed high colored urine a month ago. There was no pruritus or pale stools. She had low grade, intermittent fever. She reported anorexia and had lost 20 kg weight over the last 1 year. There was no gastrointestinal bleeding. Stools were normal. She did not have any comorbidity. She did not undergo any operation in the past. She frequently looked after a cat that was living near her house.
Clinical examination revealed a moderately nourished woman, who was icteric. There were no signs of liver cell failure. There was no supraclavicular lymphadenopathy. Abdomen was not distended and was soft. Non tender hepatomegaly was present. There was no palpable mass. There was no clinical evidence of free fluid in abdomen. Examination of other systems was unremarkable.
Serum bilirubin was 2.6 mg/dl. Conjugated bilirubin was 2 mg/dl and alkaline phosphatase was 560 IU/ml. Ultrasound scan abdomen revealed a complex cystic lesion in segment 4 and 5 of liver with dilatation of intrahepatic biliary radicles bilaterally. CT scan of abdomen revealed a complex cystic lesion in segment 4 and 5 and the same was encroaching the umbilical fissure. A solid component of the lesion extended into the hilar biliary confluence occluding it. There was no vascular invasion or metastatic disease. ERCP did not reveal any hydatid cyst elements in the extrahepatic biliary tree. Preoperative diagnosis was biliary cystadenocarcinoma.
We performed left hepatectomy with segment 5 liver resection with resection of extrahepatic biliary tree and did cholangiojejunostomy to right sided sectoral ducts. Operating time was 8 h and 30 min. Blood loss was 400 ml and we gave 1 unit blood transfusion. Patient recovered uneventfully. Biopsy showed biliary cystadenoma in liver with a solid component extending into hilar biliary confluence and obstructing it.
We intend to show the preoperative imaging, planning of the operation and the operative pictures. The poster intends to show the typical histopathology of hepatobiliary cystadenoma. The histopathology of bile duct solid component would also be illustrated.

P449

Sofosbuvir and Ledipasvir in Attainment of SVR12 in Sickle Cell Disease (SCD) Sub-population with Chronic Hepatitis C (CHC). A Single Center Prospective Open Label Clinical Pilot Study: Slash C Trial

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Background: CHC is no longer a clinical challenge in the era of DAA's. CHC and SCD contributes added challenges (sickle cell hepatopathy, splenic dysfunction, accelerated fibrosis secondary to anemia, iron overload and LPS induced mitochondrial injury). Historical management with IFN and RBV causes fatal hemolysis, severe anemia and sepsis.
Aim: This study evaluates the safety, efficacy and eradication of hepatitis C in this subgroup population with SCD
Methods: 24 patients were recruited from three sickle cell centers in NYC.
Inclusion criteria: CHC (Geno specific with variation, diagnosed between 1998–2014) with SCD in remission (with sickle cell history>30 years)
All patients were placed LDV 90 mg+SOF 400 mg a day; with food for 12 weeks
Results: Table

undetectable	LDV 90 mg and SOF 400 mg
Day 7, n, %	9/24
Day 14, n, %	14/24
Day 30, n, %	22/24
Day 60, n, %	22/24
Day 90, EOT,, n, %	22/24
Population Viral failure- 1a/4c & 1a/3c	8.3% (2/24)
Pre and post RAV	1/24 (G 1a/4c)
Retention	100%

Conclusion: This study demonstrates that LDV and SOF combination in SCD patients with CHC is safe and well tolerated; with an SVR12 of 91.67% (22/24) with 8.3% (2/24) viral failure (in concomitant genotypes; 1a/4c and 1a/3c).

P451

Feasibility and Safety of Laparoscopic Liver Resection for Hepatic Malignancies

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Background and Objective: In this decade, laparoscopic techniques have been introduced and widely applied for liver resections because of the less invasiveness and magnified view. We introduced hand-assisted laparoscopic liver resection (LLR) for benign and malignant lesions in the liver since 2006 and introduced pure LLR thereafter. The aim of this study was to assess the feasibility and safety of LLR for the treatment of hepatic malignancies.
Patients and Methods: We retrospectively reviewed the data of 55 patients who underwent LLR (partial resection or left lateral lobectomy) between July 2006 and August 2016 at Jikei University Hospital. Of those, 48 patients who underwent LLR for hepatic malignancies were included in this study (age 41–86 [median 66] years, M:F=34 : 14). We divided such patients into two groups according to the periods (1st period; 2006–2013, 2nd period; 2014–2016) and evaluated the patient background, C-P grade, diagnosis (primary vs. met), previous liver resection (LR), total pure LLR (TPLLR), simultaneous colorectal cancer surgery (CRC op), operative factors, conversion rate (CR), complications (Clavien-Dindo grade III and IV) and length of postoperative hospital stay (HS).
Results: In two periods, age (years, median) (62 vs. 69, p=0.110), sex (%, male) (75% vs. 69%, p=0.714), operative time (min, median) (260 vs. 251.5, p=0.545), intraoperative blood loss (g, median) (167.5 vs. 50, p=0.477), and HS (days, median) (8 vs. 8, p=0.545) were comparable. However, more C-P B patients (0 vs. 11%) and metastatic tumors (5% vs. 95%, p=0.007) were treated in 2nd period. More TPLLR (67% vs. 94%, p=0.012), lower CR (17% vs. 3%, p=0.085), and more previous LR (0 vs. 14%) were noted in 2nd period. There was one (8.3%) complication in 1st period, as compared to none in 2nd period.
Conclusion: Although more complex procedures have recently been performed, LLR remains feasible and safe.

P452

The Functional Role of C/EBPa and C/EBPb in Hepatocellular Carcinoma

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Introduction: Hepatocellular carcinoma (HCC) represents the second cause of cancer related death worldwide. Given the high fatality of HCC, only 12% of patients are indicated for surgery leading to long term survival. C/EBPA, a liver transcription factor, plays a major role in regulating cell proliferation and hepatocyte function. C/EBPA functionally interacts with C/EBPB to change cell behavior. This study aims to elucidate the functional role of C/EBPA and C/EBPB in the pathogenesis of HCC.
Methods and Procedures: Hepatocytes were transfected with either saRNA or siRNA to increase or repress C/EBPA or C/EBPB. Differentiated and Undifferentiated HCC were represented by HepG2 vs. PLC/PRF/5 cells. Transcript/protein expression levels of C/EBPA & C/EBPB including downstream targets were analyzed by qRT-PCR/western blot. Effect of saRNA vs. siRNA on cell density was measured by Sulforhodamine B colorimetric (SRB) assay. Effect of saRNA vs. siRNA on cell proliferation was measured indirectly via activity of mitochondrial dehydrogenases (WST-assay).
Results: Only HepG2 cells responds to the increase in C/EBPA. C/EBPB levels prevents PLC/PRF/5 cells from responding to the increase in C/EBPA. C/EBPA and C/EBPB play diverse effects in different differentiated HCC. C/EBPA activation by saRNA enhanced the expression of P21 and Albumin in differentiated HepG2 cells but not in undifferentiated PLC/PRF/5 cells. This means P21 and Albumin may not be the downstream factor of C/EBPA in undifferentiated PLC/PRF/5 cells. There was no significant alteration in the expression of C/EBPB in both cell lines. C/EBPB suppression enhanced the expression of C/EBPA and P21 in differentiated HepG2 cells but not undifferentiated PLC/PRF/5 cells. C/EBPA enhancement had a better anti-proliferative effect in differentiated HCC.
Conclusion: The dynamic interaction between C/EBPA and C/EBPB is crucial in biology of HCC. Higher ratio of C/EBPA to C/EBPB lead to better cell cycle repression; metabolic genes activation and suppression of acute phase response genes. This was more relevant in differentiated HCC. p21 was the downstream factor regulated by C/EBPA promoting cell cycle suppression in differentiated HepG2 cells. An alternative network may be more relevant in PLC/PRF/5 cells. Albumin expression was upregulated by C/EBPA enhancement in well differentiated HepG2 cells. Undifferentiated PLC/PRF/5 cells therefore cannot rely on C/EBPA for reestablishing albumin expression. C/EBPA enhancement in well differentiated HepG2 cells had better anti-proliferative effect than undifferentiated PLC/PRF/5 cells.

P453

Video-Assisted Retroperitoneal Debridment for Acute Necrotizing Pancreatitis: A Case Series

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Introduction: Acute pancreatitis affects over 280,000 patients annually in the United States and carries high morbidity and mortality. Up to 20% of patients will develop necrotizing pancreatitis. Mortality is highest in patients who develop infection of the necrotic pancreatic tissue. Open necrosectomy is the traditional approach to management of these patients. More recently, minimally invasive techniques have been developed to avoid the morbidity of open necrosectomy including percutaneous, endoscopic, and video assisted retroperitoneal debridment (VARD). We present our own recent experience in managing acute necrotizing pancreatitis through VARD.
Methodology: We present a single midwestern institutional experience in the management of acute necrotizing pancreatitis.
Results: Over a seven-year period there were 320 admissions for acute necrotizing pancreatitis. There were eight patients whom ultimately underwent VARD. We managed cases of acute necrotizing pancreatitis in a step-wise process. Initially, a percutaneous retroperitoneal drain was placed. Next, we used the percutaneous drain tract as a guide for placement of a trocar for balloon inflation of the retroperitoneal space and creation of a second retroperitoneal space through which the necrotic pancreatic tissue was debrided. The axiom chest tubes were then placed in the trocar sites for drainage. There was a single mortality in the VARD group for a mortality of 12.5. We found that the VARD procedure led to decreased use of open pancreatic necrosectomy and decreased hospital stay.
Discussion: Video assisted retroperitoneal debridement has demonstrated decreased morbidity and mortality compared to the traditional open approach. Our series demonstrate the significant morbidity and prolonged hospital stays associated with infected pancreatic necrosis. Our series also demonstrates that even though a step-wise progression from percutaneous drainage to VARD procedure, an open drainage procedure may still be required. Furthermore, a comparison of our VARD cases show how an open drainage procedure is associated with a longer hospital stay and the morbidity of multiple open washouts and delayed abdominal closure.
Conclusion: Infected pancreatic necrosis should ideally be treated through a step-wise approach using minimally invasive techniques. The VARD procedure may lead to decreased hospital stay, decreased morbidity and improved mortality.

P454

Laparoscopic Distal Pancreatectomy: An Analysis of Seventeen Years of Experience from a Tertiary Care Center in South India

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Background: Laparoscopic distal pancreatectomy gradually evolved as the standard approach for the management of lesions of distal body and tail of pancreas. Since its inception, this technique had many technical modifications. We present our experience of this procedure, its modifications and concurrent results over the past seventeen years.
Methods: This is a review of prospectively maintained database from single center from 1998 till 2015. Indications for laparoscopic distal pancreatectomy were lesions of distal body or tail of pancreas (benign looking or pre-malignant or malignant). All the clinicopathological data, operative variables and postoperative morbidity including pancreatic fistula were analyzed.
Results: During the period, 82 patients underwent laparoscopic distal pancreatectomy for pancreatic lesions. The median age was 45yrs with female to male ratio of 2.5:1. The mean tumor size was 5.1+2.9 cm. The mean operating time was 205+48 min. Spleen preservation was possible in 14 patients. The mean post-operative hospital stay was 4.9+1.3days. Significant pancreatic fistula (grade B/C) was detected in 4 patients. Male sex and BMI>25 kg/m2 were found significantly associated with occurrence of pancreatic fistula on regression analysis. Seven patients were diagnosed of pancreatic ductal adenocarcinoma and two with mucinous adenocarcinoma. One patient was detected with recurrence, during follow-up.
Conclusion: A laparoscopic approach to distal pancreatectomy is an acceptable approach for benign, premalignant as well as malignant diseases of the pancreas. However, this procedure is technically demanding and should be performed only by surgeons with sufficient experience in both open pancreatic surgery and advanced laparoscopic gastrointestinal surgery.

P455

Evaluation of Superiority of the Laparoscopic Approach for Hepatoma in the Caudate Lobe in Comparison with the Open Approach

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Background: The technique for liver resection of a caudate lobe lesion requires skill because the area is located deep in proximity with the great vessels The laparoscopic approach has made resection of tumor in the caudate lobe easier. The aim of this study was to assess the superiority and safety of the laparoscopic approach for hepatoma in the caudate lobe in comparison with the open approach.
Method: Between 2008 and 2016, 9 patients who underwent laparoscopic liver resection (LLR) for hepatoma in the caudate lobe (LLR group) were compared with 11 patients who underwent open liver resection for hepatoma in the caudate lobe (OLR group). Patient background, characteristics, and perioperative outcomes were compared.
Results: All patients in the LLR group and 5 in the OLR group were diagnosed with hepatocellular carcinoma, and 6 in the OLR group had metastatic liver tumor. There were no other significant differences in patient background. Operative duration was similar for these groups. Blood loss and hospital stay in the LLR group (50 ml, 4.5 days) were significantly lesser than in the OLR group (435 ml, 8 days) (p=0.0110, p=0.0011). Tumor exposure ratio at the surgical margin was similar between the groups.
Conclusion: The laparoscopic approach in the caudate lobe is a safe and less invasive procedure in selected patients.

P456

A Study on Single Incision Laparoscopic Fenestration for Symptomatic Liver Cysts

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Laparoscopic fenestration that is considered to be appropriate for benign simple liver cysts due to its minimal invasiveness has been performed. Furthermore single incision laparoscopic surgery has recently been highlighted due to its high cosmetic benefit. This paper deals with our experience with six cases of symptomatic simple liver cysts in which we performed single incision laparoscopic fenestration.Subjects and methods : All six patients enrolled in this study had some symptoms such as abdominal distension, and their liver cysts were 98–200 mm in maximum diameter. All cysts had projected on the surface of the liver, and could perfectly be operated on via approach from the navel only because they were located on the subhepatic space.Results : The cysts contained 300–1,400 ml of serous liquid. No postoperative complications occurred. The procedure was excellent from a cosmetic viewpoint of the surgical wound, and all the patients were highly satisfied with the procedure.Conclusions : Single incision laparoscopic fenestration for simple liver cysts is an excellent operative procedure in terms of maintaining both radicality and minimal invasiveness. This procedure can be the alternative to the conventional fenestration for symptomatic simple liver cysts.

P457

Effect of Laparoscopic Liver Resection on Hepatic Functional Reserve: A Study of Patients with Hepatocellular Carcinoma with Hepatitis C Treated with DAA Following Hepatocellular Carcinoma Resection

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Backgroud and Aim: Direct acting antivirals (DAAs), oral drugs for hepatitis C, became available for use from September 2014 in Japan, making hepatitis C a curable disease. We evaluated laparoscopic liver resection (LLR) as treatment before DAA administration based on the short-term results of patients with HCC with hepatitis C who had undergone laparoscopic HCC resection, followed by the administration of DAA at our hospita

Method: At our hospital, 206 patients underwent LLR between April 2008 and March 2016, and 144 had HCC. Of these patients, we studied 90 with a diagnosis of hepatitis C virus-related HCC (DAA given to 15 patients; 7 men, 8 women; 14 with genotype 1b, 1 with 2a; IFN ineligible or not given in 5, relapse after pretreatment in 7, non-response to pretreatment in 3; 11 with hepatic damage level A, 4 with level B, 0 with level C). In order to examine the role of LLR in multidisciplinary therapy (including the administration of DAA) for patients with HCC with hepatitis C, we studied 15 patients receiving DAA focusing on the clinical course before administration, LLR perioperative course, and the clinical course after the administration of DAA.

Results: The surgical procedures in 15 patients receiving DAA were laparoscopic partial hepatectomy in 13 and lateral segmentectomy in 2. Blood loss was 52.5 (0-208) mL. The operative time was 207 (127–390) minutes. The duration of postoperative hospitalization was 7.6 (3–13) days. One patient had a postoperative complication (bile leakage, which resolved with conservative treatment). There was no change in the level of liver damage in any of the patients one month after surgery. The administration of DAA was completed in 15 patients. At present, these 15 patients continue to have sustained virological response (SVR). One patient, to date, has developed recurrence.

Conclusion and Discussion: We administered DAA to 15 patients with HCC with hepatitis C following LLR. All 15 completed the treatment with DAA and continue to have SVR at present. In this era of DAA, LLR is considered to be a treatment that can achieve switching to DAA therapy while preserving hepatic functional reserve as a multidisciplinary treatment approach for HCC with hepatitis C.

P458

Assessment of the Feasibility and Safety of Experts Coaching Trainees: Review of Laparoscopic Hepatectomy Results

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Background: The availability of laparoscopic hepatectomy remains limited to a relatively small number of institutions because of insufficient hepatic and laparoscopic surgical experience and few training opportunities. At our institute, a particular expert surgeon participates as an operator or an assistant in all laparoscopic hepatectomies and coaches successive trainees. The aim of this study was to assess the feasibility and safety of this training system by reviewing the previous laparoscopic hepatectomy results at our institute.

Methods: One hundred sixty eight laparoscopic hepatectomies were retrospectively reviewed. Patients were divided into four groups: those undergoing surgery by the expert surgeon from April 2006 to March 2011 (80 cases, Group I), those undergoing surgery by trainee A from April 2011 to April 2013 (42 cases, Group II), those undergoing surgery by trainee B from May 2013 to March 2015 (23 cases, Group III), and those undergoing surgery by trainee C from April 2015 to July 2016 (23 cases, Group IV). All trainees had been trained as scopists and assistants of laparoscopic hepatectomy at Keio University hospital for 3 years.

Results: Surgical procedures were major hepatectomy (33 cases, 25 cases, 8 cases, and 2 cases in groups I, II, II and IV, respectively), lateral segmentectomy (6 cases, 1 case, 3 cases, and 1 case, respectively), and partial hepatectomy (41 cases, 16 cases, 12 cases, and 20 cases, respectively). The operative times (min) in each group were as follows: 379 in Group I, 451 in Group II, 321 in Group III, and 248 in Group IV. Estimated blood losses (mL) were 495, 664, 438, and 190, respectively. The first postoperative oral intake days were 14.6, 11.1, 8.1, and 8.7, respectively, and the lengths of hospital stay (days) were 2.4, 3.0, 2.3, and 1.8, respectively. No significant differences were observed among the groups in the rate of postoperative complications with a Clavien–Dindo classification grade of 2 or higher (20.0%, 14.3%, 13.0%, and 13.0%, respectively).

Conclusion: Though it is generally assumed that laparoscopic hepatectomy is a surgical procedure of the highest difficulty, trainees can learn to perform the procedure safely and effectively with intensive tuition provided by an expert.

P459

The Role of Augmented Reality by ICG Immunofluorescence in Pure Laparoscopic Hepatectomy for HCC and Cirrhosis: A Propensity Score Analysis

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Introduction: In laparoscopic hepatectomy, the surgeon cannot use their hand to palpate the liver lesion and estimate margin of resection. The use of ICG immunofluorescence technique can show up the liver tumour and has the potential to facilitate a throughout assessment during the operation.

Method: Between 2013 and 2016, there was 162 patients undergone pure laparoscopic liver resection for HCC in our hospital. 142 patients had undergone surgery by conventional laparoscopic approach. 20 patients had laparoscopic hepatectomy with additional ICG immunofluorescence augmented technique.

The surgical outcome were compared with propensity score analysis in a ratio of 1:3.

Result: 20 patients had ICG immunofluorescence assisted laparoscopic hepatectomy (Group 1). 60 patients using conventional laparoscopic liver resection with propensity matched were selected for comparison. (Group 2). The median operation time was 200 min vs 164 min p=0.679, the median blood loss was 125 ml vs 100 ml (p=0.928) respectively. 3 additional tumours were identified by ICG technique. 3 patients had suspicious lesion picked up by ICG technique but proven to be benign pathology on frozen section examination. The sensitivity of tumour detection by group 1 were 90%.

100% R0 resection were achieved in Group 1 and Group 2 respectively.

the hospital stay was 5 days vs 4 days (p=0.824) and the post-operative complication was 0(0%) vs 5(8.3%) (p=0.424) respectively.

None of the patient developed ICG related complication.

Conclusion: In current study, the new technique showed equally good short term outcome when compared with conventional laparoscopic hepatectomy. ICG immunofluorescence augmented reality is a promising technique that might facilitate easier identification tumour during laparoscopic hepatectomy.

P460

Indication for En Bloc Pancreatectomy with Colectomy: When is it Safe?

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Introduction: Aggressive en bloc resection of adjacent organs is often necessary to completely resect pancreatic or colonic lesions. However, it is currently debated whether simultaneous pancreatectomy with colectomy (P+C) is warranted as it increases morbidity and mortality compared to either operation alone. We hypothesized that morbidity and mortality would be increased in P+C, especially in cases of acute and chronic pancreatitis.

Methods: All consecutive patients who underwent pancreatectomy (P) and simultaneous pancreatectomy with colectomy (P+C) at a single high volume center from November 2006–2015 were prospectively included in this study using the ACS-NSQIP database. Patients with additional multivisceral procedures or parenchyma-sparing pancreatectomy were excluded. Data was augmented to 90-day outcomes in both groups using our institutional pancreatic database.

Results: Forty-four patients with a mean age of 59 years (28:16 male:female) underwent P+C; accounting for 2.44% (n=44/1800) of total pancreatectomies performed. Pancreatoduodenectomy (PD) was performed in 61.3% (n=27), distal pancreatectomy (DP) in 36.4% (n=16) and total pancreatectomy (TP) in 2.3% (n=1) of patients. The 30-day morbidity and mortality were higher in P+C than P (50% vs. 27%, p=0.002 and 9% vs. 2%, p=0.013); this was seen for 90-days as well. Median operative time (352 vs. 275; p<0.001) and LOS (13 vs. 7; p<0.001) were found to be significantly increased in P+C than in P. Pancreatic fistula rates were comparable across P and P+C (Type A= 11.4%, B=4.55%, C=4.55%, p=0.154). Logistical regression modeling showed no association between 30-day morbidity and colectomy (p=0.441). When P+C morbidity and mortality was analyzed according to intraoperative factors, there was no statistically significant difference according to type of pancreatectomy (PD vs. DP), origin of primary lesion (pancreas vs. colon), indication for surgery (malignant vs. non-malignant) or case status (planned colectomy vs. intraoperative decision).

Conclusions: Although addition of colectomy to pancreatectomy substantially increases morbidity and mortality, colectomy in itself is not an independent risk factor for additional morbidity. Further, subanalysis revealed the type of pancreatic resection performed, etiology (pancreatic or colonic, malignant or benign) and planning status did not account for increased risk when performing colectomy with pancreatectomy. Therefore, patients should be informed, in advance, of the risk of postoperative complications. However, indications for additional colectomy should be broader, if required, to achieve complete resection during pancreatectomy.

P462

Perioperative and Short Term Outcomes of Laparoscopic Hepatectomy of 41 Consecutive Patients from a Tertiary Care Institute

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Background: The aim of this study to analyze outcomes of laparoscopic hepatectomy done at our centre.
Method: It is a retrospective evaluation of prospectively maintained data from 41 consecutive patients; who underwent laparoscopic hepatectomy for various benign and malignant lesions, between January 2012 upto March 2016.
Result: Out of total 41 patients, 28 were males and 13 females with mean age of 59.3±16.2 years. Cirrhosis was noted in 21.4%(n=9). Twenty five patients (61%) underwent major hepetectomy (Right hepatectomy-31.7%, left hepatectomy–29.3%) while left lateral sectorectomy in 9 patients (21.9%). Mean blood loss was186.46±187.22 mL with mean operating time of 242.07±77.7 min. Mean ICU stay was 2.58±1.68 days. Majority of resections (70.7%) were performed for malignant lesions (n=29), among which hepatocellular carcinoma accounted for 55.2% (n=16). Eight patients (19.5%) had major complications (Clavien Dindo Grade III to V). Median length of hospital stay was 9 days (range 5–21 days). Resection margins were more than 2 cm in majority(51.7%) of resections for malignancy. only 13.8% (n=4) resections for malignancy achieved less than 1 cm margin.
On multivariate analysis, CTP score (p=0.049), operating time (p=0.007) and Clavien-Dindo grade (p=0.049) were found to be statistically significant with hospital stay. We have 2.4% mortality Mean follow up was 20.48±14.2 months.
Conclusion: Laparoscopic hepatectomy for benign as well as malignant pathology is feasible and safe as there was no major intraoperative adverse events, in experienced centre with skilled surgeon.

P463

Caudate Lobe Liver Abscess: Early Laparoscopic Drainage is Recommended

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Introduction: There is a high incidence of pyogenic and amebic liver abscesses in the developing world. Caudate lobe is both a rare and peculiar location in view of vicinity to vascular structures and difficult percutaneous and laparoscopic approach. We report 4 cases of pyogenic caudate lobe liver abscesses which were treated by laparoscopic drainage.
Methods: The diagnosis was confirmed with a contrast enhanced computerized tomographic scan (CECT) of abdomen. The patients were taken up for laparoscopic drainage as percutaneous approach was either not feasible (n=3) or failed (n=1) and the patients were taken up for a laparoscopic drainage. All patients underwent successful laparoscopic drainage of caudate abscess. Three ports along with Nathanson's retractor was used. The gastrohepatic omentum approach was followed. The location of abscess was confirmed intraoperatively with needle aspiration and laparoscopic ultrasound. Harmonic scalpel was used to enter the abscess cavity and create a wide window. A drain was placed in the cavity under vision after irrigation.
Results: All the patients were male and had underlying diabetes. The mean WBC count was 22000 at presentation and normalized in 3 days after drainage. The mean operative time was 67.5 min (range 55–90 min). Estimated intraoperative blood loss was less than 100 ml in all cases. The mean hospital stay was 7 days (range 5–9 days). The drain was removed on day 5 after documentation of no residual abscess in all. All patients were switched to oral antibiotics after drain removal. Follow up CT was performed 4 weeks postoperatively to confirm complete resolution.
Conclusion: Caudate lobe liver abscesses are rare but are difficult to drain by percutaneous route. Early surgical drainage (open/laparoscopic) is recommended in view of high risk of rupture in abdominal cavity and adjacent vessels.

P465

Unaided Laparoscopic Liver Resection by a Novel Method

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Background: Laparoscopic approach has become the standard procedure for many abdominal surgeries. Based on its minimal invasiveness and cosmetic advantages, these minimal access surgery is moving toward reduced size and fewer ports. We introduce reduced port or single incision laparoscopic liver resection with a novel method.
Patients and Methods: Twenty patients underwent unaided laparoscopic liver resection (15 patients with hepatocellular carcinoma, 1 growing teratoma syndrome. 2 biliary stricture with IHD stone, 2 metastatic carcinoma) between June 2015 and May 2016. Laparoscopic liver resection was performed by the operator alone, using a manual laparoscopic scope holder which could make a stable surgical view without limit activity range from a scopist.
Results: Three patients underwent left lateral sectionectomy and patient underwent tumorectomy by 3 ports. Three patients underwent left hemihepatectomy and 13 patients underwent tumorectomy without inflow occlusion by a trans-umbilical single incision. All procedures did not require open conversion and additional port. Median BMI was 25.4 kg/m2 (range 18.3–34.0) and tumor size was 17.5 (10–59) mm. Operation time and estimated blood loss were 112 (20–260) min and 200 (0-700) mL. The patients discharged median 3 (1–9) days after operation. Two patients with postoperative abdominal fluid collection required a percutaneous drainage.
Conclusion: Unaided reduced port or single incision laparoscopic liver resection might decrease a hospital stay. With the risk of bleeding and technical difficulties, candidates should be carefully selected to obtain the benefit from this surgical technique

P466

Initial Experience of Artery First Approach in Laparoscopic Pancreatoduodenectomy

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Introduction: Minimally invasive laparoscopic pancreatoduodenectomy is technically feasible and safe. An artery first approach to pancreatoduodenectomy is a critical technique to assess the complete oncological resection before an irreversible step is taken and to reduce the blood loss during the surgery. Artery first approach in laparoscopic pancreatoduodenectomy has an advantage in addition to that offered by minimally invasive surgery, the ability to assess the complete oncological clearance in the initial course of surgery. We share our experience of artery first approach in laparoscopic pancreatoduodenectomy.
Methods: Data of 9 patients undergoing elective laparoscopic pancreatoduodenectomy with one of the 3 artery first approaches (right posterior, medial uncinate, mesenteric) to SMA during January 2016 to July 2016 are retrospectively analyzed.
Results: Among 9 patients, carcinoma head of pancreas was seen in 3 cases, distal cholangiocarcinoma in 2 cases, duodenal adenocarcinoma in 2 cases, ampullary carcinoma in 1 case and neuroendocrine tumor of head of pancreas in 1 patient. 5 patients were males and 4 were females. Mean age of the patients was 61 (+/- 7.81) years. Mean duration of the surgery was 324.44(+/- 21.13) mins. Mean blood loss during the surgery was 214.4(+/-84.61) ml. All the cases were successfully completed by laparoscopic technique and no conversion was required. No intraoperative complications were seen. Average size of the tumor was 2.4 (+/-1.01) cm, average number of lymph nodes harvested during the surgery 14.6 (+/-8.26). Mean diameter of main pancreatic duct was 4 (+/- 1.66) mm, mean diameter of CBD was 12.4(+/- 4.28) mm. The mean postoperative hospital stay was 11.11(+/- 1.9) days. R0 resection was achieved in 8 cases. There was no mortality, however 1 patient developed delayed gastric emptying, 4 patients had Grade A pancreatic fistula, none of them developed Grade B or C pancreatic fistula and post pancreatoduodenectomy haemorrhage was seen in 1 patient. Post operative period of three patients was complicated by significant diarrhea requiring antidiarrheal medications.
Conclusion: Artery first approach in laparoscopic pancreatoduodenectomy is safe and feasible.

P467

Use of Internal Fiducial Markers and Computer Modeling to Aid Image-Guided Liver Surgery

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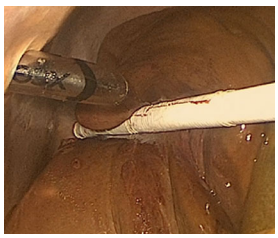
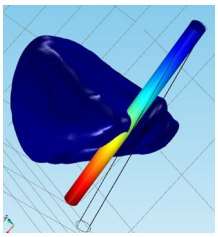
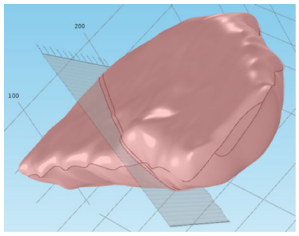
Introduction: Minimally invasive liver surgery is a complex procedure potentially aided by image guidance. The technique requires fusing a preoperative imaging set with live intraoperative laparoscopic images, rendering the target organ to appear transparent. This construct works well until the actual resection begins and deformation of the liver degrades the accuracy of the image fusion. Traditionally, accuracy is restored by rescanning the patient – a difficult task in the middle of complex surgery. Our group theorized that combining tracking of an internal fiducial marker placed within the biliary tree with computer modeling to predict organ deformation would improve the accuracy of image-guided liver surgery and reduce the frequency of intraoperative re-scanning.
Method: A simulated tumor was implanted into the liver of a porcine explant model or human cadaver. A guidewire and or biliary stent was then placed into an adjacent bile duct as an internal fiducial marker using a transpapillary approach. The liver was deformed by retracting it in a caudal direction (Figure A and B). Rotational imaging was acquired in the neutral and retracted positions. Computer modeling using novel software was used to predict the position of the tumor and internal fiducial marker, guide a planned resection line and compute resected liver volume. Accuracy was calculated by comparing the results of the computer model with the real-time fluoroscopic imaging.
Results: The computer model predicted the position of the simulated tumor during liver deformation with 2 mm accuracy compared to real-time fluoroscopic imaging. Using a planned resection plane perpendicular to the internal fiducial marker with a 5 mm margin away from the tumor (Figure C) resulted in a measured difference between the resection plane in the simulated model and the resection plane on rotational images of 4 degrees with a difference in remaining liver volume after resection of 1%.







(A)Liver lifted with laparoscopic tool (B) Simulation in COMSOL software (C) 4 Degrees variation in resection plane
Conclusion: Use of internal fiducial markers and novel computer modeling resulted in successfully tracking the position of a liver tumor with millimeter accuracy during organ deformation. It also maintained an accurate prediction of the plane of surgical resection and correctly calculated the mass of residual liver following resection. Use of this model during minimally invasive liver surgery has the potential to maintain the accuracy of the fused images far longer than current conventional methods making the procedure safer and reducing the need for repeat intra-operative scanning.

P468

Laparoscopic Liver Resection for Locally Recurrent Hepatocellular Carcinoma

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Introduction: Development of an optimal therapy for a subset of patients with locally recurrent hepatocellular carcinoma (HCC), following local therapy such as ablative therapy (AT) and trans-arterial chemoembolization (TACE), is a point of major concern. However, there is no definite recommendation made for the treatment of these recurrent HCCs in the HCC guidelines. In the past few years, laparoscopic liver resection has gained popularity owing to its minimally invasive and highly versatile characteristics. We aim to clarify the feasibility of laparoscopic surgery in locally recurrent HCCs.
Methods: All the patients who underwent liver resection for HCC between 2004 and 2015 were enrolled in the study. The clinical courses and surgical outcomes of patients with locally recurrent HCC after local therapy (LR-HCC), who underwent laparoscopic liver resection for this recurrent tumor were analyzed and compared to those of primary HCC treated with laparoscopic surgery. Optimal surgical approaches for LR-HCC were also evaluated by comparing laparoscopic liver resection (Lap-LR) with open liver resection (Open-LR).
Results: Fourteen patients underwent laparoscopic liver resection for LR-HCC (Lap-LR) (post AT: n=5, post TACE: n=9), while thirty-five patients underwent laparoscopic liver resection for primary HCC. There were no significant differences in the preoperative status between the two groups except their medical history. The rate of vascular invasion was significantly higher in Lap-LR patients as compared to those observed in patients with primary HCC. The frequency of observing complications with a Clavien-Dindo classification of grade 3a or higher tend to be higher in Lap-LR patients (p=0.08), although other surgical outcomes, including length of hospital stay, were not significantly different. Twelve patients underwent open liver resection for LR-HCC (Open-LR) during this period. No significant differences in the background status between the Lap-LR and Open-LR groups were observed. Besides the fact that the Lap-LR group showed significantly lower estimated blood loss, there were no significant intergroup differences in surgical outcomes.
Conclusions: Given its high malignant potential, LR-HCC should be resected with the most reliable procedure, which may often need an advanced surgery. However, laparoscopic surgery is markedly safer and more feasible even for patients with a history of repeated HCC therapies and/or impaired liver function.

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Comparative Analysis of the Outcome Between Open and Laparoscopic Partial Liver Resection for Hepatocellular Carcinoma

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Introduction: With progress of surgical technique and devices, laparoscopic liver resection (LR) became a realizable option for patients with hepatocellular carcinoma (HCC). However, the feasibility of LR for HCC should be guaranteed also oncologically. In Japan, only partial resection and left lateral segmentectomy had been covered by the insurance system until recently. Herein, we evaluate the short and long term outcome of laparoscopic partial liver resection compared with open method (OR) for HCC patients by matched pair analysis.
Methods and Procedures: Until March 2015, 15 consecutive HCC patients who underwent LR were compared in a retrospective analysis with a historic group of 45 patients who underwent OR. The two groups were well matched for age, gender, tumor location and size, and severity of cirrhosis. The selection criteria of HCC for both groups specified a small (size<5 cm), in the left or peripheral right segments of the liver (Couinaud's segment: II-VI, VIII).
Results: The mean age was similar in both groups (LR: 66 year [41–83], OH: 67 year [38–86]). All patients were Child-Pugh A. The mean operative time was similar in both groups (LH: 271 min [184–404], OH: 294 min [135–501]). The mean blood loss in the LR group was tended to be less than OR group (169 ml [0-1500] vs 304 ml [23-1530], p=0.10). The mean hospital stay in the LR group was significantly shorter than OR group (15days vs. 23days, p< 0.05). There was no significant difference in the incidence of postoperative complication. Critical complication was not observed except 1 case of gas embolism in the LH group (emergent conversion to laparotomy). Overall survival rate was 78% at 3-year, 78% at 5-year in LR group and 85% at 3-year, 81% at 5-year in OH group. Disease-free survival rate was 57% at 1-year, 57% at 3-year in LR group and 75% at 1-year, 42% at 3-year in OR group. There was no significant difference in overall and disease-free survival between the two groups.
Conclusion: Outcome of laparoscopic partial liver resection for small HCC including long-term survival was acceptable.

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Left Lateral Sectionectomy for HCC: Feasility, Safety and Effects

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Background: Laparoscopic left lateral sectionectomy is relatively simple and can be applied popularly. We need more researches evaluating the feasibility, safety and effects of this procedure so that it can be applied routinely in HCC treatment.
Objects: Determining the short and long-term result of laparoscopic left lateral sectionectomy for HCC treatment
Method: Series report of 134 cases of laparoscopic left lateral sectionectomy for hepatocellular carcinoma treatment at University Medical Center - Ho Chi Minh city from May 2007 to September 2016.
Results:
Sex ratio is 2:1. Mean age is 56.3±12.8 years old (16–83).
92.7% patients have got hepatitis B or C. 100% patients' liver function is Child Pugh A (5 points).
Median tumor size is 3.9 cm (2.0 to 10.0). 28% patients are in BCLC B stage.
Successful rate is 100%.
Median operation time is 90 min (40 to 300). Median blood loss is 50 ml (0–500).
Postoperative morbidity 2.45% (1 case of liver failure, 1 case of small intestinal perforation and need of reoperation). Perioperative mortality is 0%.
Median hostipal stay is 6 days (4–10).
1, 2, 3, 5-year disease-free survial rate is 79.4%, 63.9%, 52.9% and 43.6% respectively.
1, 2, 3, 5-year overall survial rate is 98.4%, 80.2%, 72.7% and 72.7% respectively.
Conclusion: Laparoscopic left lateral sectionectomy for HCC is relatively simple with high successful rate, low rate of intraoperative and postoperative morbidity and acceptable long-term result. We suggest laparoscopic procedure should be applied routinely in left lateral sectionectomy for HCC.

P472

Non-anatomic Resection of Hepatocellular Carcinoma; Comparative Study of Bipolar Radiofrequency Device (Habib 4X) Versus Ultrasonic Shear (Harmonic Scalpel)

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Introduction: Hepatocellular carcinoma (HCC) is the 5th most common malignancy worldwide with a high prevalence in Nile Delta associated with HCV infection. Anatomical liver resection is poorly tolerated in cirrhotic patients. Various devices are used to control bleeding during parenchymal transection. Of these, Harmonic Scalpel and Habib™ 4x sealer are in common use.
Patients and Methods: This study involved 50 patients with HCC managed by non-anatomical liver resection at the National Liver Institute, Menoufiya University and Gastro-intestinal Surgery Department, Tanta University, Egypt during the period from March 2011 to December 2013. All patients were of child class A, had resectable HCCs and with a good performance status. Patients were randomly divided into 2 equal groups, Group (A) underwent non-anatomical liver resection using Habib™ 4x sealer (RITA Medical Systems Inc, Freemont, California) and Group (B) underwent non-anatomical liver resection using Harmonic Scalpel (Johnson and Johnson Medical, Ethicon, Cincinnati, OH, USA).
Results: The two study groups were matched regarding demographics, clinical presentation, hepatitis virus status, preoperative imaging, laboratory data and previous therapeutic interventions. Three patients (12%) in group (A) required other haemostatic techniques during parenchymal transection, while all patients (100%) in group (B) required these techniques (P<0.0001). The estimated intraoperative blood loss in group (A) was 327.5±184.6 ml vs 662.0±355.7 ml in group (B) (p<0.001). The operative time was 163.2±28.8 min in group (A) vs 188.6±43.0 min in group (B) (P<0.018). Postoperatively, 20 patients (80%) in group (A) needed ICU admission (2.56±2.1 days) vs 23 patients (92%) in group (B) (3.24±2.9 days) (P<0.526). The mean hospital stay was 13.2±4.2 days in group (A) vs 15.3±5.1 days in group (B) (P<0.308). Resection margins were –ve in all patients in group (A) while+ve in 2 patients (8%) in group B. Post-operative liver functions developed marked affection in group (A) in comparison to group (B). In group (A), 3 patients (12%) developed intra-abdominal collections vs 3, 2, 5 and 1 patients developed post-operative intra-abdominal bleeding, bile leakage, intra-abdominal collections and portal vein thrombosis respectively in group (B). The 6-month recurrence rate was 6/25 patients (24%) in group (A) vs 9/25 patients (36%) in group (B) (P<0.452). The 6-months mortality rate was 3/25 patients (12%) in group (A) vs 4/25 patients (16%) in group (B) (P<0.387).
Conclusions: Despite the small sample size, using Habib™ 4x sealer for parenchymal transection in non-anatomical resection of hepatocellular carcinoma in cirrhotic patients seems to be superior to Harmonic scalpel

P473

Clinical Experience and Feasibility of Totally Laparoscopic Living Donor Right Hepatectomy

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Initial concerns regarding healthy donor's safety and graft integrity, need for acquiring surgical expertise in both laparoscopic liver surgery and living donor transplantation (LDLT) have delayed the development of laparoscopic donor hepatectomy in adult-to-adult LDLT. However, decreased blood loss, less postoperative pain, shorter length of stay in hospital, and excellent cosmetic outcome have well been validated as the advantage of laparoscopic hepatectomy. Hence, the safety and feasibility for laparoscopic donor should be further investigated.
We report initial experiences and adequate inclusion criteria for totally laparoscopic living donor right hepatectomy
Totally laparoscopic living donor right hepatectomy in 4 cases were performed from May 2016 up to now. For this procedure, the donors' right portal vein with long segment of more than 1 cm were preferentially included. The bile duct anomaly was preoperatively evaluated with magnetic resonance cholangiopancreatography (MRCP).
In 2 cases, right posterior hepatic duct originated from left hepatic duct (Type 3b) was identified. Mean operation time was about 7 h and the warm ischemic time was within 15 min. During operation, there was no transfusion and the inflow control like Pringle maneuver was not used. V5 and V8 were reconstructed with artificial graft in 3 cases and large right inferior hepatic vein was prepared for anastomosis in 2 cases. All grafts were removed through the supra-pubic transverse incision. The donors were discharged at 7 days after hepatectomy. We have not observed any complications in the early postoperative follow-up. And, LDLTs from these donors were also successful.
Conclusively, totally laparoscopic right donor hepatectomy in adult-to-adult LDLT can be initially attempted after enough experiences of laparoscopic hepatectomy and LDLT. However, the true benefits of totally laparoscopic living donor right hepatectomy should be fully assessed through various experiences from multi-institutes.

P474

Laparoscopic Pancreaticoduodenectomy is Safe, Feasible, and has the Acceptable Oncologic Outcomes for Pancreatic Cancer

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Background: laparoscopic pancreaticoduodenectomy (LPD) has increasingly performed in some high volume centers. However, whether it is suitable for pancreatic cancer is still uncertain. This study is to evaluate the safety, feasibility and short-term oncologic outcomes of LPD for pancreatic cancer.
Methods: Prospective data of people with intent-to-do LPD from July 2013 to January 2016 were reviewed. Of the total 153 cases, perioperative outcomes and oncologic outcomes of 47 intent-to-do LPDs performed for pancreatic cancer were analyzed.
Results: In total 47 cases, there were 36 males and 11 females. The average age was (62.9±10.1) years, and BMI was (22.54±2.8) kg/m2. There were 7 patients with upper abdominal surgical history, and two of them underwent laparoscopic distal pancreatectomy and laparoscopic gastroenteric bypass respectively. Total 7 cases were converted to open surgery and 1 case was performed with laparoscopic total pancreatectomy. The average operative time was (388.1±57.1) minutes and the blood loss was (253.2±208.1). The total complication rate was 38.3% (18/47), with 10.6% (5/47) of pancreatic fistula grade B, 12.8%(6/47) of alimentary tract bleeding, 4.2%(2/47) of bile leakage, 8.5% (4/47) of pulmonary infection, 2.1%(1/47) of surgical incision dehiscence. The postoperative stay was (17.1±10.9) days and there was no 90-day mortality. The tumor size was (3.5±0.9) cm and the number of harvested lymph nodes was (19.8±10.8). The overall survival was 60.1% and the median survival was 22 months.
Conclusions: laparoscopic pancreaticoduodenectomy is safe, feasible and has the acceptable oncologic outcomes for pancreatic cancer.
Keywords: pancreatic cancer; laparoscopic surgery, pancreaticoduodenectomy; oncologic outcomes

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Laparoscopic Management of Pancreatic Neuroendocrine Tumors: An Experience from a Tertiary Care Centre in South India

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Background: Pancreatic neuroendocrine tumors are rare with an incidence of 0.30/100,000 persons in the general population. Traditionally pancreatic neuroendocrine tumors have been managed with open surgical approach but with increasing experience laparoscopic management of pancreatic neuroendocrine tumors has evolved in the last decade. With the advent of intraoperative ultrasound identification of lesions during surgery has greatly improved. We share our experience of laparoscopic management of such lesions.
Materials and Methods: All patients diagnosed with pancreatic neuroendocrine tumors between 2010 and 2015 were included in this study irrespective of stage of the disease.
Results: 24 patients were diagnosed as pancreatic neuroendocrine tumor. Out of these 24 patients 13 patients underwent surgical management. Out of the 13 patients 11 underwent surgery by laparoscopic approach and 2 underwent surgery by open approach. 4 patients underwent pancreas preserving resection of first part of duodenum. 1 patient underwent enucleation. 1 patient underwent first part of duodenum resection along with distal pancreatectomy. 3 patients underwent pancreaticoduodenectomy. 3 patients underwent distal pancreatectomy. 1 patient underwent central pancreatectomy. On hispopathological examination, all were R0 resection. 1 patient received conventional adjuvant chemotherapy. 2 patients received mTOR inhibitor. 1 patient received PRNT.
Conclusion: Laparoscopic management of pancreatic neuroendocrine tumors is comparable to open surgery. Intraoperative ultrasound is an important modality for identification of lesions for laparoscopic approach. If adequate expertise is available laparoscopic approach towards surgical management of pancreatic neuroendocrine tumors should be considered.

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Single-Incision Laparoscopic Right Posterior Sectionectomy by Extraglissonian Approach for Hepatocellular Carcinoma: A Case Report

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Introduction: Single-incision laparoscopic surgery or laparoendoscopic single-site surgery is emerging as an alternative to conventional multiple-incision laparoscopic surgery in recent two decades. The existing documentation of applying this novel technique to laparoscopic hepatectomy, one of the most complicated and demanding procedures, is limited to a few small series.
Methods and Procedures: A 59 y/o female patient was diagnosed as having a 3.7 cm hepatocellular carcinoma (HCC) at the junction of S6 and S7 by magnetic resonance imaging. Single-incision laparoscopic hepatectomy and cholecystectomy with single-incision multiple-port longitudinal-array (SIMPLY) technique was performed. We controlled the hepatic inflow by extraglissonian approach following cholecystectomy. The liver parenchyma was dissected by a harmonic scalpel with clamp-crush technique; the major vessels and bile ducts were divided by linear staplers. The operative time was 559 min and the estimated blood loss was 800 ml. The pathologic report showed a $3.5 \times 3.5 \times 3.3$ cm moderately differentiated HCC with a closest margin of 3 mm. She was discharged on the 6th postoperative day uneventfully.
Conclusion: Single-incision laparoscopic hepatectomy with SIMPLY technique and extraglissonian approach is feasible and safe for right posterior sectionectomy. We anticipate applying this technique to other major liver resections in the future.

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Treatment of Bariatric Surgery Leaks by Endoscopic Internal Drainage Catheter Placement

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Introduction: Bariatric surgery has proven efficacy in treating obesity and obesity related conditions such as diabetes. Despite their proven efficacy, complications of these procedures are associated with significant morbidity and are challenging to manage. Therapeutic endoscopy has become essential in the treatment of bariatric surgery complications. This series serves to demonstrate one of the newest and most innovative strategies in the treatment of anastomotic leaks following bariatric surgery.
Methodology: A retrospective review of 4 patients who underwent endoscopic management of a leak following bariatric surgery. Three of 4 patients were transferred for definitive management after failed initial attempts at outside hospitals. One of the 4 patients underwent initial operation at our institution. Two of the patients underwent laparoscopic sleeve gastrectomies, 1 underwent a laparoscopic bypass revision with completion of a duodenal switch, and another underwent a laparoscopic modified duodenal switch. All patients were hemodynamically stable with no evidence of peritonitis. All patients underwent CT evaluation of the abdomen; both patients who underwent sleeve gastrectomies demonstrated proximal gastric remnant leaks, and the patients undergoing duodenal switch operations demonstrated anastomotic leaks. The treatment algorithm of these patients involved immediate endoscopy to ensure the absence of a distal obstruction and at that time were evaluated for internal catheter placement (7 French double pigtail catheter). Three patients underwent immediate internal catheter placement, and the patient who underwent a revision of the gastric bypass with completion of the duodenal switch underwent internal drainage with a 10 French double pigtail catheter prior to downsizing to a 7 French doubt pigtail catheter 21 days after initial placement. All patients were started on a full liquid diet under the guidance of a nutritionist on post-procedural day 2. All patients underwent repeat endoscopy and removal of the internal catheters at a mean of 62 days.
Results: All patients exhibited complete healing of the leak by CT, upper gastrointestinal series or endoscopy at a mean of 62 days post-procedure, and internal drainage catheters were removed at that time.
Conclusion: In hemodynamically stable patients, the treatment options for bariatric surgery leaks are vast. Despite numerous available options, long term success of these interventions remains unknown. As the treatment algorithm continues to develop, internal drainage with a double pigtail catheter should be considered in patients that are hemodynamically stable and those who demonstrate no distal obstruction with cavities amenable to this particular drainage.

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Laparoscopic Gastric Bypass Improves Pulmonary Function in Patients with Interstital Lung Disease

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Introduction: Morbidly obese patients with advanced interstitial lung disease (ILD) face two important challenges: rapid deterioration of lung function and ineligibility for lung transplantation. No studies have been published describing outcomes of bariatric surgery in this patient population. The aim of this study was to evaluate the effects of RYGB on pulmonary function in patients with ILD.
Methods and Procedures: We reviewed bariatric referrals at our institution between 2009 and 2013 and identified patients with a concurrent diagnosis of interstitial lung disease who underwent RYGB. Data was collected on patient characteristics, comorbidities and pulmonary function. Weight and pulmonary function testing were recorded every 6 months for duration of follow-up. Postoperative outcomes were calculated from data at most recent visit. Main outcome measures were postoperative changes in forced vital capacity (FVC), percent predicted values (PPV) and BMI.
Results: Five patients were identified and analyzed. Etiologies of their ILD included idiopathic pulmonary fibrosis (N=2), non-specific interstitial pneumonia (N=2) and sarcoidosis (N=1). All patients were female with a mean age 47 years old.

	Preop Mean (N=5)	Postop Mean* (N=5)	p-value
BMI (kg/m^2)	48	31.6	p<0.01
FVC (Liters)	1.88	2.3	p=0.16
Predicted Value (%)	59	73	p=0.09

*Mean length of follow-up 38±17 months.

Mean length of stay was 3 days. Postoperative complications included one 30-day readmission for acute renal insufficiency and a rectus sheath hematoma. There were no mortalities. Three patients (60%) achieved BMI transplant criteria of <30 kg/m^2.
Conclusions: All patients undergoing laparoscopic RYGB exhibited post-operative improvement in their FVC as well as their PPV, with a mean improvement of 14% predicted value over 38 months. RYGB surgery in the morbidly obese patient with ILD can be performed with acceptable morbidity and mortality by a multidisciplinary team with expertise in pulmonary medicine and bariatric surgery. Given the lack of effective therapies for ILD, RYGB may offer the potential to not only slow decline but also improve pulmonary function and help patients achieve transplant BMI requirements.

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Gastric Pouch Length is Associated with GERD After Laparoscopic Sleeve Gastrectomy

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Introduction: In recent years, laparoscopic sleeve gastrectomy (LSG) has gained popularity as a bariatric restrictive procedure to aid in the reduction of weight and its associated comorbidities. Currently, it is highly debated in the literature as to the effects of LSG on gastroesophageal reflux disease (GERD). Specifically, pre-operative GERD, intraoperative variations in boogie size, and distance stapled from pylorus have been correlated to post-operative GERD development. We aim to further identify pre and peri-operative risk factors for GERD following LSG.
Methods: A retrospective review was performed of all patients who underwent a LSG at a single institution between 07/2014 and 12/2015. The primary outcome of interest was post-operative GERD at 6 months. Stomach length was defined as the length of the stomach on pathology specimen. Patients with and without postoperative GERD were compared on pre-operative and intraoperative factors by univariate analysis using Wilcoxon rank sum, Chi-square, and Fisher's exact tests where appropriate. A multivariate logistic regression was performed to identify independent predictors of postoperative GERD after LSG. All variables were identified a priori.
Results: A total of 173 LSG (18% males, 82% females) performed by 5 surgeons were identified. GERD at 6 months was reported in 77 (44.5%) of patients. There was no difference in comorbidities in patients with and without postoperative GERD. Patients with postoperative GERD had significantly higher incidence of pre-operative GERD (60% vs 36%, p=0.003). There was no significant difference between the two groups in bougie size (36.9Fr±3.9 vs 36.9Fr±4.1, p=0.99) or distance stapled from the pylorus (6.1cm±1.2 vs. 6.3cm±1.2, p=0.43). In the multivariate analysis (Table 1) preoperative GERD (OR 2.839; 95% CI 1.452–5.549) and stomach length (OR 2.428; 95% CI 1.167–5.049) were found to be the only predictors of postoperative GERD.

Table 1
Post-Operative GERD at 6 months

Risk Factors	OR	95% CI
Age	1.014	0.989-1.041
Gender	1.803	0.728-4.465
Pre-op GERD	2.839	1.452-5.549
Pre-op DM	0.73	0.348-1.530
Bougie Size (<40Fr vs ≥ 40Fr)	0.769	0.396-1.492
Distance stapled from pylorus (<5cm vs ≥ 5cm)	1.34	0.670-2.682
Stomach Length (<23cm vs ≥ 23cm)	2.428	1.167-5.049

Discussion: Approximately 45% of patients are treated for GERD after LSG. The presence of preoperative GERD and long stomach length are associated with postoperative GERD. No significant differences in GERD were noted with intraoperative technique. Further studies on stomach anatomy and size are required to understand the effect of gastric pouch length on post-operative GERD development.

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Quality of Life Outcomes in Bariatric Surgery: Improvements in Anxiety and Depression Do Not Correlate with Postoperative Weight Loss

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Introduction: Improvements in depression and anxiety after bariatric surgery have been well documented to date, however, no studies exist which make use of a quality of life metric specific to surgical outcomes. We aimed to better assess patient quality of life after bariatric surgery, specifically as it relates to anxiety and depression, and elucidate potential predictors of improved or worsened symptoms.
Methods and Procedures: We evaluated quality of life using Surgical Outcomes Measurement System (SOMS) questionnaires from patients of a prospective bariatric surgical database, excluding revisional procedures from our analysis. Quality of life was captured via questionnaires administered preoperatively and at 2 weeks, 6 weeks, 3 months, 6 months, and 1 year postoperatively. Questionnaire domains were specific to anxiety and depression symptoms within the 7 days prior. Quality of life scores were analyzed with respect to prior diagnosis of anxiety or depression, anxiety or depression specific medication use, gender, age, and BMI.
Results: From 2014 to 2016, 296 bariatric patients completed SOMS quality of life questionnaires specific to anxiety and depression. A statistical mixed effects model was used to analyze the data. Patients experienced significant improvement over time in both anxiety and depression quality of life scores following bariatric surgery (Table 1). 56 patients had a preoperative diagnosis of anxiety and 126 patients had a preoperative diagnosis of depression. 122 patients took medication for one or both of these conditions. Preoperative diagnoses of anxiety or depression were predictors of worse anxiety and depression quality of life scores over time. Postoperative weight loss did not correlate with postoperative improvements in SOMS scores relating to anxiety or depression.
Conclusions: Though improvement in both anxiety and depression after bariatric surgery can be expected, even for those patients with a preoperative diagnosis of one or both conditions, no expectation can be made that greater postoperative weight loss will result in greater improvement of related symptoms. Further clarity for treatment of anxiety and depression in postoperative bariatric patients is necessary.

Table 1. Anxiety, Depression, and Weight Loss After Bariatric Surgery

	Preoperative	2 Weeks	6 Weeks	3 Months	6 Months	1 Year
Primary Procedures (N)	**81**	**84**	**60**	**69**	**41**	**31**
Avg. Anxiety SOMS Score (SE)[a] Min, Max: 6, 30	16.0 (0.7)	10.5 (0.5)*	10.0 (0.5)*	9.9 (0.5)*	10.0 (0.7)*	12.2 (1.0)*
Avg. Depression SOMS Score (SE)[b] Min, Max: 5, 25	11.3 (0.6)	7.1 (0.4)*	6.7 (0.3)*	6.6 (0.3)*	7.1 (0.5)*	8.2 (0.8)*
Avg. % Reduction in BMI ± sd	-	9.9 ± 0.1%	13.0 ± 0.1%	12.9 ± 0.1%	26.8 ± 0.1%	30.9 ± 0.1%

*Significantly improved from preoperative value
[a]Higher score indicates worse anxiety
[b]Higher score indicates worse depression

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Metabolic Syndrome is a Significant Predictor of Post-operative Morbidity and Mortality Following Bariatric Surgery

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Introduction: Metabolic syndrome is commonly observed in patients with morbid obesity undergoing bariatric surgery. The purpose of this study was to determine the effect of metabolic syndrome on morbidity and mortality following bariatric surgery.
Methods and Procedures: We queried the National Surgical Quality Improvement Program (NSQIP) dataset for patients who underwent bariatric surgery between 2012 and 2014. Patient demographics, comorbidities, procedure type, and perioperative complications were examined. Metabolic syndrome was defined as having a body mass index>30 kg/m2 in the presence of hypertension and diabetes. Regression analysis was used to determine the relationship between metabolic syndrome and post-operative outcomes.
Results: During the study interval, there was 59,404 who underwent an included bariatric surgical procedure (Roux-en-Y gastric bypass=28,263, sleeve gastrectomy=30,239, revision=422, and biliopancreatic diversion=480). The overall mean body mass index was 45 kg/m2, with a mean age of 45-years. 30,104 (50.6%) patients had a diagnosis of hypertension, 16,558 (27.8%) had diabetes mellitus, and 12,806 (21.5%) met the criteria for metabolic syndrome. Patients with metabolic syndrome were more likely to have Roux-en-Y gastric bypass (57.9% vs. 42.1%), a history of CHF, severe COPD, acute or chronic renal failure, dyspnea, and diminished functional status ($p<0.0001$). The overall observed incidence of post-operative complications was greater for patients with metabolic syndrome (7.5% vs. 5%; $p<0.0001$). The presence of metabolic syndrome was predictive of a patient having multiple 2 or more complications within 30-days of surgery (2.1% vs. 1.2%; OR 1.74; $p<0.0001$). Metabolic syndrome contributed to a 3.2-fold increased risk of post-operative death ($p<0.0001$).
Conclusions: Metabolic syndrome is prevalent in patients undergoing bariatric surgery nationwide. Patients with metabolic syndrome are at an increased risk of morbidity and mortality following bariatric surgery. The risk of experiencing more than 1 post-operative complication was also significantly elevated in patients with metabolic syndrome. Patients should be informed and surgeons should be aware of these increased risks.

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Technical Tricks for Safer Laparoscopic Sleeve Gastrectomy

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Background: Laparoscopic sleeve gastrectomy can lead to serious complications. However, some technical tricks may help reducing the most frightened complications like leakage or bleeding.
Methods: One hundred and fifty five operations performed with a standart technique at American Hospital and Koc University Hospital by the same surgeon were included in this presentation. In this technique, a 36 F calibration tube was utilized and a four centimeter of distal antrum was preserved. After the initial stapling with 4.5 mm staples, remaining resection was performed with 3.5 mm staples. The jaws of the stapler were compressed for at least two minutes before firing. Whole staple line was imbricated with an absorbable 3/0 self-locking suture over which a fibrin glue was applied. A suction drain was placed along the staple line. On the postoperative day two, an upper gastrointestinal series with water soluable contrast material was performed.
Results: Eighty three patients were female (53.5%), 72 were male (46.5%) and the mean age of the patients was 38.5. Median body mass index was 45.3 kg/m2 and median excess weight was 58.9 kg. Except for a bleeding on the postoperative day 2 due to which a laparotomy was performed, there was no other complications
Conclusion: Longer compression time before firing the stapler, suturing the staple line and the use of the fibrin glue may minimize the complication risks and contribute to the safety during laparoscopic sleeve gastrectomy procedures.

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Managing Gastric Band Failure: Conversion to Bypass, Sleeve, or Removal Alone

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Purpose: Laparoscopic gastric band, once popular due to its technical ease and encouraging initial results, has lost favor due to its long-term complications such as dysphagia, obstruction, and insufficient weight loss. We assessed our 5-year experience with band-removal procedures, comparing outcomes after band removal alone, conversion of band to sleeve gastrectomy (SG) and conversion of band to Roux-en-Y gastric bypass (GB).
Methods: We performed a retrospective analysis of our prospectively collected bariatric outcomes database. Patients who underwent band removal between January 2011 and December 2015 were included. Primary outcomes included 30-day complication rate, length of hospital stay, and weight loss at 6-month follow-up. We also investigated the indications for operation and choice of revisional procedure.
Results: 65 band removal patients were identified. Of these, 25 underwent lap band removal without plan for conversion (Group A), 13 were planned for conversion to GB (Group B), and 27 were planned for conversion to SG (Group C). Of the 13 patients in Group B, 4 were completed in a single stage, 6 were completed in 2 stages, 1 opted for SG instead and 2 have yet to undergo conversion. Of the 27 patients in Group C, 10 were completed in a single stage, 15 were completed in 2 stages and 2 have yet to undergo conversion.
Complications included 1 allergic reaction to adhesive dressing in Group A, 1 readmission for small bowel obstruction in Group B, and 1 case of delayed gastric emptying, requiring TPN, in Group C.
Mean length of stay in Group A was 0.9 days, with most being performed as outpatient procedures. Mean inpatient stay for Group B was 2.0 while Group C was 3.1 (median 1.5). Conversion to GB or SG resulted in modest weight loss at 6 months (9.9 and 9.7% of total preoperative body weight, respectively), while simple band removal resulted in 3.2% weight gain at 6 months follow-up.
The most common indications for removal were inadequate weight loss, pain, or obstructive symptoms such as nausea/vomiting, severe reflux or esophageal dysmotility. Patients with band erosion or with obstructive symptoms were more likely to have band removal without plan for conversion.
Conclusion: Complications after gastric band placement are relatively common. Patients who undergo band removal and conversion to SG or GB enjoy moderate improvement in weight loss whereas patients with band removal alone experience mild weight regain.

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Alleviation of Morbid Obesity and Its Associated Comorbidities via Laparoscopic Sleeve Gastrectomy

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Background: Laparoscopic Sleeve Gastrectomy (LSG) is a safe and effective operative treatment for morbid obesity. The purpose of this study was to analyze trends in biochemical parameters and pharmacologic dependence in morbidly obese patients to quantify the impact of LSG on obesity related comorbidities.
Methods: A retrospective review was conducted analyzing a consecutive series LSGs performed between January and April of 2015 at Anne Arundel Medical Center. Analyzed outcomes included patient demographics, intra-operative data, and 30-day wound and non-wound related complications. In addition, post-operative biochemical trends and pharmacologic dependence related to obesity-associated comorbidities were assessed after one year.
Results: One-hundred seventeen patients (85% female) with mean age, BMI, and ASA of 46.5 years, 45.9 kg/m2 and 2.9 were included. Common comorbidities included hypertension (HTN, 81.2%), hyperlipidemia (HLD, 45.3%), gastroesophageal reflux disease (GERD, 41.9%) and diabetes mellitus (DM, 35.0%). Operative data included mean time (66.3 min), blood loss (18 ml) and length of stay (2.0 days). Thirty day wound and non-wound related complications were 0.9% and 2.6%. At one year follow-up, pharmacologic independence or reduction was seen in 93.3% of diabetics, 72.4% of hypertensives, 64.3% of refluxers and 71.4% of hyperlipidemics. Additional decreases were BMI by 76.0% ($p<0.0001$), hemoglobin A1c by 0.8 mg/dL ($p<0.001$), blood glucose by 24.9 mmHg ($p<0.001$), systolic blood pressure by 8.7 mmHg ($p<0.0001$), diastolic blood pressure by 8.6 mmHg ($p<.0001$) and triglycerides by 42.0 mg/dL ($p<0.01$). Increases included mean HDL levels by 10.3 mg/dL ($p<.001$). Overall, mean excess weight loss (EWL) was 52.2% after one year.
Conclusion: The potential of LSG to treat morbid obesity and alleviate its most commonly associated ailments is significant as shown by major weight loss, improved biochemical parameters and independence from pharmacologic therapy. Consideration of LSG in less obese patients with DM, HTN, HLD and/or GERD refractory to medical management may serve as a valuable therapeutic strategy.

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Evaluation of Learning Curve and Outcomes of Laparoscopic Sleeve Gastrectomy Based on 4-Year Experience of a Single Surgeon

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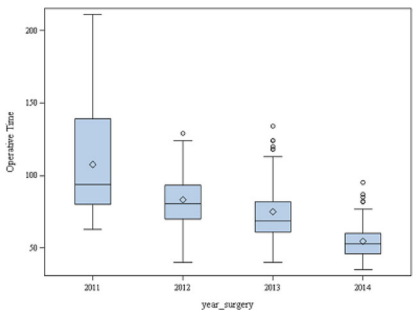
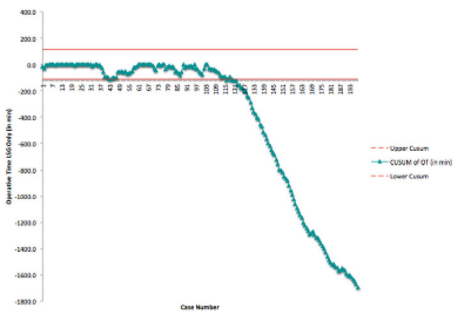
Introduction: Laparoscopic sleeve gastrectomy (LSG) has rapidly become the bariatric procedure of choice due to success regarding outcomes of weight loss and addressing comorbidities. The objective of this study is to ascertain trends, outcomes and the learning curve, predicting the number of cases required for a surgeon to reach a mastery level, based on 4-year term.
Methods: A total of 250 consecutive patients who underwent LSG by a single surgeon, from January 2011 to December 2014, were the focus of our retrospective review. The cases were sorted chronologically into 4 groups, consistent with year, when the surgery was performed. Patient's demographic, operative, postoperative characteristics and outcomes were prospectively assessed and analyzed. A cumulative sum (CUSUM) method was used to evaluate the learning curve. The one-way ANOVA test and pairwise Bonferroni comparison were used to assess the change of operative time over 4 time periods.
Results: Data of 250 patients was analyzed. Only 198 patients who underwent LSG were included (Excluded: 52 patients had LSG with concomitant procedure). Male to Female ration 1:6, mean age 44.83±11.6 years, mean operative time 75.4±29.3 min., mean postoperative day discharge 2.2±0.85 days, mean preoperative BMI 44.9±8.1, mean postoperative BMI 33.24±7.01, mean %BMI reduction (over 1 year follow-up period) 25 ±9.7%. Intraoperative complications rate 0.5%, 30-day readmission rate 4.4%, 30-day mortality rate 0.5% (1 case due to GI bleeding). A significant number of patients reported resolution or improvement in comorbidities. The combined rates at 1-year follow-up were 48%, 41%, 30%, 24% and 28% for diabetes mellitus type 2, hypertension, hyperlipidemia obstructive sleep apnea and GERD respectively.
Overall there was a significant decline in OT ($p<0.01$, as confirmed by one-way ANOVA). Pairwise comparison of OT in each year (using Bonferroni comparison) revealed a significant decline of OT from Year 2011 to 2012 (p value<0.01), insignificant decline in OT from Year 2012 to 2013 ($p=0.38$) and significant decline in OT from Year 2013 to 2014(p value<0.01). A CUSUM analysis showed a decreasing trend, suggesting that more than 121 cases were needed to reach mastery level.
Conclusions: A continuous decrease in OT was observed over entire study period. Despite that more than 121 cases are needed to achive the mastery level in LSG, this doesn't impact mortality, morbidity levels nor 1-year postoperative outcomes in an experienced laparoscopic surgeon.





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Effects of an Outpatient Infusion Pathway on 30-Day Readmission Rate Following Bariatric Surgery

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Introduction: The most common reasons for 30-day readmission following laparoscopic Roux-en-Y gastric bypass (LRYGB) and sleeve gastrectomy (LSG) are dehydration and nausea/vomiting. The primary objective of this study was to determine if implementing an outpatient infusion pathway (OIP) resulted in a decreased 30-day readmission rate in this patient population.
Methods: Data was prospectively gathered on all patients who underwent LRYGB and LSG at our bariatric center of excellence between April 1, 2015 and March 31, 2016 after instituting an OIP. OIP inclusion criteria were patients not able to take 40 ounces of fluid per day and/or persistent nausea 24 h prior to discharge. OIP protocol included an antiemetic, 1 L bolus of 0.9% saline, intravenous multivitamin, thiamine and folic acid. Thirty-day readmission rate, length of stay, and mortality rate were compared with patients who underwent LRYGB and LSG between January 1, 2014 and December 31, 2014 prior to implementing the OIP (pre-infusion group).
Results: A total of 309 patients were included for analysis, of which 174 underwent LRYGB and 135 underwent LSG. We compared 148 patients in the pre-infusion group to 161 patients in the post-infusion group. Of the 161 patients in the post-infusion group, 30 patients (18.6%) met inclusion criteria for the OIP. There was a 45% decrease in 30-day readmission rate following the institution of the OIP for patients who underwent LRYGB, however this was not statistically significant (11.39% vs 6.31%; OR 1.907; 95% CI 0.648–5.613, p=0.235). The 30-day readmission rate following LSG remained similar between cohorts (7.24% vs 7.57%; OR 0.953; 95% CI 0.263–3.456, p=0.942). There was no difference in postoperative length of stay (1.55 vs 1.35 days, p=0.074) or mortality (1.3% vs 0%, p=0.326) between pre-infusion and post-infusion groups, respectively.
Conclusion: Implementation of an OIP decreased 30-day readmission rate following LRYGB by 45%, however this was not statistically significant.

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Prospective Assessment of Postoperative Nausea After Bariatric Surgery

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Introduction: The most common reason for readmission after bariatric surgery is postoperative nausea/vomiting (PONV) and associated dehydration. While previous studies have attempted to investigate PONV after bariatric surgery, this hasn't been objectively measured and procedure-based comparisons aren't reported. The aim of this study is to compare the incidence and severity of PONV between patients undergoing laparoscopic sleeve gastrectomy (SG) and laparoscopic gastric bypass (GB).
Methods: This is a prospective, observational cohort study that evaluated all patients who underwent SG or GB at our tertiary care institution between July 2015 and June 2016. Patients undergoing revisional surgery or additional operations concurrent to bariatric surgery, including cholecystectomy or hiatal hernia repair, were excluded from the study. A standard PONV management protocol was in place during this study. Patients were asked to grade their nausea on a 10 point Likert scale at 2 h postoperatively and the morning of each postoperative day (POD). Further data was collected from chart review including medications used, length of stay, and readmission within 30 days.
Results: There were 65 patients that matched the inclusion criteria, of which 29 underwent SG and 36 underwent GB. There were no significant differences in age (46.5±9.7 vs 43.1±12.5, p=0.198), BMI (46.9±6.1 vs 50.5±10.1, p=0.294), ASA classification (2.8±0.4 vs 2.7±0.5, p=0.380), or male gender (24.1% vs 11.1%, p=0.164) when comparing SG and RYGB patients. There was no difference in the number of prophylactic PONV medications used before or during surgery (1.7±0.8 vs 1.7±0.8, p=0.851). Results of patient's nausea score (0–10), number of antiemetic and opioid medications (morphine equivalents) used are displayed in the table. There were no differences in LOS (2.6±1.3 vs 2.3±0.5, p=0.919) or readmission due to PONV (6.9% vs 11.1%, p=0.560) between the two groups. Prolonged LOS due to PONV occurred in 20.7% of SG patients and 19.4% of GB patients (p=0.901).

	Post-Op: 2 Hours			POD 1			POD 2		
	SG	GB	p	SG	GB	p	SG	GB	p
Nausea Score	3.7 ± 3.5	3.7 ±3.4	0.962	3.2 ± 3.0	2.7 ± 2.9	0.383	2.6 ± 3.1	2.6 ± 2.9	0.701
Antiemetics Used	0.7 ± 0.9	0.7 ±0.8	0.794	2.7 ± 2.3	1.6 ± 1.8	0.056	3.3 ± 2.7	2.1 ± 2.3	0.063
Opioids Used	11.7 ± 6.9	11.9 ±7.8	0.564	33.1 ± 19.8	34.6 ± 26.0	0.890	15.7 ± 16.1	15.7 ± 9.1	0.383

Conclusions: The effect of PONV is similar following SG and GB. Specifically, we found no significant differences in patient nausea scores or number of antiemetic rescue doses. Importantly, there was no difference in readmission or prolonged hospitalization due to PONV between SG and GB. While PONV is particularly important in bariatric patients as it is a major contributor to patient readmission, protocols and patient education on PONV do not need to be procedure specific.

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Liver Disease Increases Bleeding Complications After Primary Sleeve Gastrectomy

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Introduction: Bleeding, leaks and surgical site infections are major indicators specifically measured and reported in the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program (MBSAQIP) as they are not uncommon and can lead to increased morbidity, need for additional procedures and cost. Our MBSAQIP-accredited program was found to "need improvement" in the bleeding category compared to the national sample. As such, we investigated this in a search for remediable causes.
Methods: We performed a retrospective review of all patients undergoing primary laparoscopic sleeve gastrectomy (LSG) at a university hospital bariatric program from June 2008 through May 2016. Patients who experienced post-operative bleeding were identified. Indicators included need for blood transfusion, reoperation for bleeding based on clinical change, or hematoma identified by CT scan for pain within 30 days of primary LSG. Hypothesized causes for bleeding included chronic anticoagulation therapy (CAT), history of hematologic disease, history of deep vein thrombosis (DVT) or pulmonary embolus (PE), type of venous thromboembolism (VTE) prophylaxis, history of liver disease, concurrent development of post-operative DVT, and technical factors. Information was collected on preoperative age, sex, race, and body mass index (BMI). Medical records were reviewed to evaluate for technical mishaps or need for additional attention to staple line bleeding. Three fellowship-trained academic surgeons used an identical surgical technique, including a single dose of preoperative antibiotics, starting the staple line 6 cm from the pylorus, using bioabsorbable staple line buttress material on loads taller than 3.5 mm, and using a gastroscope approximating a 36Fr bougie for both sizing and a pneumatic leak test. Based on surgeon preference, the first antral stapler had an open height of 4.4 or 4.1 mm, progressing through heights of 4.1, 3.5 and occasionally 2.5 mm, based on tissue and stapler feedback. Bleeding and nonbleeding groups were statistically compared.
Results: Among 637 patients undergoing LSG, 13 (2.04%) experienced clinically significant post-operative bleeding. The mean BMI and age were not significantly different between groups. Nor was there statistical difference in history of anticoagulant use, coagulation disorder, history of or concurrent VTE, technical issues, or VTE prophylaxis between groups. There was, however, a significant difference in underlying liver pathology, with a much greater prevalence (53.8%) in the bleeding group.
Conclusions: Bleeding complications after LSG can add significant morbidity and cost. Technical errors and coagulation issues seem to be relatively unimportant compared to underlying liver disease, a factor difficult to control. Further study is warranted.

P490

Visceral Pseudoaneurysm After Revisional Bariatric Surgery: Report of Two Cases

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Introduction: As obesity is a chronic disease, subsequent surgical procedures may be required either due to poor response to, or complications of the initial procedure. Revisional surgery is associated with increased risk of post-operative hemorrhage with reported rates of 1–4%. The usual location of early post-operative bleeding is either an anastomosis or staple line, but may potentially involve the remnant stomach. In our high volume bariatric surgery center we report two cases of gastrointestinal bleeding secondary to visceral pseudoaneurysms, a rare but sinister cause of post-operative hemorrhage.
Case 1:
The first patient is a 60-year-old male whose index operation was Laparoscopic Gastric Band (LGB) placement in 2007. Due to poor weight loss and worsening diabetic control, he underwent band removal with conversion to Roux En Y Gastric Bypass (RNYGB) and remnant gastrostomy. On post-operative day (POD) 5, he developed an acute gastrointestinal bleed. Initial work up to identify the source included a diagnostic laparoscopy with remnant gastroscopy, which showed some oozing at the staple line. This area was resected but continued melena necessitated a colonoscopy and EGD. This showed fresh blood in the jejunum but without a clear source. Lastly, an angiography was done which showed a pseudoaneurysm at the junction between the gastroduodenal artery and gastroepiploic artery that was managed by coil embolization.
Case 2:
The next patient is a 64-year-old male who originally underwent an open RNYGB in 2003 for morbid obesity that was complicated by a gastro-gastric fistula that was resected in 2004. Due to persistent steroid use and continue smoking, the patient developed severe marginal ulcers and a new recurrent gastro-gastric fistula. He underwent laparoscopic excision of gastro-gastric fistula with revision of the gastrojejunostomy to improve his symptoms of gastroesophageal reflux. His post-operative course was complicated by a large anastomotic leak that was managed with an esophageal stent. On POD 33, the patient was readmitted with worsening abdominal pain, hypotension and copious melena. He underwent an upper endoscopy and colonoscopy, and no source of the bleeding was identified. A Computed tomography angiography showed a left hepatic artery pseudoaneurysm distal to the bifurcation of the left and right hepatic arteries. He underwent coil embolization of the pseudoaneurysm with subsequent resolution of gastrointestinal bleeding.
Conclusion: Although uncommon, it is important to remember pseudoaneurysms may present as a possible source for post-operative intra-luminal hemorrhage. In our practice, these were best diagnosed with angiography and treated successfully with coil embolization.

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Bariatric Surgery in Elderly Patients (Over or Equal 65 Years Old): Analysis of 28 Cases

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Background: Obesity and cardiovascular disease are two of the leading causes of death and disability worldwide. Both are frequent problems in elderly patients. Weight loss induced by surgery has proven to be highly efficacious in treating obesity and its comorbidities. However nowadays the controversy exists regarding the effectiveness and safety of bariatric/metabolic surgery in elderly patients. We present our results of elderly patients who underwent bariatric surgery at a high volume center in Chile over the last 10 years.
Methods: From 2006 to 2015, 28 elderly patients over 64 years old underwent bariatric surgery at Clinica Las Condes, a large private medical center in Chile. All of them were assessed by a multidisciplinary team and discussed in a Committee. All patients either underwent laparoscopic sleeve gastrectomy (LSG) or Roux en Y Gastric bypass (RYGB).
Results: Over this period the number of patients for each surgery were: 23 LSG and 5 patients RYGB. The average age and BMI were 67 (range 65–71) and 35 (range 30–42), similar for both procedures. All patients had 3 or more comorbidities and the most frequent were dyslipidemia and hypertension. No complications neither mortality were reported for both procedures. Mean excess weight loss at 1 year F/U was 72% for both procedures, 67% for LSG group and 77% for RYGB. Between hypertension patients 33% achieve resolution of their pathology, 50% between the dyslipidemic patients and 50% between the diabetics.
Conclusions: Laparoscopic bariatric surgery is safe and very effective procedure in obese elderly patients, similar to younger patients. We recommend it for this group of patients, especially that the life expectancy in western countries is well above 80 years old.

P492

The Utility of Routine Esophagogastroduodenoscopy Prior to Laparoscopic Roux-En-Y Gastric Bypass

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Introduction: We aimed to retrospectively review the utility of routine esophagogastroduodenoscopy (EGD) in patients undergoing laparoscopic Roux-en-y gastric bypass (LRYGB). Currently, EGD is recommended for symptomatic patients prior to LRYGB, but the use of EGD for routine screening in asymptomatic patients is debatable. The presence of gastritis, Helicobacter pylori, hiatal hernias, and other endoscopic findings can alter pre-, peri, and post-operative management of patients.
Methods and Procedures: A retrospective review of consecutive patients undergoing LRYGB with one surgeon at our hospital from May 2014 to March 2016 was completed. All patients had preoperative EGD. Data for these participants were collected using the provincial electronic medical record system. EGD findings were compared with findings from surgical gastrojejunal resection pathology.
Results: 117 consecutive patients were identified undergoing LRYGB. The average age was 46.3 years and 70.9% of the patients were female. 60 patients (51.3%) had no reported EGD findings. On EGD, one patient (0.85%) had Barrett's esophagus, 13 (11.1%) had esophagitis, 21 (18.0%) had hiatal hernias, 26 (22.2%) had gastritis, eight (6.8%) had gastric polyps, five (4.3%) had peptic ulcers, 11 (9.4%) had active H. pylori infection, and three (2.6%) had duodenitis. All patients with esophagitis or gastritis were prescribed proton-pump inhibitors and patients with H. pylori were all prescribed appropriate treatment. No upper gastrointestinal malignancies were identified.
Of the patients who had EGD findings of gastritis, 34.6% continued to have gastritis on pathological examination of the surgical gastrojejunal anastomotic ring. Additionally, 45.5% of patients with H.pylori infection had findings of gastritis during surgery. Two patients (18.1%) continued to have H. pylori infections in their surgical specimen despite treatment. Of patients who had ulcers on EGD, 40.0% had findings of gastritis during surgery. A total of fifteen patients (12.8%) were found to have chronic gastritis on histopathologic examination of the gastrojejunal anastomotic surgical specimen.
Conclusion: Routine EGD reveals at least one positive finding in approximately half of patients undergoing LRYGB. Further, more than one-third of patients with findings of gastritis, H. pylori infection or ulcers continued to have chronic gastritis during surgery. A significant proportion continued to have H. pylori infections despite treatment. Given the potentially higher risk of marginal ulcers in LRYGB patients with H. pylori and chronic gastritis, these findings emphasize a need for more aggressive treatment of gastritis, H. pylori and ulcers prior to surgery.

P493

Ten Year Retrospective Analysis of Wound Infections for EEA Stapler in Laparoscopic Roux-En-Y Gastric Bypasses; A Single Center Experience

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Background: Circular stapled anastomosis for creation of the gastrojejunostomy during Laparoscopic Roux-en-Y Gastric Bypass (LRYGB) has been associated with increased rates of surgical site infection (SSI) which occur primarily at the left upper quadrant port site. Published articles documented SSI rates from 4.5 to 30%, which led to a shift in pursuing linear stapler anastomosis for the creation of a gastrojejunostomy. SSI rates for linear anastomosis range from 0.6 to 6.9%. In addition, centers continuing to employ circular staplers have recommended additional preventive techniques to further decrease the SSI rate where the oro-gastric tube is removed and the EEA stapler is inserted, which include stapler covers, wound irrigation and wound antibiotics.
Objective: We present a single center, 10 year, consecutive case experience where the gastrojejunal anastomosis was created with a circular stapler without significant increase in surgical site infections (SSI) compared to alternative methods of creating a gastrojejunostomy.
Setting: Cuyuna Regional Medical Center (Minnesota Institute for Minimally Invasive Surgery)
Method: A retrospective review of medical records and NSQIP/MBSAQIP data was performed on patients who underwent primary or revision LRYGB for obesity between 2006–2016. The EEA stapler (with trans-oral anvil) was utilized consecutively by four faculty surgeons and the bariatric fellow. SSI prevention techniques were limited to trocar exchange, avoiding the use of stapler covers and antibiotic wound irrigation. Cases with deep organ infections were excluded. The primary endpoint was infection rate at the left upper quadrant port site where the EEA stapler was used. Surgical site infection (SSI) was defined by ACS NSQIP standards.
Results: A total of 894 LRYGB were documented from 2006 to 2016. There were 17 superficial wound infections in the left upper quadrant port site where the oro-gastric tube exits and the EEA stapler enters the abdomen. 16/17 infections required incision and drainage with antibiotics, while one was treated with antibiotics alone. The infection rate was calculated at 1.90% (17/894).
Conclusion: The circular EEA stapler, utilized with trans-oral introduction of the anvil, has an infection rate comparable to that quoted in the literature for the linear stapler. This study contradicts previous reports and highlights the need to standardize some technical components of surgery in order to minimize post-operative complications. Additional preventive steps might contribute to increased costs and time without much added benefit of decreasing surgical site infections.

P494

Predictors of Post-Operative Urinary Tract Infection After Bariatric Surgery

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Introduction: Urinary tract infections (UTIs) are a common post-operative complication. Patient factors and perioperative processes may contribute to an increased risk of UTI within 30 days of surgery. The purpose of this study was to assess the incidence and risk factors associated with UTIs in bariatric surgery patients.
Methods and Procedures: This study was a retrospective analysis of adult patients who underwent bariatric surgery at a single program between March 2012 and June 2016. Patients were identified using the Metabolic and Bariatric Surgery Accreditation and Quality Improvement Program database. Standard protocol was antibiotic prophylaxis with Ancef, whereas patients with a penicillin allergy typically received clindamycin. Foley catheters were placed selectively when a long operating room time was anticipated, most often in revision cases. The occurrence of 30-day (±2 weeks) post-operative UTI was the primary outcome, defined as an infection in the urinary tract in which antimicrobial therapy was instituted.
Results: Bariatric surgery was performed in 694 patients, 574 (82.7%) females and 120 (17.3%) males. UTI was observed in 31 (5.4%) females and 2 (1.7%) males. Gram-negative bacteria accounted for 96.3% of UTIs (64% E.coli). On univariate analysis age, OR time, placement of a Foley catheter, prophylaxis with clindamycin, and revisional surgery were significantly correlated with UTI. A multivariate logistic regression model revealed that clindamycin prophylaxis, revision surgeries, and age were statistically significant in predicting UTIs in female patients. The risk of getting a UTI increased 4.83-fold [95% CI: 2.27–10.31] with clindamycin use, 5.52-fold [95% CI: 1.96–15.63] with revision surgery, and 1.23-fold [95% CI: 1.04–1.45] for every 5 years gained in age. Foley catheter use and OR time were significantly correlated with revision procedures and therefore were not included in the model.
Conclusions: Older age, clindamycin as prophylaxis, and revision procedures comprised the main risk factors for predicting UTIs in women who undergo bariatric surgery in this experience. While revision procedures alone are not likely the cause of UTIs, they are associated with longer surgeries and consequently, Foley catheters. Clindamycin monotherapy may leave patients susceptible to gram-negative organisms. In patients with a penicillin allergy, the use of combination therapy (clindamycin with an aminoglycoside) may be effective in decreasing the observed rate of UTI. This combination is affordable and supported by the Surgical Care Improvement Project (SCIP) guidelines. Other modifiable risk factors such as avoidance of an indwelling catheter and limiting catheter duration should be considered.

Table 1: Univariate analysis of predictors of UTI in females

Variable	30D UTI N=31	No 30D UTI N=543	*P* value
Age (years)	50.4 ± 10.8	44.6 ± 11.7	**0.007†**
Length of stay (days)	2.3 ± 1.7	1.7 ± 1.2	0.074*
Operating room time (hours)	2.9 ± 1.2	2.5 ± 1.0	**0.009†**
Pre-op BMI (Kg/m^2)	47.3 ± 9.9	46.7 ± 8.1	0.718†
Diabetes	10 (32.3%)	170 (31.3%)	0.912‡
Foley catheter used	21 (67.7%)	255 (47.0%)	**0.024‡**
History of DVT or PE	2 (6.5%)	38 (7.0%)	0.907‡
History of urinary condition	6 (19.4%)	50 (9.2%)	0.064‡
Pre-operative clindamycin	17 (54.8%)	106 (19.5%)	**0.0005‡**
Prior UTI	6 (19.4%)	56 (10.3%)	0.253‡
Revision surgery	6 (19.4%)	25 (4.6%)	**0.0005‡**

BMI, body mass index; DVT, deep vein thrombosis; PE, pulmonary embolism; UTI, urinary tract infection
Values listed as mean ± standard deviation or N (%)
Statistically significant P values bolded, p ≤ 0.05
† t-test
* Mann-Whitney U test
‡ χ2 test

Table 2: Multivariate analysis of predictors of UTI in females

Variables	OR	95% CI	*P* value
Pre-operative clindamycin	4.83	2.27 - 10.31	0.0005
Revision Procedure	5.52	1.96 - 15.63	0.001
Age	1.23	1.04 - 1.45	0.013

OR and 95% CI for age expressed as 5 year increments

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Resolution of Comorbid Conditions are Significantly Higher with Malabsorptive Procedures

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Background: The resolution of comorbid conditions among the three most common bariatric procedures: sleeve gastrectomy, laparoscopic Roux-en-Y Gastrojejunostomy (LRNY), and biliopancreatic diversion with duodenal switch (BPD) in a single institution study has not been previously reported. This study aims to compare excess weight loss and co-morbidity resolution rates between these three procedures in a single center experience.
Methods: We identified 154 patients (who had at least one comorbid condition along with morbid obesity) from our retrospective database who had at least one year follow up. SPSS was used to analyze the data. ANOVA or the student t-test was used to identify significance between variables. The Chi square test was applied to assess categorical data. When the criteria for the above tests was not satisfied, we used Welch and Brown-Forsythe, Fisher or Mann-Whitney U test.
Results: The most common procedure performed was the LRNY (n=100) followed by the BPD (n=34) and sleeve gastrectomy (n=20). Patients with less than 1 year follow up were excluded from analysis. The majority of patients (75%) were women with an overall mean preoperative weight of 138.4 kgs (BMI 49.1). The average weight loss was 40.4 kg, which amounted to 42.4% in terms of excess weight loss. The diabetes mellitus (DM) resolution was statistically significantly higher in BPD (77.4%) compared to RNY (41.2%; p=0.001) and sleeve (37.5%, p=0.029). When comparing hypertension (HTN) improvement rates, these were found significantly higher in RNY (62%) compared to sleeve (36.8%; p<0.05). When comparing BPD and sleeve; BPD was found to have statistically significant better rates with HTN resolution (48% vs 15.8%, p=0.02), DM resolution (77.4% vs 37.5%, p=0.029), GERD resolution (61.9% vs 26.7%, p=0.03), OSA resolution (68.8% vs 22.2% ,p=0.025) and HLD resolution (58.3% vs 10%, p=0.01); however complication (48.5% vs 10%, p=0.04) and reoperation rates (45.5% vs 5%, p=0.002) were significantly higher in the BPD cohort compared to sleeve. No significant difference was found for the other co-morbidities analyzed between the bariatric procedures in our study cohort.
Conclusion: The resolution of comorbidities particularly diabetes mellitus was significantly higher in BPD patients comparison to other bariatric procedures, however this came at a much higher re operation and complication rates. The improvement in hypertension was also significantly higher after RNY compared to sleeve.

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Bariatric Surgery is Safe with Good Outcomes in Elderly Patients: A Retrospective Analysis

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Introduction: Bariatric surgery is the only treatment modality with long term sustained weight loss. Prevalence of obesity in elderly aged 60 years and above is more than 25%. Bariatric surgery has significantly increased to 10% in elderly population.
Methods and Procedures: A retrospective review of our institute's bariatric dataset was done from January 2010 to June 2016. Patients aged 60 and above were identified as elderly. Data was analyzed for age preoperative and follow up body mass index (BMI) and comorbidities. Analysis was done using SPSS software. Student t test was used to compare means.
Results: Total 127 patient were identified as elderly. The mean age was 62.9 years (60–76 year). Eighty-one percent were female and 19% were male. Ethnicity wise 18% were African American, 19% were Caucasian and 62% were Hispanic. Average preoperative BMI was 43 kg/m2. All procedures were done laparoscopically. Out of total procedures, 54% were laparoscopic roux-en-y gastric bypass, 14% were laparoscopic adjustable gastric band and 32% were laparoscopic sleeve gastrectomies. Average length of postoperative stay was 2.25 days. Thirty-day morbidity was 8.5% and 30-day readmission was 3%. There were no mortalities and no DVT or PE reported. The most common reason for readmission was dehydration. Mean total weight loss at one year was 70 lbs. Mean excess body weight loss in percent was 50%. Average weight loss in terms of BMI at the end of 1 year was 34.8 compared to 43 with (p<0.05).
Conclusion: Laparoscopic bariatric surgery has reasonable safety profile in elderly patients with acceptable outcomes in terms of morbidity and weight loss.

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3 Years Result of Type-2 Diabetes Remission After Sleeve Gastrectomy and Gastric Bypass in Severe Obesity Patients

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Introduction: Sleeve gastrectomy and gastric bypass are two of effective bariatric procedure in obesity and metabolic disorder. This study aims to evaluate 3-years result of diabetes remission after laparoscopic sleeve gastrectomy (LSG) and laparoscopic Roux-en-Y gastric bypass (LRYGB) in severe obesity type-2 diabetic patients.
Methods: We analyzed 364 severe obesities (BMI over 35 kg/m2) Thai patient's data who underwent LSG or LRYGB in our center from 2007 to 2015. Among of them, 98 patients had type-2 diabetes preoperatively diagnosed. Medical record reviewed include demographic data, weight change, body mass index, percentage of excess weight loss, level of HbA1c and percentage of diabetes remission patient.
Result: In 98 severe obesity type-2 diabetic patients, including 49 males and 49 females. LSG was performed in 45 patients and 53 patients underwent LRYGB. All patients mean age was 39.8 years, mean BMI was 50.6 kg/m2, mean HbA1C was 8.0%, mean obesity-related comorbidity diagnosed was 90.1% had hypertension, 64.2% had dyslipidemia, and 86.7% had obstructive sleep apnea. Diabetes remission at one year was 71.4% (59% in LSG, 80.8% in LRYGB) and mean HbA1c was 6.0%. At 3-years postoperative follow up (n =39) diabetes remission was 89.7% (80% in LSG, 100% in LRYGB) and mean HbA1c was 5.9%.
Conclusion: Bariatric surgery is safe and long-term effective for type-2 diabetes remission in severe obesity diabetic patients.

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Different Treatment Modalities for Incidental Gastrointestinal Stromal Tumors Found During Laparoscopic Sleeve Gastrectomy: Case Series

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Background: Gastrointestinal stromal tumors can be found incidentally during laparoscopic sleeve gastrectomy operations. Depending on localization, there might be a need for alterations in the technique.
Case Series: A total of three incidental tumors were identified during bariatric procedures. Patients were 53, 55 and 60 year-old males. Routine preoperative upper gastrointestinal system endoscopy did not reveal any tumors. In two of the cases, the tumors were located in the corpus close to the greater curvature of the stomach lateral to the staple line. However, in one patient, an exophitic tumor was located on the posterior aspect of the cardia which was supposed to remain. After the sleeve gastrectomy procedure, an additional wedge resection for the lesion was carried out. The serosa was closed with separate absorbable sutures. The staple line for the sleeve gastrectomy was imbricated with a continuous self-locking suture and both staple lines were sprayed with fibrin glue. All patients were discharged uneventfully on the second postoperative day. Pathologic diagnosis was gastrointestinal system tumor with low risk in all cases and there was no need for further treatment.
Conclusion: Benign or premalign lesions should be carefully sought in all patients during bariatric procedures. These lesions can be treated safely, however the surgical team should be ready for additional resections.

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Laparoscopic Adjustable Gastric Band Revisions: A Single Institution's Experience with Weight Loss Following Revision

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Introduction: Laparoscopic adjustable banding (LAGB) has been a viable option for weight loss since its FDA approval in 2001. It was initially a popular bariatric procedure due to low morbidity and mortality, good safety profile, and reversibility. Placement has decreased in recent years due to suboptimal weight loss and malfunction of the device, often requiring revisional surgery. Our study aimed to examine our institution's experience with revisional surgery following LAGB.
Methods and Procedures: We conducted a retrospective review of patients with previously placed LAGBs who underwent revisional surgery from 3/2012–4/2016 at The Ohio State University Wexner Medical Center. The primary outcome was evaluation of change in body mass index (BMI) after revisional surgery. Secondary outcomes included time from LAGB placement to revision and number of new bands placed compared to those removed.
Results: A total of 80 patients underwent revision of a previously placed LAGB from 3/2012–4/2016. Seventy-five patients underwent LAGB revision or removal and 5 patients underwent LAGB removal with conversion to a sleeve gastrectomy. The mean duration from index operation to revisional surgery was 67.1+35.17 months. Postoperatively, all patients who underwent a LAGB revision, regardless of type of revision, had a mean decrease in BMI of 1.76 kg/m2+10.75 kg/m2. Patients who underwent band revision or removal only had a mean decrease in BMI of 2.99 kg/m2+10.44 kg/m2 while the patients that had LAGB removal with conversion to sleeve gastrectomy had a mean decrease in BMI of 8.99 kg/m2+7.66 kg/m2.
Conclusion(s): Laparoscopic adjustable gastric banding requiring revision results in further weight loss at our institution as evaluated by BMI. Patients who underwent LAGB removal with conversion to sleeve gastrectomy had a greater decrease in BMI compared to those who underwent band revision or removal.

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Outcomes of Laparoscopic Hiatal Hernia Repair in Patients with Prior Sleeve Gastrectomy

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Background: Laparoscopic sleeve gastrectomy (LSG) has rapidly gained worldwide popularity, however it is associated with worsening postoperative reflux in some patients. Experience with simultaneous LSG and hiatal hernia (HH) repair has been reported, however there is ongoing debate that the development of gastroesophageal reflux disease (GERD) following LSG may not be due to the procedure itself, but due to the patient's pre-existing modifiable risk factors. Herein, we aim to analyze the clinical outcomes of laparoscopic HH repair after LSG.
Methods: We retrospectively reviewed our experience with obese and morbidly obese patients with prior LSG undergoing laparoscopic HH repair from August 2010 to July 2016. Patient demographics and clinical outcomes including mortality, length of stay (LOS), readmission rates, reoperation and complications were described. Patients were contacted to determine symptomatic relief, weight loss and overall satisfaction using a validated 13-point questionnaire.
Results: A total of 32 patients underwent laparoscopic HH repair: 23 (71.9%) patients underwent simultaneous HH repair and LSG and 9 (28.1%) patients underwent HH repair after LSG. Among these patients, 8 (88.9%) patients were females, mean age and preoperative BMI were 43±8.9 years and 45.9±5.4 kg/m2, respectively. Repair was performed with Bio-A®Gore® mesh (W.L Gore Inc, Newark, DE) and primary cruroplasty in 6 (66.7%) and 3 (33.3%) cases, respectively. All patients had a normal upper gastrografin swallow study on postoperative day 1. No mortality or need for reoperation was reported. Mean LOS was 1.3±0.7 days, and 1 (11.1%) patient was readmitted with hematemesis secondary to gastric ulcers. During follow-up, there was decrease in GERD score ($p=0.03$), and 80% of patients reported symptomatic relief after HH.
Conclusion: The association between LSG and GERD poses a complex relationship that may involve a reduction in gastric compliance and increased postprandial intragastric pressure. This is the first study to analyze the outcomes of bariatric patients with prior LSG undergoing laparoscopic HH repair. It offers a safe, feasible two-stage approach in the management of persistent GERD in well-selected obese and morbidly obese patients. Symptomatic relief was experienced by most patients during follow-up survey. A two-stage approach, rather than routine simultaneous LSG and HH repair, may be an interesting option to avoid unnecessary mesh use and to triage patients who successfully presented GERD relief after weight loss.

P501

LAGB Revision Surgery: Is There a Role?

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Introduction: Many patients who have been successful with their gastric bands do not want them removed or converted if they develop a slip that will not reduce with noninvasive management. Gastric banding in the US peaked in popularity as a surgical option for morbid obesity in 2008 and there are a large number of patients with different types of gastric bands that are either lost to follow up or because of insurance problems have been unable to afford band fills and follow up. Some of those patients sought gastric bands because they did not want a stapled procedure. When they develop an anterior slip that will not resolve with fluid removal (band vacation) and they want to salvage their band and are not interested in a conversion, do you attempt a band revision?
Methods: A retrospective review of revision gastric band surgery performed by Central Carolina Surgery, PA at Cone Health Wesley Long from 2005 to the present was performed.
Results: Excluding conversion of band to bypass or sleeve, removal of bands, or port revisions, a total of 37 operations were performed on 30 patients. The 5 men and 25 women had an average initial BMI of 46.5 and were average age of 43.9 years at the time their band was placed. Their average age at the time of revision was 47 and their BMI after revision surgery was 36. All revisions were seen for anterior slips that failed to respond to "band vacation", unable to adjust without GER, or presented with acute obstruction. Two of the bands were originally placed in Mexico and two were placed at other U.S. sites. All revisions involved band models from Inamed/Allergan. There were 25 revisions that consisted of reduction of the slip and replication anteriorly. There were 2 revisions that involved completely relocating the posterior tract as well as replicating anteriorly. Three revisions involved converting 10 cm Lapbands to AP systems. On average, the percentage excess weight lost after revision was 37.5% at an average followup interval of 23 months. There were no mortalities.
Conclusion: Revision gastric band surgery may be offered to patients averse to stapled bariatric operations with success rates that trail sleeve gastrectomy and gastric bypass. Many of these patients may not qualify for a conversion and may be better off with a revision than with no band at all.

P502

How We Should Manage the Umbilical Hernia of Patients Undergoing Bariatric Surgery

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Backgrounds: Morbid obese patients often develop an umbilical hernia. Laparoscopic approach has become a popular option for the treatment of ventral hernia. The intraperitoneal onlay mesh (IPOM) technique is a standard technique and its outcome is quite acceptable. However, the IPOM requires to use an artificial mesh and contamination of the mesh must be avoided. Therefore, when performing the gastrointestinal surgery, the use of the mesh should be discussed carefully. We have experienced 40 cases of bariatric surgery and two of those had a large umbilical hernia. We report how we manage the umbilical hernia of these cases.
[Case 1] Forty-eight year-old female who was scheduled to undergo the Roux-en Y gastric bypass (RYGB) had an umbilical hernia. A CT-scan revealed the omentum was packed in the hernia sac. At the beginning, the incarcerated omentum was repositioned but the hernia orifice was not repaired because we were afraid of mesh contamination. The hernia repair were planned to perform after body weight reduction was achieved. On the next day, the patient complained the abdominal pain with a bulging of the umbilicus that was diagnosed as an incarceration of the small bowel. The patient underwent the emergency laparoscopic ventral hernia repair using ePTFE patch.
[Case 2] Forty-seven year-old female had an umbilical hernia and underwent Sleeve gastrectomy. The orifice was at the umbilicus but the sac was expanded toward head. Then we inserted the first trocar from the left upper quadrant. Based on our previous experience, if the packed omentum would not affect the procedure, we would leave the omentum as it was packed. However, since the packed omentum affected the trocar insertion, we took out the omentum from the hernia. After the sleeve gastrectomy, we close the orifice with 2 unabsorbable suture without using mesh. The patient was discharged uneventfully and the IPOM might be necessary after weight reduction is achieved.
Discussion: The umbilical hernia is a common co-morbidity of obese patients. In case that the hernia content is the omentum, the reposition of the omentum without hernia repair might be the cause of the later incarceration of the intestine. However, the use of the mesh might be the cause of the mesh contamination.
Conclusion: The treatment of the umbilical hernia of the patient undergoing the bariatric surgery is the worrisome issue. We should be very careful to decide how to treat the umbilical hernia when doing the bariatric surgery.

P503

Outcomes of Bariatric Surgery in Cirrhotic Patients with Portal Hypertension

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Introduction: Studies on bariatric patients with cirrhosis and portal hypertension are scarce. The aim of this study was to review our experience in cirrhotic patients with portal hypertension who had bariatric surgery.
Methods: All cirrhotic patients with portal hypertension (PH) who underwent primary laparoscopic bariatric surgery (BS) at a single academic center from 2007 to 2015 were identified. Data collected included baseline demographics, co-morbidities, perioperative parameters, adverse events, and the weight loss and co-morbidities resolution. Data was summarized as the median and interquartile range (IQR) for continuous variables and as counts and percentages for categorical variables. A paired t-test was used to analyze the differences between the last follow-up point and the baseline at the time of surgery.
Results: Out of 6777 patients who underwent bariatric surgery, twelve (0.2%) patients were cirrhotic with portal hypertension; seven (58.3%) were female, median age was 55 years (IQR 48–60), and median BMI was 48 kg/m2 (IQR 43–56). Portal hypertension was diagnosed based on endoscopy (n=9), imaging (n=6), and intraoperative increased venous collateral (n=1). Comorbidities include diabetes mellitus (n=11, 92%), hypertension (n=9, 75%), sleep apnea (n=9, 75%), dyslipidemia (n=5, 42%), nonalcoholic steatohepatitis (NASH) (n=11, 98%), alcoholic hepatitis (n=1, 8%) and hepatitis C infection (n=1, 8%). There were 5 patients who had trans-intrahepatic portal systemic shunt (TIPS); 2 of them had TIPS after bariatric surgery due to recalcitrant ascites. The bariatric procedures include sleeve gastrectomy (n=10, 83%) and Roux-en-Y gastric bypass (n=2, 17%). The median length of hospital stay was 3 days (IQR 2–4). The 30-day complications occurred in two patients including wound infection requiring debridement (n=1), and intra-abdominal hematoma secondary to anticoagulation managed conservatively (n=1). There was no perioperative mortality. Late mortality occurred in one patient 8 months after sleeve gastrectomy due to pseudomembranous colitis which led to sepsis and multiple organ failure.
The median %excess weight loss (%EWL) at 1-year and at 2-years were 37.5% and 49.0% respectively. There was a significant reduction in baseline to last follow-up point (median 2-years follow-up); fasting blood glucose from140.7 mg/dL to 96.8 mg/dL, (p=0.013) and glycated hemoglobin 7.0 to 5.0, (p=0.009). Remission or improvement in obesity-related comorbidities at 1 year for diabetes, hypertension, and dyslipidemia were 100%, 50%, and 60%, respectively.
Conclusion: This is the largest series to date evaluating outcome of bariatric surgery in patients with cirrhosis and portal hypertension. Bariatric surgery in highly selected cirrhotic patients with portal hypertension is relatively safe and effective.

P504

Risk Factors for Early (<90 Days) Post-operative Marginal Ulcers Post-Roux-En-Y Gastric Bypass

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Introduction: Marginal ulceration (MU) occurs in 1%-16% of patients following Roux-en-Y gastric bypass (RYGB). The etiology, while largely unknown, implicates diabetes, smoking, NSAID use and history of peptic ulcer disease. While these factors are involved in late ulcer development, there is a relative paucity of information regarding causes of early ulcers. The aim of this study was to identify pre-operative endoscopic findings predictive of early post-operative (<90 days) marginal ulceration (MU). We hypothesized that pre-operative gastritis was a risk factor for early MU.
Methods: A retrospective review was performed, from February 2013 to 2016, on all patients who underwent either primary or revisional RYGB at our institution. All patients included in the study underwent a pre-operative esophagogastroduodenoscopy (EGD). The experimental group included patients that required an EGD within 90 days of their surgery and had an identifiable gastrojejunal ulcer at endoscopy. Demographics, comorbidities, baseline reflux symptoms, pre-operative EGD findings, biopsy results and weight at 3, 6, and 12 months post-op were collected. The control group included all patients who underwent RYGB and/or who had no identifiable ulcer at EGD within 90 days.
Results: A total of 308 patients underwent RYGB. Twenty-nine (9.4%) patients developed MUs within 90 days of surgery. There was no difference in age (46.9 years+10.9 versus 46.2 years +/- 11.1, p=0.26), gender (n=27, 93.1% versus n=253, 90.7% female, p>0.99), or pre-operative body mass index (48.9 kg/m2 +/-7.6 versus 48.0+8.4 kg/m2, p=0.46) in the experimental versus control group, respectively. Pre-operative biopsy results demonstrated no differences in the incidence of acute (p>0.99) or chronic gastritis (p=0.88), acute (p>0.99) or chronic esophagitis (p=0.25), Barrett's esophagus (p>0.99), or helicobacter pylori positivity (p>0.99) between the two groups. However, pathologic diagnosis of chemical gastritis was significantly associated with the formation of early ulcers (p<0.002, OR 4.38, 1.83–10.29 95% CI). There was no difference in percent of excess weight loss at 3 (p=0.45, 20.8% control vs 30.4% ulcer), 6 (p=0.45, 38.8% vs 48.0%), or 12 months (p=0.83, 51.0% vs 47.9%) post-surgery.
Conclusions: Pathologic diagnosis of chemical gastritis on pre-operative EGD is significantly associated with the formation of early (<90 days) post-operative MUs following RYGB. Given the cost of treating stomal ulcers vis-à-vis repeat EGDs and medications (cytoprotective and acid suppressive medications), these results suggest an important role for routine pre-op EGD and treatment of gastritis prior to RYGB.

P505

A Proposed Prediction Model for Successful Outcome After Laparoscopic Sleeve Gastrectomy

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Introduction: At present Laparoscopic Sleeve Gastrectomy (LSG) is fast becoming the most frequently performed bariatric procedure worldwide. Although patients expect 50–60% excess weight loss (EWL) on average, some do not achieve this goal. If there was a way to determine which patients will be successful with weight loss, then many patients may be able to avoid the risk associated with this procedure. The objective of this study is to develop a predictive model for a successful outcome after LSG.
Material and Methods: A retrospective analysis of 344 consecutive patients after primary LSG was performed. Patients underwent LSG between January 2011-September 2015. The data set, including 29 patients' variables, was identified to develop the predictive model. Successful outcome was defined as % EWL>50 at 1 year follow-up. Multiple logistic regression with stepwise variable selection was used to create the model. Independent variables with an association with the outcome in univariate analyses were entered into a model. With backward elimination procedure, clinically important risk factors were kept in the model. Afterward, a forward stepwise selection was also used to find a stable model.
Results: Through this time period, 63% of patients achieved successful outcome. The mean age of patients was 45.8 (±10.6) years and mean BMI was 47.5 (±8.8) kg/m2 at the time of surgery. Twenty-nine variables were analyzed and 4 were included to the final model. These variables are as follows: age, preoperative BMI, gender, and preoperative weight loss (Table 1). The model demonstrated a good calibration (Hosmer-Lemeshow goodness-of-fit test, $\chi 2=3.356$, P=0.910) and good discrimination (c-statistic 0.753).
Conclusion: The result revealed the association between successful outcome and following factors: lower age, lower preoperative BMI, male gender, and higher preoperative weight loss. Further studies are warranted to externally validate this risk model in a different population of LSG patients.

Table 1 Variables included to the final model

Variable	Value/ Units	Odds Ratio	95% Confidential Interval	Estimate	Standard Error
Age	Years	0.938	0.902–0.974	-0.0645	0.0195
Preoperative BMI	Kg/m^2	0.922	0.878–0.967	-0.0816	0.0247
Preoperative weight loss	ΔBMI	1.234	0.979–1.557	0.2106	0.1184
Gender	Female vs. male	0.177	0.053–0.585	-0.8662	0.3053

P506

Predictive Factors of 30-Day Readmission After Bariatric Surgery in a Publicly-Funded Bariatric Center: A Multivariate Analysis

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Introduction: The objective of this study was to determine readmission rates after primary bariatric surgery in a publicly-funded, comprehensive bariatric center and determine predictive factors associated with readmission. Previous studies looking into readmission have found rates ranging anywhere from 0.6 to 11.3%. Another study found that length of stay greater than two days and any complication during the initial admission were associated with readmission. Given the high volume of bariatric surgery performed at our center and excellent follow-up rates, we wanted to analyze our readmission rates following bariatric surgery and determine factors that predict early readmission.
Methods and Procedures: A population-based cohort study was performed on all patients undergoing primary bariatric surgery from January 2010 to December 2015 in a publicly-funded, comprehensive bariatric center. Procedures included laparoscopic Roux-en-Y gastric bypass (LRYGB), laparoscopic sleeve gastrectomy (LSG) and laparoscopic adjustable gastric band (LAGB). Data were collected from an administrative database. Multivariate regression analysis was then performed to determine factors that predict 30-day readmission.
Results: Over five years, 1469 patients had primary bariatric surgery (51.0% LRYGB, 40.4% LSG, 8.6% LAGB) with an overall 30-day readmission rate of 7.49%. The mean length of stay (LOS) for readmissions was 5.3 days and readmissions stays of 4 days or less accounted for 70% of the cohort. The majority of patients (67.9%) were admitted early, within the first 10 days from discharge. LRYGB had a higher readmission rate (11.3%) compared with LSG (3.9%) or LAGB (1.6%). The most common admitting diagnoses for readmission were infectious complications (24.8%), pain (17.4%), nausea/vomiting (10.1%), bleeding (9.2%), obstruction (6.4%) and anastomotic ulcers (5.5%). A significant amount of readmissions were found to have venous thromboembolisms (5.2%).
Multivariate logistic regression analysis found three factors that were independently predictive of readmission: initial LOS greater than four days (OR 2.56, 95% CI 1.31 to 5.00, p =0.006), LRYGB (OR 5.92, 95% CI 1.28 to 27.45, p=0.023) and acute renal failure (OR 19.67, 95% CI 1.16 to 332.80, p=0.039).
Conclusions: The rate of readmission after bariatric surgery in our center is 7.49%. Patients with LOS greater than four days, acute renal failure and LRYGB procedures were at higher risk of readmission. Given these findings, strategies such as the prevention of acute renal failure and closer outpatient follow-up in higher risk patients may reduce the frequency of readmissions.

P508

Adherence to Supplements in Married Couples Where Both Partners had Undergone Bariatric Surgery

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Background: Clinical guidelines recommend that patients undergoing bariatric surgery take supplements for an extended postoperative duration. However, adherence to supplements varies among this population and may be linked to a patient's social support. We investigated whether social support may impact supplement adherence by examining adherence among married couples where both partners had bariatric surgery.
Methods: We identified married couples where both partners underwent bariatric surgery at the Johns Hopkins Bayview Medical Center from 2001 to 2015. We defined a married couple as two patients with the same last name and who specifically listed each other as their spouse in their respective medical records. For each patient, we recorded demographic and surgical data, postoperative visits up to two years, and whether they ever took any of the following five supplements: B12 complex, calcium, vitamin D, iron, and multivitamin. We defined supplement adherence as taking four or more supplements within two years after surgery. Chi-squared tests determined associations between patient and surgical factors with supplement adherence.
Results: We identified 35 married couples. Partners in 34 couples (97%) shared the same address and 27 couples (77%) had their surgeries within a year of each other. Of all 70 patients, half (50%) were female, the majority (87%) were white, a third (33%) were 40–49 years old, and half (49%) had a body-mass-index (BMI) between 40–49. The majority obtained a Roux-en-y gastric bypass (79%) and a laparoscopic procedure (77%). The vast majority initiated a multivitamin (91%), followed by calcium (71%), B12 (70%), vitamin D (34%), and iron (26%), but only three-fifths (60%) of patients met our criteria of supplement adherence. While female gender (P=0.02) was associated with supplement adherence, race (P=0.11), age (P=0.42), preoperative BMI (P=0.40), bariatric surgery type (P=0.35), and laparoscopic technique (P=0.16) were not associated with supplement adherence. Among the 18 couples where both partners had 3+postoperative visits, the majority (64%) of patients exhibited supplement adherence; in the remaining 17 couples, a minority (15%) exhibited supplement adherence (P<0.01). Furthermore, partners within couples displayed concordant behavior of supplement adherence when their surgeries were within a year of each other (P<0.01).
Discussion: Supplement adherence varied among married couples where both partners underwent bariatric surgery. Female gender and attending postoperative visits were associated with supplement adherence. As partners within couples were more concordant with respect to supplement adherence when their surgeries were less than a year apart, social support may play a role in bariatric surgery outcomes.

P509

Endoscopic Weight Loss Balloon: 3 Years Experience in an Ambulatory Endoscopy Unit

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Introduction: Obesity is a worlwide epidemic associated to multiple comorbidities. Diet and exercise are poorly effective with not long term results.
Bariatric surgical procedures are effective but still associated to major complications however with a low mortality rate.
There is a need for less invasive weight loss procedures and devices such as endoscopic weight loss balloon as an alternative for patients non candidates to bariatric surgery.
Methods: We present a 3 years experience of endoscopic intragastric balloon placement (ORBERA, Apollo Endosurgery, Inc) performed in a total of 89 patients and done in an ambulatory endoscopy unit.
Results: Median follow up of 30 monthsRemoval at 6 months Short term weight loss range 12 to 26 kgWeight loss sustained at 12 months 48%20% of patients fail to achieve significance weight lossNo major complications presented in this series
Conclusions: The endoscopic intragastric balloon is thought to induced early satiety by partially filling the stomach; as presented in this case series results, this is a promising alternative of weight loss in a growing public health problem.
Long term data on the safety, efficacy and durability of endoluminal bariatric procedures are needed.

P510

Impact of Bariatric Surgery on Ambulation Status in Patients with Impaired Mobility

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Introduction: Patients with impaired mobility undergoing bariatric surgery may have higher risk for post-operative complications. They may also experience significant improvement in mobility and weight-related comorbidities. This study aims to evaluate the short-term surgical outcomes, both with respect to ambulatory status and weight-related metrics, following bariatric surgery in patients with impaired mobility.
Methods: Using a prospectively maintained institutional database, individuals who underwent primary sleeve gastrectomy (SG) or roux-en-y gastric bypass (RYGB) from February 1, 2008 through December 31, 2015 were identified. Patients with impaired mobility, defined as using a wheelchair or motorized scooter for at least part of a typical day were included. Patients using only a walker or cane were excluded. Data collected included patient demographics, co-morbidities, perioperative parameters, and postoperative outcomes. Mobility improvement was defined as discontinuation of wheelchair or scooter use.
Results: Ninety-three patients underwent primary laparoscopic RYGB (n=65, 70%) and SG (n=28, 30%) during the study period. Sixty-six (71%) patients were female; median age 56 years (IQR 46–61) and median preoperative BMI of 55 kg/m2 (IQR 49–64). Comorbidities included: hypertension (n=84, 90%), diabetes mellitus (n=57, 61%), dyslipidemia (n=68, 73%), obstructive sleep apnea (n=79, 85%), reflux disease (n=56, 60%), and osteoarthritis (n=43, 46%). Early (≤30 days) post-operative complications occurred in 17 patients (18%). Early major complications included anastomotic leak (n=3, 3%), bowel obstruction requiring reoperation (n=2, 2%), venous thromboembolism (n=1, 1%) and respiratory failure requiring re-intubation (n=2, 2%). Early minor complications included marginal ulcer (n=1), anastomotic stricture requiring endoscopic intervention (n=1), nausea and vomiting (n=2), and dehydration (n=3).
At 12 months follow-up (n=61), median BMI and % excess weight loss (%EWL) were 40 kg/m2 (IQR 34–49), and 53% (IQR 32–66), respectively. Improvement in weight-related co-morbidities was noted for diabetes mellitus (n=25/35, 71%), hypertension (n=33/56, 59%), dyslipidemia (n=20/43, 47%), obstructive sleep apnea (n=26/46, 57%) and reflux disease (n=19/34, 56%). In terms of ambulation, 38/61 patients (62%) experienced improvement in their mobility status; 13 patients (21%) were able to walk unaided while 25 (41%) required only partial support with the use of a cane or walker, all eliminating the use of a wheelchair or scooter.
Conclusion: Patients with impaired mobility are an older cohort with a higher BMI and more associated comorbidities. While this patient population is at risk for additional postoperative morbidity, bariatric surgery results in short-term improvement in mobility status and weight-related comorbidities in a majority of patients.

P511

The Effect of Obesity-Related Comorbidities on 30-Day Complication Rate After Laparoscopic Sleeve Gastrectomy

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Bariatric surgery is effective for weight loss and reduction of obesity-related comorbidities. While it has tremendous benefits for patients, weight loss surgery is also associated with significant complications and approximately 0.2% mortality rate. Although guidelines exist as to who qualifies for bariatric surgery, patient risk stratification systems for surgery are lacking. A recent German study suggested that not body mass index (BMI), but rather obesity-related comorbidities influence the rate of post-operative complications. This study reviews the effect of pre-operative obesity-related comorbidities on post-operative 30-day complication rate.
Methods: Data was prospectively collected on patients undergoing laparoscopic sleeve gastrectomy (LSG) between May 2011 and February 2014 at a single bariatric surgery center. These charts were reviewed for patient demographics (age, gender, BMI), obesity-related comorbidities (hypertension, obstructive sleep apnea, diabetes, dyslipidemia, gastroesophageal reflux, cardiovascular disease, osteoarthritis), and 30-day complication and mortality rates. Minor complications were defined as Clavien-Dindo class 2 or less, and major complications as Clavien-Dindo class 3 or higher. Patients were divided into two groups based on number of pre-operative comorbidities. Group A included patients with ≤2 obesity-related comorbidities. Group B included patients with ≥3 comorbidities. An independent student t-test for continuous and chi-square test for categorical values were performed to compare patient demographics and 30-day complication rates between these groups. Statistical analysis was performed using SPSS (Version 21).
Results: A total of 209 patients underwent LSG. Group A had 101 patients, 91 females and 10 males with a mean BMI of 49.5 kg/m2 (range 37.7 to 67.4 kg/m2) and mean age 40.7years (range 26–70 years). Group B had a total of 108 patients, 78 females and 30 males, with a mean BMI of 48.9 kg/m2 (range 35.0 to 67.2 kg/m2) and mean age 47years (range 22–67 years). While both groups did not differ in mean BMI, Group B had a higher number of males (30 males, $p=0.001$) and was older (47.0 years, $p<0.001$). The 30-day overall complication rate for Group A was 8.1% with 5.1% being minor and 3.0% major (2 leaks, 1 gastric fistula) complications. The overall complication rate for Group B was slightly lower at 7.2% with 6.3% minor and 0.9% major (1 leak) complications ($p>0.05$). No mortality occurred.
Conclusion: The data shows that males and older patients had greater number of obesity-related comorbidities. The number of preoperative comorbidities did not impact the rate of early post-operative complications following LSG.

P512

Intra-Gastric Balloons for Obesity, Experience of One Institution in Thailand; A Case Series

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Background: Obesity has been a growing concern worldwide. There is a spectrum of measures to aid with weight loss, ranging from dietary modulation to surgical measures. Intra-gastric balloons (IGBs) are one of the modalities studied and currently in practice. We report 17 cases of IGB SPATZ3® adjustable balloon outcomes (body weight [BW], body mass index [BMI]) and appetite related sensation score (satiety scale) was assessed by a visual analogue scale [VAS].
Methods: Seventeen Asian obese patients (defined as BMI≥25.0 kg/m2; according to Asian specific definitions for obesity) was studied prospectively after IGB placement. There were 15 females and 2 males, with a mean age of 33.4±12.3 years. The intra-gastric balloon devices was placed endoscopically in the stomach and filled with a volume of 350–500 mL.under intravenous sedation. Data was collected at 1- and 6-months period-during the follow-up visits were: BW, BMI and appetite related sensation score (hunger scale; range 0–10 [defined by starving and beyond as 0 to very uncomfortable full as 10, respectively]). All data were expressed as median (range).
Results: Baseline values were; BW 77.7 (61.7–106), BMI 30.4 (26.4–35) and hunger scale 8 (7–8). In all cases balloon insertion was mainly uneventful except one case having clinically nausea and vomiting at day-1 post-IGB placement (improvement with supportive treatment), 2 cases having vomiting problem, 1 case had severe vomiting within 4 days after placement then balloon removal was done, another case had intermittent vomiting during 1- month after placement and asked for cessation of this procedure however this patient was satisfy for the weight-loss result. One case required adjusting by refill the balloon from 450 mL to 650 mL due to lack of weight loss and the other case is during the follow-up period, no any complications were detected. After the follow-up period, all parameters exhibited a trend to reduction: BW 72.6 (56.5–100), BMI 28.4 (23.8–32.6) and hunger scale 5 (2–6) at 1 month and BW 68.7 (57.2–90.2), BMI 27.0 (21.8–33.3) and hunger scale 6 (6–8) at 6 months, respectively.
Conclusions: Based on our series, IGB placement in Asian patient showed the benefit result. We found the complication about vomiting problems but no major complication that required aggressive management was found in our series. However, there is a need to study our experience with a larger population of patients who have had this device inserted to report the benefit and safety of its use.

P513

The Effect of Health System Factors on Outcomes After Bariatric Surgery in a Universal Healthcare System a National Cohort Study of Bariatric Surgery in Canada

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Introduction: The objective of this study was to determine the effect of hospital accreditation and other health system factors on all-cause morbidity after bariatric surgery in a publicly funded, universal healthcare system. Previous data demonstrates that patients who receive bariatric surgery at a Center of Excellence are different than those who receive care at non-accredited centers. Canada provides a unique opportunity to naturally exclude confounders such as insurance status, hospital ownership and lack of access on comparisons between hospitals and surgeons in bariatric surgery outcomes.
Methods: This was a population-based study of all patients aged>18 who received a bariatric procedure in Canada (excluding Quebec) from April 2008 until March 2015. The main outcome of interest for the studies were all-cause morbidity during the index admission. All-cause morbidity included any documented complication which extended length of stay by 24 h or required reoperation. Risk and reliability adjusted hierarchical regression models were used to determine predictors of morbidity.
Results: Overall, 18,398 patients were identified over the seven-year period and the all-cause morbidity rate was 10.1%. Surgeon volume and teaching status were both found to significantly decrease the risk of all-cause morbidity. Specifically, for each increase in 25 bariatric cases per year the odds of all-cause morbidity was 0.94 lower (95%CI 0.87-1.00 p =0.03). Hospital teaching status conferred a 0.75 lower odds of all-cause morbidity (95%CI 0.58–0.95 p<0.001). Importantly, formal accreditation was not associated with a decrease in all-cause morbidity.
Conclusion: This national study found that surgeon volume and teaching status were the most important factors in decreased all-cause morbidity after surgery in a universal healthcare system while hospital accreditation was not a significant factor.

P514

Is Conversion from a Laparoscopic Gastric Band to Laparoscopic Sleeve Gastrectomy Safe and Efficacious?

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Objective: To see if a two stage procedure limits morbidity while allowing improvement in BMI when converting a gastric band to a sleeve gastrectomy.
Intro: Gastric banding for metabolic syndrome has a complication rate of 10–25% prompting revision to a LSG. Complications include band erosion, band slippage or failed weight loss. We hypothesize that a two stage conversion, when a band slip or erosion was present, would limit morbidity. This study compares postoperative complications and weight loss in a cohort of patients with band complications who were converted with either single stage or two stage procedures.
Methods: With approval from our institutional review board we performed a retrospective analysis of 27 patient cases in which a band was converted to a sleeve over a two-year period. Twelve patients had a two stage conversion and 15 patients had a single stage conversion. Groups were compared for incidence of complications and weight loss. Complications were defined as staple-line leak, bleeding, surgical site infection or sepsis. Groups were also compared for length of stay and BMI at 1,3,6,12 and 24 months. Analysis between groups was performed using T-Tests for continuous variables and Chi-Square Tests for categorical variables.
Results: There were no complications in either group. There was statistically significant reduction in BMI following conversion over the two year follow up period. Additionally, there was no difference in length of hospital stay (p=0.451).
Conclusion: This pilot study suggests there is no difference in morbidity when a gastric band is converted to a sleeve with a single stage or two stage procedure. Conversion of a band to a sleeve is safe when performed in a two stage approach for band slip or erosion. Conversion is also safe as a single stage approach in the absence of these complications. There was improved efficacy for all patients, with an average decrease in BMI of 8 points. These limited results would benefit from confirmation by a prospective study with a larger sample size.

P515

Iatrogenic Splenectomy During Bariatric Surgery: Early Postoperative Outcomes

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Introduction: Splenic injury during laparoscopic surgery is rare and occurs with a reported frequency of 0-2.6% and rarely requires splenectomy, which is usually due to uncontrollable hemorrhage. Iatrogenic splenectomy during abdominal procedures such as colorectal and abdominal vascular surgeries have been associated with increased risk of postoperative infectious complications and prolonged hospitalization. We propose that iatrogenic splenectomy at time of primary bariatric surgery is associated with increased postoperative complications.
Methods and Procedures: Data were retrieved from the American College of Surgeons - National Surgical Quality Improvement Program (ACS-NSQIP) dataset (2005–2014). Inclusion criteria included: adult patients aged≥18 years and underwent elective primary bariatric surgical procedures including Roux-en-Y gastric bypass (RYGB), adjustable gastric banding (AGB), sleeve gastrectomy (SG), and duodenal switch (DS) who underwent unplanned splenectomy at time of their initial procedure. Postoperative composite adverse outcome was defined as presence of any of 16 major adverse events. In order to compare postoperative outcomes, this cohort was compared with patients deemed very high risk which was defined as ASA≥3+BMI≥50+Age≥50 (n=669).
Results: We identified 25 patients (SG n=15, DS n=5, RYGB n=4, and AGB n=1) including 4 men and 21 women from the 2005–2014 ACS-NSQIP dataset who underwent an unplanned splenectomy during their primary bariatric procedure and 669 patients who were defined as very high risk preoperatively (ASA≥3+BMI≥50+Age≥50) who did not undergo concomitant splenectomy. Median age in the splenectomy group was 47 (range 25–70); median BMI and ASA class were 48 (range 39–91) kg/m2 and 3 (1–3), respectively. Baseline characteristics revealed that the high-risk comparator group to be significantly older with higher BMI and had a higher incidence of preoperative comorbid conditions including diabetes, hypertension, and preoperative dyspnea compared to the simultaneous splenectomy group.
With regards to postoperative outcomes, there was a trend towards more adverse events in the simultaneous splenectomy group compared to the high risk group (20% compared to 9%, P=0.07); however, there were significantly more thromboembolic complications (12% versus 1%, P<0.001), as well as a significantly higher incidence of unplanned readmissions (32% vs 8%, P<0.001).
Conclusion: Iatrogenic splenectomy at time of primary bariatric procedure is associated with increased risk of thromboembolic complications and a higher rate of readmission at 30 days postoperatively even in comparison to a group of patients who carry a higher preoperative risk.

P516

Bariatric Surgery Improves Nonalcoholic Fatty Liver Disease: A Contemporary Systematic Review and Meta-analysis

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Introduction: The prevalence of Non-Alcoholic Fatty Liver Disease (NAFLD) has doubled in the last 20 years. NAFLD is present in >95% of patients who undergo bariatric surgery. Although multiple single-center, small-cohort studies show that surgically-induced weight loss improves NAFLD and reverses early fibrosis, we felt it was important to assess the true impact of bariatric surgery on NAFLD by pooling all patients in a systematic review and meta-analysis.
Methods: We searched the literature (PubMed, EMBASE, Web of Science, and Cochrane Central) to identify publications from 1999 to 2016 on bariatric surgery, NAFLD, liver histology, steatosis, steatohepatitis, and fibrosis. Improvement in NAFLD was assessed using liver biochemistry and histology before and after bariatric surgery. Malabsorptive procedures such as duodenal switch and biliopancreatic diversion were excluded. The primary outcome measures were improvement and/or resolution of steatosis, steatohepatitis or fibrosis after bariatric surgery. A pooled proportion of patients with improvement or resolution was calculated using a random effects model. Heterogeneity among the studies was assessed using the I2 (inconsistency) statistic. Data are mean±SD (standard deviation)
Results: A total of 22 studies enrolling 2483 patients were included; heterogeneity was significant, and therefore we explored it further with subgroup analysis. Twelve studies investigated the impact of Roux-en-Y Gastric Bypass (RYGB), three studies included Adjustable Gastric Banding, two studies assessed Sleeve Gastrectomy, one study included Vertical Banded Gastroplasty and four studies reported a mix of procedures. The mean age of patients was 42±9 years; the pre-op body mass index was 48±7 Kg/m2.
The pooled proportion of patients who underwent any bariatric procedure and had improvement or resolution of steatosis was 86% (95% confidence interval [CI]: 0.77, 0.93). Steatohepatitis improved or resolved in 59% (95% CI: 0.38, 0.78) and fibrosis improved or resolved in 36% of patients (95% CI: 0.25, 0.48)
After RYGB, the pooled proportion of patients who had improvement or resolution of steatosis was 91% (95% CI: 0.82, 0.97); improvement or resolution of steatohepatitis was 60% (95% CI: 0.34, 0.84) and improvement or resolution of fibrosis was 36% (95% CI: 0.22, 0.50).
Conclusion: Steatosis and steatohepatitis improve or resolve in the majority of patients after bariatric surgery. More importantly, bariatric surgery improves or resolves liver fibrosis in 36% of patients. RYGB appears to have a greater impact on NAFLD compared to gastric banding and gastric sleeve. This contemporary meta-analysis strongly suggests that bariatric surgery should be considered as a treatment of NAFLD in obese patients.

P518

Structured Early Ambulation Protocols and Post-operative Weight Loss Following Laparoscopic Sleeve Gastrectomy

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Introduction: Laparoscopic sleeve gastrectomy (LSG) is recognized as a reliable surgical option for weight loss in morbidly obese patients. There are several factors that have been associated with poor weight loss following bariatric procedures. While many studies examine the benefits of early post-operative ambulation, few examine the association with long term weight loss. We evaluate these relationships.
Methods: All patients undergoing LSG between September 2014 and August 2016 at a single institution were included. Patients, residents and staff were all instructed on the benefits of early ambulation (which we define within twenty-four hours) and formal protocols were established. Routine orders were given to assist and ambulate patients postoperatively. Surveys were given to both nurses and patients. All patients then followed in an outpatient clinic, and their weights were recorded at 1 week, 1 month, and 3 month intervals until 18 months. Weight loss was then stratified by early ambulators versus non-ambulators who walked 2 h after surgery, 6 h after surgery, and every 4 h during the night.
Results: There were 237 patients who underwent LSG by a single surgeon (PG), at a single institution included in the study. In the first 24 h, 232 (98%) patients ambulated; 192 (81%) within 2 h, 222 (94%) within 6 h, and 174 (73%) every 4 h. Among the reasons for not ambulating, Fatigue (19%) was the most common followed by pain (11%), dizziness (8.0%), and breathing difficulty (3.0%).
All 237 patients had positive weight loss following LSG. Average weight loss at each time point is calculated as 12.76 lbs. at 1 week, 29.10 lbs. at 1 month, 40.85 lbs. at 3 months, 48.2 lbs. at 6 months and 59.2 lbs. at 9 months. There was no significant difference in weight loss between early ambulators and non-ambulators at any time interval. There was, however, an observable trend of higher weight loss at 6 months (54.8 and 33.2 lbs.) and 9 months (64.4 and 43.4 lbs.) for patients who ambulated at 6 h following surgery (p=0.45 and 0.69, respectively).
None of the patients experienced thromboembolic or pulmonary complications.
Disscussion: There is an observable relationship between early post LSG ambulation protocols and post-operative weight loss. More patients with longer follow ups are required to describe this relationship more definitively.

P519

Does Bariatric Surgery Alter Patients' Level of Interest in Fitness Programs and Their Perceived Barriers to Exercise?

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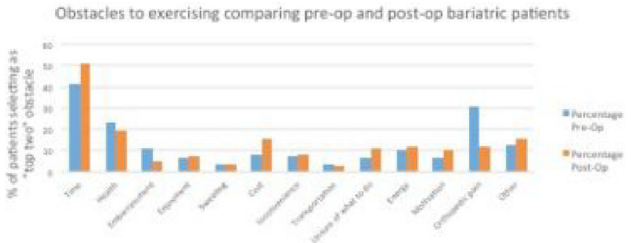
Introduction: Patients seeking bariatric surgery encounter a major behavioral challenge in integrating optimal physical activity to achieve long-term success. Moderate exercise following bariatric surgery is associated with greater postoperative weight loss and improved glucose metabolism and insulin sensitivity. The aim of this study was to assess the level of interest in fitness programs, weekly duration of exercise and obstacles faced to incorporate exercise in bariatric patients before and after surgery.
Methods: After obtaining Institutional Review Board approval, morbidly obese patients, who presented to the Bariatric clinic at IU North Hospital were administered a questionnaire over a 3 month period. The questionnaire explored their interest in paid internet and free DVD-based workouts based on a 5-point Likert scale, average duration of moderate to strenuous exercise sessions per week and their two perceived obstacles to exercise. Descriptive statistics were used where applicable. The significance of relationships of the nominal and continuous variables was calculated with Chi-square test. P-values less than 0.05 were considered significant. Statistical analysis of the data was performed using the SPSS statistical software, version 20.0 (SPSS Inc., Chicago, IL).
Results: Two hundred and ninety-four patients were enrolled in the study. Of these, 159 were preoperative while 135 were postoperative patients. 90% of the patients had access to Internet. There was more interest in the free 10-minute workout DVD than the paid Internet program. The interest in the workout DVD increased in postoperative patients compared with pre-operative ones (p=0.088). The mean duration of exercise prior to surgery was 89±92.1 min/week while it decreased to 84.4±103.7 min/week following surgery (p=0.717). Time was the most frequent obstacle in both groups.



The response of orthopedic pain or discomfort as an obstacle appeared to decrease in the post-operative population (43 of 139 vs. 14 of 115 post-operative patients reported this as an obstacle) (p =.001).
Conclusions: The post-operative group did not report a higher level of interest or engagement in moderate-to-strenuous exercise compared with the pre-operative group. However, significantly fewer post-operative patients recognized orthopedic pain/discomfort as a major obstacle to physical activity after surgery. The data further suggests bariatric programs should address time constraints as a major barrier when promoting physical activity.

P520

Endoscopic Management of Severe Dumping Syndrome After Bariatric Surgery

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Background: Bariatric surgery is a very effective treatment modality for weight loss in patients with morbid obesity. However, despite being safe, complications may occur and managing those can be difficult.
Dumping syndrome is one of these complications. It's a condition that can be challenging to manage and it may be highly debilitating.
Methods: A 77 year old female that presented with dumping symptoms that was refractory to medical treatment 10 years after having a gastric bypass. She was found to have a dilated gastrojejunostomy. The size of the stoma was reduced using the Apollo Overstitch.
Results: The patient's symptoms resolved after the procedure and her BMI went from 32 (208 pounds) to a BMI of 28 (196 pounds). She's still asymptomatic 6 months after the procedure.
Conclusion: When conservative management fails, an invasive intervention has to be performed. Since re-operating in these patients can be a real challenge, and the original surgery may need to be reverted with possible regain of the lost weight, less invasive techniques need to be developed. We are presenting a case that was managed successfully with endoscopic therapy.

P521

Estimating Weight Loss Trajectories in Laparoscopic Sleeve Gastrectomy and Roux En Y Gastric Bypass Patients

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Introduction: There is debate in the field of bariatric surgery regarding the use of Roux-en-Y gastric bypass (RYGB) or sleeve gastrectomy (SG) for weight loss. The goal of this research study was to determine how weight loss trajectories differed for patients that had SG or RYGB and had or had not attained 50% excess weight loss (EWL) or greater by 1 year at our institution.
Methods: Post-operative follow-up was categorized by 6 weeks, 3, 6, 9, and 12 months. Percent EWL at each point was calculated. Patients were classified into those with EWL<50% and ≥50% by 12 months for both surgical approaches. Plateaued weight loss was defined as the time at which consecutive follow-up intervals did not statistically differ in EWL and were identified using ANOVA with post-hoc Tukey comparisons.
Results: A total of 63 RYGB and 95 SG patients completed 1 year of follow-up at our institution. Overall, SG patients had a mean EWL of 46.6±18.6%, while RYGB patients achieved 61.8± 19.0% (p<0.001). Within SG patients, those that reached EWL of ≥50% by 12 months had reached non-significant change in weight by 9–12 months (p=0.748), and averaged a final EWL of 61.5± 12.1%. SG patients with <50% EWL achieved an average of 32.4% EWL by 12 months, with non-significant change in %EWL between 6, 9, and 12 months (p=0.999, and p=0.969). RYGB patients with ≥50% EWL had an average of 71.5±15.6% EWL at their final follow-up with non-significant weight loss occurring between 9–12 months (p=0.236), while those that achieved<50% EWL by 12 months achieved an average of 42.3±5.1% EWL, and experienced weight loss plateau starting at 6 months (p=0.702, and p=0.970).
Conclusions: It is evident that regardless of approach, weight loss trajectory differs greatly between patients that did and did not reach the final goal of 50% EWL. In patients that met the threshold, there is marked difference in their weight loss trajectory, such that in both approaches, patients with <50% EWL attainment experienced a plateau in weight loss months in advance of those that continued to lose significant excess weight. It may be possible to increase the accuracy of expectations for both the surgeon and patient by identifying preoperative patient characteristics that are common to each weight loss group and improve the prediction of weight loss outcomes for both surgeries.

P522

Demographics and Socioeconomic Status as Predictors of Weight Loss After Laparoscopic Sleeve Gastrectomy

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Background: Prior studies have established that race and socioeconomic factors may influence weight loss after bariatric surgery. Few studies have focused on laparoscopic sleeve gastrectomy (LSG). The objective of this study is to determine if demographic factors may predict postoperative weight loss following LSG.
Methods: Prospectively collected data on 666 consecutive LSG operations performed between February 2010 and May 2016 by a single surgeon (PG) were analyzed. Multiple regression analysis was done to determine if gender, race, or socioeconomic factors such as insurance and employment status correlated with postoperative weight loss. The presence of chronic comorbidities effecting quality of life such as Type II Diabetes (DM II) and Obstructive Sleep Apnea (OSA) were also recorded and analyzed.
Results: All studied groups had comparable preoperative BMIs (Mean 46 kg/m2). Race was not significantly associated with weight loss at any postoperative interval. Male gender was associated with increased weight loss through the first three months (48.2 +/- 12.5 lbs vs. 40.5 +/- 11 lbs; p= 0.0001). Patients with diabetes had significantly less weight loss at the six through 18 month intervals (50.4 +/- 17.9 lbs vs. 59.6 +/- 15.6 lbs at six months; p=0.00032; 53.3 +/- 25.4 lbs vs. 80.5 +/- 31.3 lbs at 18 months; p=0.008).Patients with obstructive sleep apnea had significantly less weight loss at the two year interval (57.5 +/- 29.2 lbs vs. 69.6 +/- 23.5 lbs; p=0.047). Those with Medicare compared to Medicaid or commercial insurance had decreased weight loss through the first year (52.8 +/- 20.8 lbs vs. 71.4 +/- 26.4 lbs vs. 68.6 +/- 24.7 lbs; p=0.0496). Notably, a higher percentage of patients in the Medicare insurance group were also diabetic and had OSA (65% vs. 34% vs. 36%; p=0.002; 55% vs. 57% vs. 80%; p=0.01). Finally, those patients who were students had the greatest weight loss at two years postoperatively with the least weight loss seen in retired patients followed by those on disability (108.0 +/-100.0 lbs vs. 26.0 +/-26.0 lbs vs. 40.0 +/-46.0 lbs; p=0.04).
Conclusions: Several demographic factors including comorbidities, insurance status, and employment may significantly affect weight loss patterns following LSG. Further studies are needed to evaluate whether demographic differences impact long term weight loss. Differences in outcomes based on patient demographics may be beneficial in the planning of the allocation of healthcare resources.

P523

The Utility of Preoperative Upper Endoscopy in Patients Undergoing Bariatric Surgery

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Objective: The aim of this study was to evaluate the diagnostic yield of routine preoperative esophagogastroduodenoscopy (EGD) in patients undergoing bariatric surgery.
Background: Obesity is a potential risk factor for a number of chronic disease processes that impact the upper gastrointestinal tract. Reflux and heartburn are conditions frequently affecting obese patients, and are often related to a hiatal hernia (HH), the presence of which has important implications in the bariatric surgery patient. Despite this, the utility of routine preoperative EGD in patients undergoing bariatric surgery remains controversial.
Methods: Following institutional review board approval, the electronic medical records of patients who underwent bariatric surgery at a university hospital-based bariatric surgery program between August 2011 and July 2016 were retrospectively evaluated. Clinical history and preoperative EGD reports were reviewed for abnormal findings, which necessitated changes in medical management or alterations in surgical procedure.
Results: Three hundred and eighty nine patients were included in the study. Three hundred and forty five (88.6%) had preoperative EGDs performed. Half of all patients (n=173) were found to have a HH (Type I: n=161, 46.6%; Type II: 0.3%, n=1; Type III: 3.2%, n=11). Of these, 73% (n= 127) had a history of heartburn, reflux or dysphagia. In all, 37% of patients (127/345) with a history of heartburn, reflux or dysphagia were found to have a HH. Thirty two percent (n=110) of patients were found to have gastritis, esophagitis or duodenitis. Ulcers were found in 7.2% (n=25) of patients. Of the patients who had preoperative EGDs, biopsies for Helicobacter (H) Pylori and Barrett's esophagus were taken in 46% (n=159) and 28% (n=98) respectively. H. Pylori was positive in 16.3% (n=23) and Barrett's 3% (n=3). Forty percent of patients (n=138) were placed on anti-reflux medications following EGD. Surgical procedure was altered in 18.8% (n=65) of patients. Of all patients who underwent screening EGDs, 75% (n=258) had abnormal findings.
Conclusion: Preoperative EGD identifies a significant proportion of upper gastrointestinal pathologies in patients considering bariatric surgery. Abnormal findings may have important implications for medical management and surgical planning. Routine use of screening EGDs should be considered in all patients undergoing bariatric surgery.

P524

Safety and Outcome of Revision Bariatric Surgery Involving Conversions: A Retrospective Analysis

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Introduction: Thirty percent of revision bariatric surgeries are conversions. With younger population undergoing bariatric and metabolic procedures, revision surgeries are practical challenge. Here we present the safety and outcome data of conversion surgeries in our institute.
Methods and Procedure: Institutional dataset was reviewed for patients from January 2010 to June 2016 for revision bariatric surgeries with conversion only. Data was analyzed for morbidity, mortality and pre and post-revision body mass index(BMI). Statistical analysis was done using SPSS software. Means were compared using t test. One way ANOVA was used to see difference between groups.
Results: Seventy nine patients were identified to have revision bariatric surgeries with conversions. Female constituted 89% of the group. Average age was 45 years(25–65). Mean pre-revision BMI was 41 kg/m2. All procedures were started laparoscopically and 8% were converted to open. Seventy six percent of procedures were adjustable band conversions (48% to bypass and 29% to sleeve). Mean postoperative length of stay was 2.7 days. There was no mortality within 30 days after surgery and morbidity was 11% with pulmonary embolism(1.3%), small bowel obstruction (3.8%). Weight loss in terms of BMI was not significant among different conversion surgeries. Pre-revision BMI was 41 kg/m2 and decreased to 30 kg/m2 at one year (p<0.05).
Conclusion: Bariatric revision surgeries with conversion are safe and have acceptable outcomes with increase incidence of morbidity.

P525

Bariatric Single Anastomosis Gastric Bypass: A Single Surgeon Experience of 532 Patients

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Background: Although single anastomosis gastric bypass (SAGB) is a promising bariatric procedure with various benefits, it is yet to gain wide acceptance and routinely performed only in specialized tertiary bariatric centers. Here we describe a single surgeon experience in SAGB with emphasis on the surgical safety and efficacy.
Methods: Retrospective analysis of all patients who underwent SAGB between January 2015 and July 2016 was performed. All procedures were performed by a single bariatric surgeon. Patient demographics, obesity related co-morbidities, operative and postoperative data, as well as first year outcomes were collected and analyzed.
Results: Five hundred and thirty-two patients underwent laparoscopic SAGB (320 female, average age 41.7±12 range 13–72 years, BMI=41.8±5.6). Prior bariatric surgery was performed in 126 patients (23.7%). One hundred and twenty-five patients (23.4%) suffered from diabetes mellitus with average HbA1C of 8.8.
No conversions to an open approach were required.
The average length of hospital stay was 2.2±0.84 days (range 1–10 days). Five patients (1.1%) suffered from major postoperative complications that necessitated reoperation within 30 days from the primary surgery. These consisted of anastemotic leaks in 1 patient, postoperative bleeding in 3 patients, and early intestinal obstruction in 1 patient. No readmissions were recorded following initial discharge. No patient died during or following surgery.
Weight loss showed a consistent trend over the follow-up period of 1 year with average EWL of 44.3% after 3 month, 67.9% after 6 month, 73.8% after 9 month and 83.3% EWL after one year. T2D has shown partial or complete remission: A1C levels after 3 month was 6.2, 6 month 5.5, 9 month 5.3 and 12 month 5.2.
Conclusion: SAGB is safe in both primary and revision bariatric surgery with accepted rate of postoperative morbidities. Short term weight loss and an improvement of obesity-related clinical parameters are favorable, however long term follow-up is warranted.

P526

Implementing the ASCVD Score to Assess Risk Reduction After a Bariatric Surgery

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Introduction: The atherosclerotic cardiovascular disease(ASCVD) risk is defined as coronary death or nonfatal myocardial infarction, or fatal / nonfatal stroke. This is a 10-year and lifetime predictor tool that considers not only myocardial disease but includes fatal and non-fatal strokes. This tool has not been used to assess absolute risk reduction after a bariatric surgery. Our goal in this study is to evaluate the impact of a bariatric surgery in the reduction of the ASCVD risk score.
Methods: From our bariatric population, we retrospectively reviewed all bariatric surgeries between 2010 and 2014. Patients who met the criteria for calculating the ASCVD 10-year and/or lifetime score calculation were included. Data collected included baseline demographics, perioperative parameters and postoperative outcomes at 12 months.
Results: From our 1129 bariatric patients, 245 (21.7%) patients met the criteria for the ASCVD risk score calculation. Laparoscopic sleeve gastrectomy(LSG) was the most prevalent surgery 64.89%(N=159) following by laparoscopic Roux-en-Y gastric bypass (LRYGB) 24.48% (N=60). Females composed 69.38%(N=170) of our population. The average age for female was 50.72±11.37 years and for male 54.89±10.9 years. The initial BMI was 42.46±6.94 kg/m2 for females and 42.90 kg/m2±6.6 for males. The percentage of estimated BMI loss (%EBMIL) at 1 year was 67.64% in females and 64% on males. The preoperative 10-year ASCVD score was significantly higher in males compared to females (17.28% ±13.83 vs. 7.52%±9.09). After 12 months follow-up, the absolute risk reduction in males was 5.42% and 2.77% in females($P<0.001$). The preoperative and 12 months lifetime risk was also calculated. In the preoperative settings males had a 56.98%±14.85 lifetime risk, while females had a 39.93%± 9.82. A significant decrease was also noted in both genders, 16.26% absolute lifetime risk reduction in males and 6.35% in females($P<0.001$). Absolute 10-year risk reduction was found to be significant in LSG and LRYGB($p<0.001$), compared to revision procedures($P=0.37$) and laparoscopic adjustable gastric banding($p=0.15$). After 1 year follow-up, treatment for hypertension was discontinued in 26.5% of the patients($p<0.001$) and the complete resolution of diabetes mellitus was achieved in 13% of the patients($p<0.001$). Furthermore, other variables such as total cholesterol, systolic blood pressure, tobacco use and HDL showed to significant improve at 12 months follow-up.
Conclusion: Our results suggest that there is a positive correlation between bariatric surgery, especially LSG and LRYGB, and the reduction of the 10-year and lifetime cardiovascular disease risk. Further prospective studies may be needed to better understand this correlation.

Table 1. ASCVD score for 10-year and lifetime risk reduction in females and males.

		Preoperative	12M	Absolute risk reduction (%)	P-Value
10 year risk (%)	Female	7.59±9.09	4.82±6.69	2.77	0.0006
	Male	17.28±13.83	11.86±11.82	5.42	<0.001
Lifetime risk (%)	Female	39.93±9.82	33.58±12.82	6.35	<0.001
	Male	56.98±14.85	40.72±21.41	16.26	<0.001

Mean ±Standard deviation. Student T test

P527

Effects of Bariatric Surgery on Sleep Apnea

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Background: Obesity is one of the risk factors for obstructive sleep apnea (OSA), increasing its risk by tenfold. The use of Continuous Positive Airway Pressure (CPAP) is a proven method of treating obstructive sleep apnea, but compliance is reported to be less than 50%. Although patients achieve important weight loss after bariatric surgery, literature is conflicting regarding any improvement of obstructive sleep apnea symptoms.
Purpose: This study aims to assess the effects of bariatric surgery on sleep apnea symptoms, apnea/hypopnea index (AHI) scores, and use of CPAP treatment.
Methodology: Retrospective chart review of patients who underwent bariatric surgery at our institution between January 2013 and September 2014. We included 376 patients who had completed a preoperative overnight polysomnography, had diagnoses of OSA, and were on CPAP prior to surgery. We then excluded patients that did not complete a post-operative polysomnography.
Results: We observed a decrease in body weight (Kg.) of 23.40%, and a decrease in BMI of 22.76% in accordance with their post bariatric state. In relation to their sleep apnea: there was a decrease in AHI of 56.86%, a decrease in their Arousal Index by 34.97% which lead to a decrease in the requirement of CPAP use by 67.64%. CPAP pressures were reduced postoperatively by 19.83%. The average interval between surgery and follow-up polysomnography was 20 months.
Conclusions: Bariatric surgery significantly improved OSA scores and decreased CPAP use in relation to decreases in BMI and body weight. These results are in relation to successful weight loss after bariatric surgery.

P528

Impact of Laparoscopic Sleeve Gastrectomy on Gastroesophageal Reflux Disease

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Introduction: Sleeve gastrectomy is estimated to be the most common bariatric operation performed today. However, the impact of laparoscopic sleeve gastrectomy (LSG) on gastroesophageal reflux remains undetermined with conflicting results in published data. The aim of this study was to examine the impact of LSG on gastroesophageal reflux disease (GERD).
Methods: Retrospective data analyses were performed on all patients undergoing LSG from 2013 to 2015 at a single institution. The patients were stratified based on the presence or absence of preoperative GERD. Presence of GERD was defined by symptoms, therapy with an anti-reflux medication, or a documented diagnosis of GERD. GERD presence was then determined at last follow up appointment within 24 months. Bivariate frequencies were compared using the Chi-squared test and the relationship between GERD and weight loss were assessed with Student's t-test.
Results: Of 85 patients, preoperative GERD was present in 54 patients (63.5%). Within this group (preopGERD+), 29 (53.7%) continued to have gastroesophageal reflux postoperatively; while 15 (48.4%) developed postoperative GERD in the group without preoperative GERD (preopGERD-). There were no significant differences in weight, BMI, % weight loss, or ?BMI with GERD outcomes in either of the two groups. Evidence of gastroesophageal reflux on preoperative barium swallow did not predict postoperative reflux. Independent of clinical status, 21 of 35 (60%) patients who had evidence of GERD on preoperative barium swallow had symptomatic GERD after LSG; while, 11 of 27 (41%) patients who did not have evidence of GERD on preoperative barium swallow had postoperative GERD. All patients who developed GERD after bariatric surgery had symptom control on a proton-pump inhibitor, and no patient has required subsequent surgical intervention. There was no statistical difference in follow up intervals between the groups.

Table 1. Postoperative GERD status based on preoperative symptoms and barium swallow results.

		Postoperative status (n=85)[a]		
Preoperative status		GERD +	GERD -	p-value
Symptoms	+	29 (53.7%)	25 (46.3%)	0.6368
	-	15 (48.4%)	16 (51.6%)	
Barium swallow	+	21 (60%)	14 (40%)	0.2959
	-	23 (46%)	27 (54%)	

[a]Data presented as number (%)
*p-value <0.05 is significant

Conclusions: Following LSG, gastroesophageal reflux improved in the nearly half of patients who had preoperative GERD. Conversely, almost half of patients without preoperative gastroesophageal reflux developed it postoperatively. Neither weight loss outcomes nor evidence of gastroesophageal reflux on preoperative barium swallow were predictive of postoperative gastroesophageal reflux. Future studies of a larger patient population and longer term follow up are needed.

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Laparoscopic Minigastric Bypass vs Laparoscopic Sleeve Gastrectomy: Metabolic Surgery for Morbid Obesity with Remission of Diabetes and Co-morbidities and Effective Weight Loss

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Introduction: Morbid obesity is a worldwide pandemic and has a strong association with diabetes mellitus and other co-morbidities. Procedures for obesity surgery lead to remission of metabolic diseases to a good extent. Laparoscopic sleeve gastrectomy (SG) and Laparoscopic single anastomosis mini-gastric bypass (MGB) are 2 commonly used procedures. Despite many thousands of published cases, MGB continues to be controversial and many national societies do not regard it as a mainstream bariatric procedure.nOur study aims to prove the efficacy of Laparoscopic MGB by comparing with LSG (a procedure well accepted by international society) in terms of weight loss and remission of diabetes mellitus and other co morbidities specifically in Asian population.
Materials and Methods: 85 matched patients out of 120 were selected with morbid obesity randomized into groups.(n=43) underwent MGD and (n=42) underwent LSG. Patients were followed up post op at 6 ,12 and 24 months in both the groups. Both groups were compared statistically in terms of loss of weight ,remission of diabetes,hypertension and obstructive sleep apnoea and dyslipidimia.3 patients were lost to follow up, 1 in LSG group and 2 in MGB group.1 patient in LSG group had marginal ulcers and underwent revision rou-en y gastrectomy.These were excluded from the analysis.
Conclusion: Thousands of cases of Laparoscopic mini-gastric bypass have been reported in literature with proven results though it is not widely worldwide. In our study it proved to result in more effective weight loss and co morbidity reduction compared to sleeve gastrectomy. Duodenal exclusion in mini-gastric bypass may have led to the incretin effect. Further studies with long term follow up are required to substantiate the effectiveness and long term outcome of procedure for better international acceptance.

Results:

	MGB(n=40)			LSG(n=40)		
Parameter (at 24 months)	Pre-op(Mean)	Post-op(mean)	%change	Pre-op	Post-op	%change
Weight	120.5	80.1	50.43	116.9	92.5	26.378
BMI	43.1	29.1	48.10	42.6	32.4	31.48
HBAIC	8.1(34)	6.1	32.78	8.4(33)	7.0	20.0
Blood pressure*	153.5(24)	134.9	13.78	147.1(22)	138.5	6.21
Total cholesterol*	283.9(22)	201.5	40.89	259.6(21)	209.5	23.91
Obstructive sleep apnoea*	18 pts	4 pts	77.77	14 pts	4 pts	71.42
Fasting glucose*	151.4(34)	115.6	30.96	146.5(33)	130.5	12.26

*only those patients having the respective co-morbidity preoperatively used for statistical analysis. Indicated by figures in the brackets.

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Bariatric Surgery in Adolescents: Band vs. Sleeve vs. Gastric Bypass

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Background: Approximately 33% of adolescents in western countries are overweight and obese, and 80% of them will become adult obese with associated severe co-morbidities. Medical and behavioral intervention remains largely ineffective in this group. We report our experience with bariatric surgery in adolescents at a high volume center in Chile over the last 12 years and their weight loss at 1 year.
Methods: From 2002 to 2015, 114 adolescents between 13–19 years old underwent bariatric surgery at Clinica Las Condes, a large private medical center in Chile. All of them were assessed by a multidisciplinary team and discussed in a Committee. At the beginning patients only underwent laparoscopic gastric banding (LGB) until 2012, but over the last 10 years, sleeve gastrectomy (LSG) and Roux en Y Gastric bypass (RYGB) were added.
Results: Over this period the number of patients for each surgery were: 40 LGB, 67 LSG and 7 patients had a RYGB. The average age and BMI were 17 (range 13–19) and 36,7 (range 30–51) for all three groups, 17 and 37 for LGB, 17 and 35,7 for LSG and for RYGB 18 and 44. All of them had 3 or more comorbidities and the majority resolved after surgery. Major complications included 2 cases of slippage (5%) in the LGB that required removal. No complications in the LSG and 1 micronutrient deficiency (14%) in the RYGB group. No mortality. Mean excess weight loss at 1 year F/U was 54% for LGB, 85% for the LSG group and 72% for the RYGB.
Conclusions: Laparoscopic bariatric surgery is safe in adolescents. In adequately selected patients and with strict multidisciplinary team follow up, bariatric surgery is an effective tool to treat obesity in the adolescent. Of the 3 most common bariatric procedures, the LSG and RYGB appear to be more effective in terms of weight loss and safety over the LGB, which is no longer performed at our institution.

P531

Laparoscopic Sleeve Gastrectomy: An Image-Based Guide to Common Postsurgical Failure

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Introduction: Laparoscopic sleeve gastrectomy (LSG) has become the most common bariatric procedure worldwide. Despite its apparent simplicity, this bariatric procedure may lead to an unfavourable outcome through insufficient weight loss or weight regain. Among the different complications associated with the LSG, sleeve leak (1-2.5%), sleeve stenosis (0.7–3.5%) and hemorrhage (<5%) are among the most frequent. The objective of this paper is to illustrate the imaging findings of insufficient weight loss or weight regain, as well as the common complications post LSG.
Methods and Procedures: A search was performed through our prospectively maintained bariatric database in order to select and illustrate the most common failure patterns. LSG failure was classified as insufficient weight loss, weight regain and surgical complications. Computerized tomography (CT) scan and upper gastrointestinal series images were selected in order to highlight the various failure patterns.
Results: Overall, twenty patients were selected from our bariatric database. Each patient was chosen to illustrate the major complications that can occur post LSG: staple line leak, abnormal angulation or stenosis, post-operative hemorrhage, gastro-esophageal reflux and splenic infarction. Various causes of insufficient weight loss or weight regain such as primary and secondary sleeve dilatations were also emphasized. Different treatment options in the armamentarium of the bariatric surgeon were also illustrated such as percutaneous drainage, endoscopic stenting with different stent types as well as surgical treatment options such as a Roux-en-Y fistulo-enterostomy for chronic fistula.
Conclusion: Given the tremendous increase in LSG procedures, surgeons will be faced with increasing numbers of post LSG complications. Radiological evaluation plays an essential role in recognizing the most frequent and feared complications of LSG such as gastric leaks and sleeve stenosis. Understanding the modified post sleeve gastrectomy surgical anatomy as well as the typical manifestations of post-surgical complications is essential in order to better serve this growing patient population.

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Can Omentopexy at the Time of Laparoscopic Sleeve Gastrectomy Help with Long Term Postoperative Nausea and Nausea-Related Complications?

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Introduction: Nausea and vomiting is a common complication after laparoscopic sleeve gastrectomy (LSG). We evaluated the potential benefit of performing an omentopexy to the greater curvature of the stomach as a method of reducing these symptoms postoperatively.
Methods: This is a retrospective cohort study of 132 patients that underwent LSG with and without omentopexy between 10/2014-8/2015 at a single hospital. Only patients that had follow up visits up to one year postoperatively were included in the final analysis (n=130). Of these, 57 patients underwent omentopexy (Group 1) and 73 didn't (Group 2). The two groups were compared in regards to postoperative nausea requiring medical attention and other nausea-related outcomes (anti-nausea medication doses, emergency room (ER) visits and hospital readmissions). Statistical methods included *t*-test and x^2-test, used as appropriate. $p<0.05$ was considered statistically significant.
Results: Patients that underwent omentopexy at the time of LSG were comparable in age, pre- and post-operative BMI, intraoperative and major postoperative complications. Groups 1 and 2 did not differ in postoperative nausea rates (21.05% vs 19.18%, respectively;$p=0.83$). The groups required similar total amounts of ondansetron (21.71±17.40 mg *vs* 17.86 ±16.58 mg, respectively;$p=0.20$) and promethazine (9.87±12.49 mg *vs* 10.00±14.00 mg, respectively;$p=0.96$) during their immediate postoperative hospitalization. Postoperative nausea-related ER visits (17.54% *vs* 12.33%, respectively;$p=0.46$) and hospital re-admissions (7.02% *vs* 6.85%, respectively;$p=1.00$) within one year of the procedure were also similar between the 2 groups. The above findings persisted after further sub-analysis of only the patients with postoperative nausea requiring medical attention with 12 patients in the omentopexy group (Group 1a) and 14 in the group without omentopexy (Group 2a). Groups 1a and 2a had similar postoperative nausea-related ER visits and hospital readmissions after stratifying for the following postoperative follow-up time periods: <30 days, 30 days-6 months and 6 months-1 year from surgery. Interestingly, no hospital readmissions>30 days from surgery were identified in patients who had undergone omentopexy, although this wasn't statistically significant when compared to those who had not undergone omentopexy ($p=0.10$).
Conclusion: Our findings indicate that omentopexy at the time of LSG does not significantly reduce postoperative nausea and nausea-related complications. However, no hospital readmissions after 30 days from surgery were noted in patients that had undergone omentopexy at the time of LSG when compared to those who did not. Further studies may elucidate the potential long-term benefit of omentopexy during LSG on postoperative nausea.

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Diarem Score as a Predictive Tool for Type 2 Diabetes Mellitus Remission in Laparoscopic Sleeve Gastrectomy Versus Laparoscopic Roux-En-Y Gastric By-Pass

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Background: For the past decade, the bariatric surgeons have been seeking a practical and consistent tool to predict the metabolic improvement after a bariatric surgery. We evaluate the utility of the DiaRem score in predicting Type 2 Diabetes Mellitus (T2D) remission after bariatric surgery.
Methods: From our bariatric population we retrospectively reviewed all patients with diagnosis of T2D who have had a Laparoscopic sleeve gastrectomy (LSG) and laparoscopic Roux-en-Y gastric by-pass (LRYGB), between 2010 and 2014. Patients that met the criteria were included, and using simple clinical data (age, HbA1c, antidiabetic medication and use of insulin), we calculated the DiaRem. The post-operative T2D remission was calculated applying the American Diabetes Association criteria and compared to the DiaRem to assess its value as a predictive tool.
Results: From 1129 bariatric patients, 87 met the criteria for the DiaRem Score calculation and remission evaluation. The population had an age mean of 54.25±11.67 years, sex distribution of 62.06% females and 77.60% were Caucasian. LSG was the most prevalent surgery 65.5% (N=57), followed by LRYGB 34.5% (N=30). The DiaRem score was distributed as follows: 0 to 2: 9.2% (N=8), 3 to 7: 23% (N=20), 8 to 12: 12.6% (N=11), 13 to 17: 39% (N=34), 18 to 22: 16.2% (N=14). The Score Mean was 11.51±6.14. The remission (partial and complete) was achieved in 39.08% (N=34) of the cases with a relative outcome of 82% (N=28) complete and 18% (N=6) Partial. As we separated the data by group we found a remission of 87.50% (N=7) in the group from 0 to 2(p=0.0023); 70% (N=14) remission in the 3 to 7 group (p=0.01); 45% (N=5) remission in the 8 to 12 group(p=0.66); 11.76% (N=4) remission in the 13 to 17 group(p=<0.001); 28.5% (N=4) remission in the 18 to 22 group(p=0.02). Regarding the type of surgery we found for LSG 73% (N=17) remission within scores from 0 to 7 vs. 26% (N=6) within scores from 8 to 22. For LRYGB 36.3% (N=4) remission within scores from 0 to 7 vs. 63% (N=7) within scores from 8 to 22. The percentage of remission was 40.34% in LSG vs. 36.60% in LRYGB(p=0.73).
Conclusion: The DiaRem score demonstrated to be a useful tool to predict pot-operative remission of T2D both after LSG and LRYGB. Further prospective and larger studies are needed to better asses this correlation.

Table 1. Reduction of anti-diabetic medication and type of procedure.

	LSG(N=57)			LRYGB (N=30)			Baseline P Value
	Preoperative	**12 months**	**P value**	**Preoperative**	**12 months**	**P value**	
Metformin use	80% (N=46)	35.08%(N=20)	0.0001[a]	63.33%(N=19)	30.0%(N=9)	0.009[a]	0.07[a]
Other non-metf	29.8%(N=17)	10.52%(N=6)	0.01[a]	46.66%(N=14)	26.66%(N=8)	0.1[a]	0.11[a]
Insulin	50.8%(N=29)	22.8%(N=13)	0.001[a]	70%(N=21)	26.66%(N=8)	0.0007[a]	0.08[a]

% Percentage (N=number) [a]Chi-square

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Gastric Leak Management in Sleeve Gastrectomy Postoperative

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Introduction: Laparoscopic sleeve gastrectomy is the most commonly performed restrictive bariatric procedure worldwide. Increasing evidence supports its good results in both weight loss and resolution or improvement of comorbidities. The most feared complication of this technique is the leak in the upper third of the suture line, near the gastroesophageal junction (GEJ) because of its difficult management. The frequency of this complication varies between 0–20% depending on the series. The objective of this study is to describe the management of gastric leaks in a high surgical volume centre.
Methods and Procedures: This is a descriptive cross sectional study. Thirty-five patients with gastric leaks after sleeve gastrectomy from a total of 3420 patients operated between January 2007 and April 2016 were evaluated. All patients had a drain placed during surgery. The need for additional procedures such as percutaneous drainage or surgery were evaluated, as well as type of feeding, need for stents and total time to complete resolution.
Results: Out of the 35 patients, 15 were managed with primary surgery drainage (42.85%), without additional procedures. 12 required a percutaneous drainage (34.28%) and in 3 of them a covered stent was placed. Seven patients (20%) required laparoscopic drainage. One patient (2.85%) with gastro pleural fistula was resolved by thoracoscopy and stent placement. Eleven patients (31.4%) were handled as outpatients throughout the whole process. The remaining patients required a median of 4 days hospital stay after readmission. Parenteral nutrition was necessary in 5 patients, and enteral feeding in 3. 30-day mortality was 0% and 90-day mortality 5.7%. The time to final resolution ranged between 25 and 426 days, with a median of 40 days.
Conclusions: Most patients were handled with minimally invasive procedures (surgical drainage or percutaneous drainage) and oral diet. 31.4% required no readmission and were treated as outpatients. Mortality related to leaks remains high.

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Bariatric Surgery Earlier in Life Leads to Improved Outcomes

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Introduction: Bariatric surgery is a proven safe and durable treatment for obesity. Limited published literature assessing the effect of bariatric procedures across age groups is available. The aim of this study was to compare the outcomes of bariatric surgery based on age at the time of operation.
Methods: After obtaining IRB approval, a retrospective review of patients who underwent surgery between August 2013 and May 2015 was performed from a prospectively maintained database. Patients were classified into 5 groups based on age. Data obtained included gender, body mass index (BMI), length of stay (LOS), readmissions, percent excess weight loss (%EWL), and resolution of obesity related comorbidities [(diabetes (DM), hypertension (HTN), reflux, obstructive sleep apnea (OSA), and hyperlipidemia (HL)] at 6 months and 12 months post-operatively. Demographics and patient characteristics were analyzed with descriptive statistics. Chi-square assessed the significance of the relationships of variables. A value of $p<0.05$ was considered significant.
Results: The review included 214 patients. Procedures included Roux-en-Y gastric bypass (69%) and sleeve gastrectomy (31%). 78.3% of patients were female. Average LOS was 2.4 ± 2.2 days. There was no statistically significant difference in resolution of comorbidities when comparing Roux-en-Y to sleeve.
Table comparing resolution of comorbidities and %EWL at 1 year after bariatric surgery.

	18–35 years n=33	36–45 years n=68	46–55 years n=61	56–65 years n=42	>65 years n=10	Significance
DM	100%	65%	74%	50%	44.4%	p=0.024
HTN	81%	57.1%	52.3%	53.3%	18.2%	p=0.017
Reflux	55.6%	51.9%	59.3%	56.3%	83.3%	p=0.726
OSA	66.7%	76.2%	69.2%	70%	100%	p=0.749
HL	0%	38.1%	44%	61.9%	63.6%	p=0.117
%EWL	59.5%	55.7%	59.1%	48.9%	52.9%	p=0.081

Conclusions: The positive impact of bariatric surgery on resolution of obesity related comorbidities is universal. However, increased rates of resolution of DM and HTN can be achieved in the younger population. Our study demonstrates the importance of undergoing bariatric procedures earlier in life to achieve optimal outcomes prior to progression of comorbid conditions.

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Laparoscopic Sleeve Gastrectomy: Short Term Outcomes with and Without Staple Line Reinforcement

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Objective: Laparoscopic sleeve gastrectomy (LSG) is the most commonly performed bariatric surgical procedure, but the optimal technique for this operation is still unclear. Patient outcomes as well as cost are extremely important considerations in determining the most effective operative technique. Staple line reinforcement is utilized by over 80% of surgeons performing LSG. It is clear that staple line reinforcement with buttress material substantially adds to the cost of the operation, and recent data suggests that outcomes are potentially worse with staple line reinforcement. Most surgeons at our institution do not utilize staple line reinforcement. The objective of this study was to review our 30-day outcomes relating to bleeding and leaks in laparoscopic sleeve gastrectomy patients as these are the two most commonly seen complications with this operation.
Methods: All sleeve gastrectomies performed between January 1, 2014 and July 31, 2016, at Vanderbilt University Medical Center were reviewed and included in the analysis. The operations were performed by five different surgeons. Two surgeons routinely used biologic buttress material with each staple load. The remaining surgeons did not use any staple line reinforcement but used surgical clips or oversewing for hemostasis. Definitions were in accordance with the MBSAQIP data registry.
Results: During this 31-month period a total of 415 laparoscopic vertical sleeve gastrectomies were performed. The median BMI was 46 (range 32–95). The median bougie size was 34.5 (range 32–36). Staple line reinforcement was utilized in 19% (N=80) of cases. The staple line was oversewn in 7% (n=31) of cases. Five percent (N=20) of all patients had staple line reinforcement with buttress material and oversewing of the staple line. Amongst all patients, two (0.5%) had post-operative bleeding requiring transfusion, and one of these patients required re-exploration. Neither of these patients had staple line reinforcement with buttress material. None of the patients had a post-operative leak. All patients had 30-day follow-up.
Conclusion: The outcomes in this study were too rare to perform statistical analysis; however, our review of LSG in a large series of patients demonstrates that this can be performed without staple line buttressing with very rare occurrences of bleeding. At our institution, the additional cost of biologic buttress material for each staple is $163 compared to $3.57 per five pack of clips. Performing a LSG without staple line reinforcement using buttressing material could represent a significant cost savings without sacrificing high quality outcomes.

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Gastroparesis Following Laparoscopic Sleeve Gastrectomy; Roux-En-Y is the Cure

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Introduction: Laparoscopic sleeve gastrectomy (LSG) is the most commonly performed bariatric procedure in the United States today. Although LSG has been proven to be safe and effective, it is not without complication. Stricture or stenosis can be a serious, yet rare, complication post LSG. The standard treatment is endoscopic dilation or a conversion to Roux-en-Y gastric bypass if less invasive treatment is ineffective. Gastroparesis following LSG is even more infrequent than stricture with only case reports in the literature. Given its rarity, optimal management remains unclear.
Case Report: 48 year old male presented to our bariatric center of excellence for an elective LSG. The patient had a BMI of 41 and a past medical history of obstructive sleep apnea, hyperlipidemia and diabetes mellitus. LSG was carried out without complications around a 32 french calibration tube in the usual manner. A single stitch was placed opposite the incisura to prevent torsion. On postoperative day (POD) #1 an esophagram was performed with delayed emptying initially, and eventual passage of contrast into the duodenum on POD#2. Despite this, the patient was unable to tolerate PO clears with persistent nausea and vomiting. On POD#6 esophagogastroduodenoscopy was performed revealing mild gastritis with the scope being passed into the duodenum with ease. No stricture or torsion was found. The patient, however, continued to have nausea and vomiting with inability to tolerate clear liquids. On POD #13 a Roux-en-Y gastric bypass (RNYGB) was offered to the patient with gastroparesis following LSG being the principal cause of symptoms. Intraoperatively, a 40F calibration tube was easily passed into the duodenum again without any stricture or torsion noted. A RNYGB was then performed in the usual manner. Postoperatively, an esophagram was obtained on POD #1 which showed brisk passage of contrast through the gastrojejunostomy. The patient was then started on a clear liquid diet, which he tolerated. The patient was discharged home tolerating clear liquid diet and on follow up visits has not had any more complaints.
Discussion: PO intolerance following LSG without any anatomic findings can be difficult to diagnose and treat. Multiple studies have shown that there is no statistically significant correlation in gastric emptying time when comparing LSG patients to non bariatric patients. We propose that in the case of gastroparesis following LSG, a conversion to a RNYGB is an effective surgical treatment option.

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Portomesenteric Venous Thrombosis as a Complication of Laparoscopic Sleeve Gastrectomy: A Case Report

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Background: Laparoscopic sleeve gastrectomy (LSG) is a fast growing option for morbidly obese patients. LSG has proven to be an effective procedure with a low rate of complications. However, an increasing number of cases of portomesenteric venous thrombosis (PMVT) are being reported in the literature.
The aim of this presentation is to emphasize the presence of subtle clinical presentation and the importance of early recognition and treatment of PMVT.
Case Report: We present a 44yo female (BMI 40.8) with history of hypertension, OSA and a long history of oral contraceptive use. She underwent an uneventful LSG. Received peri-operative pharmacological thromboprophylaxis, intra and post-operative SCDs and early ambulation. On POD 11, she presented to the ER with throbbing mid epigastric and back pain for 3 days. Pain worsened over the last 24 h. One episode of non-bilious emesis, nausea and poor PO intake was reported. She was conservatively managed with symptom improvement and discharged.
48 h later, she returned with recurrent symptoms. Abdominopelvic CT scan showed superior mesenteric vein thrombosis and a partially occlusive thrombus of the main portal vein with no signs of bowel ischemia. Physical exam was without peritoneal signs. The patient was adequately resuscitated including anticoagulant therapy. Her symptoms completely resolved within 72 h and she remained asymptomatic with diet. On HD 6, she was discharged on anticoagulation therapy for 6 months. Hematological prothrombotic work-up performed was negative.
Discussion: PMVT is a rare complication but literature has shown when it comes to bariatric surgery, it is more commonly reported with LSG. Clinical presentation is usually subtle and suspicion should rise early. It is crucial to have a high index of suspicion to perform early diagnosis and treatment. Identification of risk factors with clinical history should lead to a low threshold for clinical suspicion. In the absence of any prothrombotic disease and despite receiving appropriate peri-operative thromboprophylaxis, our patient developed PMVT. Inferring that further discussion is needed to establish improved peri-operative prophylaxis guidelines in order to prevent potential life threatening sequelae.
Conclusion: Subtle signs and symptoms and the infrequency with which PMVT is encountered makes it a diagnostic challenge. Familiarity with PMVT is critical for prompt diagnosis and treatment. Demonstrating the importance of examining the likelihood of PMVT and its dangerous manifestations when developing differential diagnosis. Thus, having a high index of suspicion may result in early recognition and action, potentially preventing unforeseen consequences.

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Simple, Safe and Effective. The MGB Added to Nissen Surgery (MGBN): 15-Year Outcomes of 1452 Cases from a Single Surgeon

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The aim of this study was to assess retrospectively the incidence of reflux and endoscopic changes in MGBN post-operative time after 5 years post-op; from 5 to 10 years post-op; from 10 to 15 years post-op.
Method: The inclusion pre-operative criteria for MGBN was: (1) erosive reflux disease; and/or (2) significant sliding hiatal hernia (>3 cm); and/or (3) hipotonia of lower esophageal sphincter (LES). The data of morbidly obese patients who underwent to MGBN by the same team in two different Hospitals from 1999 to 2016 were retrospectively collected. During this period 2135 patients were submitted to MGBN. We called all 2135 patients by means of email; mobile phone and social networks. However only 1452 patients (68%) answered the call. We divided these 1452 patients in three groups. Group 1: Patients submitted to MGBN until 5 years postoperative time; Group 2 from 5 to 10 years postoperative time and Group 3 from 10 to 15 years postoperative time. We evaluated mortality; morbidity; GERD symptoms; upper endoscopy findings; histological findings after endoscopic biopsies; weight loss and T2DM resolution.
Results: Mean age was 42. BMI was 44±4.5. No conversion to open surgery. 30day mortality was 0. Overall mortality was 0,2%. Perioperative morbidity was 0,8%. The mean operative time was 92 ±4 min. No leak was observed. %EWL was 88±4,4% at 5 years; 81+2,1% and 79±1,2% at 15years. Barret's was 0,8%. No cancer or dysplasia were found. Non-erosive reflux disease was 12% and erosive reflux disease was 5%.
Incident T2DM (46,8%) was cured in 81,2% (blood glucose<6 mmol/l and HbA1c<5.5) with a mean of 6% relapse rate after 15 years with no new case.
There are some limitations in this study. First no functional evaluation of gastroesophageal reflux by 24-h pH monitoring and/or changes of the lower esophageal sphincter pressure were assessed pre and/or postoperatively. Secondly, clinical response was determined by the use of PPIs after LSCNG, and no other prospectively clinical evaluation/scale was used.
Conclusion: This long-term study demonstrated that MGBN is a safe, simple and effective procedure to treat severe obese patients.

P540

Resolution of Metabolic Comorbidities in Post-surgery Bariatric Patients: Impact on the Quality of Life of the Patient

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Introduction: Obesity-related diseases (ORD) are associated with a decrease in the quality of life and life expectancy in patients with morbid obesity and cost of health services produce a impact in the economy.
Main: to evaluate the resolution of the principal combordities linked to obesity and their resolution in patients undergoing bariatric surgery.
Methods: A preliminary retrospective analysis of patients with morbid obesity who received bariatric surgery between january 2014 and January 2016. Comorbilities: hypertension, diabetes mellitus, dyslipidemia, sleep apnea and hypoapnea syndrome (OSAHS) or hepatic steatosis. All the patients had two surgical options: LSG or LRYGB. Follow up was performed each 3 moths per the first year after surgery recording data such as the initial weight, weight loss expressed in percentage of excess weight lost (%EWL) and the percentage of total body weight lost and partial or total resolution of the comorbidity associated with obesity.
Results: We reviewed the records of 136 patients who received bariatric surgery in the institution. Those patients without ORD were excluded. We selected 23 patients with previously documented metabolic disease. 52% (12) were females and the average age was 44±13 years; there were 17 (74%) GS and 6 (26%) LRYGB. The average initial BMI was 43±4.3 kg/m, the %EWL at one month, 6 and 12 months was 35.4±15.2, 62.5±17.5 and 79.1±20.2 respectively. The management of their comorbidities were found in 95.6% of patients (22), partial recovery in 32% and complete recovery in 68%. 52.1% of referrals were reported in the first month post-surgery.
Conclusion: Bariatric surgery has proved to be the most effective method for reducing and sustaining weight loss in the long term. These results are linked to close follow-ups and changes in dietary habits and patterns of physical activity on the part of the patient. The benefit of the surgery includes improvements in the quality of life and in the resolution of comorbidities secondary to obesity, both of which decrease the risk of an adverse cardiovascular event. The resolution of partial or total comorbidities depends, to a great extent, on a timely diagnosis and the treatment of diseases; the earlier the interventions, the greater the possibility of a cure. It is very clear, from the results of this work, that a decrease of 50% of the patient's excess weight has a positive impact in terms of discontining medications, normalizing the patient's biochemical profile and extending the patient's life expectancy.

P541

Postoperative Hemorrhage in Sleeve Gastrectomy: Single Institution 5 Year Experience

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Purpose: Thromboembolic disease is a significant cause of morbidity and mortality in bariatric patients. Controversy exists regarding the optimal prophylactic regimen, balancing prevention of thromboembolic complications and the risk of postoperative hemorrhage. In an effort to reduce our hemorrhagic complications, our group changed its perioperative prophylactic regimen from enoxaparin to subcutaneous heparin. We reviewed our results to determine if this change had a beneficial effect on postoperative hemorrhage in patients undergoing sleeve gastrectomy.
Methods and Procedures: We performed a retrospective review of our prospectively-collected bariatric surgery outcomes database. We identified all patients who experienced postoperative hemorrhage following primary laparoscopic sleeve gastrectomy between January 2011 and August 2016 and reviewed their outcomes.
Results: During the study period, our group performed 1161 primary laparoscopic sleeve gastrectomies. Of these, 18 patients suffered postoperative bleeding (1.6%), of whom 5 required reoperation (0.4%) and the remainder were treated with transfusion alone. There did not appear to be an association between bleeding and choice of chemoprophylaxis. Of note, the rate of postoperative hemorrhage has trended downward since we began using staple line reinforcement, but this difference does not reach statistical significance.
Conclusion: Postoperative hemorrhage is a rare complication of bariatric surgery, but can result in significant morbidity. In our experience the complication is most commonly managed nonoperatively. Further investigation into the choice of chemoprophylaxis and use of staple line reinforcement is warranted.

P542

Laparoscopic Greater Curvature Plication Versus Laparoscopic Sleeve Gastrectomy: Long-Term Results of Prospective Randomized Trial

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Introduction: Laparoscopic greater curvature placation (LGCP) is a new restrictive bariatric procedure with a similar restrictive mechanism as laparoscopic sleeve gastrectomy (LSG), which has no potential risk of leak. Aim of the study was to compare long-term results of LSG and LGCP.
Methods and Procedures: Multicenter prospective randomized study enrolled 54 patients with morbid obesity. They were allocated either to LGCP group (n=25) or LSG group (n=27). Main exclusion criteria were: ASA>III, age>75, BMI>65 kg/m^2. There were 40 women and 12 men, mean age was 42,6±6,8 years (range, 35–62). Data on the operation time, complications, hospital stay, body mass index loss (BMIL), percentage of excess weight loss (%EWL), loss of appetite and improvement of comorbidities were collected.
Results: After 4 years postoperatively, mean %EWL was 74,4±15,5 in the LSG group and 24,1±13,7 in the LGCP group (p<0,01). The comorbidities including diabetes, sleep apnea and hypertension, improved in LSG group much more than in LGCP group.
Conclusions: Long-term results showed that LSG is better than LGCP in terms of weight loss and improvement of comorbidities.

P543

The Outcome of Bariatric Surgery in Adolescents

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Introduction: The prevalence of obesity among adolescents is rapidly increasing and is associated with substantial co-morbid disease states. At present, bariatric procedures in carefully selected patients are recommended in order to have a better quality of life and resolution of the co-morbidities. The aim of this study is to review our experience with adolescents who underwent bariatric surgery.
Methods: Patients aged 19 years and younger who underwent bariatric surgery at a single academic center between 2006 and 2015 were identified. Data collected included baseline demographics, co-morbidities, perioperative parameters, 30-day and 1-year complications and the weight loss and co-morbidities resolution. Data was summarized as the mean and standard deviation for continuous variables and as counts and frequency for categorical variables.
Results: A total of 37 patients aged 19 years and below was identified. Twenty seven (73%) were female, mean age was 17.9±1.1 years, preoperative mean body weight 143.9±28.5 kg and mean body mass index (BMI) was 51.2±9.2 kg/m2. Comorbidities include sleep apnea (n=17, 46%), fatty liver (n=11, 30%), hypertension (n=9, 24%), dyslipidemia (n=5, 14%), and diabetes mellitus (n=3, 8%).
All the bariatric procedures were primary procedures and performed laparoscopically: Roux-en-Y gastric bypass (n=23, 62%), sleeve gastrectomy (n=12, 32%) and adjustable gastric banding (n=2, 5%). The mean operative time was 118.9±44.9 min and the mean length of stay was 3±3 days. There were 2 patients (5.4%) with 30-day post-operative complications: pneumonia (n=1) and heart failure in preexisting congenital heart disease (n=1). At 8-month follow, one patient had the conversion of sleeve gastrectomy to duodenal switch as a second-stage procedure. There was no unplanned readmission, re-operation, morbidity or mortality in this cohort.
The mean % excess weight loss at 1-year (follow-up of 54%), 2-years (follow-up of 35%) and 5-years (follow-up of 22%) were 68±26%, 64±24%, and 65±32% respectively. In the mean follow-up time of 23±22 months, remission of diabetes, improvement of hypertension and dyslipidemia occurred in 2 out of 2, 4 out of 4 and 2 out of 2 patients with available data, respectively.
Conclusion: Our experience suggests that bariatric surgery in selected adolescents is safe and effective in managing obesity-related comorbidities. Age alone should not be the limiting factor for selecting patients for bariatric surgery.

P544

Predictors of Increased Length of Hospital Stay Following Laparoscopic Sleeve Gastrectomy from the National Surgical Quality Improvement Program

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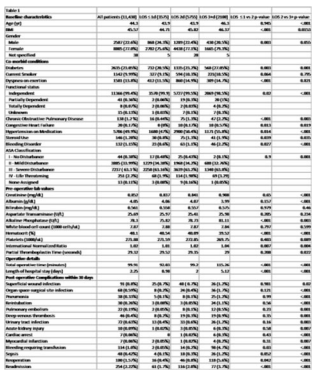
Introduction: The objective of this study was to identify patient- and procedure-related variables associated with prolonged length of stay after laparoscopic sleeve gastrectomy. Extended length of hospital stay following bariatric surgery is associated with increased health care costs and there is growing pressure to reduce length of stay after bariatric surgery. To address this issue, many bariatric centers have developed "fast-track" programs in an attempt to reduce the length of hospital stay after surgery.
Methods: Laparoscopic sleeve gastrectomy procedures reported to the American College of Surgeons National Surgical Quality Improvement Program between 2009 and 2012 were reviewed. We excluded all open procedures and revision procedures. Baseline patient characteristics, pre-operative lab values, procedural details and 30-day complications were reviewed. Logistic regression analysis was used in univariate and multivariate modes to identify patient factors that predicted prolonged hospitalization (defined as ≥3 days). Pre-operative patient characteristics with a P value less than 0.1 were entered into logistic regression using conditional stepwise method. The logistic regression analysis was computed with a 95% confidence interval and expressed as an odds ratio. The Stata 13 statistical software program (StataCorp. 2013. Stata Statistical Software: Release 13. College Station, TX: StataCorp LP.) was used in our analysis.
Results: We identified 11,430 patients who underwent laparoscopic sleeve gastrectomy. The median length of stay was 2 days (range 0-369) and 18.4% required hospitalization≥3 days. Multivariate analysis revealed that female sex (OR 1.49), age greater than 65 (OR 2.19), body mass index greater than 50 (OR 1.44), pre-operative functional status (OR 7.80), chronic obstructive pulmonary disease (OR 2.20), hypertension (OR 1.27), renal insufficiency (OR 1.69), anemia (OR 1.39), and prolonged operative time (OR 2.53) were significantly associated with prolonged hospital stay.



Univariate analysis			Multivariate analysis	
	OR (95 % confidence interval)	p-value	OR (95 % confidence interval)	p-value
Female Sex	1.17 (1.04–1.31)	0.008	1.49 (1.24–1.80)	<0.001
Age >65	2.36 (1.81–3.07)	<0.001	2.19 (1.42–3.37)	<0.001
BMI				
<40	1.0		1.0	
40–44.9	0.95 (0.92–1.00)	0.426	0.994 (0.81–1.22)	0.96
45–49.9	1.06 (0.91–1.27)	0.428	0.90 (0.72–1.12)	0.352
>50	1.32 (1.16–1.50)	<0.001	1.44 (1.18–1.76)	<0.001
Diabetes	1.30 (1.17–1.45)	<0.001		
Smoker	1.07 (0.93–1.25)	0.368		
Dyspnea	1.05 (0.98–1.12)	0.139		
Functional status				
Independent	1.0		1.0	
Partially dependent	4.28 (2.32–7.91)	<0.001	5.38 (1.93–14.96)	0.001
Totally dependent	4.49 (1.22–17.98)	0.014	7.80 (0.77–79.03)	0.082
COPD	2.32 (1.63–3.32)	<0.001	2.20 (1.35–3.59)	0.001
CHF	4.46 (1.85–10.73)	0.001		
HTN	1.33 (1.21–1.46)	<0.001	1.27 (1.09–1.47)	0.002
Steroid use	1.75 (1.22–2.52)	0.003		
Bleeding disorder	2.41 (1.68–3.45)	<0.001		
Creatinine > 1.2	1.65 (1.36–1.96)	<0.001	1.69 (1.26–2.27)	<0.001
Albumin ≤ 3.5	1.44 (1.21–1.71)	<0.001	1.27 (0.99–1.62)	0.056
AST > 50	1.04 (0.81–1.32)	0.78		
WBC > 12	1.21 (0.96–1.52)	0.115		
HCT ≤ 35	1.78 (1.50–2.11)	<0.001	1.39 (1.09–1.78)	0.008
PLT ≤ 140	1.35 (0.92–1.99)	0.119		
INR ≥ 1.2	1.70 (1.47–2.52)	<0.001	1.55 (1.12–2.13)	0.008
Operative time ≥ 180 minutes	3.09 (2.60–3.66)	<0.001	2.53 (2.00–3.20)	<0.001
ASA Classification				
No disturbance	1.0			
Mild disturbance	4.52 (1.89–18.7)	0.037		
Severe disturbance	4.77 (1.15–19.74)	0.031		
Life-threatening disturbance	7.96 (1.88–33.78)	0.005		

Conclusion: Pre-operative patient characteristics as well as operative details predict prolonged length of stay following laparoscopic sleeve gastrectomy. As the utilization of fast-track protocols in bariatric surgery programs expands, these data may be used to assist in the selection of patients who may be inappropriate for rapid discharge from the hospital after sleeve gastrectomy.

P545

Comparative Study Between Mini-Gastric Bypass and Roux-En-Y Gastric Bypass in Asian Population

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Introduction: Asian population have increased risk of type 2 diabetes ,hypertension and dyslipidemia at lower BMI compared to western populations. This has been attributed to genetic factors. Laparoscopic minigastric bypass is a single anastomosis procedure with a shorter learning curve .We present a comparative study between LMGB vs conventional Rou-en-y Gastric bypass(RYGB) in terms of weight loss and co morbidity improvement in an asian population. Minigastric bypass depite its proven efficacy in asian populations in terms of weight loss is considered inferior to rou-en y gastric bypass in the west.Aim of our study is to compare the two in terms of weight loss and co morbidity reduction and rate of complications.
Materials and Methods: 102 patients matched in terms of Age ,sex, BMI and co morbidities were randomized into 2 groups and 51 patients each underwent MGB and RYGB. Patients were followed up for a period of 2 yrs and the 2 groups were compared in terms of operative time, complications, reoperation rate, weight loss, BMI reduction, glycosylated hemoglobin(diabetes control) and dyslipidemia. Out of the 51 patients in the MGB group 2 patients had early post operative obstruction and required re operation. 1 patient from this group was lost to follow up.4 patients from the RYGB group had early post operative obstruction and required reoperation.1 patient was lost to follow up
Results: Post operatively a minor complication rate of 5% was noted with the minigastric bypass group compared to 4.7% with rou en y group.Rate of major complications including anastomotic leak was found to be equivalent in both the groups.*
Conclusion: No significant difference was found between the mini-gastric bypass and roux en y gastric bypass groups in terms of BMI, diabetes control, dyslipidemia. There was no significant difference in the anastomotic leak rate. Therefore, Mini-gastric bypass seems to be equally efficacious to roux en y gastric bypass in terms of outcomes and complication rate and warrants worldwide acceptance.
*

Results:

	MGB(n=50)			RYGB(n=50)			
Parameter (at 24 months)	Pre-op(Mean)	Post-op(mean)	%change	Pre-op	Post-op	%change	
BMI	44.5	29.1	34.6	43.7	29.5	32.49	insignificant
HBAIC	8.7(35)	6.1	29.88	8.4(32)	6.2	26.19%	insignificant
Total cholesterol*	163.5(30)	125	23.54	133(28)	110	17.29%	insignificant
OHS(no of patients)	16	6	62.5	14	5	64.28	-

*only those patients having the respective co morbidity preop used for statistical analysis. Indicated by figures in the brackets.

P546

Long-Term Hypovitaminosis D and Secondary Hyperparathyroidism Outcomes of the Roux-En-Y Gastric Bypass: A Systematic Review

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Introduction: Pre-operative Vitamin D deficiency is markedly prevalent in prospective bariatric surgery patients. While bariatric surgery leads to significant weight-loss, it can exacerbate or prolong Vitamin D deficiency. We systematically reviewed the literature to assess whether secondary hyperparathyroidism is maintained in the medium to long-term in patients following the roux-en-Y gastric bypass.
Methods: A comprehensive literature search was conducted through Medline, Embase, Scopus, Web of Science, Dare, Cochrane library, and HTA database. The search terms used were bariatric surgery, gastric bypass and hyperparathyroidism.
Results: Fourteen studies were included (n=2688 subjects) in this systematic review. The average patient age was 44.8+8 years. All studies had mean follow-up intervals between 24 and 132 months.
Parathyroid hormone levels rose gradually over 5 year follow-up from a weighted mean pre-operative level of 5.69+1.2 pmol/L to 6.36+0.77 pmol/L, 7.59+0.73 pmol/L, and 8.29 +1.41 pmol/L at 2 years, between 2–5 years, and beyond 5 years respectively. Vitamin D levels, while initially rising post-surgery from a weighted mean of 18.27+3.65 ng/mL to 24.66+2.30 ng/mL at 2 years, slowly fell to a weighted mean of 20.50+4.37 ng/mL and 20.76+3.80 ng/mL between follow-up intervals 2–5 years, and beyond 5 respectively.
Conclusion: It appears that hyperparathyroidism persists at 5 year follow-up after gastric bypass, despite most patients being supplemented with calcium and Vitamin D.

P547

Laparoscopic Revision of Roux-En-Y Gastric Bypass to Distal Bypass for Weight Regain: Midterm Outcomes

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Introduction: Roux-en-Y gastric bypass (RYGB) is well known to be effective for the morbidly obese population. However, weight regain continues to be a significant problem for many patients. We report the outcomes of revision of RYGB to distal RYGB (DRYGB) in patients suffering from weight regain following their original procedure.
Methods: A review of prospectively collected data was performed at a tertiary urban teaching hospital. Over a four-year period between March 2012 and May 2016, 17 patients underwent laparoscopic revision of RYGB to DRYGB. At the time of the original RYGB, the mean weight and body mass index (BMI) were 324.4±60.8 lbs. and 52.2±8.2 kg/m2, respectively. The interval between the original procedure and the revision was 120.1±61.2 months. Patients regained on average 70.2±41.8 lbs, or a BMI gain of 11.4±6.7 kg/m2. The mean weight at the time of revision was 277.5±54.8 lbs. (BMI of 44.7±6.9 kg/m2). All patients suffered from one or more obesity-related comorbidities.
Results: The mean operative time was 157.4±30.8 min. All patients were discharged on post-operative day 1, except for two who were discharged on post-operative day 2. There were no complications or mortalities within 30 days of surgery. The average weight (BMI) were 229.4±53.6 lbs. (37.0±6.0 kg/m2) at six months, 215.5±46.5 lbs. (34.4±5.8 kg/m2) at one year, 205.2±28.9 lbs. (34.3±4.0 kg/m2) at two years, and 184.5±44.9 lbs. (29.1± 7.5 kg/m2) at three years. We used percent excess BMI loss (%EBMIL) calculated as follow: (BMI at revision – BMI at 3 years)/(BMI at revision – ideal BMI) x 100. The % EBMIL at three years was 72.7±35.2%. Four patients (23.5%) suffered from protein calorie malnutrition following the procedure, of which two required reversal. One patient died at four years from severe protein calorie malnutrition because failure to follow up. Another patient, who was not malnourished, required reversal due to ischemic bowel secondary to adhesive bowel obstruction. Using paired t-test, significant difference was found between the BMI at revision and the BMI at three years post revision (p=.02).
Conclusion: The options of surgical revision are limited for patients who regained weight after RYGB. In spite of higher risks of long term malnutrition, laparoscopic revision to DRYGB remains an effective procedure for these patients.

P548

Endoscopic Predictive Value for Diagnosing Hiatal Hernia in Sleeve Gastrectomy Patients

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Background: Hiatal hernia (HH) is closely associated with morbid obesity. There is controversy over the need for preoperative esophagogastroduodenoscopy (EGD) before bariatric procedures. The aim of this study is to determine the predictive value of preoperative endoscopy in diagnosing HH.
Methods: A retrospective review of all cases who underwent sleeve gastrectomy (SG) in our academic center between January 2011 and December 2015 was performed. Patients who had preoperative EGD reports were entered in the study. Data were collected for the demographics, preoperative endoscopic and intraoperative findings. Each patient's EGD findings were compared with the intraoperative ones.
Results:
From total of 402 SG cases, 381 (81% female) had preoperative EGD. The mean age of the subjects was 45.8 years (±10.6 years) with the mean BMI of 47.5 kg/m2 (±8.8 kg/m2). There was no significant difference in age and BMI between males and females.
80 cases (20.5%) had a preoperative EGD that showed HH and 39 of those (48.7%) had intraoperative findings consistent with HH. 301 (79%) patients had no HH on preoperative EGD, out of which 286 (95%) patients were also negative for HH intraoperatively. Compared with intraoperative diagnosis, EGD had sensitivity of 67% (±7%) and specificity of 85% (±2%). The negative predictive value of EGD was 96% (±2%) for HH but the positive predictive value was 34% (±5%).
Conclusions: EGD is a valuable informative tool in preoperative evaluation of bariatric patients. Our study demonstrated that EGD has high negative predictive value in ruling out HH but also with relatively low positive predictive value to prove its presence. Further studies are warranted to evaluate the discrepancies between the Preoperative and intraoperative identification of HH.
Keywords: Bariatric surgeries, Hiatal hernia, Sleeve gastrectomy, esophagogastroduodenoscopy (EGD).

P549

Autophony After Laparoscopic Sleeve Gastrectomy: A Case Report

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Introduction: Bariatric surgery, and the extreme weight loss associated with the procedure, can lead to unique clinical conditions. Eustachian tube dysfunction, or patulous Eustachian tube, is a rare but described clinical phenomenon in the setting of massive weight loss.
Case: We present a case of a 35 year old female with a preoperative BMI of 37.9 who underwent a laparoscopic sleeve gastrectomy. Six months postoperatively, after losing approximately 60 pounds (EWL 70%), she developed a sensation of fullness, muffled hearing, and autophony (the unusually loud hearing of one's own voice) in the left ear. Her symptoms persisted over the next several months, during which time her total weight loss reached 83 pounds (EWL 92%). She was eventually referred to otolaryngology for evaluation. Audiogram and tympanostomy results were normal. Fiberoptic endoscopy revealed a wide orifice of the left Eustachian tube with a persistent gap, consistent with a patulous defect. She is currently on a trial of conservative management, including nasal hydration and hypertonic saline drops.
Results: A literature search identified 2 publications which describe Eustachian tube dysfunction after weight loss surgery. The mechanism is thought to be due to loss of adipose tissue, or "Ostmann's fat", in the peritubal region. This allows the Eustachain tube to remain patent. The resulting clinical symptoms include autophony, hearing one's own breathing, and a sensation of aural fullness in the setting of normal audiometry and tympanostomy findings.
Conclusions: The rapid weight loss associated with bariatric surgery predisposes these patients to developing Eustachian tube dysfunction. While not previously described in the bariatric literature, there is data to suggest that this syndrome is a highly prevalent, though largely under recognized, entity in this specific population. Raising awareness of this condition among the community of bariatric surgeons will facilitate diagnosis and allow appropriate referral and management.

P550

Small Bowel Late Perfurated by Phitobezoar After by Pass Gastrico Y Roux

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Method: Surgical report of a female patient, 53 years old who underwent laparoscopic Gastric Bypass Y De Roux after 1 year post-surgery complained of sudden abdominal pain with nausea, vomit and abdominal distention.
CT Scan revealed small bowel distention and pneumo-peritonium. Patient subsequently underwent laparotomy which revealed perforation of small bowel by the site filled with Phytobezoar. Post surgery, patient disclosed excessive daily intake of cereal bars.
Conclusion: The passage of rich intake of cereals without the active digestion by gastric acid post Gastric Bypass Sugery increases the formation of Phytobezoar.

P551

Presence and Implication of Celiac Disease in Bariatric Surgery Patients

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Introduction: Bariatric surgery is generally safe and effective, but co-existing malabsorptive processes may further increase the risk of complications or nutritional deficiencies. Bariatric surgery has not been well-studied in the setting of pre-existing celiac disease. Some literature would suggest a gluten free diet may contribute to weight gain pre-operatively and/or may impair post-operative weight loss. Here described is the only reported series of patients with celiac disease undergoing bariatric surgery.
Methods: Patients who underwent bariatric surgery from January 2002 to December 2015 were retrospectively reviewed. Patients with a recorded diagnosis of celiac disease or testing for suspicion of celiac disease were identified and then re-reviewed by a gastroenterologist with expertise in celiac disease to confirm that serum testing, pathology, and/or resolution following a gluten free diet were accurate and diagnostic according to American Gastroenterological Association (AGA) criteria. Patient demographics, operative data, and follow-up with special attention to weight loss and nutritional parameters were collected.
Results: During this time period, greater than 12,000 patients underwent bariatric surgery. There were 68 patients that were identified as having abnormal results in serology or pathology. Expert review confirmed 4 patients with celiac disease based on AGA criteria. All patients were female, with an average age of 43 years, and a mean BMI of 42.7 kg/m2. Weight-related co-morbidities included: pre-diabetes or diabetes (3), hyperlipidemia (2) and sleep apnea (2). At the time of surgery 3 out of the 4 patients were following a gluten free diet. Three patients underwent laparoscopic gastric bypass, and one patient underwent a laparoscopic sleeve gastrectomy. There were no perioperative complications.
At 6 months follow-up, the average percent excess weight loss was 66.2%. The same patients that were following a gluten free diet preoperatively continued postoperatively as well. No patients were anemic, or had vitamin B12 or iron deficiencies at 6-month follow-up. One patient had vitamin D deficiency and responded to daily oral supplementation at a standard post-operative dose. Intermediate term follow up greater than 2 years was available for 2 patients revealing new vitamin D deficiency, treated with daily oral supplementation.
Conclusions: Though many bariatric patients may present with a presumptive diagnosis of celiac disease, a small percentage of these meet criteria set forth by the AGA. In this series, bariatric surgery appeared safe and effective. Weight loss was comparable to reported rates in non-celiac counterparts. Increased attention to vitamin D levels may be warranted post-operatively.

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Mini Gastric Bypass Causes Successful Weight Loss without Increasing Objective Evidence of Acid/Alkaline Reflux: Early Experience from a Tertiary Care Centre in India

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Background: With increasing number of bariatric procedures being done, the question of gastro-esophageal reflux improving or worsening is often asked. Whereas some studies have shown resolution of Gastro-esophageal reflux disease (GERD) after Laparoscopic Sleeve Gastrectomy (LSG), others are of the opinion that LSG can actually induce the occurrence of GERD. Laparoscopic mini gastric bypass (MGB) / OAGB / SADI-S/ Omega Loop is a newly emerged procedure which claims virtues of a restrictive and mal-absorptive procedure with minimal anastomoses. In the initial years, the most notorious controversy concerning the disadvantage of MGB was with suspected post-operative oesophagitis and gastritis caused by bile reflux due to bilio-enteric anastomosis. Studies have reported improvement in reflux related symptoms post-operatively after MGB, but no objective method was used to analyse reflux in these studies.
Aim: The study was designed to compare weight loss and post operative reflux parameters after MGB and LSG.
Materials and Methods: 20 patients were included in each study group. All patients, apart from the pre-operative bariatric work up, underwent pre and post-operative clinical assessment for reflux symptoms, endoscopy, oesophageal manometry and 24-hour pH-metry. Weight loss was also compared with age and BMI matched subjects from each group. All patients were followed up for at least three months.
Results: All patients underwent MGB/LSG successfully. The mean absolute weight loss recorded at three months was 29.10 and 25.20 kgs, while the percentage excess weight loss was 49.65 and 40.54 in MGB and LSG groups respectively. The mean pre-operative percentage time for pH<4, during pH metry was 3.84 and 9.43 while it was 2.84 and 3.81 at 3 months after LSG and MGB, respectively. One patient in MGB group with no GERD pre-operatively, had alkaline reflux (%-time>4 with pH>7) at 12 weeks showed spontaneous resolution at 6 months, on repeat pH metry. No statistical difference was noted on comparing LES length and LES pressure pre and post-operatively within a same group, and between both the groups.
Conclusion: MGB results in significant weight loss comparable to LSG with a dramatic decrease in number of reflux events without increasing any alkaline reflux. No statistical difference was noted between the MGB & LSG in terms of reflux episodes. Short term results in this small cohort of patients favors equivalent results with MGB.

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Perioperative Bleeding and Blood Transfusion is a Major Risk Factor for Venous Thromboembolism Following Bariatirc Surgery

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Background: Morbidly obese patients are at an increased risk for venous thromboembolism (VTE, considered either a DVT or a PE) after bariatric surgery. When a perioperative bleeding event occurs, routine chemical thromboprophylaxis (most often low molecular weight heparin) is often withheld. The decision about when or even if to start VTE prophylaxis once the bleeding seems to have stopped is difficult secondary to concerns about inciting another bleeding event. We sought to evaluate the relationship between perioperative bleeding necessitating transfusion and the incidence of postoperative VTE in bariatric surgery patients.
Methods and Procedures: The American College of Surgeons-National Surgical Quality Improvement Program (NSQIP) dataset between 2012 and 2014 was queried to identify patients who underwent bariatric surgery (n=59,424). Gastric bypass (n=28,268), sleeve gastrectomy (n=30,258), bariatric revision (n=418), and biliopancreatic diversion procedures were included (n=480). Univariate and multivariate regression were used to determine perioperative factors predictive of post-operative VTE within 30-days of surgery in patients to experience a bleeding complication necessitating transfusion.
Results: From the entire study sample, DVT was diagnosed an average of 14.3 days post-surgery, while PE presented at 12.1 days. Patients diagnosed with a post-operative VTE were more likely to have another major complication compared to patients who did not have a VTE (21.3% vs 3.2%; $p<0.0001$). Predictive risk factors of VTE included: blood transfusion, BMI, length of hospital stay, male sex, procedure type, history of severe COPD, ASA classification of III or IV, bleeding disorder, reoperation, any renal complication, any cardiac complication, any pulmonary complication, any infection, and CVA ($p<0.05$). Multivariate regression analysis of patients who received a blood transfusion revealed a significantly increased risk of subsequent VTE (Odds Ratio [OR]=4.81; $p<0.0001$). If a patient who received a perioperative transfusion also had a pulmonary complication, the risk of VTE increased considerably (OR=89.1, $p<0.0001$).
Conclusions: Bariatric surgery patients who receive a postoperative blood transfusion are at a substantially increased risk for VTE – especially if they also experience a subsequent pulmonary complication. The etiology of VTE in those who are transfused is likely multifactorial and related to an increased rate of reoperation, a gap in chemical thromboprophylaxis in patients who bleed, and perhaps to a hypercoagulable state induced by the prior transfusion. In those who bleed, consideration should be given to reinitiating chemical thromboprophylaxis when safe, conducting a screening ultrasound of the lower extremities, and possibly even placing vena cava filter in patients at highest risk.

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Implications of Medicaid Expansion on Insurance Coverage After Bariatric Surgery

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Background: Bariatric surgery leads to dramatic weight loss and improved overall health, which may affect insurance status for certain patients. Traditional Medicaid only provides coverage for children, pregnant women, and disabled adults, while expanded Medicaid provides insurance coverage to all adults with incomes up to 138% of the federal poverty level. The objective of this study was to evaluate our 30-year bariatric surgery experience in a non-expansion state and determine the impact of resolving obesity and its associated comorbidites on postoperative insurance status. We hypothesized that successful bariatric surgery would lead to improved health status but an unintended loss of Medicaid coverage.
Methods: All patients who underwent bariatric surgery at a single institution in a non-expansion state from 1985 through 2015 were identified using a prospectively collected database, which was merged with administrative billing data to identify payor status at the time of surgery, one-year postoperatively, and at the last encounter with our health system. All patients under the age of 65 with Medicaid payor status at the time of surgery qualified for that coverage due to disability. Univariate and multivariate analyses were used to identify differences in patients who no longer qualified for disability and Medicaid insurance after bariatric surgery.
Results: Over the 30-year study period, 3,487 patients underwent bariatric surgery, with 373 (10.7%) having Medicaid coverage at the time of surgery. This cohort of patients had a median age of 37 years and preoperative Body Mass Index (BMI) of 54 kg/m2. At one-year follow-up, 155 (41.6%) of patients no longer qualified for Medicaid, leaving 76 (49.0%) of those with no insurance coverage. The preoperative prevalence of diabetes (32.3 vs. 44.0%, p=0.02), age (36 vs. 38 years, p =0.01) and BMI (53 vs. 55 kg/m2, p=0.04) were significantly lower in patients who no longer qualified for Medicaid after bariatric surgery. Multivariate regression demonstrated that every point increase in preoperative BMI (OR 0.91, p=0.01) predicted a 9% decrease in the likelihood of losing Medicaid coverage postoperatively.
Conclusions: Not expanding Medicaid has lead to a major disparity in insurance coverage for patients undergoing bariatric surgery. Successful surgery in a non-expansion state results in over 40% of patients losing Medicaid coverage postoperatively, with half of those patients returning for follow-up with no insurance coverage at all. This barrier to care has major implications in patients undergoing bariatric surgery, which requires life long follow-up and nutrition screening.

Variable	Odds Ratio	95% Wald		p-value
BMI (1-point increment)	0.912	0.883	0.928	0.01
Increased age (year)	0.997	0.982	1.001	0.08
Race (White)	2.007	0.867	4.647	0.10
Male Sex	1.633	0.988	2.702	0.06
Band vs. Roux-en-Y gastric bypass	0.686	0.28	1.677	0.41
Gastric sleeve vs. Roux-en-Y gastric bypass	0.873	0.414	1.842	0.72

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Comparison of Laparoscopic Roux-En-Y Gastric Bypass with Laparoscopic Sleeve Gastrectomy for Type 2 Diabetes Patients

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Objective: To compare the effects of laparoscopic Roux-en-Y gastric bypass (LRYGB) with laparoscopic sleeve gastrectomy (LSG) to treat type 2 diabetes (T2DM) patients.
Methods: 44 patients suffering from T2DM were enrolled in this study in Beijing Shijitan Hospital during March 2012 to March 2016. The patients were divided into LRYGB group (n=24) or LSG group (n=20) based on the surgical procedure and the clinic data of two group were collected and compared.
Results: All patients suffered from T2DM undertook LRYGB surgery or LSG surgery successfully. The average levels of fasting blood sugar (FBS) and glycosylated hemoglobin (HbAlc) of 44 patients before surgery were 9.17±3.29 mmol/L, 7.99%±1.88% respectively. The mean body mass index (BMI) of them was 39.10±6.56 kg/m2 before surgery. There were no significant difference in the mean FBS, HbAlc and BMI in two groups (P>0.05).The average levels FBS and HbAlc of all patients at 1, 12 months after surgery were lower than those before surgery (2.98± 2.60 mmol/L, P=0.000, 3.00±2.62 mmol/L, P=0.000;1.86% ± 1.74%, P=0.000, 1.90% ± 1.70%, P=0.000). The mean BMI of all patients was decreased significantly at 12 months after surgery (P<0.05) and the mean excess weight loss(E WL%)was 80.61% ± 20.06%(74.52% ∼ 86.71%) at 12 months after surgery. The average operating time for the patients in LRYGB group was significantly longer compared to LSG group (107.9±16.1 min vs. 92.0±26.1 min, P=0.008), but there were no significant difference in the mean operative bleeding,hospital stay and the recovery time in two groups (P>0.05). Although the mean HbAlc of the patients at 1, 12 months after surgery in LRYGB group were lower than those in LSG group (1.36%±0.30%, P=0.000, 1.44% ±0.32%,P=0.000), there were no significant difference in the decreases including levels of FBS, the mean BMI and EWL% in two groups (P>0.05). The patients were followed up for 16 ∼ 18 months, an average period of 16 months. No major complication was found in all patients.
Conclusions: This research concludes that LRYGB and LSG are safe and effective to treat the patients who suffered from type 2 diabetes. We recommend LSG as preferable choice of the surgical procedure considering easily being operated.
Keywords: Roux-en-Y gastric bypass;sleeve gastrectomy ;laparoscopic surgery; type 2 diabetes

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Early Discharge Does Not Increase Readmission Rate or Complications Following Bariatric Surgery

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Introduction: Reducing hospital length of stay (LOS) is a goal for minimizing resource utilization and costs following bariatric surgery. We aimed to compare post-operative outcomes between patients who had early (LOS≤1 day) and standard discharge (LOS>1 day) and to identify factors associated with early discharge after bariatric surgery.
Methods: We performed a retrospective analysis of 1,226 patients≥18 years of age who underwent sleeve gastrectomy (VSG) or Roux-en-Y gastric bypass (RYGBP) between November 2009 and July 2015 at our institution. Patient demographics, pre-operative body mass index (BMI), pre-surgical comorbidities, LOS, and excess weight loss percentages (%EWL) were recorded. Post-operative morbidity included nausea, vomiting, dehydration, wound complication, leak, ulcer, incisional hernia and small bowel obstruction. We defined early discharge as patients with LOS≤1 day. Predictors and post-operative outcomes associated with early discharge were identified by multivariable analysis using univariable and multivariable logistic regression models.
Results: Overall median age was 43 years (IQR: 35, 52). The majority of patients were female (n= 959, 78.2%) and Caucasian (n=827, 67.46%). Most patients had multiple comorbidities (n=728, 59.38%), most commonly hypertension (n=715, 58.32%), diabetes (n=359, 29.28%), and gastroesophageal reflux disease (GERD) (n=430, 35.07%). The overall mean pre-operative BMI mean was 48.51±10 kg/m2. Mean LOS was 2.74±1.9 days and was longer among patients undergoing RYGBP (2.97±2.29) as compared to VSG (2.41±1.14) (P<0.001). Sixty-six patients (5.4%) had an early discharge. Patients with an early discharge were more likely to have undergone a laparoscopic operation (laparoscopic: n=63, 95.45% vs. open: n=3, 4.55%; P=0.005), VSG (VSG: n=53, 80.30% vs. RYGBP: n=13, 19.70%; P=<0.001) but less likely have pre-op GERD (GERD: n=13, 19.70% vs. no GERD: 53, 80.30%; P=0.007). Patient characteristics such as age, sex, BMI, race, insurance status, and co-morbidities other than GERD were not associated with early discharge (all P>0.05). Post-operative morbidity and readmission within 30 days did not differ between those with or without an early discharge (all P>0.05). After controlling for all factors, VSG (OR 6.90, P=<0.001) and pre op GERD (OR 0.53, P=0.050) were the only independent factors associated with early discharge.
Discussion: Patients who undergo VSG and those without preoperative GERD are more likely to be discharged early. There is no association between early discharge and postoperative morbidity or readmission. Further larger studies are needed to identify which factors are associated with increased resource utilization following bariatric surgery.

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Effect of Medical Weight Management on Pre-operative and Post-operative Weight Loss for Bariatric Surgery Patients

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Background: Medical weight management (MWM) is required pre-operatively by some bariatric centers and insurance companies. Multiple studies evaluating the effect of MWM on weight loss before and after surgery have been published. However, the effect of MWM on preoperative weight loss is often confounded by a disproportionate weight loss during the preoperative "liquid diet". Furthermore, determination of MWM's impact on postoperative weight loss and durability of weight maintenance is hampered by relatively short follow up in these studies. The goal of this study was to examine the effect of MWM on pre-operative (controlling for the liquid diet phase) and medium term post-operative follow up.

Methods: An IRB approved, retrospective review was completed on patients who had bariatric surgery by a single bariatric surgeon in a center of excellence from 2012 to 2014. Patients who underwent a laparoscopic sleeve gastrectomy (LSG) and laparoscopic roux-en-y gastric bypass (LRYGB) were categorized into two groups: those who had four months of pre-operative MWM with a bariatrician and those who did not. Weight loss was evaluated prior to the start of their liquid diet.

Pre-operative and post-operative percentage of excess weight lost (%EWL) was compared between the two cohorts. Specifically, the impact of MWM on weight loss was evaluated from the first surgical visit to the pre-operative visit, as well as %EWL from operation to 1 and 3 years post-operatively.

Results: 246 patients were identified that met inclusion criteria. Of those, 36% had pre-operative MWM. There were 107 LSG and 139 LRYGB performed. The follow-up average was 2.6 years (range 1–4 years). Patients with MWM (LSG and LRYGB) had an average % EWL of 1.7% when re-evaluated at the pre-operative visit, compared to a gain of 0.08% excess weight in the patients without MWM (p=0.054). No difference was found in the change in %EWL post-operatively between the two groups at 1 year (p=0.95 for LRYGB, p=0.68 for LSG) and 3 years (p=0.26 for LRYGB, p=0.73 for LSG).

Conclusion: The patients with MWM did have more weight loss pre-operatively, which may be statistically significant with a larger cohort. This difference was not appreciated in the post-operative period for either surgical procedure (LSG or LRYGB). MWM may have a small effect on pre-operative weight loss, which may reduce operative risk. Additional investigation and longer follow up is needed to determine the effect of MWM and the appropriate role of MWM for bariatric surgery patients.

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Breaking the Myth of Alkaline Gastric Reflux Related Complications Attributed to Mini-gastric Bypass: Long Term Follow-Up of Patients Having Undergone Mini-gastric Bypass I

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Introduction: Laparoscopic Minigastric bypass involves a single billroth type 2 anastomosis between the created neogastric pouch and the jejunal loop 150–250 cm from the duodenojejunal flexure. According to western experts there is significant risk of bile reflux gastritis with MGB bypass due to the omega loop with biliary secretions going into distal loop via the neo-stomach. Normally bile is present in the stomach constantly due to physiological reflux .Patients with an ulcerated mucosa with active gastritis when subjected to bile reflux cause the stomach to become irritable and contract, thereby cause upward propulsion of the bile towards the gastro esophageal junction causing symptoms of reflux. Therefore symtoms attributed to alkaline gastritis are actually due to peptic gastritis which is present in the patients preoperatively. Patients with gastritis pre operatively ought to have symptoms of bile reflux. Aim of our study was to follow up patients without gastritis preoperatively who underwent MGB to confirm etiology of the reflux attributed to MGB.

Methods: 250 morbidly obese patients were screened from 2002 to 2008 in our institution.220 having normal oesophogastroduodenoscopy (OGDscopy) underwent MGB and were followed up for a minimum period of 8 yrs for symptoms of reflux using baylors reflux symptom index(score>13 is suggestive of gastritis) Repeat OGDscopy was carried out at 2,4 ,6 and 8 yrs interval to look for newly developed gastritis which would be attributed to alkaline bile reflux. Anastomotic leak occured in 5 patients but were minor leaks managed conservatively.

Results: Alkaline reflux gastritis was documented by OGDscopy and reflux scores in only 4% of patients and was related to marginal ulcers in most cases suggesting effect of reflux on ulcerated gastric mucosa. Stenosis (chronic sequeale of alkaline reflux gastritis) was seen in only 1% of the patients.

Conclusion: Patients having undergone Laparoscopic mini-gastric bypass did not have significant alkaline bile gastric reflux. Bile reflux gastritis was seen in patients with marginal ulcers having ulcerated mucosa with minimal incidence in those with normal mucosa and without co existent gastritis. Alkaline bile gastritis attributed to MGB seems to be due to previously present peptic disease.

	at 2	at 4	at 6	at 8
Marginal ulcers	7(3.18%)	8(3.63%)	8(3.63%)	8(3.63%)
Reflux scores(>13)	6(2.72%)	9(4.09%)	9(4.09%)	9(4.09%)
Stenosis	0(0%)	2(0.9%)	3(1.36%)	3(1.36%)

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Safety and Efficacy of Novel Clamping Device to Facilitate Sleeve Formation in Laparoscopic Sleeve Gastrectomy

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Background: Current techniques for gastric pouch creation with use of a Bougie in laparoscopic sleeve gastrectomy (LSG) have been shown to result in inconsistent pouch anatomy. A three point technique using a gastric clamp (GC) (Standard Clamp, Standard Bariatrics Inc., OH) for LSG is a novel approach to help surgeons maintain predetermined distances from key landmarks (incisura angularis (IA), pylorus, and gastroesophageal junction (GEJ)) during stapling. By maintaining the stomach in a flat plane, the GC facilitates resection of the entire posterior fundus while avoiding unwanted zig-zags, twists, and spirals. We sought to evaluate the safety and efficacy of the GC for use in LSG.
Methods: This is an IRB approved, retrospective review of LSG cases performed in 2016 at a center specializing in bariatric surgery. All patients underwent LSG with either use of a 40F Bougie to guide sleeve formation or use of the GC to align the staple line 1 cm from the GEJ, 3 cm from the IA, and 6 cm from the pylorus. Patient demographics, perioperative characteristics, and post-operative complications were evaluated.
Results: 175 patients underwent LSG for management of morbid obesity either with the GC (n=36) or with use of a Bougie (n=139). There were no significant preoperative differences in age, preop BMI, or sex. When comparing the GC group to the Bougie group, there were no significant differences in operative time (105 min vs. 108 min; p=0.33), overall length of stay (1.33 days vs. 1.48 days; p=0.55), follow up nausea rate (19% vs. 22%; p=0.82), or follow up GERD rate (14% vs. 17%; p=0.80). There were no intraoperative complications in either group. Use of the GC resulted in a clinically significant decreased post operative complication rate (6% vs. 17%; p=0.11) as well as a statistically significant decrease in the frequency of operations requiring more than 6 staple cartridges to complete creation of the sleeve (0% vs. 14%; p=0.02).
Conclusions: The GC with three point technique is a safe and effective approach in LSG with favorable early outcomes compared to surgery performed with Bougie guidance. Holding the stomach in place during stapling improved resource utilization by decreasing staple cartridge waste, with the potential effect of standardizing gastric pouch formation. Future studies are required with longer term follow up to assess long term outcomes of patients undergoing LSG with the GC.

Characteristics	*GC* (n = 36)	*Bougie* (n = 139)	P *value*
Age (years)	40	41	0.64
Sex			1.00
Male	7 (19.4%)	28 (20.1%)	
Female	6 (80.6%)	9 (79.9%)	
Pre-Operative BMI	50	50	0.91
Operative Time (min)	105	108	0.33
Length of Stay (days)	1.33	1.48	0.55
Post-operative Complications	2 (6%)	24 (18%)	0.11
Dehydration	1 (3%)	12 (9%)	
Cardiac Event	0 (0%)	3 (2%)	
Wound Infection	0 (0%)	5 (4%)	
Venous Thromboembolism	1 (3%)	0 (0%)	
Readmission	0 (0%)	4 (3%)	
Nausea at Follow Up	7 (19%)	31 (22%)	0.82
GERD at Follow Up	5 (14%)	24 (17%)	0.80
> 6 Staple Cartridges Used	0 (0%)	20 (14%)	0.02

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Utility of the One Anastomosis Gastric Bypass for the Treatment of Dysfunctional Gastric Band in Patients with Morbid Obesity

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Introduction: Laparoscopic Gastric Band (LGB) is a restrictive and reversible method for the treatment of Morbid Obesity (MO), its positioning technique is simple and is one of the most popularly used. The dysfunction incidence and/or long term failure is high. At the moment, the removal of the band is the most used method, even though these resolve the complications, it is also associated with a fast recovery or persistence of the obesity.One Anastomosis Gastric Bypass (OAGB) is a restrictive/Malabsortive method, several authors have demonstrated good results.The aim of this intervention is to show our initial experience in 18 patients with persistent MO secondary to a dysfunctional LGB in whom laparoscopic removal of the GB and conversion to OAGB was performed at the same surgical time with a follow up to 1, 3 and 6 months.
Methods and Procedures: From September of 2010 to April of 2014, 18 patients with persistent MO secondary to a dysfunctional LGB were operated on laparoscopically of retirement and conversion to OAGB in the same surgical time. Data Include: demographics, preoperative Body Mass Index (BMI), symptomatology and associated preoperative morbidity, surgical time, duration of hospital stay and postoperative weight loss t to 1, 3 and 6 months.
Results: Age average was 35,7 years (19–50), BMI average: 42.0 kg/m2 (35,1–57,2). 10 (55,5%) referred progressive increase in the rations of food. Associate morbidity: Diabetes Mellitus 5 (27,7%), Hypertension: 4 (22,2%), sleep apnea: 6 (33,3%). The operating time was 161 (125–210) minutes. Removal of the band was made by dissection of the gastric plication, exposition and cut of the safety pin and extraction. The creation of the gastric pouch began at 7–8 cm below the GE junction with 32 Fr. calibration bougie and the G-J anastomosis was created at 250 cm from the Treitz fixation. In one patient (5,5%) cholecystectomy due to lithiasis was made. All cases were completed by laparoscopically. Water-soluble gastrography was done 48 h after surgery. The hospital stay was 2,38 (1–4) days. 1 patient (1,1%) presented a non-complicated pneumonia that required re-hospitalization. 2 patients (11,1%) declared to have dyspeptic symptoms. Mortality was 0. The follow up was made every month during the first 6 months. The loss percentage of weight excess was: 3 months 36,4%, 6 months 55,6%.
Conclusion: The conversion to OAGB is effective for the treatment of the dysfunctional and/or insolvent LGB, with short term favorable results in weight loss.

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Amylin (An Insulin Co-secretor) is Significantly Reduced at One Year After Laparoscopic Sleeve Gastrectomy in Both Morbidly Obese Diabetic and Non-diabetic Patients

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Introduction: Both morbid obesity and Type 2 Diabetes are a growing health problem in Kuwait and worldwide. Bariatric surgery considered one of the most effective options to treat morbid obesity .Laparoscopic Sleeve gastrectomy (LSG) emerges as a primary procedure to treat morbid obesity beside other procedure like Gastric Bypass. In this study, we look at the effect of LSG on Amylin and Glucose homeostasis on both morbid obese diabetic and non-diabetic patients.
Method: Between January 2012 and July 2014, 23 morbid obese and 17 morbid obese diabetic patients underwent LSG, with 19 lean diabetic and 15 lean subjects as control. Fasting blood Samples were collected for Glucose, insulin, Proinsulin, C-peptide, HbA1c and Amylin preoperatively and from control group then at 7, 15, 30, 60, 90,180 and 360 days postoperatively.
Results: Both morbid obese diabetic and non-diabetic patients were similar in preoperative BMI, gender, and age. EBWL after one year was 54% (41–73) in morbid obese diabetic and 73.15% (52–98) in morbid obese patients with no statistical difference. Fasting glucose, insulin, proinsulin, c- peptide, HOMA IR, and total amylin were significantly decreased after 360 days in both morbid obese and morbid obese diabetic patients.
Conclusion: LSG has a favorable effect in glucose homeostasis at one year after LSG in both morbid obese and morbid obese diabetic patients. Total Amylin was significantly decreased one year after LSG in both groups which may prevent the progression to B cell death.

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The Metabolic Profile of Fractures in the Bariatric Population: A Single Institution Experience

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Introduction: Obesity is accompanied by substantial hormonal and bone metabolism changes which have been poorly understood and described inconsistently. The objective of this study is to assess the nature of these changes before and after bariatric surgery and their relationship with pathologic fractures.
Methods: We retrospectively reviewed all bariatric surgeries between 2010–2015. Patients who suffered pathologic fractures were identified. Patients' demographics, associated comorbidities, and laboratory values of: Vitamin D, calcium, and ALP were followed at three intervals for 1 year. Fisher's exact test and paired t-test was used to determine significance. A linear regression model or Pearson correlation coefficient was used to assess relationship and significance.
Results: From1129 bariatric patients 10.8% (n=122) fractures were identified, of which 53% (n=65) dated before surgery, 49% (n=60) dated after surgery, and 4.09% (n=5) dated before and after surgery. When occurring postoperative, the mean fracture occurrence was at 16.71 ± 15.42 months after surgery. The population was predominantly women 63.9% (n=78). Laparoscopic sleeve gastrectomy (LSG) was the most prevalent procedure 51.6% (n=63) followed by Laparoscopic Roux-en-Y gastric bypass 22.9% (n=28). From122 fractures 104 vitamin D levels were identified. Pre-operative Vitamin D insufficiency was present in 37.5% (n=39) and deficiency in 23.07% (n=24). Post-operatively; vitamin D insufficiency was present in 30.7% (n=32) and 7.6% (n=8) had deficiency 6-months after bariatric surgery, whereas 32.69% (n=34) had insufficiency and 8.6% (n=9) deficiency, 12-months postoperatively. When compared to pre-operative, the difference in Vitamin D levels was found significant at 6 months ($p<0001$) and 12 months ($p=0.0003$) following LSG. In LYRGB significance was only found at 12 months ($p=0.0101$) post-operative. A linear regression model recognized post-operative relationship between BMI and Vitamin D levels but to be only significant at 12-months following bariatric surgery ($P=0.0017$). A negative-correlation between BMI and Vitamin D levels was identified and to be only significant at 12-months post-operatively ($P=0.0418$).The Relationship between sleep apnea and the occurrence of fracture pre-operatively was found to be significant ($P=0.0348$). ALP was consistently within normal values pre and post-operatively.
Conclusions: Obese patients have lower levels of vitamin D pre-operatively and post-operatively vitamin D levels improved. There is a relationship pre-operatively between sleep apnea and the occurrence of fractures. Prospective studies are necessary to further understand and recognize the risk factors for fractures so that interventions could be in place to minimize its occurrence in the bariatric population.

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Effects of Roux-En-Y Gastric Bypass and Sleeve Gastrectomy on Calcium, Vitamin D, and Parathyroid Hormone at Two Years

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Introduction: The effects of bariatric surgery on calcium, vitamin D, and parathyroid hormone (PTH) homeostasis have demonstrated conflicting results after short-term follow-up. The purpose of this study was to analyze outcomes of calcium, vitamin D, and PTH after bariatric surgery and compare the effects of Roux-en-Y gastric bypass (RYGB) with laparoscopic sleeve gastrectomy (LSG).
Methods: All patients who underwent RYGB or LSG at a single institution over a 3-year period were identified from a prospectively maintained database. Subgroup analyses were performed stratifying by bariatric procedure. Patients with incomplete pre- and post-op values for a specific lab were excluded from analysis of that lab but were included in analyses of other lab values for which their information was complete. Vitamin D insufficiency was defined as <30 ng/mL, vitamin D deficiency as <20, and hyperparathyroidism as PTH>90 pg/mL. Bivariate frequencies were compared using Chi-square and Student's t-test. Significance was $p<0.05$.
Results: Of 195 patients who met inclusion criteria, 111 had RYGB and 84 had LSG. Pre-operative demographics were similar between the groups. Overall, a decrease in serum calcium ($p=0.016$), increase in PTH ($p<0.001$) and hyperparathyroidism ($p=0.006$), an increase in serum vitamin D ($p<0.001$), and improvement in vitamin D insufficiency ($p=0.006$) and deficiency ($p=0.029$) were seen post-operatively. RYGB patients showed improvement in serum vitamin D ($p=0.002$) and vitamin D insufficiency ($p=0.010$) but with increased PTH ($p<0.001$) and hyperparathyroidism ($p=0.023$) after operation. LSG patients had increased serum vitamin D ($p=0.042$) without significantly reducing their rate of insufficiency or deficiency, and they saw a decrease in PTH ($p<0.001$) without significantly affecting hyperparathyroidism. In comparison of RYGB and LSG, %WL ($p<0.001$), ΔBMI ($p<0.001$), and final BMI ($p=0.032$) were superior for RYGB. Serum calcium was lower in RYGB patients ($p=0.032$), and prevalence of hyperparathyroidism was similar. Although only RYGB patients had significant reduction in vitamin D insufficiency, rates of insufficiency were similar between groups, and deficiency was significantly more prevalent after RYGB than after LSG ($p=0.045$). There were no significant differences in follow up and supplement compliance.
Conclusions: RYGB and LSG have varying effects on calcium, vitamin D, and PTH. Although RYGB patients enjoy greater improvement in vitamin D insufficiency, they are at increased risk of deficiency in comparison to LSG patients. This may be due to malabsorption not inherent in LSG. Future studies are needed to determine how these changes impact skeletal health.

P564

Can Colectomy Improve Type 2 Diabetes Mellitus?

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Introduction: Gastrectomy and diversionary gastroduodenal procedures can improve type 2 diabetes (T2D). Colorectal resection alters intestinal microbiome and might be associated with favorable hormonal changes. The aim of the study was to study the possible evolution of T2D in patients who underwent colectomy.
Methods: All patients with T2D who underwent colectomy for benign diseases from 2004 to 2015 at a single academic center who had at least 1-year postsurgical follow up were identified. We excluded patients with colorectal malignancies, inflammatory bowel diseases, and patients on immunosuppressive medications. Baseline characteristics, pre-operative and post-operative BMI, glycated hemoglobin (HbA1c), and diabetes medications were collected. Data was summarized as the median and interquartile range (IQR) for continuous variables and as counts and percentages for categorical variables. A paired t test and Wilcoxon signed-rank test were used to calculate the difference between the last follow up point and baseline at the time of surgery. Two dependent proportions were compared with Z-test.
Results: A total of 171 T2D patients who underwent colorectal resection for benign diseases were identified with a median postsurgical follow up of 3 years (IQR 1–5). Ninety nine (58%) patients were female and median age was 67 years (IQR 56–75). The median duration of diabetes to colectomy was 3 years (IQR 1–7). Underlying colorectal diseases included diverticulitis (n=112, 65%), adenomatous polyps (n=37, 22%), ischemic colitis (n=10, 6%), volvulus (n=6, 3.5%), colonic inertia (n=3, 2%), severe C. difficile colitis (n=2, 1%) and Ogilvie syndrome (n=1, 0.5%). Colectomy procedures include sigmoid colectomy (n=91, 53%), right hemi-colectomy (n=45, 27%), left hemi-colectomy (n=12, 7%), total colectomy (n=12, 7%), anterior resection (n=7, 4%) and transverse colectomy (n=4, 2%). The median BMI at baseline and post-colectomy were 30.3 kg/m2 (IQR 26.6–34.6) and 30.4 kg/m2 (IQR 26.2–35), respectively ($p=0.1$). The median HbA1c at baseline and post-colectomy were 6.7% (IQR 6.2–7.5) and 6.5% (IQR 6.5–7.1), respectively ($p=0.5$). The proportion of patients taking diabetes medications at baseline versus post-colectomy was 75% versus 71% ($p=0.3$) and the proportion of patients on insulin was 32% versus 40% ($p=0.1$). Furthermore, the postsurgical weight and glycemic outcomes were not associated with the type of colorectal resections.
Conclusion: Data of this exploratory analysis indicate that colectomy is not associated with significant improvement of T2D.

P565

Total Parenteral Nutrition After Bariatric Surgery

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Introduction: Patients uncommonly require total parenteral nutrition (TPN) after bariatric surgery due to postoperative complications. We aim to describe this unique cohort of patients and compare them based on indication necessitating the initiation of TPN.
Methods and Procedures: We retrospectively reviewed institutional data from 2008 to 2014 identifying patients who required TPN after both primary and revisional bariatric operations; these included roux-en-y gastric bypass, sleeve gastrectomy, and gastric band placement. Data was collected on patient demographics, operative details, indication for TPN and its duration of use, laboratory values, morbidity, and mortality.
Results: Of the 62 patients identified, 55 were female. Mean age at operation was 47 and mean preoperative BMI 40.4. Operations included 46 roux-en-y gastric bypasses (4 open), 7 sleeve gastrectomies, and 4 gastric bands. 68% (42) were revisional operations. Patients were divided into two groups based on indication for TPN use—infectious (including leak, perforation and abscess) and noninfectious failure to thrive (ulcer disease, obstruction, stricture, and other food intolerance). Mean length of TPN use was 44.5 days (range 6-600) in the infectious group and 63 days (range 3-180) in the noninfectious group ($p=0.2$). BMI before initiating TPN was significantly lower in the noninfectious group, mean 26.7 vs. 40.4 ($p=0.0029$). When analyzing nutritional studies in these patients, albumin and prealbumin were significantly lower in the infectious group upon initiation of TPN; prealbumin 10.7 vs. 12.5 ($p=0.036$) and albumin 3.0 vs. 3.3 ($p=0.004$). When TPN was discontinued, the infectious group continued to have lower nutritional laboratory values; prealbumin 12.8 vs. 15.5 ($p=0.039$) and albumin 2.8 vs. 3.5 ($p=0.0003$).Total hospital length of stay (LOS) and ICU LOS were significantly longer in the infectious group on index hospitalization–total LOS 18.5 vs. 12 days ($p=0.049$), ICU LOS 6.5 vs. 1.5 days ($p=0.02$). Mortality was not significantly different when comparing the two groups ($p=0.62$).
Conclusions: Although TPN is rarely needed after bariatric surgery, it is most commonly initiated because of either infectious complications or noninfectious failure to thrive. Patients requiring TPN for infectious indications including leak, perforation, and abscess tend to have more severe malnutrition (despite a higher BMI) and more prolonged hospital stays than those with noninfectious failure to thrive.

P566

Prevalence and Predictors of Postoperative Thiamine Deficiency After Vertical Sleeve Gastrectomy

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Introduction: As the vertical sleeve gastrectomy (VSG) becomes increasingly popular, its effect on postoperative micronutrients levels, such as thiamine, becomes more important. We previously found a 1.8% prevalence of thiamine deficiency in bariatric patients prior to surgery. The aim of the present study is to determine the prevalence of thiamine deficiency at our center following VSG and to explore possible predictors of postoperative thiamine levels.
Methods: A retrospective chart review was performed on 147 bariatric patients between 18 and 65 years old who underwent VSG between April 2011 and February 2015. Demographics, pre-operative body mass index (BMI), obesity associated co-morbidities, alcohol intake, smoking habits, insurance type, calendar year of the procedure, occurrence of post-operative complications, and compliance with post-operative nutrition and follow up appointment guidelines were extracted. We defined thiamine deficiency as <78 nmol/L on any lab draw within one year after the VSG. A comparison of the above factors was made between the thiamine sufficient group and the thiamine deficient group after the groups had been matched using a propensity score. Propensity score matching and multivariate logistic regression models were created to analyze the factors associated with thiamine deficiency after bariatric surgery.
Results: Out of the 147 patients, 105 met inclusion criteria and were included in the analysis, of whom 27 (25.7%) had thiamine deficiency. Overall median age was 42 years (IQR: 36, 49). The majority of patients (92.4%) were African Americans or Caucasian (47.6% and 44.8%, respectively), female (77.1%), and compliant with vitamins (81.0%). The overall mean pre-operative BMI was 46.4±7.3 kg/m2. Patients with thiamine deficiency were more likely to be African American (66.7% vs. 41.0%, p=0.02), and to report nausea (59.3% vs. 25.6%, p=0.002) and vomiting (44.4% vs. 14.1%, p=0.001) compared with those without thiamine deficiency. Compliance with vitamins did not differ between those with or without thiamine deficiency (70.4% vs. 84.6%, p=0.10). After controlling for all factors, African American race (OR 4.62, p=0.013), nausea (OR 4.04, p=0.025), and vomiting (OR 3.88, p=0.032) were independent risk factors for the development of thiamine deficiency. Similar differences were observed in the propensity score model.
Discussion: We found an alarmingly high prevalence of thiamine deficiency in postoperative sleeve gastrectomy patients. This disorder may have serious consequences including Wernicke encephalopathy. Hence, it is important to identify predictive factors including demographics, post-operative complications, and behaviors so that measures can be taken to prevent thiamine deficiency in VSG patients.

P567

Barriers to Compliance with Long-Term Follow-Up After Bariatric Surgery

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Introduction: The aim of this review was to evaluate and compare our 6-month and 1-year follow-up data as a MBSAQIP Accredited Bariatric Surgery Center and address any potential barriers to patient compliance. Our goal is to find a potential target for intervention to meet the current standards set by the MBSAQIP and ultimately improve long-term weight loss for our patients.
Methods and Procedures: In this retrospective chart review follow-up data at 1-year was evaluated for 64 cases from one bariatric surgeon between January 2015 and July 2015 and 6-month data for 69 patients between September 2015 and January 2016. Patients who did not follow-up (with a member of the bariatric team) at the 1-year and 6-month mark respectively were telephoned and interviewed about barriers to compliance with follow-up.
Results: Sixty-four patients underwent bariatric surgery between January and July 2015. At 1-year, 28/64 (43.75%) of patients met the requirements for follow-up with a member of the bariatric team. Of the 36/64 patients who failed to comply, or considered lost to follow-up, 17/64 (26.5%) patients attested that they knew about the 1-year follow-up, but that they were "too busy" to make an appointment. Twelve (18.75%) patients had moved or their telephone numbers were no longer in service. Five (7.8%) patients had issues with insurance that prevented them from complying with follow-up, but stated that they knew they had to follow-up. Two (3.1%) patients stated that they were unaware of the need for follow-up. In the 6-month group, 43/69 (62.3%) of patients were compliant with follow-up, whereas 22/69 (31.9%) of patients were "too busy" or "forgot" to follow-up. Only one patient (1.44%) had an insurance issue, and one patient (1.44%) did not follow up because of issues with the staff. Two patients had moved or their telephone numbers were not in service.
Conclusions: In our retrospective review our follow-ups dropped from 62.3% of patients at 6-months to 43.75% at 1 year. The majority of patients were "too busy" or "forgot" to make an appointment. Interestingly, without prompt, these patients understood the importance of compliance, and the interview served as a reminder to make an appointment for follow-up. These results provide some answer to poor compliance and areas where a directed intervention could improve long-term follow-up. Further investigation into earlier follow-up will help identify additional patients who are lost to follow-up in the early post-operative period and help improve long-term patient compliance.

P568

New Operative Approach to Jejuno-Jejunal Intussusception

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Background: Laparoscopic management of jejuno-jejunal (JJ) intussusception is an accepted approach to JJ after gastric bypass for weight loss. Typically this occurs from distally through the JJ into biliopancreatic limb (BPL). We show the results of our operative technique of decreasing the size of the JJ anastomosis utilizing a laparoscopic linear stapler.
Methods: Retrospective review of EMR data from 2015 for patients presenting of operatively managed cases of JJ intussusception identified by CPT codes. All patients had intermittent abdominal pain and intussusception on CT.
Results: 3 cases were identified. 2 were started laparoscopically and one was converted due to adhesions to the abdominal wall. One was started open (due to known adhesions). Operative approach was reduction of intussusception, linear stapling of the JJ along the prior staple line to reduce anastamotic size and tacking the BPL to the distal small bowel (only the last 2 patients). There were no complications and no morbidity. Follow up visits at 2 weeks, 1 month, and 1 year confirmed no recurrent intussusceptions and abdominal pain related to incidences of intussusception was resolved.
Conclusion: Laparoscopic approach to JJ intussusceptions is not always possible. Complete redo of JJ anastamosis may not be necessary and simple partial division of the JJ anastamosis with or without tacking of the distal limb to the biliopancreatic limb may decrease complication rates.

P569

Effect of Pre-operative BMI in the Weight Loss of Patients Who Underwent Laparoscopic Sleeve Gastrectomy and Roux En Y Gastric Bypass

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Introduction: Patients undergoing sleeve gastrectomy (SG) and Roux-n-Y gastric bypass (RYGB) have great variations in weight loss. The aim of this study is to evaluate the effect of preoperative BMI on the excess weight loss (EWL) at 12 months of patients who underwent SG and RYGB, and its trends over time.
Methods: A Single institution's patients who underwent SG an RYGB were stratified by pre-operative (BMI<50 kg/m^2 vs BMI>50 kg/m^2), and followed at 6 weeks, 3, 6, 9 and 12 months. Trends in EWL over time were analyzed using ANOVA with post-hoc Tukey tests. Plateau of EWL was established when consecutive follow up EWL measurements showed non-statistically significant differences. Obstructive sleep apnea, gastroesophageal reflux disease, hyperlipidemia, hypertension and diabetes were assessed preoperatively and at 1-year for complete resolution.
Results: A total of 158 patients were included in the study (RYGB: N=63, SG: N=95). For all patients with start BMI of <50 kg/m^2, RYGB had a mean EWL of 66.9±19.3% at 12 months, and plateaued by 9 months with 63.5±16.5% EWL (p=0.789); whereas SG patients plateaued by 6 months with 45% of EWL (9 mo.: 50%, p=0.362; 12 mo.: 51%, p=0.220). For pre-operative BMI>50 kg/m^2, both SG and RYGB plateaued by 12 months with mean EWL of 39% (9 mo.: 35%, p=0.544) and 49% (9 mo.: 45%, p=0.793) respectively. Regardless of the BMI, RYGB patients had better resolution of all assessed comorbidities compared to SG, although only obstructive sleep apnea showed a statistical significant improvement (SG: 35.5%, RYGB: 57.9%, p=0.014).
Conclusion: Our study shows a wide variation of weight loss trajectories among RYGB and SG patients. RYGB patients with a lower pre-operative BMI reached plateau 3 months later than SG patients, and had better percentages of EWL by 12 months. Additionally, higher pre-operative BMI patients tended to have a slower weight loss progression after bariatric surgery, and were likely to plateau sooner. RYGB significantly outperformed SG for weight loss and comorbidities resolution by 12 months.

P570

Comparative Study of the Effect of Roux-En-Y Gastric Bypass and Sleeve Gastrectomy on Renal Function and Urine Oxalate Excretion

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Laparoscopic Roux-en-Y gastric bypass (RYGB) and sleeve gastrectomy (SG) are the most commonly performed bariatric procedures. Hyperoxaluria is common after RYGB and is associated with increased incidence of calcium oxalate kidney stones. However, the effect of SG on nephrolithiasis risk is less clear. The potential impact of bariatric surgery on renal function remains unclear. Therefore, we conducted a retrospective study to evaluate changes in urine oxalate excretion and renal function in a cohort of patients in the first year after Roux-en-Y gastric bypass versus sleeve gastrectomy. Patients undergoing RYGB or SG at Mayo Clinic were identified between 2000 and 2013. Pre- and post-operative urinary oxalate levels were available in a total of 18 RYGB and 7 SG patients. Estimated glomerular filtration rate (eGFR) was determined using the CKD EPI creatinine equation. Pre and postoperative serum Creatinine (Cr) data were available for 260 RYGB and 107 SG patients. These patients were further stratified into groups of normal preoperative renal function and chronic renal insufficiency based on eGFR, and the effects of RYGB versus SG on the renal function were further evaluated. By one year after surgery, the % EWL is 69.2±1.3% in RYGB and 59.5±4.9% in SG, respectively. Postoperative urine oxalate excretion was measured at 6 months and 12 months after index surgery. In RYGB patients, it was 0.34±0.16 mmol/L (6 months) and 0.56±0.23 mmol/L (12 months). In SG patients, it was 0.24± 0.07 mmol/L (6 months) and 0.28±0.13 mmol/L (12 months). Urine oxalate excretion increased significantly 1 year after RYGB ($p<0.01$), but did not change after SG. Postoperative Cr decreased significantly 6 months and 12 months after RYGB ($p<0.01$), but remained unchanged after SG. In terms of postoperative eGFR, there was no significant change in normal renal function patients after either bariatric procedure. However, it increased significantly after lap RYGB ($p<0.001$) in chronic renal insufficiency patients. The change in eGFR was not observed chronic renal insufficiency patients after SG. Our results suggest urine oxalate excretion increases after RYGB but not SG. In renal insufficient patients, serum Cr falls after RYGB but not SG. Similarly, eGFR increased significantly after RYGB but not SG in these patients. There was no change in either Cr or eGFR in normal renal function patient underwent bariatric surgery. Furthermore, the changes in serum Cr and eGFR were not associated with %EWL after surgery. Longer term follow up will be needed to determine if these effects persist over time.

P571

Preoperative Upper Endoscopy and Predicting Hiatal Hernia Repair in Bariatric Surgery

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Introduction: Hiatal hernias (HH) are identified in 40% of bariatric surgery patients. We aimed to analyze the impact of endoscopic findings during routine preop endoscopy on rates of repairing hiatal hernia during bariatric surgery.
Methods: The records of 515 consecutive patients who underwent endoscopy from 2013 to 2016 in preparation for primary bariatric surgery were analyzed. Prevalence of HH, defined as a hiatal defect twice the scope size (>2 cm) on retroflexion, was derived based on EGD findings. We calculated rates of hiatal hernia repair (HHR) correlated with EGD findings for each group. We also calculated the number of patients that underwent HHR without EGD findings consistent with HH.
Results: The groups consisted of 268 RYGB and 247 SG patients. Average age was 45 (SD=11.5). Average BMI was 47 (SD=8.87). Upper endoscopy evaluation identified HH in 289 patients (56%; RYGB=149, SG=140). Intra-op repair of HH was undertaken in 22 RYGB patients (8%) and in 134 SG patients (54%). The rate of HHR by intraoperative identification alone was less in the RYGB group, 1, compared to 43 in SG. The rate of HHR with a positive EGD was 7.8% in RYGB and 37% in SG. The rate of HHR with a negative EGD was 0.4% in RYGB and 17% in SG. The rate of no HHR with a positive EGD was 48% in RYGB and 20% in SG. The rate of no HHR with a negative EGD was 44% in RYGB and 26% in SG. A positive EGD led to a significantly higher rate of HHR than intraoperative assessment alone in the SG patients.
Conclusion: Hiatal hernias are common in bariatric patients. A standard for preoperative evaluation for weight loss surgery has been elusive. HH is a risk factor for reflux, and GERD is the most common complication after SG. Preoperative evaluation for HH should be the standard, and EGD reliably predicts repair. Although EGD may overestimate the presence of HH, we recommend routine endoscopy to identify and prepare the surgeon for HHs that will be missed on intraoperative evaluation alone.

P572

Initial Experience and Short-Term Outcomes in a Remote Northern Bariatric Centre of Excellence

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Objective: To combat the obesity epidemic in Northwestern Ontario, the Ontario Bariatric Network has recently created a Bariatric Centre of Excellence in Thunder Bay, Ontario. This is a remote northern tertiary hospital housing two dedicated fellowship trained bariatric surgeons and is a unique practice model in Canada. Our aim was to complete a review of the first two years (251 cases) in this practice to analyze short term outcomes to determine whether it is safe and feasible to offer minimally invasive bariatric surgery in this setting so as to meet the standards of a Bariatric Centre of Excellence.
Methods and Procedures: An observational case series examining the first two years of the bariatric surgery practice in Thunder Bay, Ontario was undertaken via retrospective chart review. All patients taken to the OR for a bariatric surgery procedure in the 2014 and 2015 calendar years were included. Primary outcomes measured were 30-day morbidity and mortality. Secondary outcomes included length of stay in hospital and operating time. A patient database was also collected to assess patient demographics and the presence of obesity related comorbidities.
Results: During the study period a total of 251 patients were taken to the OR for bariatric procedures; 163 (64.9%) received gastric bypass with Roux-en-Y reconstruction while 84 (33.5%) received sleeve gastrectomy. There were no deaths, and 4 (1.6%) procedures were aborted without completion. There was a single readmission for an unrelated issue; this was promptly resolved. There were 4 (1.6%) patients taken back to the OR, 3 (1.2%) of which were for intra-abdominal bleed; all were ultimately discharged home without major complication. There were zero anastomotic leaks. Mean length of stay was 2.12 days. Mean OR times were 104 and 76 min for bypass and sleeve gastrectomy respectively. Patients were predominantly female (87.3%), mean patient age was 45.3 years and mean pre-operative BMI was 47.3 kg/m2 (range 36.3–67.5). Obesity associated medical comorbidities included diabetes mellitus (25.5%), hypertension (43.8%), obstructive sleep apnea (35.1%), GERD (50.2%), coronary artery disease (2%), dyslipidemia (29.5%) and osteoarthritis (36.7%).
Conclusions: Based on our results we believe that high quality minimally invasive bariatric surgery can be offered in a remote northern setting to the standards of a Bariatric Centre of Excellence in a safe and effective manner. Further data will be required to assess long-term outcomes.

P573

Association Between Postoperative Prealbumin Levels and Excess Weight Loss in Patients Undergoing Laparoscopic Sleeve Gastrectomy

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Background: Laparoscopic sleeve gastrectomy (LSG) is an effective treatment for morbid obesity and is becoming increasingly popular in bariatric surgery. The resulting alteration in gastrointestinal anatomy after LSG may lead to changes in nutritional parameters such as serum prealbumin, which if low, is an early indicator of malnutrition. The objective of this study was to assess the relationship between measured serum prealbumin and excess weight loss (EWL%) three months after LSG.
Methods: A retrospective review was performed of all patients who underwent a LSG at a single institution between 07/2014 and 12/2015. Patients with ≤30% EWL were compared to patients with >30% EWL. Patient demographics, comorbidities, perioperative factors and 3 month nutritional assessment were analyzed by univariate analysis using Wilcoxon rank sum, Chi-square, and Fisher's exact tests where appropriate.
Results: A total of 201 patients underwent LSG of which 160 patients had complete data. At 3 month follow up 56/160 patients (35%) had>30% EWL. Patients with an EWL of >30% had a mean (+/-SEM) serum prealbumin level of 18.5 +/- 0.54 mg/dL versus 23.8 +/- 2.81 mg/dL for those with an EWL≤30%, (p=.004). There was no statistically significant difference between mean (+/-SEM) serum albumin levels at 3 months in patients with >30% versus ≤30% EWL (4.19 +/- 0.04 g/dL vs. 4.13 +/- 0.03 g/dL, p=.41).
Conclusion: Patients with >30% EWL at 3 month follow up have lower measured serum prealbumin levels compared to patients with ≤30% EWL, despite having normal albumin levels. Long-term follow up is necessary to further identify the relationship between albumin, pre-albumin and EWL in bariatric patients.

P574

Predictive Value of Pre-op Gastric Emptying Study on Bariatric Surgery

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Introduction: As the prevalence of obesity continues to grow worldwide, the use of bariatric surgery in the treatment of obesity has increased significantly. Patients with a BMI over 40 or between 35–40 but with high risk co-morbidities such as diabetes, sleep apnea or obesity related cardiomyopathy are eligible for bariatric surgery. However, bariatric surgery can potentially lead to long term motility disorders. This retrospective study analyzed the relationship between patients' pre-op gastric emptying studies with their post-surgical clinical outcome.
Patient and Methods: The retrospective study of 64 patients (61 F, 3 M), age range (25–67), mean age (46.2), weight range (189-361.6 lbs) and mean weight (249.5 lbs) who underwent bariatric surgery was reviewed. Gastric emptying studies were analyzed on 62 patients prior to and 2 patients after bariatric surgery. The studies were interpreted independently by three expert NM physicians and the patients' outcome was obtained.
Results: Of the 62 pre-op gastric emptying studies, 45 were normal while 17 were abnormal. In post op follow up, of patients with normal gastric emptying studies, 24/45 (53.3%) were asymptomatic and 21/45 (46.7%) were symptomatic. Of the pre-op delayed gastric emptying studies, 7/17 (41.2%) were asymptomatic compared to 10/17 (58.8%) who were symptomatic. There was no statistically significant difference between the patients who had prior normal or abnormal gastric emptying studies with their post-surgical outcome ($p=0.39$). Of the 64 patients, 11 patients had the Roux-En-Y, with 3/11 (27.3%) asymptomatic and 8/11 (72.7%) symptomatic, while from the 53 patients with sleeve gastrectomy 29/53 (54.7%) were asymptomatic as compared to 24/53 (45.3%) who were symptomatic post bariatric surgery. There was no statistically significant difference between type of bariatric surgery and the patients' outcome ($p=0.097$).
Conclusion: There was no difference between the patients' pre-op gastric emptying results vs their clinical outcome. There was also no difference between different techniques of surgery in our patient population. More studies are required to confirm these findings and to see the predictive value in a larger patient population.
We strongly recommend a repeat gastric emptying study to be performed in 3–6 months post-surgery in order to predict the patients' clinical outcome.

P575

Characteristics of Women Eligible for Bariatric Surgery: A Study of 2013–2014 Nhanes Data

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Background: About 10% of adult women are reported to have morbid obesity, yet, only a percentage of that population undergo bariatric surgery. Bariatric surgery is the most effective evidence-based treatment for morbid obesity and prevention and treatment of its comorbidities. The proposed study, a part of ongoing analysis, characterizes bariatric surgery eligible (BE) women and compares them with those not eligible for the surgery.
Methods: The population of reproductive age BE women was identified from the 2013–2014 National Health and Nutrition Examination Survey. Demographic, psychological and reproductive variables in BE and non-BE adult women who participated in the survey, were analyzed using chi-square test.
Results: About 15.6% (6.58 million) of 20–44 years old BE women (mean age 32.03 years) were identified. Of these, BE women had lower family incomes (34.7%, 40.6% and 24.7% of BE vs 23.3%, 31.4.6% and 45.3% of non-BE women belonged to low-, middle- and high- family incomes, respectively, p .026). Major depression was observed in 8.6% of BE vs 1.3% in non-BE women, $p<.02$.
About 22% of BE women had education less than high school (HS) (vs. 13.6% non-BE), 19.4% of BE women attended HS (vs. 18% non-BE) and 58.3% of BE women had more than HS education (vs. 68.4% non-BE) (p .103). 22% of BE women were Non-Hispanic Black, 57% of BE women were Non-Hispanic White, and 4.6% of BE women were Mexican/Other Hispanics (vs. 10.8%, 58.9%, and 3.4% respectively, in non-BE women, p .08); 33% of BE women and 22% of non-BE women had no insurance coverage, but the difference was not statistically significant. Infertility was observed in 25.4% of BE as opposed to 11.9% in non-BE women (p .06).
Conclusion: Significant differences between BE and non-BE women of reproductive age were prevalent based on sociodemographic factors, namely, income and insurance coverage and marginally significant differences were observed in race/ethnicity and education. Significantly higher prevalence of major depression and trends for infertility observed in BE women emphasize a need for better understanding of the demographic, psychological and reproductive factors in reproductive age BE women. Based on such information tailored interventions can help increase their access to bariatric surgery and prevent future morbidity.

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Clinical Versus Patient Reported Measures of Depression in Bariatric Surgery

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Introduction: The rate of obesity in the United States has more than doubled in the last 50 years. Bariatric surgery has an excellent safety profile and is the most effective approach to weight loss. Additionally, advances in the preoperative assessment have played an important role in the detection of high risk patients. For example, depression is the most prevalent mental health diagnosis amongst the 15 million morbidly obese Americans today. There is significant evidence showing poorer surgical outcomes in high risk patients with mental health illness. To improve these outcomes, mental health assessments are now standard of care and are required preoperatively for patients considering bariatric surgery. However, there remains a wide range of practices on how to best screen patients for depression. In this study, we sought to understand the relationship between traditional clinical practice and a patient-reported depression screening tool, Patient Health Questionnaire 8 (PHQ-8).
Methods: We used prospectively collected data from the Michigan Bariatric Surgery Collaborative (MBSC) to assess the overall rate of patients with a preoperative diagnosis of depression during the study period (January 2014 – June 2016). This diagnosis is based on clinically audited chart review. The definition of depression includes "clinical depression and depressive disorder, treated with medication, electroconvulsive therapy, and/or psychotherapy." We then surveyed a sample of patients in the immediate preoperative period (n=4486) using the validated PHQ-8. A PHQ-8 score of >10 was diagnostic for depression. We examined the association between results PHQ-8 screening and of traditional depression diagnosis methods, determining the proportion of patients with undiagnosed depression. Next, we conducted a chi-squared test for socioeconomic factors such as race, gender, income level, type of insurance, and employment status for this undiagnosed population.
Results: The overall rate of clinically diagnosed of depression in the study cohort is 45.6% and 14.8% of all patients screened positive for depression using PHQ-8. Of the patients without a traditional clinical diagnosis of depression, 10.2% screened positive for depression using the PHQ-8. This subset of undiagnosed patients was more likely to be male, non-white, of higher BMI, and employed than their clinically diagnosed counterparts.
Conclusions: Despite significant efforts to ensure the timely and accurate diagnosis of depression in bariatric surgery patients, a large proportion of patients may undergo surgery undiagnosed by current clinical assessments. Mandatory inclusion of patient self-screening tools may be a key component of preoperative mental health evaluations moving forward.

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Gastric Bypass is Safe and Effective for the Super-Super Obese Patient

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Background: Obesity in the United States is on the rise with a growing percentage of patients being diagnosed as super-super-obese (SSO) defined as patients with a Body Mass Index (BMI)$\geq$60 kg/m. This patient population is at high risk of mortality due to associated comorbidities. In patients with BMI$\leq$49 kg/m, the Roux en-Y Gastric Bypass (RYGB) is considered the 'gold standard' surgical treatment for BMI reduction. However, there are limited studies to extrapolate that into SSO patients and some surgeons advocate for a staged approach. The goal of this study is to analyze the safety and efficacy of RYGB surgery in the SSO population.
Methods: Between September 2004 to April 2015, 78 SSO patients underwent RYGB surgery at NYU Lutheran Medical Center. A retrospective study was performed to analyze reduction of preoperative comorbidities, postoperative outcomes and complications, total percentage of excess weight loss (%EWL) and patient follow up.
Results: Thirty six patients were males and 42 were females with a mean age of 37 ± 10. The mean BMI was 65 ± 4.8 kg/m and 12 (15.3%) had a BMI$\geq$70 kg/m. The average OR time was 123 ± 50 min, estimated blood loss (EBL) was 10 ± 7.9 ml, and the average length of stay was 75 ± 38 h. None of the patients were converted to open surgery and 66 (83.5%) had no postoperative complications. For patients with complications, all were Clavien-Dindo Grade 1–2 and did not require any invasive interventions. Of the 46 patients who followed up within 6 months, 45 (98.7%) had a decrease in %EWL with an average of 26 ± 14%. Thirty six (78.3%) of these follow up patients had preoperative comorbidities and 15 (41.7%) had significant improvement or even complete resolution post surgery.
Conclusion: In our experience, the RYGB is a safe and effective single stage surgical treatment for SSO patients. These patients start to achieve a significant BMI reduction as well as improvement or resolution of their comorbidities without significantly high complication rate however, longer follow up is needed. Follow up in general within this patient population is a nationwide problem and is something that needs to be more consistent in order to better track the postoperative course of the SSO patient.

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Laparoscopic Sleeve Gastrectomy: What is the Ideal Bougie Size?

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Introduction: Morbid obesity has become a worldwide major health hazard. The only proven effective treatment is bariatric surgery. The gastric bypass was considered the gold standard but recently sleeve gastrectomy Is increasingly been performed with results demonstrating less complications and similar weight loss to the gastric bypass. Typically, a calibration bougie or orogastric tube is utilized to size the gastric sleeve prior to resection. The optimal size has been a subject of discussion, with advocates for either a larger or smaller sleeve to achieve the best outcomes. The aim of this study is to evaluate the ideal bougie size for best postoperative outcomes following a sleeve gastrectomy.
Methods: A systematic review was conducted through PubMed to identify relevant studies from January 2008 through December 2016 with comparative data on differing bougie sizes used during laparoscopic sleeve gastrectomy. The primary outcomes assessed included % excess weight loss (%EWL) and postoperative complications (postoperative bleeding, staple line bleeding, staple line leak and postoperative nausea and vomiting). Secondary outcomes were comorbidity resolution (hypertension, diabetes mellitus type 2) and length of hospital stay. Results are expressed as standard difference in means with standard error. Statistical analysis was done using fixed-effects meta-analysis to compare the mean value of the separate groups (Comprehensive Meta-Analysis Version 3.3.070 software; Biostat Inc., Englewood, NJ).
Results: Six studies were quantitatively assessed and included for meta-analysis. Among the studies, 238 patients underwent a laparoscopic sleeve gastrectomy using a bougie size 32F and smaller; and 241 patients underwent a laparoscopic sleeve gastrectomy using a bougie larger than 32F.
There were no significant differences in post-operative outcomes between patients that underwent sleeve gastrectomy with either bougie sizes as it relates to %EWL (0.060, 0.092, P=0.511), post- operative complications (-0.042, 0.092, P=0.648), hospital stay (0.104, 0.107, P=0.334) and comorbidity resolution (0.084, 0.264, P=0.750).
Conclusions: The use of a bougie size bigger or smaller than 32F for sleeve gastrectomy showed no difference in postoperative outcomes following sleeve gastrectomy.

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The Laparo-Endoscopic Rendezvous: Trial of the Technique in Sleeve Gastrectomy

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Background: Laparoscopic sleeve gastrectomy (LSG) is a relatively new and common restrictive operation for treatment of morbid obesity. Staple line leak is one of the most serious complications of LSG. We conducted a prospective clinical trial in order to evaluate the potential benefits of the use of intra-operative endoscopy in conjunction with LSG and the role of this new evolving technique, which we called the "Laparo-endoscopic Rendezvous" in intra-operative identification and prevention of staple line leak.
Patients and Methods: Fifteen morbidly obese patients underwent LSG using the "Laparo-endoscopic Rendezvous" technique between August 2014 and April 2015. The potential benefits of this technique, difficulties encountered, as well as operative time and postoperative complications were observed in the study group.
Results: Intra-operatively, 1 case of intra-luminal bleeding, 1 case of twisting of the gastric sleeve and 1 case of kinking of the gastric sleeve were observed. The operative time ranged from 100 to 180 min (mean, 134.3 min). No postoperative complications were reported in the study group. The overall gastric leak rate was 0%.
Conclusion: Inspite of the logistical and technical difficulties that might be encountered with the use of intra-operative endoscopy in conjunction with LSG and the relatively long operative time, the "Laparo-endoscopic Rendezvous" is a safe and promising new technique with several potential benefits.

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Percutaneous Needles and Minilaparoscopy: Single-Port Surgery Hybrid Technique, An Accessible and Efficient Combination

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Introduction: The obvious advantage generated when we reduce tissue damage through minimally invasive techniques such as single-port surgery or the use of mini instruments have led us to create hybrid combinations that take advantage of each of the techniques or tools in order to maximize the results. In this case we combined the use of percutaneous needles and minilaparoscopy instruments taking advantage of the benefits of each technique, this lead to satisfactory results that allowed us to put this combination as a viable and beneficial option for minimally invasive cholecystectomy.
Methods and Procedures: We analyzed the results of 64 patients who underwent hybrid laparoscopic cholecystectomy combining the benefits of the mini instruments technique and the percutaneous needles used in CL1P technique. We replaced the traditional ports, the 10 mm subxiphoid was replaced by a 3.5 mm mini instrument port and the 5 mm subcostal by a 1.8 mm percutaneous needle, we had an adequate exposure and a good development of the technique. This was done by a single experienced surgical team during a 20 month period, from January 1st 2015 to august 31st 2016 in a private hospital. From 214 gallbladder procedures performed, this technique represented 30% of all cholecystectomies, acute or not acute benign pathology, calculous or acalculous, and performed under these exclusion criteria: obese (BMI 35 or more), senile (over 60 years) and comorbid patients (sepsis, cancer or choledocholithiasis). Partial conversion was considered anytime we replaced any port but the surgery was still under laparoscopic technique and total conversion when it was replaced by open cholecystectomy.
Results: The surgery results showed the feasibility to develop this combination of techniques in 90.6% (58) of our patients; of the remaining 9.4%(6) patients conversion we only had 6.2% (4) patients that required replacement of the percutaneous needle for a 5 mm port, 1.5% (1) required a traditional 4 ports laparoscopy and 1.5% (1) case required open laparotomy. Drains were left in 3.1% (2) patients. There were no postoperatory complications, no extensions of hospital stay and no change in any other evaluation parameter (pain, etc) compared to traditional laparoscopy, except the better cosmesis results when hybrid technique was done.
Conclusions: The combination of mini instruments and the use of percutaneous needle generates a hybrid technique making minimally invasive techniques feasible while aiming at reducing tissue damage in laparoscopic cholecystectomy

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Minimally Invasive Posterior Retroperitoneoscopic Approach for Extra-adrenal Tumors

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Background: Patients with small retroperitoneal tumors difficult to access by traditional anterior laparoscopic techniques are often subjected to open operations, with significant associated discomfort and relatively longer recovery times. Minimally invasive posterior retroperitoneoscopic adrenalectomy has been demonstrated to be both safe and effective when compared to the anterior approach. We have found a similar posterior minimally invasive approach useful for other tumors of the retroperitoneum, and here we review our experience with the posterior retroperitoneoscopic approach applied to patients with extra-adrenal tumor processes.
Methods: We performed a retrospective analysis of all patients who underwent posterior retroperitoneoscopic resection or excisional biopsy of extra-adrenal tumor processes from 2005 to 2015. Outcome measures included procedural (diagnostic or therapeutic) success, complications, and length of stay.
Results: Twenty-eight operations were performed. Mean age was 49 years (SD 13.6). Mean BMI was 31 kg/m2 (SD 7.2); 42% of patients had a BMI≥30. Laterality was evenly split between the right and left sides; 61% of patients had undergone at least one prior abdominal operation. Mean tumor size was 2.9 cm (SD 1.4), mean operative time was 123 min (SD 58.4), and median blood loss was 25mL. Twelve patients (43%) underwent the operation for diagnosis, 12 for therapeutic intent, and 4 (14%) for combined reasons. Final pathologic diagnoses included lymphoma, paraganglioma, as well as recurrent adrenocortical carcinoma and pheochromocytoma, and metastatic melanoma, gastrointestinal stromal tumor, neuroendocrine carcinoma, non-small cell lung cancer, and pancreatic adenocarcinoma. The procedure was considered successful in 25 of 28 operations (89%). Median length of stay was 1 day. There was one complication (3.6%), two patients underwent conversion to an open operation (7.1%), and there was no operative mortality.
Conclusion: The posterior retroperitoneoscopic approach for extra-adrenal tumors is safe and feasible in carefully selected patients. Operative time, complication rates, and conversion rates appear to be similar to those reported for retroperitoneoscopic adrenalectomy. Surgeon experience and careful preoperative planning are critical to success.

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Treatment Options for Artery Compression Syndroms

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Aims: We report and discuss our experiences with celiac (CMAS) and superior (SMAS) mesenteric artery syndrome that are both associated with similar gastrointestinal symptoms like chronic abdominal pain resulting in weight loss because of fear of eating.
Methods: Between 2011 and 2016, 9 patients were presented in our institution. 8/9 patients suffered from typical symptoms of chronic or intermediate epigastric pain sometimes associated with deterioration of physical activity. All patients complained weight loss and difficulties of weight regain because of fear of eating and/or pain despite small portions of food intake. 1/9 patient was referred to our emergency department after an attack of abdominal pain and nausea. Computed tomography revealed massive dilatation of the stomach with gastric wall and hepatic portal vein gas as signs of severe ischemic tissue injury. Patient's history revealed chronic abdominal pain since 5 years with post-prandial distress syndrome.
Results: In 7/9 patients CMAS was diagnosed and patients underwent laparoscopic division of the median arcuate ligament after exposion of the celiac trunk. No major complications occurred intra- or post-operatively. One 78-year old patient (ASA-III) needed intensive care treatment because of tachy-hyperpnoe and hypocapnia post-operatively. All patients experienced symptomatic relief. 2/9 patients had diagnosis of SMAS. One patient could regain weight with improvement of pain symptoms under conservative treatment with sufficient pain medication. The other was presented with an acute abdomen. Gastroscopy showed disseminated necrotic alterations of the mucous membrane and additionally compression of the horizontal part of the duodenum. MRI confirmed SMAS. Naso-gastric tube for ten days achieved decompression and toning of the stomach before open surgery. Mobilization of the duodenum, transection of a fixating band of connective tissue between the SMA and aorta and refixation of the duodenum in the retroperitoneum was performed. The stomach was vital and could be preserved. Seven days after surgery the patient could be discharged fully recovered.
Conclusions: Decompression of the celiac trunk in case of CMAS can be performed laparoscopically. SMAS might need acute surgical therapy in case of decompensation of the emptying of the stomach. Conservative treatment can be discussed with the patient when surgical treatment is considered cautiously.

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Reduced Port Laparoscopic Ileostomy

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Objective: Laparoscopic ileostomy commonly performed for the patients with colorectal obstruction due to cancer, peritonitis with perforation of colon or the other reason. Reduced port surgery is a novel technique that may be performed when considering minimally invasive surgery and desiring a cosmetic benefit. The aim of this study was to evaluate safety and feasibility of reduced port laparoscopic ileostomy.
Methods: Between July 2012 and June 2016, 50 patients who underwent reduced port laparoscopic ileostomy were included 32 male and 18 female, age: 63 years old. The outcomes were evaluated in terms of operation time, intraoperative blood loss and perioperative complications.
Sugical Procedures: The patients were placed in the supine position and the operator stood left side. An access device with the wound-protector (EZ access, HAKKO, Nagono, Japan) was inserted on the future ileostomy site in the right lower abdomen, inserting two of 5-mm trocars, maintaining pneumoperitoneum at 10 mmHg with carbon dioxide. A 5-mm trocar was inserted in the left lower abdomen. A 5-mm flexible laparoscope was inserted from access device port. After exploring abdominal cavity, ileum end was identified. Then the marking using dye was put on the ileum of 25 cm proximal from the ileum end. The ileum marked by dye was grasped, and extracted through the access devise. Then a Blooke ileostomy was created.
Results: Reduced port laparoscopic ileostomy was performed for 50 patients with colorectal obstruction due to cancer, ovarian cancer, peritonitis and Crohn disease etc. The mean operative time was 115 min, the mean blood loss was 6.9 ml. One patient received one additional port. There were no intraoperative complications. Four patients (8%) experienced postoperative complications (two of deep surgical site infection, one of pneumonia and one of renal dysfunction). There were no other intraoperative or postoperative complications.

P584

Recurrence After Simultaneous Minimally Invasive Inguinal Hernia Repair and Robotic Radical Prostatectomy

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Introduction: Inguinal hernia is a well-known complication of radical prostatectomy, with up to 40% of patients requiring repair within the first two years of surgery. However, it is unclear whether concurrent inguinal hernia repair with prostate resection would be beneficial. This study examines our institution's experience with simultaneous, minimally invasive hernia repair during robotic-assisted laparoscopic radical prostatectomy.
Methods: We retrospectively reviewed patients who underwent combined robotic-assisted laparoscopic prostatectomy and minimally invasive inguinal hernia repairs between January 2004 and July 2016. Demographics, procedure-related details and outcomes data were then analyzed for this group.
Results: Eighteen patients were identified, including seven with prior abdominal surgery. The mean age and mean BMI were 61.2±8.2 years and 26.7±2.9 kg/m2, respectively. There were eight bilateral hernias; of the 10 unilateral repairs, five were left-sided. Robotic repairs were performed on 15 patients, while three had laparoscopic repairs, and nineteen of 26 hernias (13 patients) were reinforced with permanent mesh. Mean operative time was 273±66 min with a median length of stay of 2 days. Median time to follow-up was 24 (IQR 7.4–51.4) months. Recurrence was noted in three patients (12.5%), whose direct defects had been covered with mesh and secured with tacks. Two such patients underwent open repair one year after the index surgery. The third was asymptomatic and opted for close observation with no untoward effects during the follow-up period. Although mortality and surgical site infection were nil, other post-operative complications included venous thrombosis (5.6%), bladder leak (2.8%) and post-operative pain (22.2%).
Conclusions: Results from this study on robotic and laparoscopic inguinal hernia repair during prostatectomy support the safety of concomitant surgery. However, an unexpectedly high recurrence rate was noted, suggesting that hernia repair is better deferred for the post-operative period in asymptomatic patients. Further studies with a larger cohort are needed to determine how these results compare with delayed open inguinal hernia repair.

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Laparoscopic Modified Keyhole Plus Repair for Parastomal Hernia Single Centre Last 15Years Experience from India

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Abstract: Laparoscopic parastomal hernia repair has been reported in literature which is associated with low morbidity and acceptable recurrence. The objective of the present study is to present our experience over past 15 years of our modified keyhole plus repair technique for parastomal hernia.
Material and Methods: A retrospective review of last 15 years data of patients who underwent laparoscopic modified keyhole plus repair for parastomal hernia.
Keysteps:
Removal of hernia sac
Closure of the defect with non-absorbable suture
Proper fixation of composite Mesh with a central keyhole slit
Mesh fixation with both trans fascial sutures and tackers
Results: Total 14 symptomatic parastomal hernia patients underwent this procedure among which 10 were colostomy hernias, 1 was end ileostomy hernia, 2 cases were post ileal conduit and 1 was suprapubic cystostomy. 2 patients underwent additional IPOM for ventral hernia. 8 patients had BMI>30 kg/m2. The mean operative time was 108 min. Mean hospital stay was 3 days. Median follow up was 2 years. Seroma in 4 patients. There was no mesh infection. 1 patient presented with asymptomatic recurrence after 3 year of surgery.
Conclusion: Laparoscopic key hole plus repair for parastomal hernia seems safe, effective and feasible with good cosmetic and functional outcome with acceptable recurrence.

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Surgical Complications After Laparoscopic Pancreaticoduodenectomy: A Single Center's Experience

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Aim: The purpose of this article is to describe and illustrate the surgical complications after Laparoscopic Pancreaticoduodenectomy (LPD), and share our center's experience.
Methods: There were 80 patients who underwent laparoscopic pancreatoduodenectomy by a single surgeon at the Department of Pancreatic Surgery, West China Hospital, Sichuan University, China, from September 2010 to October 2015. After applying the exclusion criteria, a total of 72 patients were included for analyses, we retrospectively collected and analyzed the clinical data of them, which included preoperative, intraoperative, and postoperative variables.
Results: Of all the 72 patients, the mean age was 58.6±12.2 years old. Twenty-nine patients were female while 43 male. Ten patients needed intraoperative blood transfusion intraoperative time. Seven patients need re-operation within 30-day following LPD. The median operative time was 480.0 min (IQR 420.0 min-520.0 min), and the median estimated intraoperative blood loss was 200.0 ml (IQR 150.0 ml-300.0 ml). Based on the Clavien-Dindo classification, there were 28 (38.89%) cases of grades I–II, ten (13.89%) cases of grades III–IV, and 2 (2.78%) cases of grade V postoperative complications. The total morbidity was 55.5%, and the postoperative 30-day mortality was 2.78%.
Conclusion: LPD, including laparoscopic pylorus-preserving pancreaticoduodenectomy (LPPPD), although associating with various severe complications, is a safe and feasible procedure, but should be performed by experienced and highly skillful surgeons.

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Reduced Port Laparoscopy and Endoscopy Cooperative Surgery (RP-LECS) with the Novel FJ (Free Jaw) Clip and F (Free) Loop Plus Devices

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Introduction: In conjunction with Charmant, a local eyeglass frame manufacturer, we developed novel devices called the FJ (Free Jaw) Clip to grasp organs in the abdominal cavity and the F (Free) Loop Plus to pull thread extracorporeally from within the abdominal cavity.
Product Summary: The FJ Clip is a stainless steel, removable forceps for use in laparoscopic surgery. It provides a strong grip but rarely crushes organ tissue. To pull out thread tied to the FJ Clip, we developed the F Loop Plus, which is a 21G by 90-mm-long special stainless needle with φ0.1-mm NiTi alloy thread.
Case: We performed 5 cases of reduced port laparoscopic and endoscopic cooperative surgery (LECS). We performed reduced port surgery (RPS) by making a 1.5-cm incision at the umbilicus, inserting 2 trocars (12 mm and 5 mm), and inserting another trocar (5 mm) at the left side of the abdomen. We expanded the left hepatic lobe with a 12-mm FJ Clip for Penrose drain placement, grasped the front wall of the gastric body with a 12-mm FJ Clip, applying traction toward the legs to pull up the tissues around the tumor, and resected all layers of the tumor via oral endoscopic submucosal dissection technique. The resected area was closed with a suturing device or interrupted sutures in the abdominal cavity.
Results: The average operation time was 204 min and postoperative hospital stay was 9.8 days. There were no complications after surgery.
Conclusion: We believe the FJ Clip and F Loop Plus are effective for use in LECS and RPS.

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Technique of Esophagojejunostomy Using the Transoral Pretilted Anvil Head After Laparoscopy Assisted Total Gastrectomy (LATG) for Gastric Cancer

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Introduction: During esophagojejunostomy using a circular stapler after LATG, placement of the anvil head via the transabdominal approach proved difficult. The authors report on a method modified for laparoscopy-assisted, esophagojejunostomy performed by placing the pretilted anvil head(OrVil) via the transoral approach.
Methods and Procedures: Between January 2013 and August 2016, esophagojejunostomy was performed using OrVil in 78 patients after LATG. The anesthesiologist introduced the anvil while observing its passage through the pharynx. During the anastomosis, we kept the jejunum fixed in position with a silicone band Lig-A-Loops, thereby preventing the intestine from slipping off the shaft of the stapler.
Results: Esophagojejunal anastomosis using the OrVil was achieved successfully in all patients. No other complications, such as hypopharyngeal perforation and/or esophageal mucosal injury, occurred during passage. The postoperative complications of anastomosis were leakage in two patients and stenosis in 2 patients, in whom mild relief was achieved using a bougie.
Conclusion: Esophagojejunostomy using the transoral pretilted anvil head is a simple and safe technique.

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Thoracosocopic Stapler and Plication for Eventration of Diaphragm: A Hybrid Approach

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Introduction: Diaphragmatic Eventration is an uncommon entity denoting abnormal elevation of hemidiaphragm. The condition is often asymptomatic, often discovered incidentally on radiological scans. Affected individuals suffer from chest discomfort, respiratory compromise & recurrent respiratory infections. The condition is most often congenital with irregular muscularization of diaphragmatic segments, or may be acquired secondary to phrenic nerve dysfunction.
Treatment of the condition was traditionally performed with an open thoracotomy with diaphragmatic plication. Attempts at diminishing morbidity of an open thoracotomy resulted in formulation of video assisted plication, & even a laparoscopic approach where excess diaphragm was excised with an endostapler. Thoracoscopic plication offers individualization of degree of plication as per severity of individual's condition.
Methods: At our centre, we adopted a thoracoscopic plication in 2 cases & endostapler resection of afflicted hemidiaphragm segment in 2 cases. In view of 1 patient developing a recurrence in both groups, we modified the procedure to add plication of diaphragm over the stapler line. This hybrid approach was utilized in 5 cases.
In all our cases, the diaphragmatic adhesions with the lung were dissected with energy source. Excess diaphragm was pinched off the abdominal organs & excised with endostapler extending from posterolateral to anteromedial aspects, staying away from pericardium. The staple line was reinforced with a layer of non-absorbable sutures. We then proceeded to plicate the hemidiaphragm along the length of staple line, with amount plicated decided on basis of laxity of segment being sutured.
Conclusion: By strictly adhering to thoracoscopic access, we significantly reduced operative time, hospital stay, morbidity & recovery time for our cases. The hybrid procedure was found to be technically feasible, combining the advantages of endostapler excision with strengthening provided by plication and was associated with 0% recurrence on 6 months follow up with 50% recurrence in only stapler group (Fig. 1).

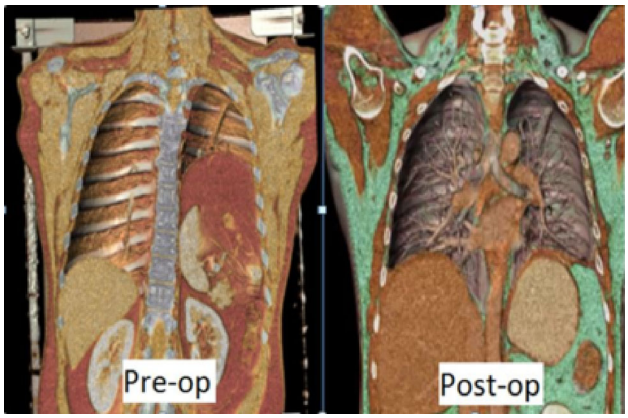

Fig. 1 Pre & Post-operative CT reconstructions of a patient who underwent hybrid repair of diaphragmatic eventration

Sr No.	Procedure	Age in years	Operative Time	Recurrence	Complications
1	Plication	60	170	+	Moderate Pleural effusion
2	Plication	56	145	-	-
3	Endostapler	34	90	+	Atelectasis & Intercostal Neuralgia
4	Endostapler	42	100	-	-
5	Endostapler + Plication	22	145	-	Stitch abscess
6	Endostapler + Plication	42	155	-	-
7	Endostapler + Plication	28	150	-	-
8	Endostapler + Plication	36	140	-	Fever
9	Endostapler + Plication	44	125	-	-

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Surgery for Epiploic Appendagitis

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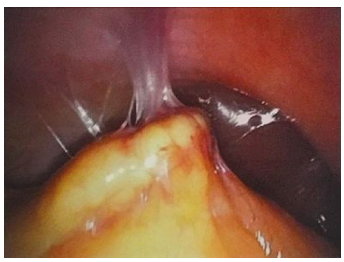
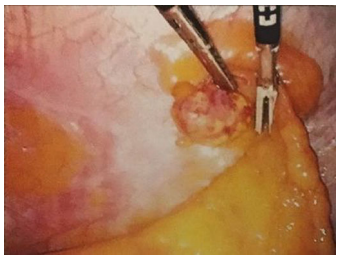
Introduction: Although epiploic appendagitis is normally treated conservatively, there is a select subset of patients who benefit from surgical intervention. Surgery may be required for diagnosis and/or treatment. We are presenting a small case series of patients who were managed surgically after failing non-operative observation.
Patient Data: Recently at our institution, two patients presented with persistent left lower quadrant pain. The first patient is a 55-year-old male who presented with left lower quadrant abdominal pain radiating to the left groin. The patient had tenderness on physical examination, but no other findings were elicited. The working diagnosis was an inguinal hernia, but one was not observed during the examination. He was scheduled for a diagnostic laparoscopy with a possible inguinal hernia repair. The second patient is a 50-year-old female who presented to the Emergency Department at an outside facility with an acute onset of left lower quadrant abdominal pain. A CT scan of the abdomen and pelvis was performed and a diagnosis of epiploic appendagitis was made. She was discharged with pain medication. However, the pain did not improve with medication. She sought a surgical opinion for definitive treatment. On physical examination, there was point tenderness in the left lower quadrant. This finding correlated with the cross-sectional images. She was scheduled for a diagnostic laparoscopy.
Treatment Course: During laparoscopic exploration, both patients had similar findings. There were inflammatory changes and adhesions in the left lower quadrant between the thickened, inflamed epiploica and the anterior abdominal wall. The pathology was at the location of maximal tenderness each patient exhibited on physical examination. Since the diagnosis was confirmed, the inflamed portions were resected with a LigaSure device. Postoperatively, both patients had immediate and complete cessation of their presenting symptoms. At their follow-up visits, the patients reported that they did not have a recurrence of the original symptoms. They had pain from surgery, which had resolved shortly after surgery. Neither patient had any surgical complications.
Conclusion: Epiploic appendagitis can be managed safely by surgical resection. As described by Sand et al, there are more common diseases with similar symptoms. Therefore, surgery may be a necessary diagnostic and therapeutic tool for this pathology. The increased use of CT scans may aid in diagnosing or ruling out this entity.





P592

Real to Virtual Scene Registration Using Kinect® for Endoscopic Augmented Reality System

Atul Kumar, PhD[1], Shih-Wei Huang, MD[1], Yen-Yu Wang, MS[1], Kai-Che Liu, PhD[1], Wan-Chi Hung, MS[2], Yi-Chun Lee, PhD[2], Jungle Chi-hsiang Wu[1], Jian Hua Lin[1, 1]Chang Bing Show Chwan Memorial Hospital, [2]IRCAD-Taiwan

Objective: An augmented reality (AR) approach using pre-surgical CT/MRI model superimposed on the surgical scene enables to visualize the structures behind the surface. A major challenge in such AR is the registration of the real and the virtual object. This study presents an augmented reality system for endoscopic surgery where the real and virtual objects are registered with the help of Kinect® depth camera.
Method: A CT scan 3D virtual model (Pctvm) of a phantom (a torso phantom (IOUSFAN®) enclosed in a plastic box) was reconstructed. The AR system comprised of a computer, a software system, an NDI® 3D tracking system, a Kinect® and an endoscope system. The NDI® tracking system's reference frame was the global reference frame (GlobalRF) for the AR. All the objects to be tracked during AR were brought in the GlobalRF. 1) Kinect® to GlobalRF : The Kinect® depth camera was fixed with respect to the NDI tracking system and their positional relationship was calculated by landmark registration technique. 2) Endoscope to GlobalRF: An NDI tracking tool was mounted on the endoscope camera. A perspective-n-point solution was applied to find the camera location with respect to the tracking tool. 3) Phantom to GlobalRF: A 3D virtual model of the phantom (Pkvm) was reconstructed using the Kinect®. The virtual model Pkvm was registered with Pctvm using iterative closest point algorithm. The system was applied on the phantom and the AR was visualized on a computer monitor. The error of superimposition of the real and the virtual scene was measured as the root mean square of the distances (in mm) between the edges of the real scene and the virtual scene in their rendered images.
Results: The complete software for the AR was developed using C++and was run in a computer with Intel® Core™ i7 960 @3.20 GHz, 6.00RAM 64 bit Windows 7. The software used several open source libraries. The complete system was applied on the phantom at its 30 different positons. Error of superimposition fall between 5 to 15 mm.
Conclusions: The current study presents an augmented reality system for endoscopic surgery where the real and the virtual objects are registered using the 3D model from Kinect® and the 3D model from CT scan.

P593

Robotic Ventral Hernia Repair with Mesh: MIS Fellowship Program Experience in a New York City Hospital

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Introduction: This study aims to document our initial experience with robotic surgical approach to ventral hernias as part of our Advanced GI Minimally Invasive Surgery (MIS) fellowship curriculum. Over the course of 9 months we utilized the da Vinci robotic platform and performed 44 ventral hernia repairs using 4 different types of mesh. We describe our experience, results, and conclusions of using this novel approach.
Methods and Procedures: All robotic ventral hernia repairs with mesh performed electively from July 2015 to March 2016 were tracked and retrospectively analyzed. Procedures were performed by MIS fellowship program director with active participation of the MIS Fellow and general surgical residents. Preoperative diagnosis included simple ventral hernias and chronically incarcerated ventral hernias. No acutely incarcerated or strangulated hernia repairs were included in this study. Age, ASA (American Society of Anesthesiologists), diagnosis, BMI, total operative time (docking and console time), and complications (death, recurrence, wound infection, conversion to laparoscopic/open procedure, chronic pain and re-admissions) were analyzed. All cases were performed using intraperitoneal only mesh (IPOM) and fascial defect size was measured intra-operatively. Hernia sac was always excised prior to completing the fascial repair and mesh was sutured to abdominal wall peritoneum using V-Loc 180 device and barbed monofilament. No tacks or trans-fascial sutures were employed. Patient follow up was at 1 and 12 weeks postoperatively.
Results: Under aforementioned criteria, a total of 44 cases were performed. Patient population characteristics were: mean age 52 years (range 26–81), mean BMI 34 (range 20–53), mean ASA 2.2 (range 1–3) and mean total operative time of 161.5 min (range 78–350). Cohort diagnosis breakdown was 9 (20%) chronically incarcerated and 35 (80%) reducible ventral hernias. Fascial defect mean size was 5 cm (range 3 cm – 10 cm). Mesh types used were: Symbotex −36(82%), Phasix ST 4(9%), Ventralex ST −1(2%) and Ventrio ST −1(2%). One (2%) patient developed a hematoma which was evacuated in the office and wound packed until complete healing occurred. There were no incidences of death, wound infection, conversion to laparoscopic/open procedure, re-admission, recurrence, or chronic pain.
Conclusions: Robotic ventral hernia repair is feasible and safe to perform on any patient regardless of diagnosis, BMI, age, and ASA at a teaching community medical center. Our data indicates that either type of mesh can be utilized. This approach has low morbidity and virtually eliminates the complication of chronic pain by avoiding trans-fascial sutures and tacks.

P594

A Systematic Review and Meta-analysis Comparing the Open with the Laparoscopic Approach for Transverse Colon Cancer

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Aim: All randomized controlled trials comparing laparoscopic versus open colectomy in colorectal malignancy have up-to-now excluded transverse colon malignancies, potentially due to the advanced laparoscopic skills required for dissecting around the middle colic vessels and the associated morbidity. This study aimed to systematically review the literature, establish the level of evidence and compare the laparoscopic (LTC) to the open (OTC) approach for transverse colonic cancer resections.
Method: The Scopus, Cochrane library and Pubmed databases were interrogated. Selected studies were critically appraised and the short term morbidity and long term oncological outcomes were meta-analyzed. Sensitivity analysis according to the quality of the study and year of publication was performed. Statistical heterogeneity and publication bias were also investigated.
Results: Nine case control trials with 1156 patients (610 in the LTC and 546 in the OTC) were included in the study. LTC was found to have shorter hospital stay [Weight mean difference (WMD) =-2.99 (-4.62, -1.37); P=0.003] and faster start of oral intake [WMD=-1.44 (-1.64, -1.23); P<0.00001], with longer operative time [WMD=40.35 (22.22, 58.47) ;P<0.0001]. No difference was found in relation to anastomotic leak [Odds Ratio (OR)=0.74 (0.33, 1.65) ;P=0.46], intra-abdominal abscess [OR=0.56 (0.23, 1.40);P=0.22], and lymph nodes harvested [WMD=-1.14 (-2.61, 0.33); P=0.13] outcomes, or in relation to oncological outcomes such as overall survival [HR =1.40 (0.63, 3.14) ;P=0.97], disease free survival [HR=0.84 (0.58, 1.21) ;P=0.34], local recurrence [OR=1.13 (0.42, 3.07) ;P=0.81] or distant metastases [OR=0.68 (0.40, 1.16);P=0.16].
Conclusion: LTC provides significant short-term benefits with no increased morbidity and similar long-term oncological outcomes in relation to OTC in colorectal cancer surgery.

P595

2D To 3D Conversion of Conventional Endoscopic Video: A Preliminary Result

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Objective: The stereo endoscope available for clinical use has two camera system which does not allow it to change the focal length of the endoscope during the surgery. Moreover, for the stereo visualization clinicians need to replace the conventional system with a new stereo system which is multiple times expensive compared to the conventional endoscope. Recently, MedicalTek® has introduced a system (MonoStereo®) which can convert a conventional endoscopic video into a stereo video. This study presents an experience with MonoStereo® system in several kinds of surgery.
Method: The MonoStereo® system comprises of a 2D-3D converter device and a 3D monitor. The video input from conventional endoscope is captured by the device and the stereo output of the video is visualized on the monitor. The system allows the user to zoom in and out, and free movement of the endoscope. The stereo perception can be changed by adjusting the human factors such as distance between two eyes.
An IRB approval for using MonoStereo® in surgical cases of urology, gynecology, colorectal, cholecystectomy and ear base surgery was received from Show Chwan Memorial IRB committee. The stereo system was applied on total of 18 patients in Show Chwan Memorial Hospital during December 2014 to June 2016. The surgeries were done by several surgeons using 0o or 30o (wide angle) Karl Storz® endoscope. The surgeries went without any intra-operative complications. The user experience of the surgeons was recorded in the form of questionnaire where each question was scored on Likert scale from 1 to 5. The questions included the experience about 3D perception of the instruments and the surgical anatomy, latency in the display, stress in visualization, usefulness in the surgery and comparison of the stereo visualization with that from conventional 2D endoscopic system.
Results: The average score in Likart's scale of the user experience for 18 cases is shown in Fig. 1.
Conclusions: The study presents an experience of stereo video produced with MonoStereo® and conventional endoscope. The experience suggests that MonoStereo®is suitable for several kinds of surgeries and is more helpful for such surgeries compared to conventional 2D endoscopic video alone.

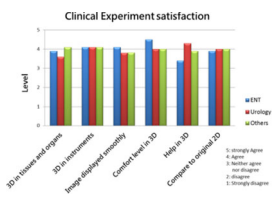

Fig. 1 Results of the user experience by the questionnaire scored in Liker's scale

P596

Single Incision Laparoscopic Percutaneous Extraperitoneal Closure (Lpec) for Inguinal Hernia in Children

Ryohei Onishi, Yoshiyuki Kawakami, Hidenori Fujii, Makoto Yoshida, Hidemaro Yoshiba, Koji Doi, Toshiharu Aotake, Fumie Tanaka, Yuki Hirose, Department of Surgery, Japanese Red Cross Fukui Hospital, Fukui, Japan

Introduction: A Laparoscopic Percutaneous Extraperitoneal Closure (LPEC) has become widespread as a safe and profitable operative procedure to treat pediatric inguinal hernia (IH). Recently, to reduce further operative invasiveness and to get better cosmetic results, single-incision LPEC has been developed.
Purpose: A single-incision LPEC for children was performed since July of 2014 at our hospital.To discuss the safety and usefulness of this procedure, we retrospectively investigated postoperative outcomes such as operative time, hospital stay and major complications.Moreover, we reviewed clinical records of patients who had surgical treatment with anterior approach (Potts method) and compared postoperative outcomes.
Operative Procedure: Under general anesthesia, in supine position, we placed a 5 mm 30° laparoscope through 1.0 cm vertical trans-umbilical skin incision. A 2-3mm port for a grasping forceps was inserted through umbilicus. By using LPEC needle, hernia sac was closed extraperitoneally.
Results: From July of 2014 to April of 2016, 9 female cases of single-incision LPEC were performed at our hospital. Average age was 5.7 years old, range, 1.2–7.5. Average operative time of unilateral and bilateral cases was 33 min, range, 27–40, in 7 cases and 51 min, range, 46–55, in 2 cases in each. There were no serious complications associated with this procedure. In 2 bilateral cases, contra-lateral hernia was detected intra-operatively and repaired as well. Length of hospital stay was 3 days for all cases. No recurrence of hernia has been identified so far. On the other hands, from April of 2010 to April of 2015, Potts operation was performed in 28 female cases of inguinal hernia with an average age of 5.5 years old, range, 0.1–12.6 years. Operative time of unilateral and bilateral cases was 37 min, range, 20–61, in 26 cases and 70 min, range, 52–88, in 2 cases in each.
Conclusions: Although we had a few single-incision LPEC cases, there were no operative complications and recurrence in the early postoperative period. Operative time in single-incision LPEC group was not significantly increased when compared to that in Potts operation group. We concluded that single-incision LPEC was less invasive and enough safe procedure that enabled us to perform contra-lateral exploration to treat incidental inguinal hernia without any additional operation. Thus some reports showed effectiveness of LPEC method in male child or in younger adult cases, we would expect single-incision LPEC is useful for them as well.

P597

Fifteen Years of Laparoscopic Colorectal Surgery: A Retrospective Analysis of a Single Teaching Hospital

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Background: Laparoscopic surgery has changed the way we perform surgery. Its benefits are clearly in any hospital with enabled surgeons. Currently, there are very few restrictions on the routine use of laparoscopic access. However, in the beginning, laparoscopic surgery was only for selected cases.
Objective: Analyze the results of laparoscopic colorectal surgery at a single teaching institution between 1995 and 2016.
Methods: This study is a retrospective analysis of a prospective database of 596 patients who underwent laparoscopic colorectal surgery. Surgery performed, operative and postoperative complications, conversion index, mortality and operative time were considered.
Results: From 1995 to 2016, 596 operations were performed, 269 between 1995 and 2011 and 327 between 2012 and 2016. Left colectomies and rectosigmoidectomy were 340 (57,1%), right colectomies were 144 (24,2%), total proctocolectomies with or without ileal pouch-anal anastomosis (IPAA) were 37 (6,2%), total colectomies were 29 (4,9%), abdominoperineal resections were 29 (4,9%), rectopexy for rectal prolapse were 10 (1,7%) and there were 7 other nonclassified resections. The mean age of patients was 57,9 ± 15,1 years. 223 (37,4%) were men and 373 (62,6%) were women. Average body mass index (BMC) was 26,65 ± 4,6 and mean operative time was 243,8 ± 95,5 min. Operative complications occurred in 28 (4,7%) patients and conversion in 46 (7,7%) cases. Thirty-day complications were classified based on Clavien-Dindo. Of all patients, 411 (69%) had no complications, 63 (10,6%) were Clavien I, 56 (9,4%) were Clavien II, 6 (1%) were Clavien IIIa, 28 (4,7%) were Clavien IIIb, 14 (2,3%) were Clavien IVa, 7 (1,2%) were Clavien IVb and 11 (1,8%) were Clavien V. Anastomotic leak occurred in 46 (7,7%) cases and 46 (7,7%) patients required reoperations for postoperative complications.
Conclusion: results of laparoscopic resections in a teaching institution are in line with the major worldwide centers, including the initial experience, showing the safety and feasibility of this technique.

P598

Necrotizing Fasciitis is a Rare Yet Morbid Complication Following Laparoscopy

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Background: Necrotizing Fasciitis (NF) is a rapidly progressive infection involving the subcutaneous tissue and fascia associated with a significantly high morbidity and mortality. Few cases have been reported of NF arising secondary to laparoscopic port site placement. In the age of minimally invasive surgery, awareness of such a fatal infectious complication is essential to avoid delay in diagnosis and subsequent significant morbidity or mortality.
Case Presentation: This is a case of a 61-year-old female, past medical history significant for hypothyroidism and diabetes mellitus, who presents with two weeks of progressive abdominal pain, subjective fevers, chills and malodorous discharge from her umbilicus surgical port site. These symptoms developed less than one month after an elective laparoscopic bilateral salpingo-oophorectomy. CT scan was performed and revealed a 4.2 × 5.7 cm fluid collection at the level of the umbilicus with extensive gas noted within the subcutaneous fat of the anterior abdomen; findings consistent with necrotizing fasciitis. Laboratory values, including white blood cell count (WBC) 18.6 and lactic acid 3.1, were consistent with the development of clinical sepsis. As a result, this patient emergently underwent extensive sharp excisional debridement of necrotic abdominal skin, subcutaneous tissue, muscle and fascia. The abdomen was copiously irrigated and left open with extensive packing. A total of four surgical debridement and washouts occurred throughout the hospital stay, ultimately resulting in abdominal wall closure. Final surgical pathology revealed necrotizing fasciitis and abscess. Conclusive wound cultures revealed Methicillin-sensitive Staphylococci Aureus (MSSA). The postoperative course was complicated by multi-system organ failure including acute renal failure, pulmonary effusions, and acute respiratory failure secondary to severe sepsis. Ultimately, patient stabilized and was discharged to sub-acute rehab on a long term antibiotic regimen. The patient has remained stable after four month follow up.
Discussion: Necrotizing fasciitis is a rare postoperative complication of laparoscopic surgery. Routine use of perioperative prophylactic antibiotics has been shown to significantly improve the number of surgical site infections (SSI). Early detection and high clinical suspicion is crucial for proper management of NF. Treatment with aggressive and multiple surgical debridement and washouts, in conjunction with intravenous broad spectrum antibiotics, is imperative in limiting the grave morbidity and mortality associated with NF.

P599

Transcystic Drainage Tube is Usefulness for Preventing Postoperative Leakage After Laparoscopic-Endoscopic Cooperative Surgery for Duodenal Tumors

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Background: Technique of endoscopic submucosal dissection (ESD) for duodenal tumors has been advancing, but complications such as delayed perforation and bleeding are yet to be solved. It still remains a matter of debate if the suppression of pancreatic juice activation by draining bile juice actually prevents these complications.
Objective: To evaluate the role of bile drainage by transcystic tube (C-tube) for preventing postoperative perforation and bleeding after laparoscopic-endoscopic cooperative surgery (LECS) for duodenal tumors.
Patients and Methods: Two distinct surgical procedures: ESD reinforced by sero-muscular suture (ESD method) and whole layer resection (Resection method) were advocated. For tumor located in the duodenum adhering to the pancreas or in cases when the carcinoma was diagnosed preoperatively, ESD preceded by sero-muscular suture was performed, and for the tumor diagnosed as adenoma and localized to the free wall, whole layer resection was performed endoscopically or laparoscopically and was followed by Albert-Lembert suture. Laparoscopic cholecystectomy and C-tube placement were performed after tumor resection. ESD was performed in 2 patients with carcinoma diagnosed preoperatively (46, 32 mm). Resection method was carried out in 2 patients with adenoma (16, 19 mm). Operation time were 409 and 276 min in ESD group, and 320 and 374 min in Resection group. Blood loss was minimal in all cases.
Results: None of the patients had postoperative complications. C-tube was removed on seventh postoperative day. Compared to patients treated with ESD alone, in previous 26 cases, those treated with LECS had evidently no postoperative blood loss (3.8% Vs 0%) or delayed perforation (7.7% Vs 0%).
Conclusions: LECS with C-tube placement as a minimal invasive procedure is useful and effective in preventing postoperative complications after LECS for duodenal tumors.

P600

The Role of Single Incision Laparoscopic Surgery (SILS) in the Ileus Operation

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Background: Ileus has a variety of backgrounds and its operation mode is often modified to meet the intraoperative requirements. Single incision laparoscopic surgery (SILS) is a laparoscopic procedure which leaves a single small incision in navel, and has been reported to be less invasive than and as safe and efficient as the conventional multiport laparoscopic surgery (MPS). The role of SILS in the ileus operation has not been well studied.

Objective: The aim of this study was to examine the perioperative outcome of SILS in ileus operation.
Methods: This is a retrospective study from a prospectively collected database. The investigation took place in a high-volume mutidiciplinary acute hospital in Japan. From 2011 to 2015, 64 consecutive patients who were treated for non-cancerous ileus were identified.
Results: Out of 64 non-cancerous ileus patients, 43 patients were planned for open surgery (OS) (4; unstable vital signs, 3; ischemic change suspected, 5; post-perforation operation, 31; severe distension) and 21 were planned for SILS. The background of patients who had SILS was as follows; median age was 66 (20–88) year-old, 13 (61.9%) were female, 17 (81.1%) were Performance Status 0 or 1, Preoperative diagnosis was adhesion in 10 (47.6%) and strangulation in 11 (52.4%), the first ileus episode in 15 (71.4%), the number of past abdominal operative history was 0 in 5 (23.8%) and one in 14 (66.7%). Operation mode was as follows; small bowel resection in 8 (38.1%), derotation in 6(28.6%), adhesiolysis in 4(19.0%), debanding in 2(9.5%), colectomy in 1(3.8%). Perioperative outcome was as follows; the median operation time was 121 (38–217) min, bleeding Volume was 0 (0-500mL), being completed by SILS in 15 (71.5%) and converted to OS in 6(18.5%) (3; unable to detect responsible lesions, 2; difficult to perform procedure, 1; broad necrosis of intestine detected), intraoperative damage to organ occurred in 2 (serosal damage due to adhesiolysis), surgical site infection occurred in 2 (9.5%), pneumonia occurred in 1 (4.7%). Median hospital stay after surgery was 11 (5–35) days.
Conclusions: SILS in selected patients is a reasonable option in ileus surgery.

P601

Laparoscopic Repair of Diaphragmatic Eventration, Presenting as Gastric Outlet Obstruction

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Diaphragmatic Eventration may occur as a congenital anomaly with loss of muscle fibers in the central tendon, that looks membranous, or from paralysis, where there is muscle, but no contractility. It Usually presents as respiratory distress due to reduced pulmonary volume from the abdominal pressure. I report a rare case presenting as gastric outlet obstruction.
The thinned out membranous diaphragm was housing the stomach in the LUQ concavity as shown on the UGI. The displaced stomach was causing dysphagia and vomiting, with inability to eat. The colon and small bowel was also seen on CT to be present in the LUQ.
64 year old gentlemen presented with inability to eat with vomiting and dysphagia and dyspnea. The severe dysphagia, bloating, vomiting was associated with LUQ pain. He claimed to be standing upright and massaging his LUQ for relief of symptoms. CT scan and UGI revealed eventration of diaphragm with high riding stomach in the chest. Patient also had severe mitral regurgitation, with exertional dyspnea in addition to dyspnea with bloating.
Laparoscopic repair was proceeded with plication of the diaphragm with multiple interrupted #0 Ethibond sutures. This was reinforced with composite mesh- which was sutured and partly tacked with staples.
Patient recovered well and was able to eat well and obtained symptomatic relief. He did not have any further vomiting or bloating. He did develop CHF from MR and had Mitral valve replacement and is currently doing well.
Thoracoscopic approach has been described, but it is feasible to perform plication with laparoscopy and also use a compsite mesh to reinforce the repair site.
Technological advances have extended the applications of laparoscopic procedures. The morbidity of surgery is lessened if laparoscopy is feasible. The duration of stay is reduced in this cost conscious environment. The durability of the repair is prolonged with addition of composite mesh.





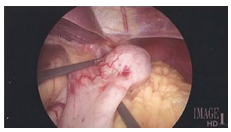
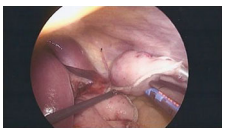
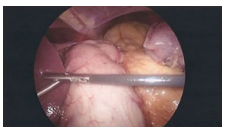
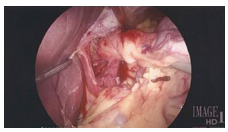


P602

Gastrointestinal Stromal Tumor in Severely Anemic Jahovah's Witness Patient: A Case Report and Literature Review

Paul R Clark, MD, Florida State University College of Medicine

Introduction: The aim of this manuscript is to present a case of gastrointestinal stromal tumor in severely anemic Jahovah's witness patient and to discuss management options. Gastrointestinal stromal tumors (GISTs) are the most common mesenchymal tumors of the GI tract and represent ~ 0.1-3% of all GI tumors. A review of the current literature is also presented.
Case Presentation: The authors present the case of a 66-year-old female who is a practicing Jahovah's witness presenting with headache and dark tarry stools. Patient was found to be severely anemic; Hb of 5.4. Endoscopy showed a prolapsed nodular lesion in the cardia roughly 2.5 cm with superficial ulceration and active bleeding, this was treated with epi injection and APC ablation. Patient was taken to the operating room and underwent a laparoscopic partial gastrectomy, hiatal hernia repair and intraoperative EGD. Blood loss was minimal and post op Hb was stable at 5.4. Pathology revealed clear margins with 5.7 cm greatest diameter, mitotic count 1 per 50 HPF. The tumor was therefore intermediate risk, requiring no adjuvant Imantinib therapy and surveillance with CT q 3–6 months for 1st 3–5 years providing a estimated recurrence free survival 2–5 yrs> 90% and 10 yrs 80–87%. Patient was discharged on erythropoietin post operative day 3.
Conclusion: Gastrointestinal stromal tumors (GISTs) rare neoplasms representing ~ 0.1-3% of all GI malignancies. GISTs are most commonly found in the stomach and present with bleeding. CT with IV contrast is recommended imaging modality and preoperative biopsy is not routinely necessary for a primary resectable neoplasm suspicious for GIST and may increase risk of rupture w/ dissemination or bleeding. However if metastatic disease suspected or differential includes other malignancies such as lymphoma a biopsy is warranted. In 2008 Imantinib (antineoplastic tyrosine kinase inhibitor) was approved for daily dose of 400 mg by FDA for adjuvant therapy for high risk patients following complete resection and is recommended for adjuvant therapy depending on an estimation of the risk of recurrence, which is based on tumor size, mitotic index, location in GI tract, and the presence or absence of tumor rupture (either spontaneously or during surgery). Minimally invasive laparoscopic resection of primary GISTs can be preformed following basic oncologic principles and is particularly appealing in patients with bleeding with contraindications to transfusion.


P603

Difficulty Assessment for Single-Incision Laparoscopic Surgery for Splenic Diseases

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Backgrounds: Laparoscopic splenectomy is now a standard choice of treatment for patients for splenectomy. Recent developments of surgical technique and instruments enabled us to perform splenectomy through a single umbilical incision for the purpose of less invasiveness and better cosmetic outcome. The purpose of this study was to evaluate the feasibility and predict the difficulty of single incision laparoscopic splenectomy (SILS) by comparison of conventional multiport laparoscopic splenectomy (MPLS).
Patients and Methods: Forty-six patients between November 2009 and June 2016 were included, 18 had ABO incompatible kidney transplantation, 12 had ITP, 6 had splenic tumors, 4 had splenic malignant lymphoma, 3 had splenomegaly and hypersplenism, 2 had splenic artery aneurysm, and one had hereditary spherocytosis. Operative factors and post-operative complications in the two groups were compared.
Results: The male/female ratio was 9/19 in the SILS group, and 9/9 in the MPLS group. The median age was 44 in the SILS group and 50.5 in the MPLS group. The median body mass index (BMI) was significantly smaller in the SILS group (21.3 vs 24.4 kg/m2). The median operative time and estimated blood loss were similar between the two groups, 133.5 min and 30 ml in the SILS group and 120 min and 10 ml in the MPLS group, respectively. The median weight of resected spleen was similar (205 g in the SILS group and 255 g in the MPLS group). There were no mortalities in all 46 patients. In the MPLS group, there were 4 patients with portal or splenic vein thrombosis (PSVT) detected by routine postoperative CT scan. In the SILS group, we found 4 patients with PSVT, 3 with postoperative bleeding, and only one of 3 patients required transfusion. There were 1 conversion to hand assisted laparoscopic surgery in the MPLS group, and 1 conversion to open surgery in the SILS group due to bleeding. Additional ports were required in 8 patients in the SILS group because of bleeding in 2 and insufficient view for safe operation in 6. Height, body weight, BMI, and spleen weight were similar between patients with and without additional ports. Operative time and blood loss were significantly greater in patients with additional ports (172 min vs 119 min, 190 ml vs 10 ml).
Conclusions: In selected patients, SILS is safe and feasible. We should not hesitate to place additional port for safe operation, as operational difficulty could not be predicted preoperatively.

P604

Perioperative Safety of Laparoscopic Surgery in Pregnant Patients: One Surgeon's Experience

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Introduction: The aim of this study was to evaluate the experience of one surgeon at one hospital in performing abdominal non-obstetric surgery on pregnant patients over 6 years.
Methods: A retrospective chart review of all relevant procedures was performed, noting maternal demographics, estimated gestational age (EGA), type and details of procedure, and pre- and post-operative course to 30 days.
Results: Twenty-nine pregnant patients underwent 29 abdominal procedures from September 2007 to July 2013 at a dedicated women and children's hospital. Of these, 18 (62%) were laparoscopic appendectomies, 8 (28%) were laparoscopic cholecystectomies, one was an open umbilical hernia repair, one was a laparoscopic reduction of an internal hernia following previous roux-en-Y gastric bypass, and one was an open repair of a ruptured spontaneous splenic artery aneurysm with splenectomy. Mean maternal age was 25.9 years (standard deviation (SD) 6.0, range 17–42) and mean estimated gestational age (EGA) was 19.7 weeks (SD 8.5); 6, 14, and 7 patients with a recorded EGA were in the 1st, 2nd, and 3rd trimesters, respectively. Mean operative time for appendectomy was 34.6 min (SD 12.1, range 18–55), and for cholecystectomy was 40.3 min (SD 22.7, range 20–87). Among patients undergoing appendectomy, 5 were found to be perforated, 3 to have a normal appendix (1 of whom had a torsed ovary), and 1 to have granulomatous appendicitis. All appendices and mesoappendices were divided with an endoscopic stapler. In consecutive thirds of appendectomy experience, mean operative time decreased from 40 to 37 to 26 min. Indications for cholecystectomy included gallstone pancreatitis, choledocholithiasis, biliary colic leading to malnutrition, and acute cholecystitis. No patients entered labor during their hospital course. There were 4 postoperative complications in 3 patients (10%), including 2 ileus, 1 UTI, and 1 superficial wound infection. One patient had 2 readmissions for persistent emesis after cholecystectomy. There were no reoperations or deaths.
Conclusion: Abdominal surgery is safe and feasible in pregnant patients in all trimesters, although it remains prudent to aim for the 2nd trimester or postpartum when feasible. We see no contraindication to laparoscopy in pregnant patients when the surgeon has a degree of comfort and experience in performing a given procedure with this approach.

P605

Laparoscopic vs Robotic Pancreatectomy: Areal Innovation in China

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Where shall we go after all challenges in our life regime, over decades ago in morbidity and mortality the Pancreatectomy it is a silence deadly disease. After many years from work, researchers doctors surgeons scientists comes up a new technology this techniques work on keep patients less danger less pain shorter hospitalization, even some surgery promising without morbidity and improve patients outcomes without take in our consideration age old or young

In our institution we focused on pancreatic surgery whether lap or robotic both techniques are feasible and safe because the main surgeon has high expert and great experience in laparoscopic and Robotic, it was depend on the resection and dissection pancreas and major blood vesseles .Since 2006 our group has performed nearly or even more than 450 cases by classic laparoscopic (MOU procedure) some of the cases with the assistance of Davinci Robotic surgical device and some cases was complex pancreas resections .We demonstarted the safety and feasibility of this approach as well as identified critical metrics important for optimizing out-comes. This studies will review the important milestones in the development of program as well as present outcomes from another institutions studies in China ,whether laproscopic or Robotic platform is associated with comparable to lower morbidity rates then open pancreatic surgery especially for older person, and Robotic approaches will be more reliable than the laparoscopic MIPS in the future.

Finally our experience show that both techniques Laparoscopic or Robotic pancreas surgery becoming more attractive option for pancreas disease. However there will be more reports on this effectiveness on MIPs & RPs on the malignancy in the future possibility.

P606

A Comparative Study of the Invasiveness of Single-Incision and Conventional Laparoscopic Cholecystectomy

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Single-incision laparoscopic cholecystectomy (SIL-C) is being rapidly adopted due to its favorable esthetic outcome, but the question remains as to whether it is less invasive than conventional laparoscopic cholecystectomy (LC). Therefore, the invasiveness of SIL-C and LC was compared.

Methods: At our hospital, SIL-C is not indicated for cases of cholecystitis of moderate or higher severity. Therefore, 44 cases of SIL-C and 182 cases of LC performed for similar indications over a two-year period were compared. The items investigated were operative time, postoperative pain, duration of postoperative stay, postoperative inflammatory findings, and postoperative complications. Postoperative pain was assessed using a visual analogue scale (VAS).

Results: Operative time was significantly longer for SIL-C (104.4±30.8 min) than for LC (78.5±26.8 min), while no significant differences were observed between SIL-C and LC in postoperative pain at any time point (51.6±17.8 vs. 46.5±18.6 on postoperative day (POD) 0, 41.5±20.4 vs. 32.7±18.5 on POD 1, 8.8±7.4 vs.8.9±6.3 on POD 7). The duration of postoperative stay was significantly longer for LC (3.4±1.5 days) than for SIL-C (2.6±0.9 days). No significant between-group differences were observed in postoperative inflammatory findings (temperature and leukocyte count on POD 1). No perioperative complications occurred in either group.

Conclusion: While SIL-C is highly favorable in terms of esthetics, it was not shown to be less invasive than LC in the present study.

P607

Median Arcuate Ligament Compression Syndrome: Laparoscopic Management and Technical Aspects

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Background: The study aims to assess the feasibility and midterm outcome of laparoscopic treatment of celiac artery compression syndrome. The tips and tricks to obtain a better exposure and a safer procedure are described.

Materials and Methods: In a period from 2005 to 2015, 16 patients underwent laparoscopic decompression of the celiac trunk, using standard laparoscopic transperitoneal approach. There were 10 females and 6 males with median age of 43,8+16,2 (28–72) years. All patients had a history of postprandial abdominal pain and weight loss exceeded 10% of the body mass. As a part of the search for more common causes of upper abdominal pain, upper GI endoscopy and abdominal ultrasound were performed in all patients without conclusive results. Preoperative CT angiography and duplex scan revealed hemodynamically relevant stenosis of the celiac trunk>70% in all cases (median 77,5%, range 55–90% + 13,2).

All procedures were carried out under general anesthesia. Patients were placed in a supine split-leg reverse Trendelenburg position. Five (5 and 10-mm) troacars were typically placed as for a fundoplication. A liver retractor was used to retract the left liver lobe laterally. The avascular region of the gastohepatic omentum was divided and the right crus of the diaphragm was identified. To get a better exposure of aortoceliac region the stomach was retracted to the patient's left side with an atraumatic grasper through a 5-mm port in the left flank.

The muscular fibers of the crural decussation were divided with ultrasonic scissors to expose the median arcuate ligament. The ligament was cut using coagulating hook, which permitted elevation of the fibers from the aortic wall as they divide. A 10-mm laparoscopic Doppler ultrasound scanning probe was used to assess the improvement of the flow in the celiac artery.

Results: Median operating time was 170 min. Recovery was uneventful and median post-op hospital stay was 6+2,4 (2–9) days. Post-op assessment include evaluation of the complaints, the results of CT-angiography and duplex ultrasound. The mean follow-up period was 35 months (range 3–60 months). The symptoms improved in all patients in early post-op period. Symptoms reappeared in one patient due to celiac artery occlusion, treated by percutaneous angioplasty.

Conclusion: The study demonstrates the feasibility of laparoscopic approach in the treatment of median arcuate compression syndrome. Additional patients and longer follow-up are needed for long-term assessment of this technique.

P608

The Outcomes of Protack™ and N-Butyl Cyanoacrylate Histoacryl® Glue for Mesh Fixation in Laparoscopic Totally Extra-peritoneal (TEP) Inguinal Hernia Repair

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Background: Mesh fixation with staples may be the cause of chronic inguinal pain. The aim of this study was to compare the post-operative pain between the use of ProTack™ and n-butyl cyanoacrylate Histoacryl® glue for mesh fixation in laparoscopic TEP inguinal hernia repair.

Methods: This was a prospective cohort study. Thirty-eight patients (35 M,3F) with 22 bilateral (all males), 16 unilateral underwent surgery from May 2014 to April 2016. A total of 60 inguinal hernia repairs were included (30 by ProTack™, 30 by Histoacryl®). The post-operative pain scale (VAS), feeling of inguinal discomfort, length of stay (LOS), operative time, instrument cost, overall cost, complication and recurrence rate [mean follow up 9 months (5–30)] were collected.

Results: On the 4th hour, the average post-operative pain score after using Protack™ and Histoacryl® was 3.11±2.04 and 2.59±1.48, respectively. After three months, 5 of 30 repairs in Protack™ group felt inguinal discomfort, while no inguinal discomfort in Histoacryl® group. The average LOS and operative time: 3.10±0.71 and 3.23±1.38 days; 84.67±23.94 and 91.67±24.82 min, respectively. The cost of Protack™ in each patient was 102.86 USD while Histoacryl® was 28.57 USD. The overall cost was 1,117.16±72.56 USD and 1,165.91±173.27 USD. Two seromas were observed in Protack™ group, and there were 2 recurrences after operation in Histoacryl® group.

Conclusions: The advantages of Histoacryl® are the decrease of late post-operative inguinal discomfort (p=0.006) and the expense of mesh fixation instrument. The complication and recurrent rate in 9 months were not different.

P609

Simultaneous Elective Laparoscopic Sigmoid Colectomy and Splenectomy for Recurrent Diverticulitis and Splenic Granulomatous Disease

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Background: Splenectomy together with colectomy is typically performed as a result of iatrogenic injury and not as an additional elective procedure. We report a first patient who underwent elective combined laparoscopic sigmoid resection and splenectomy for recurrent diverticulitis and splenic granulomatous disease.
Case Report: A 50-year-old African American female presented with recurrent episodes of diverticulitis. Her past medical history was significant for generalized fatigue, dyspnea, mediastinal and porta hepatis lymphadenopathy, and subcutaneous nodules but biopsy were unable to establish diagnosis. Prior to evaluation for laparoscopic sigmoid resection, the patient developed evidence of innumerable hypodense splenic lesions. Splenectomy was offered to the patient to be performed in addition to sigmoid resection. Five mm trocars were placed in the right upper quadrant, umbilicus and previous Pfannenstiel incision and a 10/12 mm trocar in the right lower quadrant. The severely inflamed sigmoid colon was mobilized and dissection followed first towards the rectum, which was stapled. Next, the descending colon was freed and the splenic flexure was completely mobilized. The short gastric vessels were divided and the retroperitoneal attachments of the spleen, which showed multiple granulomas, were cut. The splenic hilum was divided with an Echelon stapler. The Pfannenstiel incision was reopened and the spleen was removed in a retrieval bag and the colon was pulled out of the abdomen. The colorectal anastomosis was created with an EEA stapler. Splenic pathology demonstrated multiple noncaseating granulomas with appearance consistent with sarcoidosis. The patient tolerated the procedure without complications and had an uneventful post-operative course. She established care with a sarcoidosis specialist and was started on prednisone and methotrexate with improvement in her symptoms.
Conclusion: Our case highlights the value of elective laparoscopic splenectomy performed in addition to segmental colon resection as a safe procedure. Diagnosis of sarcoidosis was established and the patient did not require two surgeries.

P610

A Study of 56 Cases of Single-Incision Gasless Transumbilical Laparoscopy-Assisted Appendectomy for Acute Appendicitis

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Currently, single-incision laparoscopic appendectomy is widely performed in many institutions. Some surgical procedures have been developed, but most of these require inducing pneumoperitoneum. We performed single-incision transumbilical laparoscopy-assisted appendectomy (TULAA) without pneumoperitoneum, with lifting of the abdominal wall by using a muscle hook. We performed this technique in 56 patients between January 2012 and June 2016. We compared the mortality and morbidity between single-incision laparoscopic appendectomy under pneumoperitoneum and gasless TULAA, both performed in the same period. Gasless TULAA was completed in 33 patients (59.0%). No significant difference in postoperative complications was observed. In addition, gasless TULAA resulted in significantly fewer incidences of bleeding, shorter operation time, and shorter postoperative hospital stay. Gasless TULAA can be easily converted to other procedures if necessary. Thus, gasless TULAA appears to be a safe and useful procedure.

P611

Is Single Incision Laparoscopic Cholecystectomy Dead?

Adrian Maghiar, George Dejeu, Dan Ciurtin, Marius Sfirlea, Codru?a Macovei, Spitalul Pelican Oradea

In our clinic we have a vast experience with sils chole, with over 500 cases in the last 5 years. During this time we have passed through all fases concerning this technique. From early adopters, to trying different ways of performing the surgery, to studying the advantages and complications, studying the worthiness of performing such a technique.
In this study we looked back at all our experience with sils chole, and used all the data we gathers in our previous studies. We performed 536 sils chole during the last 5 years, 214 using the puppeteer technique, 37 using only one grasper to expose the gall bladder, and the rest (285) using the endo grab device. We had 63 conversions from sils, 24 from the puppeteer technique, 7 from using one grasper, 32 from the endo grab group. We considered conversion the need to add one or more trocare, we had no conversions to open surgery. We only had one case of CBD injury, that we resolved laparoscopicaly. Using this data we can safely conclude that is it safe and feasible as a surgical procedure. We then looked at post op complication rates, and given we only had 9 cases we to reopperate, 5 for sub hepatic collection, 3 peri hepatic abcesses, 1 ramâne the CBD stone, all resolved laparoscopicaly, we concluded that it is safe from the post op complication rates point of view also. The next step was to look at the finances. Given that we are from a developing country, with a medical system in continuous change, we are also a private institution, we looked at comparisons between lap chole and sils chole, and the numbers were that if we do not count (it was impossible for us the cuantify) the training needed, it was a difference of less than 1% in cost, more for the sils group (because of the cost of the endo grab device, curbed grspers, we do not use single port device), with identical pay for all cases. Looking at all the data, and taking into consideration the fact that about 20% of patients are asking for this type of procedure, we conclude that sils chole is not dead. It may not be the future gold standard, but it is a viable and safe alternative to the gold standard.

P612

The Surgical Outcomes of Laparoscopy-Assisted Pylorus-Preserving Gastrectomy for Early Gastric Cancer

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Introduction: The pylorus-preserving gastrectomy for patients with early gastric cancer is one of limited surgeries, which intends to preserve gastric functions.
This approach is considered to be more favorable as preserving the pyloric function brings the following benefits: preventing postoperative dumping syndrome and hypoferric anemia, protecting bile mucosal injury of the remnant stomach, and enhancing postoperative weight restoration.
As the laparoscopic surgery is widely performed, it has greatly increased the understanding of micro anatomical that is done by expanding vision effect. This makes it feasible to preserve infrapyrolic vessels and vagal nerve, which also enables us to perform minimally invasive surgery.
Indication and Surgical Procedure: Laparoscopy-assisted pylorus-preserving gastrectomy (LAPPG) was performed to the intramucosal or submucosal carcinoma located in the middle thirds of the stomach without lymph node metastasis.
A pyloric cuff of 3.0 cm to 5.0 cm in length was retained. Both the hepatic and pyloric branches of the vagal nerve and the right gastric vessels were preserved. The celiac branch of the vagal nerve and the infrapyloric artery and vein were also preserved.
This study examined 26 gastric adenocarcinoma patients who had underwent LAPPG at our institution between January 2013 and December 2015.
The median age was 64 years old (32–82 years old) including 17 men and 9 women. The operation median time was 260 min (180–336 min), and the amount of bleeding was 50 ml (5-227 ml). The median of the hospitalization was nine days (7–16 days). The three patients had delayed gastric emptying (11%), however, it was improved conservatively. During the first postoperative year, we had 25 cases of the upper gastrointestinal endoscopy, 17 cases (68%) of remained food debris in the stomach. Furthermore, we had 17 cases of the exacerbation of reflux esophagitis, including 5 cases of Grade B and 2 cases of Grade C based on LA Grade of reflux esophagitis. The symptoms were all controllable at PPI. All cases have no recurrence survival.
Conclusions: LAPPG for the early gastric cancer located in the middle thirds of stomach is minimally invasive and safe surgical procedure to be performed. In terms of the postoperative esophagitis, there needs to be further examination on the presence or absence of a hiatal hernia in the preoperative test..

P613

Laparoscopic Distal Pancreatectomy in Pancreatic Cancer: Single Centre Experience of Short and Long Term Outcomes

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Introduction: Pancreatic ductal adenocarcinoma (PDAC) is an aggressive disease with poor prognosis. Radical resection with negative margins is important to achieve cure. Laparoscopic distal pancreatectomy (lap DP) for PDAC has been performed recently, but wise patient selection is required. We report the outcomes of our patients undergoing lap DP for PDAC.
Methods: We retrospectively analysed data of patients undergoing lap DP for PDAC from June 2006 to August 2016. Demographic details such as age, sex, body mass index (BMI) were recorded. Operative variables such as blood loss, operation time and intraoperative adverse events were recorded. Postoperative variables such as hospital stay, morbidity and mortality were recorded. Patients were followed up at regular intervals and recurrence and survival data were noted.
Results: Thirty three patients were included in this study.(20 males,13 females). Mean age was 50.2 years. Mean blood loss was 352.5 ml. Mean operation time was 254.5 min. Mean hospital stay was 13.3 days. Fourteen patients had postop complications. There was no 30 day mortality. There was recurrence in 11 patients at a mean duration of 22.8 months. Ten patients have died and the mean survival was 28.5 months.
Conclusion: Lap DP can be performed in patients with PDAC with good oncological outcomes and low morbidity and mortality.

P614

Laparoscopic Hiatal Hernia Hernia Repair: 15 Year Experience at a Single Institution

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Introduction: Laparoscopic surgery for the treatment of patients with hiatal hernia (HH) is now standard clinical practice. The aim of this study was to analyze the outcomes of surgical treatment of HH at a single institution during 15 year period.
Methods: Medical records of 395 cases of laparoscopic surgeries for treatment of HH (September 2001 December 2014) were reviewed. Complication, recurrence, and reoperation rates were compared according to the type of surgical procedure.
Results: After excluding the concurrent HH repairs in bariatric surgery and Heller myotomy for achalasia, 299 cases of primary HH repair were included. The patients who underwent interrupted suture repair had higher rate of recurrence, reoperation, and perioperative complications than the patients who underwent continuous suture technique with barbed suture ($p=0.001$, $p<0.001$, and $p<0.001$). There were no differences in recurrence and reoperation rates when mesh was used ($p=0,729$, $p=0.197$) whereas perioperative complication rate was significantly higher when mesh was used (15.2% vs 7.3%,$p=0.049$). The patients with a history of previous uppergastrointestinal surgery had similar recurrence, reoperation, and complication rates than those who did not have previous surgery history ($p=0.563$,$p=0.563$, and $p=0.318$). There was mortality due to AFib after exploratory reoperation for small bowel obstruction.
Conclusions: Laparoscopic HH repair can be performed with acceptable surgical outcomes and overall lower recurrence, reoperation, and complication rates. Continuous barbed sutures for cruroplasty had better outcomes compared with interrupt sutures. Although mesh usage was related with higher perioperative complication rate, it did not increase the reoperation rate. However, mesh did not provide benefit for recurrence. Previous surgery had no negative impact on the surgical outcomes.

P615

Cracking the Code for Early Discharge without Readmission Following Laparoscopic Vertical Sleeve Gastrectomy (VSG)

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Introduction: Vertical sleeve gastrectomy is the most commonly performed bariatric operation. Advantages include a reduced risk of micronutrient deficiency, as well as the absence of anastomosis creation. Despite its advantages, complications such as leaks, bleeding and stricture can occur. The purpose of this report is to determine whether a standard protocol without expensive adjuncts such as buttress material, specimen retrieval bags and extended anticoagulation regimens, can promote early discharge without increasing complications, readmissions or compromising weight loss.
Methods: A retrospective review of laparoscopic sleeve gastrectomies performed by a single surgeon at a community hospital between January 2015 and September 2016 was performed. Preoperative education was standardized amongst patients. A single anesthesiologist performed 96% of the cases. A 4-trocar technique with a Nathanson retractor was employed, and the largest trocar was placed within the umbilicus or lower midline. A 36 French bougie was placed along the lesser curvature, and stapling was performed in a curvilinear fashion. The initial fire load occurred 3 cm from the pylorus and was angled towards the left shoulder, the second fire was neutral, and subsequent staple loads were articulated at a 15 degree angle until reaching the gastroesophageal junction. The staple line was oversewn continuously, reapproximating the omentum to the greater curvature. Hiatal hernias, if present, were repaired. No intraoperative dye test or endoscopy was performed. Lovenox and venodynes were used for deep venous thrombosis prophylaxis; no outpatient anticoagulation was prescribed. A clear liquid diet was started immediately postoperatively.
The following parameters were identified: 30-day readmission rate (both related and unrelated to the surgery), early complications (leak, stricture, bleeding, wound infection), and corresponding weight loss data. Data was analyzed using Microsoft Excel 2013.
Results: One-hundred-sixty-five laparoscopic sleeve gastrectomies were performed between January 2015 and September 2016. The 30-day readmission rate was 0 percent. There was 1 epigastric bleed that required operative intervention, but there were no leaks or strictures. In the 2015 cohort, the percent excess body mass index loss was 66% at 1 year compared the national average of 59% (MBSQIP); the 2016 1 year follow-up data is pending.
Conclusion: The data reported is reflective of a multi-factorial process that involves a consistent, patient oriented staff, standardization of technique, and aggressive return to activity post-operatively. Expensive adjuncts such as buttress material and outpatient anticoagulation are generally not necessary to achieve favorable outcomes.

P616

Analyzing the Benefits of a Minimally Invasive Esophagectomy for Esophageal Cancer in a Veterans Affairs Medical Center

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Introduction: Despite the advances in early detection and neoadjuvant therapy; surgical resection remains the gold standard of definitive treatment for esophageal malignancy. Minimally invasive esophagectomy (MIE) for esophageal cancer has emerged as an effective treatment. To date, there are no published studies focusing on the benefits of MIE versus open esophagectomy at a Veterans Affair Medical Center (VAMC). This article describes an initial pilot study of MIE at a VAMC and examines early surgical and oncologic outcomes focusing on the benefits of MIE versus open esophagectomy.
Methods: The Veterans Affairs Tumor Registry was queried for patients with a new diagnosis of esophageal cancer who were also treated at the Washington, DC VAMC. Patients who were eligible for surgical resection were cross referenced through the Veterans Information Systems and Technology Architecture (VISTA) and Computerized Patient Record System (CPRS) during the time period between 2003 and 2016. Clinical and pathological data was reviewed retrospectively and statistical analysis was performed using independent sample t-tests.
Results: Between 2003 and 2015, the Washington, DC VAMC Tumor Registry recorded over 130 individuals with a new diagnosis of esophageal cancer. Within this grouping, 27 patients were offered surgical resection and 18 patients underwent an open transhiatal or Ivor-Lewis esophagectomy, and 9 underwent an Ivor-Lewis MIE. The overall average stage of a Veteran diagnosed with esophageal cancer during this time period was stage three. Surgical candidates had an average stage less than two (T1-3, N0-1, M0) and non-surgical candidates had an average stage greater than three. Of the surgical candidates, 20–30% also had a stricture at time of diagnosis and 30–40% underwent neoadjuvant therapy. There was no difference in age, BMI, smoking status, or renal function at time of surgery between the two surgical groups however pre-operative albumin was higher in the MIE group ($p<0.05$). Patients who underwent a MIE had less blood loss, more nodes harvested ($p<0.05$) and required fewer transfusions ($p<0.06$) with no change in leak rate or operative time ($p>0.05$).
Conclusion: The Veteran population undergoing surgical resection for esophageal cancer may have superior operative outcomes with a MIE technique versus traditional laparotomy and thoracotomy. This initial pilot study documents that MIE is an effective procedure at a VAMC and should be offered for esophageal cancer at the VAMC.

P617

The Minimally Invasive Consultant: An Evaluation of Practice Patterns in a Community Hospital

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Minimally invasive surgery is now the preferred approach to a majority of common surgical diseases. General surgeons with advanced laparoscopic and robotic skills are often sought for both scheduled and urgent intraoperative consultation by a variety surgical specialists, urologists and gynecologists most commonly, as well as other less experienced general surgeons. The purpose of this project was to evaluate the demand for the services of a skilled minimally invasive surgeon at a community hospital.

A prospectively collected database from a single surgeon was queried for procedures identifying the surgeon as consultant from 8/1/2008 to present. Indications for the consultation and the procedure performed were reviewed. Descriptive statistics were applied.

The surgeon was involved in 3,973 cases in which a consultant role was served in 603 (6.6%). Fifteen cases (2.5%) involved proctoring general surgeon working toward obtaining robotic credentials and were excluded from analysis leaving a total of 588 cases. Consultation services were requested in 373 urologic (63%), 106 gynecologic (18%), and 97 general surgery cases (17%). 12 cases (2%) were identified as other. The overwhelming demand was for advanced laparoscopic, hand-assisted laparoscopic, and robotic interventions (447/588; (76%).

Minimally invasive surgeons can serve a vital role as consultants for many surgical services in both the preoperative and intraoperative phases of care. Urology and gynecology are the predominant specialties for whom this multidisciplinary advantage is best exemplified. The majority of consultant cases make use of the laparoscopic or robotic skills of the surgeon and range from assisting other surgeons to performing concomitant general surgical procedures. Patients are served well with a comprehensive application of diverse and current surgical skills in the community hospital setting.

P619

A Study of Video Assisted Anal Fistula Treatment (VAAFT)

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Introduction: Fistulas in ano consist of epithelialized tracts between the ano-rectal canal & the external (usually perianal) skin. In spite of their prevalance, no surgical intervention has been hailed a gold standard in their treatment. Therefore, treatment relies greatly on the surgeon's correct assessment & astute judgment. Traditional Fistulotomy & Fistulectomy are associated with significant risk of sphincter injury causing anal incontinence. Video Assisted Anal Fistula Treatment (VAAFT) is a novel endoscopic technique which is unique in allowing direct visualization of fistula tracts.

Materials and Methods: All cases of fistula in ano were subjected to pre-operative Magnetic Resonance or Ultrasonographic Fistulography. Those found to have complex fistulas with multiple branching tracts were eliminated from the study group. VAAFT scope is introduced via the external opening & instillation of normal saline serves to maintain patency of the tract during surgery. The internal opening is identified & closed with either stapler within the anal canal or under-running with Polyglactin sutures. The tract is visualized in its entirely & any secondary tracts if present, are identified. The tract is debrided with a brush introduced via the scope's working channel & the wall cauterized with the help of a spherical tip electro-cautery probe. A tissue sealant glue is introduced at the end of procedure after scope has been removed. Patients were followed up for a minimum of 3 months post-operatively & were assessed for discomfort, pain & incontinence.

Results: 30 patients within the series were evaluated. Mean hospital stay was 2 days with 21 cases complaining of post-op discomfort for 3 days post-procedure. 26 patients returned to work 1 week after surgery which is considerable improvement when compared with traditional surgical options. 4 cases were discovered to have secondary tracts intra-operatively which were not noted in pre-operative imagine. Of these 4, 3 cases developed recurrent discharge, which were given a successful trial of conservative management. No patient within the study group complained of incontinence post-procedure.

Conclusion: VAAFT is unique in allowing the surgery to be performed under direct endoluminal vision. Thus there is greater accuracy in identifying secondary tracts & the internal opening correctly, offering the opportunity to corroborate visualized tract with pre-operative imaging studies. Due to minimal damage to surrounding structures, VAAFT is truly the preeminent sphincter saving surgical option. The procedure is associated with reduced morbidity & better patient acceptance.

P620

Peritoneal Dialysis Following Peritoneal Catheter Removal for Peritonitis: 10 Year Experience from a Single Institution

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Introduction: The incidence of chronic kidney disease (CKD) continues to rise in the United States while the utilization of peritoneal dialysis (PD) continues to decline. Catheter-associated infections, specifically peritonitis, is reported to occur in 6% of patients and remains a leading complication of PD. PD associated peritonitis is a major impetus for patient transition to hemodialysis (HD) either due to resulting adhesive disease and catheter non-function following successful treatment of peritonitis with antibiotics or catheter removal at the time of peritonitis. Herein, we detail our PD catheter experience and the PD-catheter associated outcomes of those patients diagnosed with peritonitis.

Methods: In 2005, our institution adopted the best-demonstrated principles of PD catheter placement, including laparoscopy, rectus sheath tunneling, and selective omentopexy. Retrospective chart review was performed on all patients who underwent PD catheter placement at our institution from January 2005 through December 2015. Those patients who were diagnosed with peritonitis were identified. The cause of peritonitis, duration of antibiotic treatment, and PD catheter outcomes were recorded.

Results: A total of 457 patients underwent PD catheter placement at our institution during the defined study period. Twenty-seven (5.9%) patients had at least one PD catheter removal related to peritonitis. Within this cohort, the average age at PD catheter placement was 57.3 years, the average body mass index (BMI) was 28.5 kg/m2, and 13 (48.1%) patients were female. Diabetes mellitus and hypertension were the two main causes of end-stage renal disease (n=18, 66.7%). Twenty-four (88.9%) patients had acute peritonitis at the time of PD catheter removal while 3 (11.1%) patients had their PD catheter removed for chronic peritonitis. The average time from PD catheter placement to peritonitis was 429.6 days. Culture-positive peritonitis occurred in 24 (88.9%) patients. Gram positive and gram negative bacteria and fungi were all causes of peritonitis. Twelve (44.4%) patients had their PD catheter replaced after treatment of peritonitis with antibiotics. The average time from PD catheter removal to replacement was 214.9 days. Of the 12 patients who had their PD catheter replaced, 7 (36.8%) still have their PD catheter in place, for an average time of 196.4 days.

Conclusions: To date, this is the largest single center experience with PD catheters. The rate of PD associated peritonitis at our institution parallels the national average. The prompt diagnosis and treatment of PD associated peritonitis facilitates successful replacement and long-term utilization of PD.

P621

Video: Laparoscopic J-Tube Placement

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A 60 year-old male with a history of erosive esophagitis s/p a distal esophagectomy and gastrectomy with colonic interposition graft was admitted to the Neurology service with progressive weakness of his upper extremities and was diagnosed with a variant of Guillan Barre Syndrome. He eventually underwent laparoscopic jejunal feeding tube placement, detailed in this video.

The indications of j-tube placement are reviewed including the necessity to establish enteral access for feeding and bowel decompression for patients with neurological disorders, impaired swallowing, certain cancers, and selective recent surgeries.

The video details the steps for performing the procedure including optimal port placement, endoscopic evaluation, lysis of adhesions, jejunal site selection, and laparoscopic insertion of the feeding tube.

P622

Laparoscopic Pancreaticoduodenectomy with "Easy-First" Strategy for Borderline Resectable Pancreatic Cancer: Technology and Results

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Background: Pancreatic cancer is one of the most lethal cancers in the world with increasing incidence. Approximately 80% of pancreatic cancers are metastatic or local advanced. Laparoscopic pancreaticoduodenectomy (LPD) has been proven with the advantage of less blood loss, earlier recovery, better cosmesis. Whether LPD is safe and feasible for borderline resectable pancreatic cancer is still uncertain.
Methods: Analyze the prospective data of patients who were diagnosed as borderline resectable pancreatic cancer and then underwent laparoscopic pancreaticoduodenectomy with "Easy First" strategy retrospectively.
Results: Total 18 patients with borderline resectable pancreatic cancer undergoing LPD from June 2013 to December 2015 were enrolled. Conversion to open procedure was required in 4 cases (22.2%) and laparoscopic total pancreatectomy was required in 1 case. The average operation time was (379.2±51.7)min, and blood loss was (340.6±280.6)ml.Total complication rate was 55.5% (10/18), with 2 cases of pancreatic leakage grade B, 3 cases for hemorrhage, 3 cases for bile leakage, 1 case for infection and 1 case for delayed gastric emptying. The average length of hospital stay was (20.7±9.6) days. The perioperative mortality was 0%. All patients were diagnosed as pancreatic adenocarcinomas pathologically and the average harvested lymph nodes were (16.3±7.6). The medium follow-up was 24 (8–36) months, 12 patients were still living with no evidence of recurrence, and 6 patients were suffered local recurrence or metastasis with 2 of them died.
Conclusions: Laparoscopic pancreaticoduodenectomy with 'Easy First' strategy is safe and feasible for borderline resectable pancreatic cancer with acceptable oncologic outcomes.
Keywords: Laparoscopic surgery; pancreaticoduodenectomy; pancreatic cancer; oncologic outcomes

P623

Laparoscopic Nissen's Fundoplication Versus Laparoscopic Partial Fundoplication: Improvement in Reflux Scores without Mechanical Complications with Partial Fundoplica

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Introduction: Gastroesophageal reflux disease is defined as chronic symptoms or mucosal damage caused by abnormal reflux of gastric contents into the esophagus. Chronic GERD is an established risk factor for development of barrets metaplasia. Surgical treatment includes dysphagia, bloating and flatulence(mechanical complications) which might require re-operation. Partial fundoplication has lesser incidence of above symtoms but has a potential for recurrent reflux and thus failure. Mechanical complications in Nissen's fundoplication are associated with a supracompetent high pressure zone (HPZ) which relaxes incompletely on swallowing and is associated with abolition of gas reflux and physiological acid reflux. Partial fundoplication procedures utilise a lesser degree of fundoplication, are associated with a very low incidence of mechanical complications. In the laparoscopic era mechanical complications have overtaken recurrent reflux as principal reason for revisional fundoplication. Our study aims to compare the above 2 procedures in terms of reflux, dysphagia, bloating and flatulence at 6 months from the procedure.
Materials and Methods: 260 patients between the years 2006 to 2016, matched for age, sex, gender ,weight and having reflux evidenced by manometry pressures<10 mm of mercury and 24 h ph monitoring suggestive of reflux and a normal barium swallow underwent fundoplication. A floppy Nissen's fundoplication was used. Patients were randomized into 2 groups, one undergoing Nissen's and the other partial fundoplication. Post operatively patients were followed up at 1 year . Patients were compared in terms of improvement in reflux scores using baylors reflux symptom index(>13 suggestive of reflux), dysphagia scores, and presence of bloating or flatulence.
Results: 0ut of 130 patients 10 pts(7.7%) in the Nissen's group required reoperation for severe symtoms of dysphagia following which Nissen's fundoplication was taken down and converted into partial fundoplication. out of the remaining 120 patients 77%(92 patients) patients had complete resolution of reflux, 33% patients(40) had significant dysphagia with 20% patients(24) had flatulence and bloating.In the partial fundoplication group 85%(110) had improvement in reflux and remaining 15% patients had persistent symptoms of reflux.The results were analysed statistically .
Conclusion: Partial fundoplication group had equivalent improvement in the symptoms of reflux as compared to Nissen's fundoplication without dysphagia and bloating associated with Nissen's fundoplication. Partial fundoplication procedure is at least as effective and durable in reflux control as Nissen's fundoplication, whilst being associated with lower incidence of mechanical complications.

P624

Feasibility of Reduced Port Laparoscopic Surgery for Rectal Prolapse

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Background: The Wells type posterior rectopexy is one of the standard methods of choice for the treatment of rectal prolapse. Laparoscopic surgery has been shown to be feasible in this technique. We have introduced reduced port laparoscopic surgery (RPS) for rectal prolapse. The aim of this study was to evaluate the feasibility of RPS for Wells type posterior rectopexy.
Patients and Methods: A transumbilical straight 25 mm skin incision was made and an EZ AccessTM with lap protector was placed in the incision. A 12-mm trocar (camera port) and a 5-mm trocar (left hand working port) were placed in the EZ AccessTM. Another 12-mm trocar (right hand working port) was placed in right iliac fossa. Except for the site of trocars, surgical technique was same as the conventional multiport surgery (MPS). This study included 4 patients with MPS and 10 patients with RPS between Aug 2012 and December 2015. Twelve patients had rectal prolapse without anal prolapse (Tuttle type II), and 2 patients had intussusception of the rectum (Tuttle type III) and MPS was performed in obese patients, or in patients with previous pelvic surgery.
Results: Mean body mass index in patients with MPS and RPS was 27 kg/m2 and 20 kg/m2, respectively. There were no conversions to open surgery in all 14 patients and there were no mortalities. Mean operative time in the MPS group and RPS group were 169 min and 171 min, respectively. Blood loss during surgery was very slight amount in the RPS group and 20 ml in the MPS group. Mean postoperative hospital stay was 7 days in both groups. As for the postoperative complications, one patients in the RPS group had a superficial surgical site infection. Up to median follow-up of 10 months, no recurrence was found in both groups. Defecation function assessed by Cleveland Clinic Continence Grading Scale was 10 in the MPS group and 8 in the RPS group.
Conclusions: Reduced port laparoscopic surgery for rectal prolapse in selected patients is safe and feasible procedure in comparison with conventional multiport surgery in terms of operative factors, postoperative complication, and defecation functions. RPS has superior outcomes over conventional multiport surgery.

P625

Partial Gastrectomy by Less Invasive LECS

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Introduction: Now a days, NOTES (Natural Orifice Translumenal Endoscopic Surgery) is partially accepted as a concept of minimally invasive maneuver that prosecutes the development of new technology and techniques. Gastric SMT has been one of the commonly performed NOTES procedures named LECS (Laparoscopy and Endoscopy Cooperative Surgery) until date, with the majority of technique being performed EFTR (Endoscopic Full-thickness Resection). The cases reported here demonstrates the extremely less invasive LECS by which four cases of hybrid NOTES partial gastrectomy are performed in humans.
Methods: All of four cases were gastric SMT. Under general anesthesia, we performed intraabdominal operation for two patients and intragastric operation for two patients. For first tow intraabdominal cases, we placed 5 mm port at umbilicus at first then placed additional 2 or 3 mm ports. The lesions were resected by laparoscopic coagulating shears. The rest of two cases, we fix the stomach wall to abdominal wall by PEG (Percutaneous endoscopic gastrostomy) method. Then three 3 mm ports were inserted into stomach directly. After trocar placement we used 3 mm electrocoagulator, retractor, and camera for resection. All of four cases, the resected SMT were retrieved from oral way by endoscope. Basically, the gastrostomy was sewn closed using laparoscopic techniques. All the patients were discharged, without major complications.
Discussion: Hybrid NOTES partial gastrectomy can be safely performed in humans. This procedure requires less incision than resected specimen by using transoral removal technique. In case of trans gastric operation the view is still low resolution and it demands high technique. Although the size of lesion is limited, this methodology may become more common in the near future.

P626

Laparoscopic Management of Appendiceal Mucoceles: Outcomes in a Series of 15 Cases

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Introduction: The aim of this paper is to evaluate the safety and efficacy of managing appendiceal mucoceles laparoscopically. Mucocele of the appendix is an extremely rare condition (<0.5%) that requires surgical excision due to the malignant potential of the lesion. Improper removal of the lesion that leads to rupture and spillage of the mucin can result in pseudomyxoma peritonei, which turns a relatively simple surgical problem into a very complex problem that is often incurable. Many surgeons advocate the open approach for management of appendiceal mucoceles to mitigate the risk of mucin spillage. Several case reports, however, have described successful laparoscopic care. This paper adds to the limited literature, as it describes outcomes following laparoscopic management of appendiceal mucocele in 15 patients.
Methods and Procedures: A prospective database was used to identify all patients with suspected appendiceal mucocele who underwent a laparoscopic appendectomy between January, 2006 and October, 2015. Additional data was retrospectively collected and included patient characteristics, lesion characteristics, diagnostic method, intraoperative data, final pathology, and follow-up. The primary endpoint was complications. Data was maintained in an excel database and a descriptive analysis performed.
Results: During our study period, 15 patients underwent laparoscopic appendectomy for suspected appendiceal mucocele. The majority of patients were female (60%) and Caucasian (66.7%), with a mean age of 57.7±16.3 years. Twelve of the 15 lesions were identified preoperatively with CT; the remaining 3 were diagnosed intraoperatively. Mean lesion size from preoperative imaging (2.3±2.2 cm) was similar to the size of the resected lesions on pathologic review (2.1±1.8 cm). Mean estimated blood loss was 10±0 cc. Regarding final pathology, only 1 specimen showed evidence of early appendicitis, and a variety of pathologies were reported, including simple mucocele (n=5), mucinous cystadenoma (n=3), mucinous cystadenoma with low grade dysplasia (n=6), and mucinous cystic neoplasm with high grade dysplasia (n=1). Only 1 lesion had evidence of a positive margin and 5 had evidence of dissecting mucin. There were no ruptures and no intra- or postoperative complications, symptoms of recurrence, or radiographic evidence of recurrence or pseudomyxoma peritonei. Mean follow-up was 3.5±2.8 years.
Conclusions: In conclusion, this series provides further support that laparoscopic management of appendiceal mucoceles is a safe and effective alternative to open surgery.

P627

Outcomes of Laparoscopic Pancreaticoduodenectomy in the Elderly Patients

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Background: With the increasing proportion of elderly patients with periampullary tumors, the outcomes of surgery for elderly patients should be concerned. Laparoscopic pancreaticoduodenectomy (LPD) has been proven with the advantage of less blood loss, earlier recovery. This study aimed to analyze the outcomes of LPD in elderly patients.
Methods: Prospective data from patients undergoing laparoscopic pancreaticoduodenectomy from September 2012 to January 2016 were enrolled. The patients were divided into three groups based on age with group I for patients aged<60 years, group II for patients aged 60–75 years, group III for patients aged>75years.
Results: A total of 157 patients underwent LPD from September 2012 to January 2016, with 63 patients in group I, 76 patients in group II, 18 patients in group III. The average operative time and blood loss were similar (I vs II vs III: 363.4 63.9 vs 368.3 51.4 vs 389.9 40.4 min, P(I-II)=0.6171, P(II-III)=0.0997; 175.3 88.8 vs 214.4 171.6 vs 227 209.9 ml, P(I-II)=0.0868, P(II-III)=0.7893). The overall complication was higher in group III than group I and group II (I vs II vs III: 27.6% vs 30.1% vs 66.7%, P(I-II)=0.7413, P(II-III)=0.0018). however, the hospital stay was similar in group II and group III, but less in group I(I vs II vs III: 14.7 5.4 vs 19.3 12.4 vs 20.9 15.1 days, P(I-II)=0.0043, P(II-III)=0.6383), so did the cost (I vs II vs III: 95233.4 22662.0 vs 106549.7 35224.8 vs 112068.0 12461.2 RMB, P(I-II)=0.0238, P(II-III)=0.2727).
Conclusions: Laparoscopic pancreaticoduodenectomy is acceptable in elderly.
Keywords: laparoscopic surgery; pancreaticoduodenectomy; elderly; complication; costs

P629

Doble Internal Hernia in a Patient with History of Laparospic Roux-Y Gastric Bypass

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Introduction: In the last decades, the laparoscopic roux-y gastric bypass (LRYGP), has become one of the most used bariatric procedures, thanks to its eficiency in weight lost and metabolic control. But there could be complications, such as internal hernias, either through the Petersen space or the mesenteric gap.
The incidence of internal hernias after a LRYGB without closure of the Petersen space, or mesenteric gap is low, about 3–6%
We havent found in the literatura a case report of a double internal hernia.
Objective: To report a rare complication of LRGB, which must be diagnosed and treated in a timely manner, to improve the outcome
Case Report: We present a case o a female patient, with history of a LRYGB 3 years ago. 4 days before her admission, she started with abdominal pain, difuse, exacerbated with food intake, partially atenuated adopoting left lateral decubitus. 24 h previous to her admission pain intensity increases. The plain abdominal film showed distenden small bowel loop and they were filled with fluid and intraluminal air. She underwent a diagnostic laparoscopy, finding a doble internal hernia, in mesenteric gap and petersen space, without vascular compromise, the hernias were reduce and the defects were closed with 2−0 vascular prolene.
Results: Surgery time of 20 min. The diet was started 4 h after the procedure, she was discharged next day after surgery.
Conclusion: We must suspect an internal hernia in all patients with andominal pain. Diagnostic laparoscopy is a great method for diagnose and treatment. A proper closure of the gaps during bariatric procedures shlould be made, to prevent future complications.

P630

Common Bile Duct Exploration Using Intraoperative Cholangiogram Remains a Feasible Modality for Treating Choledocholelithiasis

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Background: The widely accepted modalities for the management of choledocholelithiasis (CC) are: endoscopic retrograde cholangiopancreatography (ERCP) with cholecystectomy (Cty) and common bile duct exploration (CBDE) with cholecystectomy. Since the emergence of ERCP in the late 1970s, there has been an increasing use of ERCP in conjunction with Cty in the management of CC. The result is a new generation of general surgeons with little to no exposure in CBDE techniques.
Objective: The purpose of this study was to compare the clinical characteristics and outcomes of patients who presented with CC based on the treatment modality: ERCP-Cty or CBDE-Cty.
Methods: After obtaining approval from our institutional review board, a retrospective review was conducted on all patients who presented with CC from June of 2012 to May 2016. The data obtained include gender, age, American Society of Anesthesiologist score (ASA), body mass index (BMI), comorbidities, procedure time, length of stay (LOS) and complications within 30 days of surgery. The CBDE technique used in this series was an intraoperative cholangiogram. Independent T and Chi-square tests were performed using IBM® SPSS® 24 software.
Results: A total of 114 patients presented with CC. Of this number, ERCP-Cty was performed in 82 (72%) patients and the remainder treated with CBDE-Cty. Median age was 55 years (20 to 90 years) with 82 (72%) being female. There was no statistical difference in the median age and gender of the patients in both groups (Age: p=0.22 and Gender: p=0.65). BMI range from 15.8 to 57.2 kg\m2 (median of 29.9 kg\m2) and no difference noted among the two treatment arms (p=0.68). The median procedure time for performing ERCP-Cty was 131 min (46–385) compare to 168 min (68 to 372) for CBDE-Cty (p=0.076). When patient characteristics such as ASA, diabetes, congestive heart failure, chronic obstructive pulmonary disease, chronic hepatitis, chronic kidney disease, anti-platelet or anticoagulation therapy and complications were noted, there was no difference between the two modalities. (p=0.80, 0.30, 0.74, 1.00, 1.00, 0.31, 1.00, 1.00). Mean LOS was 6.43 days (0–27) for ERCP-Cty and 5.69 days (0–29) for CBDE-Cty (p=0.53).
Conclusion: In addition to patients who undergo CBDE-Cty requiring only 1 anesthesia session as opposed 2 anesthesia sessions with ERCP-Cty, CBDE-Cty cut the LOS by 0.74 days. Our data suggest that CBDE-Cty remains a feasible modality for treating CC and therefore, should be employed more.

P632

Preoperative Use of Inferior Vena Cava Filter in Bariatric Surgery: A Single Institution Experience

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Background: Postoperative pulmonary embolism (PE) remains one of the leading cause of morbidity and mortality after bariatric surgery. The use of preoperative inferior vena cava (IVC) filter has not been proven to be beneficial. We present our experience with preoperative IVC filter use.
Objective: To analyzethe effect IVC filter in patients following bariatric surgery while controlling for differences in the baseline patient characteristics and risk factors.
Methods: All the patients who underwent Laparoscopic Roux-en-Y Gastric Bypass (LRYGB), Laparoscopic Sleeve gastrectomy (LSG)and revision procedures (REV) between 2010 and 2015were retrospectively reviewed. The data regarding patient's demographics, BMI,Pulmonary embolism, Deep Vein thrombosis (DVT) and IVC filter placement were documented. Cases are matched to controls using propensity score matching. Different matching schemes were considered, namely matching ratios from 1 to 1 up to 4−1. Once the base line characteristics were matched Univariate logistic regressions was used to compare between patients with IVC filter and no IVC filter who underwent bariatric procedures.
Results: A total of 1380 patient underwent laparoscopic procedures between2010 and 2015, of which 51patients(3%) had preoperative IVC filter.There were no significant differences in the baseline characteristics among the51 patients with IVC filter and in 51 matched control patients. There were twenty four female patients (47%) with IVC filter against eighteen female patients (35%) without IVC filter.The average age in the cohort is48.6± 13.6 and the average BMI was 52.8±14.9. There was significant difference in the Length of stay (LOS) between IVC filter vs no IVC filter (4.4±4.2 vs 2±3, p<0.01).The Outcome of PE and DVT in both groups using 4:1 match showed no significance(0%vs1%;Odds Ratio (OR),16.36; p=0.1) & (0%vs1%,OR, 16.24,P=0.1)
Conclusion: According to our data there is insufficient evidence to support the use of perioperative IVC filter.These results are in agreement with the current evidence in the literature

Relationship and Outcomes in Matched analyses

VARIABLES	ODDS RATIO	P-VALUE
Hypertension	0.25	<0.001
obstructive sleep apnea	0.47	0.03
Coronary artery disease	1.33	0.62
Diabetes	6.81	0.003
Hypercholesterolemia	0.37	0.13
Smoking	0.68	0.29
Length ofS tay	1.24	<0.001
DVT(4:1match)	16.24	0.1
PE(4:1match)	16.36	0.1

P633

Laparoscopic Heller Myotomy with Hiatal Hernia Closure for Primary Achalasia: A Single Institution 5-Year Experience

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Background: Achalasia is often associated with hiatal hernias. It is unknown if this plays a role in the overall outcomes. We present our 5-year experience of laparoscopic Heller myotomies (LHM).
Methods: Records of patients who underwent LHM from 2010 to 2015 were retrospectively reviewed.When the hiatal hernia was present, unidirectional barbed suture was used to close the defect.These outcomes were compared between group with Quillclosure (QC) and NoClosure.
Results: One hundred seven patients were identified.There were 56 male patients (52.3%) with an average age of 58±17.There were 27(25%) patients underwent with Quill closure. The QC group presented longer operation time (86±29 min vs 71±25.1 min, p=0.01) andhigher complication rate (10% vs0%, p<0.01) than No closure.Closure and No closure, blood loss (27±34 ml vs 31±32 ml), hospital stay length(3.2±2.7 day's vs 2.3±2.5days,) and 30-days readmission rate(13.7% vs 3.8%)wer comparable between the groups.However,Closure indicated.After the surgery,there was lesser improvement of dysphagia in Closure than in No closure(17%vs5.1% p=0.04),with medianfollow-up 1.4 year
Conclusion: LaparoscopicMyotomy with fundoplication and hiatal closure yields reasonable early clinical outcomes.However,this study revealsachalasia patients with hiatal hernia constitutes different clinical entity in terms of worse complication rate and worse improvement rate of major symptom than the patients without hiatalhernia.

Clinical improvement

	Closure n=27	NO Closure n=78	Combine n=107	p-values
Preoperation				
Dysphagia	26(89.6%)	69(88.4%)	95(88.7%)	
Regurgitation	13(44.8%)	16(20.5%)	29(27.1%)	p=0.01
Nausea/vomitting	6(20.6%)	9(11.5%)	15(14%)	
Chestpain	2(6.8%)	5(6.4%)	7(6.5%)	
Heartburn	5(17.2%)	11(14.1%)	16(14.9%)	
Weightloss	11(37.9%)	10(12.8%)	21(19.6%)	p=0.03
PPI usage	14(48.2%)	38(48.7%)	52(48.5%)	
Postoperation				
Dysphagia	5(17.2%)	4(5.1%)	9(8.4%)	p=0.04
Regurgitation	3(10.3%)	4(5.1%)	7(6.5%)	
Nausea/vomiting	1(3.4%)	1(1.2%)	1(1%)	
Chestpain	0	0	0	
Heartburn	1(3.4%)	3(3.8%)	4(3.7%)	
Weightloss	2(6.8%)	0(10%)	2(1.8%)	
PPIusage	13(44.8%)	39(50%)	52(48.5%)	

P634

Surgeon Interest Key in Growing a Multidisiplinary Peritoneal Dialysis Program

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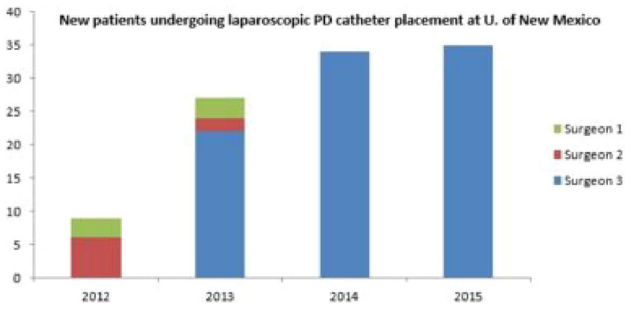
Objectives: Peritoneal dialysis (PD) has been shown to be a viable and attractive option for patients with end stage renal disease (ESRD). The United States lags behind many countries with the prevalence of PD only 7% of all patients with ESRD. Our research has examined how surgeon interest in PD catheter placement can facilitate the growth of a successful peritoneal dialysis program. We have studied the incidence of patients undergoing laparoscopic PD catheter placement during the years of 2012 through 2015 in the University of New Mexico (UNM) system.
Methods and Procedures: Patients undergoing peritoneal dialysis catheter placement at the UNM during a four-year period (1/1/2012-12/31/2015) was examined via a retrospective chart review. UNM medical records were queried to find patients with operative reports who underwent laparoscopic PD catheter placement. Only patients with ESRD who were new to PD were included. The census of patients on PD at the largest partner of UNM (DCI – Albuquerque) was also reviewed on January 1 of each year.
Results: Three surgeons in total performed placement of PD catheters in the years of 2012 through 2015 at UNM, for a total of 105 new patients being started on PD. Of the 105 patients, 86% of the above procedures were performed by one surgeon. The census of PD patients at DCI after the first year (January 2013) was 30, but increased to 48, 53 and 45 in the following three years.



Conclusions: Laparoscopic PD catheter placement is a needed and beneficial procedure to offer ones community, and within a short time frame a viable referral base can be established. With one surgeon taking an interest in performing PD catheter placement, a program has been established at UNM, with numbers comparable to other centers in the United States. Future studies will look at the changing incidence of PD across the State of New Mexico.

P635

Colonoscopy Skills Improvement (CSI) Program Decreases Sedation Usage During Colonoscopy

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Introduction: The Canadian Association of Gastroenterology (CAG) developed the Colonoscopy Skills Improvement (CSI) program to improve colonoscopy quality across Canada.
Purpose: To show that educational interventions for endoscopists can result in improved colonoscopy quality outcomes.
Methods: This retrospective cohort study was performed on fourteen fully trained endoscopists practicing in St. John's, Newfoundland who have undergone CSI training. CSI training was completed between October 2014 and December 2015. Fifty procedures immediately prior to and after undergoing training were included for each endoscopist. Subjects were identified through records from the health authority. Data were extracted from the electronic medical record (EMR), recorded on a standardized data sheet and entered into SPSS version 20.0 for analysis. Student's T-test was used to compare groups for continuous data; Chi-squared tests were used for categorical data.
Results: Thus far, partial data for analysis have been collected for 1329 procedures. Seven endoscopists were Gastroenterologists and seven were General Surgeons. The most common indication for colonoscopy was family history of colorectal cancer in 188 (14.1%) patients. Patient groups pre and post CSI training were comparable in terms of: mean age (59.6yrs v. 60.4yrs), sex (55.8% female v. 51.9% female), and indication. Procedure was completed based on intent in 1232 (92.7%) cases. There was no difference in completion or cecal intubation rates between groups. Fentanyl and versed were the only sedation agents used. Intravenous sedation was used in 1183 (89%) cases. There was no difference in the rate of sedation usage between groups. There was a statistically significant decrease in average dose of fentanyl (80.5mcg v. 70.9mcg, $p<0.001$) and average dose of versed (2.6 mg v. 2.3 mg, $p<0.001$) used during each procedure after CSI training.
Conclusions: Participation in the CAG CSI program was associated with decreased sedation usage during colonoscopy. Further study is necessary to assess improvements in other quality outcomes.

P636

Similar Outcomes in Male and Female Patients Undergoing Elective Totally Extra-peritoneal Laparoscopic Inguinal Hernia Repair

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Objective: Female gender has been found to increase risk of unfavorable postoperative outcomes following repair of various hernia types. Studies suggest that females experience higher risks of recurrence following incisional hernia repair and are at risk for increased pain, discomfort, and fatigue following laparoscopic transabdominal preperitoneal (TAPP) repair of groin hernias. However, limited data exist comparing female and male outcomes following totally extra-peritoneal (TEP) laparoscopic inguinal hernia repair (LIHR). The aim of our study was to compare quality of life trends and clinical outcomes following elective LIHR in male and female cohorts. We hypothesize that no significantly divergent outcomes would be found between the genders.
Methods: A retrospective review of a prospectively maintained database identified 588 male and 50 female patients who underwent LIHR between 2009–2015 (n=638). All cases were performed by four surgeons at a single institution, using totally extra-peritoneal (TEP) technique. Quality of life outcomes were measured using Short Form-36 (SF-36), Surgical Outcomes Measurement System (SOMS), and Carolinas Comfort Scale (CCS) surveys administered pre-operatively and at 3 weeks, 6 months, 1 year, and 2 years post- operatively. Comparisons between gender cohorts were made using a chi-square test or t-test. Changes over time were assessed using mixed effects models.
Results: A cohort of 638 patients underwent elective LIHR and completed a validated quality of life survey.
The female cohort contained a larger percentage of femoral hernias (8.0% vs. 2.0%, p=0.03), a smaller number recurrent hernias (2.0% vs. 13.3%, p=0.02), and a smaller number of previous, unrelated hernia repairs (8.3% vs. 27.8%, $p<0.01$). Additionally, the female cohort had significantly lower average BMI and BMI category composition (Table 1). There were no significant differences in postoperative complications, including recurrence rates (F=0.0% vs. M=2.1%, p=0.61) and readmission rates within 30 days (2.3% vs. 2.1%, p=0.99). Likewise, CCS scores for pain, mesh sensation, and movement did not differ at any time point. SOMS scores for pain, pain impact, pain quality, fatigue, physical functioning, body image, and satisfaction were also similar between groups.
Conclusion: Female gender was not found to be a risk factor for postoperative complications following laparoscopic repair of inguinal hernias using TEP technique. The two cohorts did not exhibit divergent clinical outcomes and no significant differences in short- or long-term quality of life were found.

Table 1. Laparoscopic Inguinal Hernia Repairs: Characteristics by Gender (n=638)

Variables	Female N (%)	Male N (%)	P-Value
BMI (kg/m^2) -Mean ± SD	24.8 ± 4.7	26.1 ± 3.4	<0.01
BMI <25	30 (63.8)	230 (39.9)	
BMI 25-30	11 (23.4)	276 (47.9)	<0.01
BMI 30+	6 (12.3)	70 (12.2)	

P637

Demonstration of Variability in Excess Weight Loss Calculation Using Different Baseline Weights

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Background: In the era of quality surveillance and measurement, reporting of clinical outcomes are not standardized. One of the most important reported measures in bariatric surgery is "Percent Excess Weight Loss" or %EWL, calculated from the difference between a patient's "baseline weight" and "ideal body weight" or IBW.
Hypothesis: As bariatric programs determine when to identify the baseline weight of their patients, we expect this value is variable across programs. We hypothesize that lack of a standard definition for baseline weight can lead to significant differences in %EWL calculation. Our objective is to demonstrate this variability by utilizing different baseline weights to calculate %EWL in our patient subset.
Methods: A random sample of 60 patients was selected from bariatric patients who underwent laparoscopic Roux-n-Y gastric bypass or laparoscopic sleeve gastrectomy from January 2012 through December 2012 at Dartmouth-Hitchcock Medical Center. Patients lost to follow-up at 1 year and patients who became pregnant were excluded. %EWL at 1month and 1 year was calculated using three baseline weights: first preoperative visit (PRE1), second preoperative visit (PRE2), and day of surgery (DOS). Paired t-tests were used to compare %EWL calculations at binary time points.
Results:

Average %Excess Weight Loss at PRE1, PRE2, and DOS at 1month and at 1 year after laparoscopic bariatric surgery

Time after Surgery	%EWL PRE1	%EWL PRE2	%EWL DOS
1 month	23.70%	22.02%	15.17%
1 year	59.11%	58.36%	54.63%

At 1 month: DOS versus PRE1 ($p<0.0001$); DOS versus PRE2 ($p<0.001$).
At 1 year: DOS versus PRE1 ($p<0.0001$); DOS versus PRE2 ($p<0.0001$).

Conclusion: Given the emerging need to compare and contrast clinical outcomes across geographic locations, amongst health care institutions, and between health care providers, it is important to standardize outcomes accounting methodology. We have shown that calculating %EWL within our patient sample using different baseline weights yields significantly different results. This reflects the variability that may occur from program to program. We advocate utilizing the earliest preoperative patient weight at entry into the clinical bariatric program as the baseline patient weight because we feel this will most accurately reflect the impact of interaction with a surgical weight loss program on clinical weight loss outcomes.

P638

The Project Re-Engineered Discharge (RED) Surgery (S) on a 30 Day Readmission Rate in Colorectal Cancer Surgery Patients

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Introduction: A 30-day unplanned readmission has become an important metric for quality of care associated with worse clinical outcomes including increased one year mortality in colorectal cancer (CRC) patients. The Project RED is an evidence based intervention developed in an effort to improve the hospital discharge process and reduce readmission rate in medical patients. The Project RED-S was piloted in our CRC surgery patients to assess its feasibility in surgical patients and to facilitate transition of care from inpatient to outpatient care setting.
Methods: The Project RED-S was piloted in CRC surgery patients treated at our institution from September 2014 to October 2015 with a discharge advocate coordinating discharge plans with the primary team, providing patient education, and creating a patient-centered after-hospital care plan package with instructions at 4th-5th grade reading level, medication reconciliations, and follow-up appointments. A follow-up phone call was made by a nurse within 2–4 days after discharge to review appointments, medications and medical concerns. Retrospectively, we compared demographics and clinical data of the Project RED-S patients to those of CRC surgery patients prior to the pilot project for 6 months.
Results: 34 patients in the pre-intervention group and 28 patients in the Project RED-S group were examined. Due to the small sample size, there were no differences between the two groups across demographics, intra-operative, and post-operative outcomes, including surgical site infection, length of stay, or discharge to facility other than home. The Project RED-S patients had favorable rates of 30-day readmission (18% vs. 23%) and mortality (0% vs. 9%) although statistical significance was not reached. In addition, the cognitive interviews with patients, their care givers and clinicians demonstrated improved patients' experience with discharge process.
Conclusions: Even though some readmissions are inevitable, the current evidence suggests that the rate of readmission could be reduced with carefully planned perioperative strategies. The pilot Project RED-S generated positive feedback and proof of concept in surgical patients. Currently, we are in the process of implementing a hospital wide readmission tool coordinating multidisciplinary effort from the day of admission to outpatient care after discharge in a larger patient population.

P639

Comparison of Laparoscope Versus Da Vinci Robot on Surgical Site Infections Based on Operation Time and Operator Volume

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Introduction: Robot-assisted surgery is a rapidly advancing and evolving field. There has been substantial progress in not only the ability but the availability of robotics in passing years allowing the field to expand. Robotics is unique in that it is not centered on a primary surgeon, but rather a multidisciplinary team approach with contributions by the surgeon, the scrub technician, the bedside assistant, and other integral people. As a result of this change, the new and complex surgical approach should be subject to critical review. Specifically, this paper looks at the most common robotic procedures in our hospital and reviews the perioperative complications, specifically surgical site infections. This study is part of an ongoing review of prospectively collected data comparing the rate of surgical site infections (SSI) in laparoscopic versus robotic operative cases, using NSQIP and Midas databases.
Methods: NSQIP and MIDAS reviews of all patients who underwent laparoscopic and robotic surgery from 2013 to 2015 at Saint Mary's Hospital were collected and examined for SSIs. From this data, the most common procedures performed in both arms were selected for review: cholecystectomy, sleeve gastrectomy, colectomy, and hysterectomy. The only exclusion criterion was those patients who had more than one procedure performed during the same case.
Results: A total of 827 laparoscopic procedures and 1360 robotic procedures were performed and analyzed from 2013 to 2015. The majority of laparoscopic cases were cholecystectomies (551). The majority of robotic cases were hysterectomies (666). The laparoscopic group had four SSIs while the robotic group had a total of fifteen SSIs – nine of which were hysterectomies.
Conclusion: The above data suggests an increased incidence of SSI in the robotic hysterectomy cases. This could be related to the learning curve by the surgeons or operative staff included in the robotic procedures as most SSIs occurred during 2013 relative to 2014 and 2015. Looking at the number of procedures performed by each surgeon and the corresponding case minutes it appears the more cases a surgeon does, the shorter the duration of the case and the less likely a resulting SSI. While this can be true of laparoscopic cases as well, there is more staff in the room and an extended length of time involved in setting up and performing robotic procedures; all of these factors increase the risk of SSI.

P640

Operating Theatre Patients Traffic Management: Kuwait's Perspective

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Background: Mubarak Alkabeer University Hospital serves as the main public secondary hospital for citizens living within the Hawali governate, State of Kuwait, accommodating for 915,000 Kuwaitis and non-Kuwaitis alike. Functioning as a teaching hospital due to the diverse medical and surgical fields that it encompasses, it includes general medical and surgical wards, with their susceptibilities. General, Urological, and Orthopedic surgeries are conducted within the surgical operating theaters, each with their designated rooms. Operation cancellation is evident in our main theatre.
Objective: To assess and evaluate factors related to cancelling scheduled surgeries.
Methods: A retrospective study was conducted within a 6 year-span; January 1st 2010 to December 31st 2015. The operations were elective cases, surgeries were mainly of the general surgical field. A cancelled surgery specific incident report document was filled upon cancelling a case.
Results: A total of 3,275 patients were electively operated within a 6 year time period. The number one reason for operation cancellation was due to the fact that the patient was not admitted. Percentages are as follows: 2010 (106/411)14.5%, 2011 (84/431) 11.5%, 2012 (110/493) 15.1%, 2013 (141/637) 19.3%, 2014 (115/597)15.8%, and in 2015 (183/706) 25.8% patient were unattended to operatively due to this sole reason, making it the most common cause for failure to progress with the patient's management. The second most common reason on average within these years were due to an overrun list however, this wasn't the case in 2011 and 2013. In 2011 (42/431), other reasons were the most common cause, whether that was due to unavailable beds, equipment failure, unavailable staff/equipment etc. In 2013, 63 patient's refused surgery, making it the second most common cause during that year. The third most common cause ranged from patient refusal in 2011 (4.9%) and 2012 (5.3%). In 2010 and 2013 other was listed as the most common cause with 39 (5.3%) and 38 (5.2%) patient's had their operations cancelled respectively. In 2014 and 2015 unavailable beds was the third most common cause having values of 7.3% and 8.9% each.
Conclusion: Patients who failed to show up ranked top in delaying/ cancelling surgeries. Reasons are unknown but we believe it could be due to seeking alternative earlier appointments. Further analysis is being conducted to delineate each year's factors, aiming at shortening waiting time for their elective procedures.

P642

Cost Analysis and Supply Utilization of Laparoscopic Cholecystectomy

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Introduction: Laparoscopic cholecystectomy is one of the most commonly performed procedures in the United States. As one of the highest volume surgeries being performed on an annual basis at our academic medical center, cost analysis is essential to ensure the actual cost of the surgery is minimized without compromising the safety and quality of patient outcomes. We hypothesized there is a statistically significant intra-departmental cost variance with supply utilization variability amongst surgeons of different background and subspecialty.
Methods: This retrospective observational review evaluated 372 laparoscopic cholecystectomy cases (performed by 12 unique surgeons) from June 2015 to June 2016. Surgeons with a case volume of 5 or less were excluded. The 12 surgeons were subdivided into cohorts based on specialty: 2 in bariatric surgery (BS), 5 in acute care surgery (ACS), and 5 in general surgery (GS). The study utilized the Surgical Profitability Compass Procedure Cost Manager System (The Advisory Board Company) to stratify case volume, supply cost, case duration, case severity level, and patient length-of-stay intra-departmentally (BS, ACS, and GS). Supply cost was further analyzed by individual supply units by impact rating and total cost contribution. Statistical methods included a simple comparison of percentages, t-Test, and one-way ANOVA.
Results: Average composite supply cost per case was $569 (US Dollars). The mean case volume distribution was 133 (BS), 109 (ACS), and 130 (GS). The mean intra-departmental total supply cost variance was ($P<0.005$) with $674.5 (BS), $567.8 (ACS), and $529 (GS). ACS and GS presented with a higher standard deviation of cost - $98 (ACS) and $110 (GS) versus $26 (BS). The mean case duration distribution was statistically significant ($P<0.02$) with 70 min (BS), 104 min (ACS), and 75.8 (GS). There was no statistically significant difference in mean case severity level ($P<0.7$) between Bariatric Surgery (1.6), Acute Care Surgery (1.9), and General Surgery (1.9). The average patient length-of-stay distribution ($P<0.001$) was 1.15 (BS), 3.1 (ACS), and 1.17 (GS).
Conclusion: Overall, there was a statistically significant difference in mean supply cost. The highest supply cost per case was in bariatric surgery and the lowest in general surgery. However the higher surgical supply costs may be attenuated by decreased operative time and post-procedure length of stay. Strategies to reduce total supply cost per case include mandating exchange of expensive items, standardization of supply sets, increased cost transparency, and enhanced education to surgeons regarding equipment pricing. Future studies will include incentive and intervention-based cost reduction.

Bariatric Surgery	Impact Rating	Total Cost (Dollars)	Units Used	Units/Case
Trocar Bladeless With Handle 11MM XCEL ($137.38/unit)	1	14,189	105	1
Pack Lap Chole CDS ($120.96/unit)	2	15,967	132	1
Insert Scissors 31cm Endoscopic Disp ($40/unit)	3	4,560	114	1

General Surgery	Impact Rating	Total Cost (Dollars)	Units Used	Units/Case
Pack Lap Chole CDS ($120.96/unit)	1	8,225	68	1
Applier Clip 10MM ERCA ($77.62/unit)	2	3,338	43	1
Pack General Laparoscopy CDS ($124.65/unit)	3	7,354	59	1

Acute Care Surgery	Impact Rating	Total Cost (Dollars)	Units Used	Units/Case
Trocar Bladeless With Handle 11MM XCEL ($137.38/unit)	1	107	1	1
Pack Lap Chole CDS ($120.96/unit)	2	12,943	107	1
Insert Scissors 31cm Endoscopic Disp ($40/unit)	3	1,040	26	1

P643

Surgical Approach and Postoperative Changes in Body Weight, Skeletal Muscle and Adipose Tissue Mass in Early Gastric Cancer Patients

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Introduction: The loss of body weight and body skeletal muscle mass after gastrectomy is associated with worse quality of life and decreased survival in gastric cancer patients. Maintaining body weight and skeletal muscle mass after gastrectomy may lead to improved outcomes. The aim of this study was to evaluate the longitudinal changes in body weight and body composition (skeletal muscle mass and adipose tissue mass) after conventional open gastrectomy (OG) and laparoscopic assisted gastrectomy (LG) for early gastric cancer.
Methods: Seventy-two patients, who underwent distal gastrectomy and were diagnosed with pathologically Stage I gastric cancer, were retrospectively analyzed (41 patients for OG, 31 patients for LG). We evaluated body composition with the parameters based on measurement of cross sectional area of psoas muscle and adipose tissue from abdominal computed tomography. These parameters and body weight were obtained preoperatively and at 6 and 12 months postoperatively and we compared the changes between the two groups (OG vs. LG). Univariate and multivariate logistic regression analyses was also conducted to identify clinical factors contributing significant loss of skeletal muscle mass.
Results: There were no difference between the two groups in patients' backgrounds except that in the OG group, Roux-en-Y reconstruction was more commonly selected, amount of intraoperative blood loss was greater and operative duration was longer. There were no significant difference between the two groups in the degree of decrease in each parameters at 6 months after operation, while, at 12 months after operation, OG group showed significantly greater decrease than LG group in any parameters: % of the preoperative value (OG vs. LG) were 91.6 vs. 94.4 (p=0.0485) in body weight, 91.5 vs. 94.9 (p=0.0408) in skeletal muscle and 58.7 vs. 71.9 (p=0.0343) in adipose tissue. Open gastrectomy (hazard ratio 4.83, 95% confidence interval, 1.097–34.482) was identified as the single independent risk factor for more than 15% loss of skeletal muscle mass at 12 months after operation.
Conclusion: Laparoscopic gastrectomy might have some advantage in maintenance of body weight and body composition during the first postoperative year over the conventional open approach.

P644

Intraoperative Cholangiogram During Laparoscopic Cholecystectomy: A Good Investment?

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Introduction: Intraoperative cholangiogram (IOC) procedures have endured the test of time. Although modern technology provides worthy alternatives to IOC utilization during laparoscopic procedures, the decision to perform the procedure is maintained by supporters worldwide. It may be possible that this bias represents a benefit to the patient as well as the system. Big data allows for a discrete investigation regarding the outcomes of surgeries accompanied by IOC, including its financial implications.
Methods: The Nationwide Inpatient Sample was queried for all laparoscopic cholecystectomies (ICD-9 code=5123) undertaken from 1998 to 2013 (n=1,103,725). Elixhauser comorbidity was coded using HCUP comorbidity software. Van Walraven's summarized method was used to score comparisons. Surgical complications were also coded and summarized. A control subset (n= 333,320) was identified from those patients, 18 to 65 years old, cancer free and free from comorbidity and complexity, having a laparoscopic cholecystectomy. Patients with IOC (ICD-9= 8753) were identified in both groups. SAS Enterprise 6.1 was utilized to compute mean total charges and to calculate IOC cost and the financial burden of complications in their respective groupings. Estimated average yield for the time period was then calculated.
Results: Average total charges in the complicated group were found to be 60% higher in patients with related surgical complications ($34,824 vs $21,757, p<.0001). The average total charges for IOC(+) and IOC(-) patients in our control group was $22,892 ± $59 and $21,203 ± $39, respectively. Calculated average charge for an IOC was $1,591 to $1,709. The average total charge for an IOC(-) patient with just one surgically related complication was $31,667 ± $730. The additional charge for one surgical complication was calculated to be $9,695 to $11,231. The rate of surgically related complications was found to be lower in the IOC(+) group when compared to the IOC(-) (1.87% vs 2.01%, p<.0001). Total financial burden of surgical complications for 6,631 complex LC cases was 64.3 M −74.5 M dollars. Total cost of IOC would be 10.6 M to 11.3 M dollars. Average percent yield was 14–17%.
Conclusion: Objective initiatives concerning improved patient care are not considered to be complete without thorough financial analysis. Given the current US economy, an investment with yields over 10% are hard to come by. The risk of capital is likely to be offset by savings associated with IOC use and likely reduction in complexity. The value of these metrics in developing future healthcare policy should not be ignored.

P645

Demographic and Clinical Factors Associated with Suicide in Gastric Cancer in the United States

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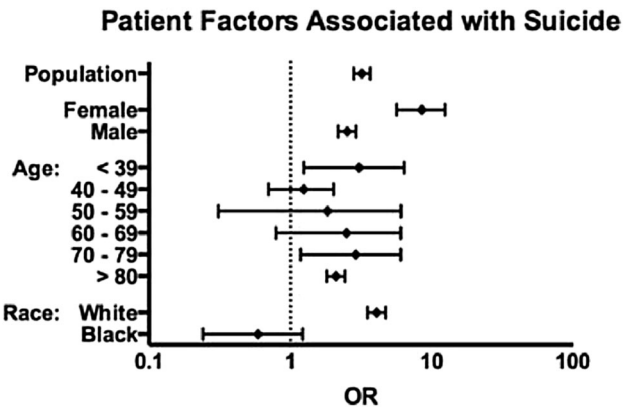
Background: Increased suicidal tendencies among cancer patients have been well documented. To date there has been no specific examination of suicide rates and clinical and demographic factors associated with suicide in patients with gastric cancer. This retrospective review examines the incidence of suicide and associated demographic and clinical factors in patients with gastric cancer from 1973 to 2013.
Methods: The Surveillance, Epidemiology, and End Results (SEER) Database of the National Cancer Institute was queried to identify patients with gastric cancer. The study includes mortality and demographic data from 1973 to 2013. Comparison data with the United States population was derived from the Centers for Disease Control and Prevention's National Center for Injury Prevention and Control using the Web-based Injury Statistics Query and Reporting System. Standardized Mortality Rations (SMRs) and their 95% confidence intervals (95% CIs) were calculated and multivariable logistic regression models generated odds ratios (ORs) for the identification of factors associated with suicide in gastric cancer.
Results: Of 121,820 patient deaths 210 (0.17%) were due to suicide. 86% of patients committing suicide were Male and 83% of suicides occurred in Whites. The odds of Males committing suicide were 4.8 times greater than Females (95% CI: 3.1 −7.2) and the odds of Whites committing suicide were 1.8 times greater than Non-Whites (95% CI: 1.26–2.6). There was no relationship between suicide and income, mode of radiation therapy, histology, or role of surgical intervention. While 38% of suicides occurred in patients presenting with Stage IV disease, the relationship between stage at presentation and suicide was not statistically significant. Patients with gastric cancer were 3.21 times more likely to commit suicide than the general population (95% CI: 2.80–3.67). Males and females were both significantly more likely than the gender matched population to commit suicide. With respect to age, patients<39 years and >80 years with gastric cancer significantly more likely than the age-matched population to commit suicide.



Conclusion: Suicide represents a potentially preventable cause of death in patients with cancer. Identification of evidence-based risk factors associated with suicide among patients with gastric cancer is an important step in the development of screening of a screening tool and development of an interventional strategy. There were significant differences with respect to race and gender in patients with gastric cancer. Whites and Males were significantly more likely to commit suicide than females and Non-Whites as were patients at the extremes of age.

P646

Fires in the Operating Room: Does Clipping Hair Make a Difference?

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Background: Operating room fires are rare events that remain an under-reported source of devastating complications. Surgical fires are commonly a result of alcohol-based surgical skin preparations ignited by electrosurgical energy in the presence of oxygen. Manufacturer guidelines recommend waiting at least 60 min after application to hair-bearing areas in order to decrease the risk of fire. We could find no studies examining the flammability of common surgical preps with respect to hair. The PURPOSE of our study was to determine the relationships between surgical fires and hair when using alcohol-based skin preps.
Methods: A standardized, ex-vivo model was created with 4 cm^2 pieces of porcine skin. A hand-held "Bovie" was activated for 2 s on 30 W coag mode with room air oxygen (21%). Alcohol-based preps included: 70% isopropyl alcohol with 2% chlorhexidine gluconate (Chloroprep), and 74% isopropyl alcohol with 0.7% iodine (Duraprep). Non-alcohol based preps were: 4% chlorhexidine gluconate and 1% iodine paint. Preps were tested immediately after application (0 min) and after a 3-minute delay (per manufacturer recommendations when no hair is present). A visible flame was considered positive and was confirmed with thermal imaging. Experiments were repeated 20 times based upon a pre-test probability of 35%. Fisher's exact test was used to compare categorical variables with statistical significance set at $p<0.05$.
Results: Non-alcohol based skin preps (4% chlorhexidine and 1% iodine paint) caused no fires on immediate 0% (0/40) or 3-minute delayed testing 0% (0/40) [similar to saline control (0%, 0/20; p=1.0)]. Alcohol-based skin preps created fires both immediately and on delayed testing in 23% (36/160) of experiments. When comparing clipped vs. hairy skin, there was no difference in the incidence of fire with alcohol-based preps. (Table 1)
Conclusion: Alcohol-based skin prep causes surgical fires. The presence of hair did not alter the incidence of fire whether or not the surgeon waited 3 min for drying. Patients remain at risk for burn when alcohol-based skin prep is used regardless of the presence of hair.

Surgical Fires with and without Hair

	No Hair(n)	Hair(n)	p-value
Chloroprep			
Immediate	2	7	0.12
3-Minute Delay	6	11	0.2
Duraprep			
Immediate	5	0	0.05
3-Minute Delay	2	0	0.5

P647

Comparing Manual and Mechanical Esophagogastric Anastomosis in Esophageal Cancer Patients: A Retrospective Cohort Study

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Objectives: The controversy over the efficacy of the two well-known methods of using mechanical stapler or hand-sewn techniques in esophagogastric anastomosis on morbidity, postoperative complications, functional outcome, and quality of life after esophagectomy is still continuing. Thus, due to the discrepancies, the purpose of the present study was to compare the clinical outcomes of manual and mechanical anastomoses after esophagectomy for esophageal cancer.
Methods: A retrospective cohort study was conducted on 409 patients undergoing esophagectomy for esophageal cancer from 2008 to 2013 in Iran, at Tabriz University of Medical Sciences (the department of Thoracic Surgery). During this period, 259 (63.3%) patients were operated by manual anastomosis (hand-sewn technique) and 150 patients (36.7%) were operated by mechanical anastomosis (stapled technique). Then, all patients were visited in the 2nd week, 4th month, 8th month and 12th month after operation and they were controlled in terms of post-operative complications such as reflux, anastomotic stricture, dysphagia and anastomotic leakage.
Results: The mean follow-up time was 12 months. The mean operation time in the mechanical anastomosis group and manual group were 211.45 ± 82.25 and 251.42 ± 52.81 min, respectively (P=0.023). After the operation, 38 (14.67%) anastomotic leakage occurred in the manual group compared with 8 (5.3%) in the mechanical group (P=0.002). Also, comparing postoperative complications: reflux, anastomotic stricture, and need for dilatation in the patients of the manual anastomosis group were meaningful respectively (P =0.021, P=0.029, P=0.021).
Conclusions: Using mechanical anastomosis not only reduced operation time meaningfully, but also it led to lower anastomotic leakage and postoperative complications such as: reflux, anastomotic stricture and need for dilatation.

P648

Impact of a Colonoscopy Skills Improvement Course on Withdrawal Time

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Introduction: A Colonoscopy Skills Improvement (CSI) course developed by the Canadian Association of Gastroenterology (CAG) attempts to improve colonoscopy quality.
Purpose: To measure the impact of this course on withdrawal time (wd).
Methods: This retrospective cohort study was performed on fourteen fully trained endoscopists practicing in St. John's, Newfoundland who underwent CSI training in October of 2014. The study included 1329 procedures immediately prior to and after undergoing training. Subjects were identified through health authority records. Data was extracted from the electronic medical record (EMR), recorded on a standardized data sheet and entered into SPSS version 20.0 for analysis. Student's T-test was used to compare groups for continuous data, Chi-squared tests were used for categorical data.
Results: Thus far, partial data have been collected on 1329 colonoscopies conducted by seven Gastroenterologists and seven General Surgeons. The most common indication for colonoscopy was family history of colorectal cancer in 188 (14.1%) patients. Patient groups pre and post CSI training were comparable in terms of : mean age (59.6yrs v. 60.4yrs), sex (55.8% female v. 51.9% female), and indication. Polyp detection rate was higher post CSI training (44.9% v. 55.1%, p=0.067) but did not achieve statistical significance. Procedure was completed based on intent in 1232 (92.7%) cases. There was no difference in completion or cecal intubation rates between groups. Withdrawal time was recorded for 1241 (93.4%) cases. There was a statistically significant increase in mean wd after completion of the CSI program (12.35 min v. 13.20, p=0.036).
Conclusions: Participation in the CAG's CSI course is associated with longer withdrawal times. There is also a trend towards higher polyp detection rates.

P649

Short Term Outcomes of Laparoscopic Colorectal Resection in Psychiatric Population: A Multicenters Retrospective Study in Japan

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Objectives: To compare the short-term outcomes of laparoscopy versus open surgery in colorectal malignancies in patients with psychiatric comorbidity.
Background: Many studies have associated the presence of psychiatric disorders to adverse outcomes. Although laparoscopic approach is minimally invasive, it is unclear whether laparoscopic colorectal resection is safe for patients with psychiatric comorbidity.
Method: A retrospective chart review of surgical patients with psychiatric comorbidity from April 2014 to April 2016 was conducted at the largest psychiatric center and middle volume hospital in Japan. Patients were divided into laparoscopy group (LG) (n=58) and open group (OG) (n=71). Pre-, intra- and post-operative data were recorded. Logistic and linear regression analysis was performed to delineate the predictors of complication and mortality. Statistical analysis was performed using SPSS programming version 23. A P value of 0.05 was used as statistically significant.
Results: There were 42% (n=56) patients with schizophrenia, 30% (n=40) with dementia. The perioperative data set including gender, age, body mass index (BMI), ASA physical status, comorbidity, tumor size, histopathological result and pathological stage showed no difference between laparoscopy and open group. The conversion rate was 2.8%. Laparoscopy group had less blood loss (mean [SD], LG 88.05 [89.57] ml versus OG 325.80 [319.68] ml; (p=0.001), shorter time to oral intake (mean [SD], LG 2.47 [1.88] ml versus OG 3.69 [2.77] days; (p=0.003), less surgical site infection (SSI) (LG 6.7% versus OG 93.3%; p=0.002) and less small bowel obstruction (SBO) (LG 22.2% versus OG 77.8%; p=0.04). There was no difference in the length of stay, complications, and mortality between the two groups. After adjusting for age, BMI, ASA, operating time and blood loss, the open group was associated with an increased odds ratio for SSI (odds ratio OR=10.62) and SBO (odds ratio OR=1.83). Multiple linear regressions showed increased operating time in LG compared with OG.
Conclusions: Laparoscopic colorectal resection in colorectal cancer is associated with decreased risk of SSI and SBO compared to open procedure. After further study of patient selection criteria, we hypothesize that laparoscopic procedure is a preferred option for colorectal cancer in the increasing population with underlying psychiatric diseases.

P650

Predictors of Conversion from Laparoscopic Cholecystectomy to Open Cholecystectomy. An Institutional Experience

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Background and Objective: Since its introduction in the 1990s, Laparoscopic Cholecystectomy (LC) quickly emerged has the gold standard for treating gallbladder pathology (GP). The Open Cholecystectomy (OP) modality is, however, still well and alive. This is because some patients have contraindications to pneumoperitoneum and hence not amenable to LC. It is also sometimes necessary to convert from LC to OP (LCOP). The purpose of this study is to determine factors that are predictive of conversion from LC to OP.
Methods: This is a retrospective review of patients who under LC at our institution from June of 2012 to May 2016. Institutional review board approval was petitioned for and obtained. Data analyzed include gender, age, American Society of Anesthesiologist score (ASA), body mass index (BMI), comorbidities, procedure time, length of stay (LOS), reason for conversion, comorbidities and complications within 30 days of surgery. Independent T and Chi-square tests were performed using IBM® SPSS® 24 software.
Results: A total of 878 patients underwent LC. Median age was 47 years old (18 to 95). Females consisted of 667 (76%) of the patients. LC converted to open was observed in 40 (4.5%) patients. The reasons for conversion included: inability to identify the biliary structures 3 (8%), injury to biliary structures 3 (8%), adhesions 20 (50%) and other 14 (35%). Gender did not play a role in conversion to OP (p=0.60). Average BMI of LCOP was 34 kg\m2 compared to 33 kg\m2 for patients who did not need conversion to OP (p=0.14). The following clinical factors increased the likelihood of LCOP: history of abdominal surgery (p=0.019), diabetes mellitus (0.002), chronic kidney disease (p=0.023), acute myocardium infarction (p=0.038) and acute pancreatitis (p=0.036). Chronic obstructive pulmonary disease (p=0.266), antiplatelet or anticoagulation use (p=0.526) and chronic hepatitis (p=0.732) had no bearing on the tendency to LCOP. LCOP (32.5%) had more complications relative to patients who did not need conversion (14.6%) (p=0.004).
Conclusion: Conversion to OP is an operative judgment that most general surgeons will have to make during their lifetime. The above predictors serve as a guideline to making such a judgment when performing LC.

P651

Nurses' Attitudes Towards Female Surgeons: Is There Gender Discrimination in the Surgeon-Nurse Relationship?

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Introduction: This study was undertaken to determine whether nurses' attitudes reflect discrimination against women in Surgery. In Surgery, traditional gender roles have dictated surgeon-nurse relationships. However, the increasing number of women in Surgery may have altered these relationships, thereby affecting nurses' attitudes toward female surgeons.
Methods: 134 hospital-based nurses were queried using a validated survey, which included binary, multiple choice, and Likert scale questions. Responses were assessed based on nurse age: (1)<30 years (younger), (2) 30–45 years (mid-aged), and (3)>45 years (older).
Results: 95% of nurses deem female surgeons as capable as male surgeons; 85% do not consider the knowledge base of male surgeons' superior to female surgeons and 78% do not believe women have it easier than men in Surgery. 36% of nurses accept differences in the doctor-nurse relationship between male vs. female surgeons; 53% think male surgeons have the best relationship. Fewer older nurses, relative to mid-aged nurses, agree that nurses treat female surgeons differently (p=0.01). More older nurses, compared to younger, disagree with: "Is there a negative attitude toward female surgeons at your institution?" (p=0.02). Of all nurses, 38% think Surgery is sexist.
Conclusion: Relative to male surgeons, the majority of nurses, but notably not all, consider women to be capable and knowledgeable surgeons. Older nurses are more likely to disbelieve that gender plays a role in nurse–surgeon relationships and that discrimination against female surgeons exists in their institution. While only a minority of nurses have a disparaging view of women in Surgery, none should. Still today, women in Surgery face discrimination which must end to foster careers of women in Surgery.

P653

Impact of ICD-10 on Coding of General Surgical Procedures

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Background: Beginning October 1, 2015 International Statistical Classification of Diseases and Related Health Problems (ICD)-10 coding was implemented in the US healthcare system for the coding of diagnosis and inpatient procedures. Number of procedure codes increased from 3,882 in ICD−9 to 71,974 in ICD-10. Change to ICD-10 has implications related to change management of coding infrastructure and potentially reimbursement. The goal of the study was to describe how commonly performed surgeries are coded using ICD-10 codes.
Methods: We used Premier hospital inpatient database for Q4, 2015 (first full quarter with ICD-10 coding data). We identified discharges with a primary diagnosis and relevant Medicare Severity-Diagnosis Related Group (MS-DRGs) for appendectomy (338–343), cholecystectomy (411–419), incisional/ventral hernia (350–352), inguinal hernia (353–355), major small and large bowel procedures (329–331), and rectal resection (332–334). Descriptive analysis was conducted to report the top ICD-10 procedure codes.
Results: A total of 5,002 discharges for appendectomy, 10,559 for cholecystectomy, 1,802 for incisional/ventral hernia, 758 for inguinal hernia, 11,453 for major small and large bowel procedures, and 234 for rectal resection were identified. Top primary ICD-10 procedure codes are listed in Table 1. Among top surgical procedures, percutaneous endoscopic approach (minimally invasive, laparoscopic or robotic) accounted for over 89% of appendectomy and cholecystectomy; synthetic mesh was used in ~83% cases and open approach was used in ~76% of cases for incisional/ventral hernia; ~61% cases addressed hernia of right inguinal region versus ~39% for left inguinal region, and mesh was flagged in ~84% cases; open approach accounted for ~58% cases versus ~42% for endoscopic approach, and ~62% cases were for resection or excision of sigmoid colon versus ~38% for right colectomy; open approach accounted for ~66% cases versus ~34% using endoscopic approach for rectal resection.
Conclusion: ICD-10 coding offers granular information on anatomical region of surgery (for inguinal hernia and bowel procedures), approach used (open, endoscopic, robotic) and type of prosthetic used (synthetic, autologous). This opens up new avenues for surgical outcomes research.

Table 1. List of Top ICD-10 Codes by Procedure

Procedure	ICD-10 codes	% of procedure
Appendectomy	0DTJ4ZZ	87.3
	0DTJ0ZZ	10.7
Cholecystectomy	0FT44ZZ	88.1
	0FT40ZZ	7.7
Incisional/ventral hernia	0WUF0JZ	58.5
	0WUF4JZ	20.9
	0WQF0ZZ	14.6
	0WQF4ZZ	1.9
Inguinal hernia	0YU50JZ	37.3
	0YU60JZ	22.2
	0YQ50ZZ	7.3
	0YU54JZ	6.6
	0YQ60ZZ	6.2
	0YU64JZ	5.0
Small and large bowel procedures	0DTN0ZZ	10.3
	0DTF0ZZ	9.2
	0DTN4ZZ	7.5
	0DTF4ZZ	7.4
	0DBN0ZZ	5.6
	0DBN4ZZ	3.6
Rectal resection	0DTP0ZZ	30.8
	0DBP0ZZ	26.1
	0DTP4ZZ	19.2
	0DBP4ZZ	10.3

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You are What You Measure: Take Charge of Your Individual Surgeon Metric Data or Someone Else Will

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Introduction: The last decade yielded myriad studies of surgical outcomes using large datasets. Unfortunately, the National Surgical Quality Improvement Program (NSQIP) and Thoracic Morbidity and Mortality System (TMMS) datasets were developed with institutional outcomes in mind. In an attempt to quantify individual surgeon quality, these platforms are increasingly queried but with minimal supporting data. The American College of Surgeons (ACS) Surgeon Specific Registry (SSR) is an online database whereby surgeons conveniently track cases and outcomes for maintenance of certification (MOC). Here, we identify potential shortcomings of outcome measurement using this reporting system and identify methods to overcome them using commercially available statistical software.
Methods and Procedures: One surgeon (KRK) maintained 100% case capture within ACS SSR from July 2014 through August 2016. Additional variable fields were generated within SPSS including "referring physician", "insurance status", "BMI" and others. Variables were recoded as necessary for statistical analysis. CPT codes were grouped into procedure bundles (i.e. "lap_right_colectomy") for outcome measurement. As a project goal was ease of use, a single coding script was generated and run on a monthly basis after the online SSR database was exported into the SPSS database (Version 23.0. Armonk, NY: IBM Corp.). Pre-defined reports were run using ACS SSR and compared to SPSS analysis.
Results: The study dataset included 536 cases completed at a tertiary referral center. The SSR "Outcomes by Frequency" report was identical to SPSS frequency reporting for "death", "return to operating room" and "readmission to hospital" variables. The SSR "Wound Infection Report" only reported "Superficial Incisional SSI", ignoring organ and deep space infections. Predefined SSR reports were unable to analyze anything. To attempt analysis, the user must run the "Post-Op Occurrence by CPT Code" report, find each complication occurrence and click through to the associated patient record. This proves inadequate without methods for statistical analysis. Further, grouping by "emergency" field or comorbidity is not possible, precluding ability for risk-adjustment. In contrast, SPSS provides all necessary functionality for effective analysis of outcomes. On average, 1 h a month was required to import data into SPSS, update values for user-defined variables, run the previously-defined script, and evaluate outcomes.
Conclusions: Minimal data supports use of non-100% capture data for individual surgeon outcomes. Data entry by non-surgeons may lead to misidentification of outcomes or risk-adjustment variables. Using the ACS SSR with a commercially available statistical package enables surgeons to control their data and effectively demonstrate outcomes.

P655

Comparing Surgical Outcomes Following Elective Laparoscopic Inguinal Hernia Repair Across BMI Cohorts

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Objective: Obesity has been shown to increase risk of postoperative complications following open inguinal hernia repair. Additionally, studies suggest 30 day clinical outcomes for obese patients do not differ between laparoscopic and open repairs. However, limited data exist comparing outcomes between BMI cohorts following laparoscopic inguinal hernia repair (LIHR). The aim of our study was to compare quality of life trends and clinical outcomes following LIHR across three BMI cohorts, BMI<25.0, BMI 25.0–30.0, and BMI>30.0. We hypothesize that unlike open procedures, LIHR will not result in significantly divergent outcomes between BMI cohorts.
Methods: A retrospective review of a prospectively maintained database identified 623 patients who underwent LIHR between 2009–2015. Cases were performed by four surgeons at a single institution using totally extra-peritoneal (TEP). Quality of life outcomes were measured using Short Form-36 (SF-36), Surgical Outcomes Measurement System (SOMS), and Carolinas Comfort Scale (CCS) surveys administered preoperatively and at 3 weeks, 6 months, 1 year, and 2 years post- operatively. Comparisons between BMI cohorts were made using a chi-square test or t-test. Changes over time were assessed using mixed effects models.
Results: A cohort of 623 patients underwent elective LIHR and completed a validated quality of life survey. The three BMI cohorts exhibited different gender compositions (88.5% vs. 96.2% vs. 92.1% male, p<0.01), ASA classes (1.8 vs. 1.9 vs. 2.1, p<0.01) and smoking statuses (Table 1). The cohorts also differed in OR times (37.0 vs. 39 vs. 44.0 min, p=0.01). There were no differences in postoperative complications, including recurrence (0.8% vs. 2.7% vs. 2.9%, p=0.28).Despite no significant difference in preoperative pain scores, SOMS scores for VAS pain differed at 1 year (0.1 vs. 1.5 vs. 0.2, p=0.03). Table 2 shows CCS scores.
Conclusion: Elevated BMI was not found to be a risk factor for postoperative clinical complications following LIHR using TEP technique. However, the three cohorts did exhibit divergent quality of life outcomes at both short- and long-term intervals.

Table 1. Laparoscopic Inguinal Hernia Repairs: Characteristics by BMI Group (n=623)

Variables	BMI <25 N (%)	BMI 25-30 N (%)	BMI 30+ N (%)	P-Value
Smoking Status				
None	181 (69.9)	177 (61.9)	48 (63.2)	<0.01
Current	8 (3.1)	24 (8.4)	11 (14.5)	
Former	70 (27.0)	85 (29.7)	17 (22.4)	

Table 2. QoL Characteristics by BMI Group

Variables	BMI <25		BMI 25-30		BMI 30+		P-Value
	Mean	SE	Mean	SE	Mean	SE	
CCS Mesh Score at 3WPO	1.7	0.5	2.8	0.5	2.1	0.8	0.03
CCS Pain Score at 2YPO	1.1	0.4	2.6	0.8	3.1	1.2	0.03
Higher CCS scores indicate more severe symptoms							

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Have We Reached a Twilight of the Intraoperative Cholangiogram Use?

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Introduction: Intraoperative cholangiogram (IOC) remains a source of professional disagreement. Persistent speculation and a lack of cohesive evidence still surrounds the decision to choose the procedure over other available imaging modalities. It may be hypothesized that IOC utilization may not be favored when performing laparoscopic procedures and appears to have vulnerability to regional biases.
Methods: The Nationwide Inpatient Sample was queried for all cholecystectomies undertaken from 1998 to 2013. A subset (n=1,103,725) was created from those patients that were 18 years or older and cancer free and who underwent the laparoscopic procedure. From this data those patients who underwent IOC were subjected to statistical analysis using SAS Enterprise 6.1. Raw frequencies for outcome measures (mortality, length of stay, and total charges) were determined. Statistical evaluation of these groups were then computed using ANOVA and students t-tests where appropriate. Elixhauser's methodology contained in HCUP's comorbidity software was employed for coding and van Walraven method was used supplementary to generate a summary score. A combined surgical complications score was also employed.
Results: Mortality was found to be lower in the IOC+group (0.47% vs 0.50%, p<.0001). Length of stay was higher in the IOC+group (4.25 vs 4.07, p<.0001). Mean total charges were found to be higher in the IOC+group ($32,141 vs $30,895, p<.0001). When controlling for age, gender, and race, multifactorial analysis of the comorbidity score revealed a weak correlation with utilization of IOC (OR=0.0033, 95% CI: .001-.005, p=.002) while IOC utilization was also found to be negatively correlated with the rate of complications (OR=-0.010, 95% CI: -0.012-0.007, p<.0001). The demographic data revealed patients in the US Southern census region are most likely to receive IOC (OR=0.08, 95% CI: 0.078-.083, p<.0001). Rural/non-teaching (RNT) patients were also correlated with IOC (OR=0.06, 95% CI: 0.061–0.065, p<.0001) when compared regionally. Southern patients maintained the highest total charges of all rurally designated regions ($24,163 vs $15,931 in NE, p<.0001).
Conclusion: The utilization of IOC coincides with improved mortality but increased length of stay with higher average total charges. This choice of utilization is weakly correlated with patient comorbidity while demonstrating stronger reduction in the rate of surgical complications. Sothern RNT patients undergo IOC most frequently and do so at increased expense in comparison with the other US regions. Although IOC utilization appears to be decreasing, some clinical outcomes warrant its choice.

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The Role of Social Support and Patient Expectations in Weight and Body Fat Loss Following Bariatric Surgery

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Introduction: When severe obesity remains refractive to medical management, bariatric surgery can provide the most rapid relief. However, long-term weight and body fat loss following bariatric surgery in relation to psychiatric variables is unclear. Identifying patients at risk for postoperative failure can provide opportunities for targeted intervention. We hypothesized that higher levels of social support in bariatric surgery patients would correlate positively with postoperative weight loss, body fat loss, and realistic outcomes.
Methods: We performed a retrospective chart review of 60 patients who completed preoperative psychiatric interviews and underwent laparoscopic sleeve gastrectomy, band, or bypass surgery for morbid obesity at Buffalo General Medical Center. Patients who received previous bariatric surgery or intravenous nutrition within one year postoperatively were excluded. We used linear regression analyses to compare levels of reported preoperative social support and weight loss expectations with 1, 3, 6, and 12 month postoperative weight loss, body fat loss, and ratio of actual to expected weight loss.
Results: Preoperative patient expectations were not significantly associated with postoperative weight loss, body fat loss, or ratio of actual to expected outcomes at 1, 3, 6, or 12 months. Additionally, social support was not significantly associated with postoperative weight loss or ratio of actual to expected outcomes at these same time points. Social support was not correlated with body fat loss at 3, 6, or 12 months postoperative. However, the number of people that patients reported being able to talk to when upset about their weight was a positive predictor of body fat loss immediately following bariatric surgery. Patients who reported higher numbers of social support lost significantly more body fat 1 month postoperative compared to those who had fewer people to talk to (p=0.012). After accounting for age and gender, this relationship was no longer significant.
Conclusions: The finding that preoperative patient expectations are not a function of bariatric surgery outcomes is consistent with the current literature. However, higher levels of social support are a clear health promotion benefit for immediate postoperative body fat loss outcomes. Cognitive meaning associated with larger support systems may allow healthcare providers to identify bariatric surgery candidates at risk of postoperative failure. Preoperative protocols to encourage identification and maintenance of social support systems should be considered to reduce the likelihood of bariatric postoperative failure and improve patient outcomes.

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Safety and Efficiency of Ultra Thin Surgical Swab for Needlescopic Surgery

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Background: The role of laparoscopic instruments less than Ø5mm, i.e. needlescopic or miniature instruments, has been increasing in the era of single-incision, needlescopic and/or reduce port surgery. A wide variety of miniature instruments has already been commercially available, however, a cotton dissector has not been down-sized yet, partially due to high manufacturing barriers. We have successfully developed a novel Ø3mm cotton dissector, in collaboration with an industry which has promising manufacturing technology for downsizing cotton swabs: spraying cotton powders and molding them with biocompatible glue on a shaft, instead of whipping cotton strings directly onto a shaft. The aims of this study were to evaluate safety and performance of this newly developed miniature cotton dissector in bench-top testing and preclinical settings.
Methods: [Safety study] The stability of "sprayed and glued" cotton powders was evaluated in a standard "elution test" (n=5): counting number of cotton particles>0.5 μm eluted out from cotton bud soaked in 500 mL pure water for 10 min and centrifuged @ 150 rpm. Commercially available two Ø5mm cotton dissectors (dissectors A and B) were served as control (n=5 each). [Performance study] The Ø3mm cotton dissector was used in porcine laparoscopic surgery to evaluate its performance.
Results: [Safety study] The median number of cotton particles eluted out from new Ø3mm cotton dissector was 175 in pure water, whereas 329×10^2 out from dissector A, and 312×10^2 out from dissector B, respectively. [Performance study] The new Ø3mm cotton dissector performed well in porcine laparoscopic fundoplication, especially in blunt dissection of retro-esophageal spaces. Although no organ injuries directly related to the use of cotton dissectors were encountered, additional care might be required since the tip of "needlescopic" dissector showed easier penetration into parenchymal organs e.g. liver and spleen.
Conclusions: Our newly developed Ø3mm cotton dissector is far more stable in its physical property when compared to currently existing Ø5mm equivalent products. Its performance is considered acceptable, as long as used by expertized hands with firm understanding of potential risk of ultra-thin instruments. The devices are now under regulatory process in Japan and will become clinically available soon.

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Drivers of Length of Stay After Cholecystectomy. Our Institutional Observation

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Background and Objective: Hospitals and healthcare systems across the country are under increasing pressures to reduce costs and improve patient outcomes. One area that has gained the attention of administrators is the hospital length of stay (LOS). The purpose of this study is to identify drivers of LOS after a cholecystectomy.
Methods: Institutional review board approval was requested and obtained. A retrospective review of all patients undergoing cholecystectomy (CLY) from June 2012 to May 2016 was undertaking at a community hospital. Data collected and analyzed include gender, age, American Society of Anesthesiologist score (ASA), body mass index (BMI), comorbidities, operative time, type of CLY, length of stay (LOS), endoscopic retrograde cholangiopancreatography (ERCP), intraoperative cholangiogram (IOC), comorbidities and complications within 30 days of surgery. Linear regression analysis was performed using IBM® SPSS® 24 software.
Results: There were 907 CLY performed at our institution, of which 878 (97%) were performed with laparoscopy. Females composed of 678 (75%) patients and the median age was 48 years old (18 to 95). ASA of the patients included: I 32 (4%), II 391 (43%), III 433 (48%) and IV 50 (6%). BMI ranged from 14 to 66 kg\m2 (median 32 kg\m2). The median operative time was 75 min (15 to 372). 147 (16%) complications within 30 days were noted. The complication grades included: grade I 41 (28%), grade II 87 (59%), grade III 12 (8%), grade IV 3 (2%) and grade V 4 (3%). LOS for this series of patients ranged from 0 to 52 days (Mean=3 and Median 2). When the linear regression model was analyzed, gender (p=0.002), conversion to an open procedure (p<0.001), ASA (p<0.001), acute pancreatitis (AP) (p<0.001), Congestive heart failure (CHF) (p<0.001), chronic kidney disease (CKD) (p=0.002) and ERCP (p<0.001) were significant factors that influenced the LOS. In particular, the conversion from laparoscopic cholecystectomy to open cholecystectomy increased the LOS by 3 days; patients with CHF had their stay extended by 3.6 days and ERCP increased LOS by 2 days. Diabetes Mellitus (p=0.662), complications (p=0.589) and BMI (0.143) were not significant drivers of LOS.
Conclusion: The factors influencing the LOS after CLY are multifocal. This study provides a list of LOS drivers that can be targeted with interventions to reduce LOS.

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Laparoscopic Surgery and the Geriatric Population

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Introduction: Recently, there has been a significant increase in age in the United States. By 2030, it is estimated that 70 million people will be >65 years old, 20% of the overall U.S. population. With these changes it is the responsibility of the medical community to better understand the physiology and surgical needs of these patients in order to optimize outcomes. The vast majority of procedures performed in adult patients are low risk operations, such as laparoscopic appendectomy and cholecystectomy. Our aim is to investigate the outcomes, including length of stay, morbidity, mortality, re-admission and discharge disposition of the elder population (>80) undergoing low risk laparoscopic operations in our community hospital.
Methods: Retrospective chart review was done at a tertiary community hospital. The time frame utilized was 2011–2015. Patients were excluded only on the basis of their age (Age>80) at the time of operation and the specific operation they were having (Cholecystectomy or Appendectomy).
Results: There were a total of 32 patients who underwent laparoscopic appendectomy or cholecystectomy from 2011 to 2015. 23 patients (71.88%) were female and 30 (93.75%) underwent laparoscopic cholecystectomy. No patients were converted to an open procedure. The average age was 86.4 years and average ASA classification prior to surgery was 2.88. Higher ASA class, specifically those that were class III/IV were more likely to have an increased length of stay that was statistically significant. Overall age>80 was an independent risk factor for transfer to another medical facility rather than home, a surrogate marker for physical decompensation following surgery.
Conclusions: The American College of Surgeons updated list of assessment tools published in 2016 provides a guide to assist in the care of the geriatric population, but more work should be done in the area of pre-operative assessment and planning. Routine surgery, such as the laparoscopic cholecystectomy, effects this population in a more substantial way and early recognition coupled with increased education for physicians regarding geriatric patients can help to reduce length of stay, morbidity, and overall physical and mental deconditioning.

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Laparoscopic Repair of Large Hiatal Hernia: Our Experience with the Surgical Procedure

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Background: Large hiatal hernia is a rare condition in which more than one-third of the stomach migrated in the thoracic cavity. It may result serious complications such as obstruction, perforation, lung and heart compression. Therefore surgical treatment should be considered by the patient's overall medical status. We present our experience in managing large hiatal hernia with the surgical procedure.
Methods: Clinical records of all patients who underwent surgical repair of large hiatal hernia in our hospital from April 2011 to March 2016 were reviewed. Our surgical procedure for large hiatal hernia includes transection of the hernia sac at the level of the crus and leaving distal sac as it is. This means that complete resection of the hernia sac from the thoracic cavity is avoided to decrease the risk of complications. Mesh should be carefully replaced not to touch the esophagus directly to avoid esophageal injury. Fundoplication is considered as an optional technique for elderly patients.
Results: Total number of patients were 12, 1 male and 11 females, who underwent laparoscopic repair at least 6 months prior to this study. The median age was 79.5. The median operating time was 138 min and the median intraoperative blood loss was 15 mL. None of the patients had serious complication or symptomatic recurrence.
Conclusion: The hernia sac should not be completely removed from the thoracic cavity in order to decrease the risk of serious complications especially for elderly patients. Our procedure with transection of the hernia sac at the level of the crus and leaving distal sac seems to be reasonable as well as the procedure for the inguinal hernia.

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Predictors of Increased Operative Duration in Elective Laparoscopic Cholecystectomy

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Introduction: In an effort to reduce costs and increase efficiency, general surgeons are increasingly performing operations at outpatient surgical centers (OSC). There is mounting pressure to complete cases in an expeditious manner, but little is known regarding potential obstacles to efficiency in the OSC. The purpose of this study was to identify other factors that increase operative duration in the outpatient surgical center setting for elective laparoscopic cholecystectomies.
Methods and Procedures: A single-center retrospective review was performed over a three year period (2012–2015). Demographic, clinical and outcome data was obtained on laparoscopic cholecystectomy performed by a high-volume single general surgery at an OSC. Multivariate regression analysis was performed to identify factors associated with increased operative duration.
Results:
The study population consisted of 279 patients who underwent laparoscopic cholecystectomy at the OSC. The mean operative duration for laparoscopic cholecystectomy was 27.7 min.
Multivariate regression analysis did not associate increased age or male gender with increased operative duration. Increased BMI was found to be associated with longer operative duration—a 10 unit increase in BMI was associated with a 1.9 min increase in operative duration ($p<0.01$). Resident acting as surgeon junior added 3.6 min to the case ($p<0.01$). Smoking increased operative time 3.6 min ($p<0.05$). Iatrogenic perforation of the gallbladder was the strongest predictor of a longer operation, slowing the operation by 6.6 min ($p<0.001$).
Conclusion(s): Increased BMI, resident involvement, smoking and perforation of the gallbladder were independently predictors of increased operative duration for laparoscopic cholecystectomy in the outpatient surgical center setting. This data should help improve scheduling accuracy for outpatient surgical centers. Furthermore, this data may be useful in future work, attempting to improve operating room efficiency.

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Validation of New Japanese Classification System for Esophageal Achalasia

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Background and Aim: The role of high resolution manometry in the diagnosis of esophageal achalasia has been increasing, especially since it became a part of Chicago classification criteria. On the contrary, the morphologic classification based on classic Barium esophagogram, has become less clinically important. Recently, the Japanese classification system was revised in 30 years. In this new system, achalasia is morphologically classified into three types: St (straight type), Sg (sigmoid type), and aSg (advanced sigmoid type), based on its X-ray findings. The system has been limitedly used in Japan, and has not been fully validated in terms of its demographical significance and predictive capability of postoperative outcomes. The aim of this study was to clarify the clinical value of new Japanese classification system.
Patients and Methods: The consecutive 48 patients with a definitive diagnosis of achalasia who underwent laparoscopic Heller-Dor (LHD) surgery from April 2005 to December 2014, were enrolled in the study. Diagnosis of achalasia was confirmed by esophageal manometry. The cases were retrospectively classified into three disease types using new classification system. We compared characteristics, clinical symptoms, manometoric profiles, as well as surgical and postoperative outcomes between St and Sg/aSg patients.
Results: Thirty patients were categorized in St type, 15 in Sg type, and 3 in aSg type, respectively. Patients with Sg/aSg diseases were significantly older than those with St disease [median age: 37 vs. 57 years, $p<0.0001$]. Male/female ratio and body mass index were not significantly different between Sg/aSg and St groups. The morbidity period was longer in Sg/aSg than St groups [44.5 vs. 96 months, $p=0.006$]. Pneumatic balloon dilatation (PBD) was more frequency attempted preoperatively in Sg/aSg group than St group (2 vs 5 times, $p=0.04$). There was no significant difference in operative time [230 vs. 217 minutes] and estimated blood loss (18.5 vs. 32.3 mL). No significant deference was noted in necessity of postoperative PBD, continuation of medication, and postoperative persistent clinical symptoms (chest pain and residual passage disturbance) between the two groups.
Conclusion: The new Japanese classification system may give additional insight and information in understanding epidemiology of esophageal achalasia, however, our study failed to demonstrate "inter-disease type" differences in surgical outcomes and prognoses. Further accumulation of clinical cases are definitely necessary to clarify its predictive capability.

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A NSQIP Analysis of Patient Outcomes After Laparoscopic and Open Left Sided Colectomies

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Background: A laparoscopic surgical approach for colectomies has been correlated with better surgical and patient outcomes. This quality improvement review hopes to examine some of the supposed variables affected by a difference in surgical procedures to determine if the results are consistent with the current literature.
Materials and Methods: Data over the past five years from The American College of Surgeons National Surgical Quality Improvement Project (ACS-NSQIP) database was used to identify colectomies performed at the Royal Jubilee Hospital, Victoria General Hospital, and Nanaimo Regional General Hospital. Comparisons were made between open (oc) & laparoscopic colectomies (lc), and between elective & emergent colectomies.
Results: 266 elective cases were collected across the three hospital; lc=156 and oc=110. Most demographic data was similar between oc and lc +/- 5% except oc had 5.1% more people that smoked, 10.6% more people with hypertension, and 6.1% more people with malignancies. The patients that received oc stayed 2.7 more days in the hospital, had an increased chance of an anastomotic leak by 1.2%, 3.6% increase in re-admission rate, and a 3.3% increase in post-op infection. Elective laparoscopic surgeries were longer surgeries by 14.7 min and no difference in mortality rates were noted.
Conclusions: While there was considerable variance in outcomes for emergent surgeries, elective colectomies were shown to have better patient results when done using a laparoscopic technique. This is consistent with the results of current studies analyzing similar procedures.

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Laparoscopic Common Bile Duct Exploration: Results from a Community Hospital

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Introduction: The approach to biliary disease has been traditionally treated with laparoscopic cholecystectomy (LC) in almost all settings but the approach to choledocholithiasis has not been so standardized. The use of pre-operative ERCP is common in most institutions, however the reliability of ERCP may place patients at a significant disadvantage as it requires an additional procedure and increased hospital stay. Traditional open exploration with cholecystectomy and common bile duct exploration (CBDE) allowed for definitive treatment in one operation. LC combined with intra-operative cholangiography (IOC) followed by laparoscopic common bile duct exploration (LCBDE) is also possible. This one stage approach requires the proper equipment and longer operative time, but decreases hospital length of stay (LOS), eliminates the need for another procedure, and decreases overall costs. Previous review of the experience at our community hospital from 1991 to 1997 was published in 1998. The objective of this study is to provide a follow up on this experience, 2011–2015.
Methods: Retrospective chart review was done at a tertiary community hospital. The time frame utilized was 2011–2015. Information was obtained regarding the history and presentation, imaging studies, operative details and follow-up.
Results: A total of 370 patients underwent LC from 2011 to 2015. 269 patients (72.7%) were female and 101 males (27.3%) underwent LC. The average age was 44 years and the ASA classification prior to surgery was ~ 1.25. Most were diagnosed with acute cholecystitis. Choledocholithiasis was revealed by IOC but was noted to resolve with simple flushing in $\sim 60\%$ of cases. 87% (44 patients) with CBD stones were successfully removed using a LCBDE technique. This technique was unsuccessful in 5.4% necessitating a post-operative ERCP. LCBDE patients initially remained in the hospital an average ~ 1.4 days longer while those that underwent ERCP followed by LC stayed ~ 3 days.
Conclusions: The management of choledocholithiasis with laparoscopy at the time of the initial procedure can be a safe alternative to the use of routine preoperative ERCP followed by definitive management, providing an optional therapy that can be done with one procedure. Our results show a high success rate, decreased length of stay and decreased costs using this approach. Lack of equipment, lack of experience with advanced laparoscopic techniques, and an increase in ERCP utilization are all likely contributing factors which prevent increased use of this technique.

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Esophageal Bypass Surgery Followed by Definitive Chemoradiotherapy Can Become an Effective Therapeutic Strategy, Improving the Poor Quality of Life of Patients with Locally Advanced Esophageal Carcinoma

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Background: Although locally advanced esophageal carcinoma is commonly treated by definitive chemoradiotherapy (dCRT), the prognosis is poor. Because the symptoms caused by a poor oral intake and/or esophagorespiratory fistula lead to both poor compliance to dCRT and a poor QOL, we perform esophageal bypass surgery (EBS) prior to dCRT for patients with severe esophageal stenosis and/or esophagorespiratory fistula in order to allow them to eat food while receiving dCRT. We herein report the clinical results of this therapeutic strategy.
Patients: Seventy-three locally advanced esophageal carcinoma patients without distant organ metastasis who received dCRT in our institute after April 2005 were enrolled. Nineteen had previously undergone EBS (Bypass group).
Results: The reason for EBS was esophagorespiratory fistula (n=11) and esophageal stenosis (n=8). The median operative time was 212 min; there were no cases of anastomotic leakage. The median duration between EBS and dCRT was 27.5 (19–64) days. One patient could not receive dCRT due to the rapid progression of the tumor; one patient underwent radiotherapy alone because of the patient's request. The responses to dCRT were as follows CR (n=3) and PR (n=8; response rate, 64.7%). The responses among the 54 patients who received dCRT as the initial treatment (CRT group) were as follows: CR (n=9) and PR (n=29; response rate, 70.4%). Salvage surgery was performed for 3 and 9 patients in the Bypass and CRT groups, respectively. EBS was performed for 8 patients in the CRT group because of the esophageal stenosis and/or esophagorespiratory fistula after dCRT. The one-year and three-year overall survival rates were 47.9% and 32.8%, respectively, in the Bypass group, and 45.0% and 15.5% in CRT group. The clinical responses and survival of the groups did not differ to a statistically significant extent. In the Bypass group, 14 patients could not eat or drink anything and 2 patients ate liquid food preoperatively; however, all patients could eat rice gruel after EBS. The oral intake was significantly improved in the Bypass group.
Conclusion: Prior EBS contributed to the rapid initiation of oral intake and improved the QOL of the patients. Although some patients could not receive dCRT because of rapid tumor progression or due to the development of distant organ metastasis during dCRT, there was no significant difference in overall survival. Thus, EBS followed by dCRT can be an effective therapeutic option for locally advanced esophageal carcinoma in patients without morbidities.

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Hand Washing Knowledge in Surgical Ward: Complete Audit Cycle

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Introduction: Studies has shown clear discrepancies among doctors between the attitude and the compliance of hand washing, on the contrary nurses and other medical professions are more compliant with hand washing.
The aim of this audit is to assess the knowledge of different medical staff of hand hygiene steps and improve the hand washing technique to be compliant with NHS National Patient safety Agency(NPSA)
Results: 32 questionnaires retuned out of 36 distributed. 9 Allied health professionals (AHP), 8 nurses, 6 junior doctors, 6 surgical trainees and 3 consultants
AHP answered 114 right answer out of 117(97.4%), Nurses 98/104 (94%), Junior doctors 72/78(92%), surgical trainee70/78(89%) consultants 30/39(76%)
Re audit showed improvement in all groups: AHP from 97 to 99% Nurses from 94 to 100% junior doctors 92–98% surgical trainees from 89 to 98% consultant from 76% to100%.
Conclusions: Recent studies have shown that doctors are less compliant with hand hygiene compared to other health professions. Our study confirmed this finding, moreover it showed that the more senior the doctors, the least compliant with hand washing they are. However continuous teaching and auditing can easily improve medical staff adherence to a better hand hygiene technique and hence infection prevention.

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Validation of an Exoskeletal Surgical Assist Suit in an Experiment Simulating Laparoscopic Surgery

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Introduction: In laparoscopic surgery, surgeons view a monitor to observe conditions within the body cavity while using forceps. This procedure requires them to operate in difficult positions with twisting of the neck and trunk and lifting of the upper arm, which increases physical burden and possible deteriorates performance. We developed an exoskeletal surgical assist suit (SAS) to decrease the surgeon's physical burden. SAS aims to support the lifting of the upper arm without interfering with procedures or the use of forceps. To verify the validity of SAS, we conducted experiments simulating laparoscopic surgery (ex vivo experiment) using an electromyogram and measured work efficiency.
Methods: The participants were 4 surgeons skilled in laparoscopic surgery. They performed a continuous suture on a swine stomach transected in the middle using a dry box. An electromyogram was obtained thrice for 30 min on anterior and medial parts of both deltoid muscles, during the procedure performed with and without SAS. Muscle burden, as measured by the electromyogram, was quantified as % maximum voluntary contraction (MVC). The number of sutures inserted within a defined experimental time was defined as work efficiency. Analysis and comparison was made between procedures performed with and without SAS.
Results: The average %MVC on the right anterior part, which had the highest burden in this experiment, was compared between the procedures performed with and without SAS. The %MVC was reduced to 18% from 29% and to 16% from 22% on the parts of anterior and medial deltoid muscles, respectively. On average, the number of inserted sutures was 17 without SAS and 24 with SAS.
Conclusion: In this experiment, the muscle burden on the upper arm was reduced using SAS. Thus, we confirmed the validity of SAS in aiding the surgeon during laparoscopic surgery. In addition, the number of inserted sutures increased, confirming that work efficiency improved.
Outlook: In this experiment, we confirmed the validity of SAS in an experiment simulating laparoscopic surgery. We will further improve SAS to optimize weight saving and switch operation so that it can be used in normal practice for surgery in the future.

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Impact of Robotic Surgery Versus Laparoscopic Surgery on Surgeon Musculoskeletal Symptoms and Workload: A Systematic Review and Meta-analysis

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Introduction: The goal of this systematic review and meta-analysis was to summarize the evidence and results on differences in surgeon musculoskeletal symptoms and workload between the robotic and laparoscopic surgeries. Despite better patient outcomes associated with minimally invasive surgery techniques compared to open; the physical and mental impact of these surgical techniques on the surgeons has not been evaluated in a systematic way, comparing robotic to laparoscopic techniques.
Methods and Procedures: A comprehensive search of several databases from each database's inception to June 16th, 2016, in all languages, was conducted. The databases included Ovid Medline In-Process & Other Non-Indexed Citations, Ovid MEDLINE, Ovid EMBASE, Ovid Cochrane Central Register of Controlled Trials, Web of Science, and Scopus. The search strategy was designed and conducted by an experienced librarian with input from the study's principle investigator using controlled vocabulary, supplemented with keywords, to search for comparative studies of surgeon workload for robotic versus laparoscopic surgeries. Covidence, an online systematic review platform recommended by Cochrane, has been used for screening and data extraction. Exclusion criteria were case studies, review studies, systematic reviews, consensus statements, book chapters, or non-comparative studies including a single surgical technique. The Newcastle Ottawa Scale, an instruments for assessing the quality of nonrandomized studies in meta-analyses, was applied to assess the quality of all the included studies.
Results: From a pool of 1130 studies, 55 were identified as comparing surgeon musculoskeletal symptoms or workload for robotic and laparoscopic surgeries. A number of subjective and/or objective tools were used in the included comparative studies. The most common subjective tools used were SURG-TLX and NASA-TLX (n=10), and the most common objective tool used was electromyography (n=11). Overall, studies appeared to have low to moderate risk of bias on the Newcastle Ottawa Scale. Despite the general heterogeneity in outcomes reporting, robotic surgery is associated with less musculoskeletal symptoms and lower workload than laparoscopic surgery.
Conclusions: The results of this systematic review suggest that surgeon musculoskeletal symptoms and workload are lower during robotic surgery than laparoscopic surgery. Because of the high risk of bias due to methodology heterogeneity in the current literature, more consistent and homogenous methodologies are needed to measure the surgeon musculoskeletal symptoms and workload across different surgical techniques. Surgeon musculoskeletal symptoms and workload may impact patient safety and outcomes; thus, surgeon musculoskeletal symptoms and workload evaluation should be combined with patient outcomes for future prospective studies between surgical techniques.

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Ergonomic Assessment of the Scrub Nurse During Robot-Assisted Surgery

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Introduction: The use of a Da Vinci robot comes with numerous advantages. Recent papers describe the ergonomic benefits for the surgeon in the console. Ergonomics for scrub nurses at the OR-table during robot-assisted procedures gained minor attention.The aim of this study is to analyze the posture of scrub nurses during robot-assisted surgery.
Methods and Procedures: Eleven scrub nurses were included in this project. Fourteen procedures were severly analyzed with ergonomic scoring tools. Sagittal and dorsal photographs were taken and multiple angle measurements were conducted. The joint angles of the trunk, neck, shoulder, elbow, pelvic girdle and spine were calculated and transformed into a Rapid Upper Limb Assessment (RULA) score. Physical intensity and ergonomic risk factors were assessed with a questionnaire.
Results: Seventy-three percent of the scrub nurses report uncomfortable working positions for longer periods. Twenty percent of the participants report pain or visible bruising due to hinder of the robot arm. Obstructions occur with an average of 2.8 times in a surgical procedure. This mainly affects the lower arm (60 percent). All joint angles - except from the elbow joint - are potentially harmful. High risk ergonomic scores were measured during all reported actions. Tissue traction was recognized as the action with the highest physical workload.
Conclusions: During robot-assisted surgery, scrub nurses experience non-ergonomic trunk, neck and shoulder angles. Tissue traction is reported as the most intensive action by the participants. Tacking leads to the highest RULA scores. The surgeon's awareness of the position of the robot arms can reduce the number of obstructive robot arm movements for the scrub nurse. Lowering the number of instrument replacements can lead to better ergonomic postures.

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Tracking Mental Workload by Multimodal Measurements During Minimally Invasive Surgery Training

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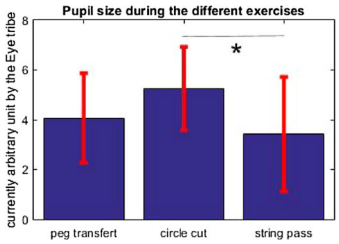
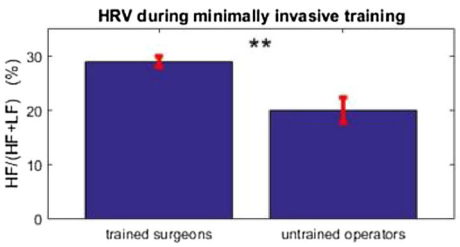
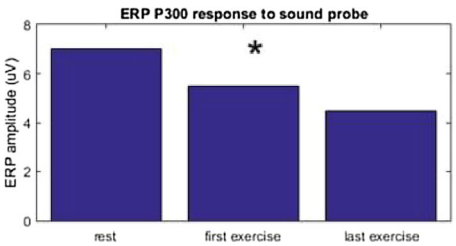
Introduction: Surgery requires abundant attentional resources which can deteriorate in the face of excessive mental workload. This is particularly the case in minimally invasive surgery, where the lack of direct vision of the operation presents a challenge. To improve the care in such operations, a better understanding of stress in the OR as well as the development of training tools for stress management is necessary. Mental workload and stress have been well described in the literature, however, very few have studied a multimodal approach. The first objective is to be able to differentiate between the exercises use as fundamentals for Laparoscopic surgery, then between different levels of expertise. Finally, we want to develop a multimodal classifier allowing surgeons to compare the quality of their stress management to their pairs.
Methods: In order to monitor the stress of the operator, we use a multimodal system consisting of:

- cognionics quick 20 eeg device, The EEG records the Evoked Response Potentials (ERPs) induced by a sound probe (every 3 s, 100 ms sound, 6 frequencies randomized (750–2000 Hz)).
- the eye tribe eye tracker, the eye tracker gives the pupil dilation, a well known marker of stress
- Hexoskin biometric shirt, which records heart activity and respiration

A matlab software has been developed to synchronize and record the data from those different devices. Minimally invasive surgeons train using exercises of different difficulty level. Of those, we chose three: peg transfer, circle cut and string pass. The operator is also recorded at rest to obtain a baseline.
Results: The preliminary results obtained with a dozen current subjects indicates that the following parameters will allow for a multimodal classification. Pupil dilation levels show a clear difference in amplitude between the task judged the hardest and the easiest (all subjects included). The heart rate variation high frequencies proportion is well known marker of stress. The lower it is, the more stressed the operator is. This indicate a lower stress for trained surgeons during the tasks (all tasks included). The ERP (Cz channel) levels show that for a short session of exercise, the workload increases significantly. ($p<0,05$ *, $p<0,01$ **)
Conclusions: Our preliminary results indicate that tracking minimally invasive surgeons mental status using multimodal techniques can provide a basis to assess the stress management of surgeons. This will lead the way for a study that will observe the correlation between task performance and stress.







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Single-Incision Robotic Cholecystectomy vs Single-Incision Laparoscopic Cholecystectomy: A Comparison in Outcomes

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Introduction: Single-Incision Laparoscopic Cholecystectomy (SILC) was developed to decrease abdominal peritoneal trauma, decrease postoperative pain and to improve cosmetic outcomes over traditional multiport laparoscopic cholecystectomy. It however has several technical limitations, such as lack of triangulation, cross handling and instrument collision. With the advent of Single-Incision Robotic Cholecystectomy (SIRC), these limitations were overturned while retaining the benefits of the single incision. The aim of this review is to evaluate the post-operative outcomes of SIRC as it compares to SILC.
Methods: A systematic review was conducted through PubMed to identify relevant studies from January 2011 to December 2016 with comparative data on single-incision laparoscopic cholecystectomy vs single-incision robotic cholecystectomy. The primary outcomes analyzed were postoperative pain, postoperative complications (bile leakage, port site infection, incisional hernia, periumbilical cellulitis, incidence of intraabdominal abscess and abdominal wall hematomas) and length of hospital stay. The secondary outcomes assessed included conversion rate to an open procedure and surgical operative times. Results are expressed as standard difference in means with standard error. Statistical analysis was done using fixed-effects meta-analysis to compare the mean value of the separate groups (Comprehensive Meta-Analysis Version 3.3.070 software; Biostat Inc., Englewood, NJ).
Results: Four studies were quantitatively assessed and included for meta-analysis. Among the four studies, 298 patients underwent single-incision laparoscopic cholecystectomy and 280 patients underwent single-incision robotic cholecystectomy. There was a significant reduction in postoperative pain levels (-2.322, 0.243, P=0.001) with single-incision robotic cholecystectomy as well as significantly longer operative times (0.657, 0.089, P=0.001) when compared to single-incision laparoscopic cholecystectomy. There were no significant differences in length of hospital stay (-0.014, 0.090, p=0.880), conversion to open procedure (-0.130, 0.144, p=0.367) or postoperative complications (-0.056, 0.008, P=0.531).
Conclusions: Postoperative pain levels are significantly reduced following single-incision robotic cholecystectomy when compared to single-incision laparoscopic cholecystectomy.

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Robotic Repair of a Right Sided Bochdalek Hernia: A Case Report and Literature Review

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Background: Bochdalek hernias are usually diagnosed in the neonatal period, occurring in 1/2200 to 1/12,500 live births. There are few reported cases of Bochdalek hernias in adults. Robotic repair has not been described in current literature as opposed to the laparoscopic approach. Here we present a case of an adult with clinical signs of bowel obstruction secondary to a Bochdalek hernia which was repaired using a robotic approach.
Case Report: A 74 year old gentleman with past medical history of benign prostatic hyperplasia presented to the emergency department with a one week history of nausea, vomiting, diarrhea, and decline in appetite. Computed tomography (CT) imaging of the chest and abdomen revealed elevation of the right hemidiaphragm and evidence of small bowel obstruction. The patient was managed conservatively with nasogastric tube placement and bowel rest. He underwent colonoscopy which could not be completed secondary to a transverse colon stricture which was confirmed by barium enema. Upon repeat CT imaging, the patient was found to have herniated colon through a right sided diaphragmatic hernia which caused colonic narrowing. The patient's intestinal obstruction improved clinically with continued conservative management and he underwent robotic repair of a right posterior diaphragmatic hernia. The hernia defect was closed with interrupted figure of eight Ethibond sutures. A right sided chest tube was placed. Intraoperatively the herniated proximal transverse colon was noted to be ischemic and a right hemicolectomy was performed. He recovered well and was discharged home on postoperative day five.
Conclusions: Congenital diaphragmatic hernias usually present in the neonatal period and are rare in adults. Operative repair is recommended and laparoscopic repair has been described. Based on the existing literature regarding laparoscopic repair and the current case report, robotic repair also appears to be a viable and safe option.

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Diffusion of Robotic-Assisted Laparoscopic Technology from 2008 to 2013: A National Study

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Introduction: We seek to examine the temporal trend of robotic-assisted laparoscopic technology prevalence and outcomes across specialties from 2008 to 2013. Initial population-based studies since the robotic-assistance ICD-9 code became available in 2008 demonstrated equivalent outcomes between laparoscopic procedures with and without robotic-assistance. With the availability of subsequent years of data, we employ temporal trend analyses to examine the impact of temporal elapse and diffusion of technology on outcomes.
Methods: A cross-sectional study using Nationwide Inpatient Sample from 2008 to 2013 was performed, identifying the 90% most commonly performed elective robotic-assisted procedures and their conventional laparoscopic counterparts. Orthopedic and otolaryngologic cases were excluded. Modified Wilcoxon rank-sum test was used to examine for trend significance. Regression models were constructed to examine association between year of operation and outcomes, including mortality, length of stay (LOS) and cost, among robotic-assisted cases.
Results: From 2008 to 2013, a total of 4,499,168 laparoscopic procedures were performed across the nation, 13.22% of which were with robotic-assistance. Its prevalence has increased significantly from 6.80 to 17.28% (p-trend<0.001). Specialties utilizing robotic-assistance during laparoscopic procedures most commonly were urology (34.13%) and obstetrics/gynecology (10.13%), while specialties with the most rapid growth in robotic usage were colorectal surgery (from 0.36 to 8.10%) and thoracic surgery (from 0.43 to 8.83%)(both p-trend<0.001). The usage of robotic-assisted technology by large-bedsize hospitals dropped from 78.96 to 64.25%, signifying a diffusion of technology to smaller hospitals (p-trend<0.001). After adjusting for preoperative patient and hospital characteristics, there was no significant association between year of operation and mortality (p=0.511) or LOS (p=0.396) among robotic-assisted laparoscopic surgeries over the study period. This finding remained consistent after stratification for hospital bedsize. However, there was a small but significant increase in cost per admission of $344.23 (p=0.001; 95% CI 143.12-545.33) per year for robotic-assisted procedures after adjustment for inflation.
Conclusions: Robotic-assisted laparoscopic procedures have undergone rapid growths in prevalence and diffusion to different levels of hospitals. However, we were not able to demonstrate a corresponding improval in outcomes such as mortality and LOS, although a gradual increase in cost over the six-year study period was found.

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The Safety and Efficacy of the Da Vinci Robotic Stapler in Robotic-Assisted Bariatric Surgery

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Introduction: Robotic-assisted bariatric surgery has been shown to be safe in several studies[1,2,3]. One recent advance in robotic instrumentation is the development of the robotic stapler. Whereas previously, robotic-assisted bariatric procedures required stapling via a laparoscopic assistant port, the robot now has the capability to integrate robotic stapling into the procedure. To date, there has been no study evaluating the safety of robotic stapling. This study aims to determine the safety and efficacy of the robotic stapler in bariatric operations.
Methods: This study looks at the experience of a single surgeon in a single institution from 2015 to 2016. A prospectively collected, retrospectively analyzed database of all robotic-assisted bariatric operations was analyzed. Demographics, robotic stapler usage and misfire rate were evaluated for the primary surgery group and the revision surgery group. Fisher's exact test was used to determine statistical significance between the two groups.
Results: A total of 97 robotic bariatric operations were performed during the study period. Forty of these made use of the robotic stapler, and 57 used laparoscopic stapling via assistant port. In the robotic stapling group, the operations included: 21 Vertical Sleeve Gastrectomies, 10 revisions of prior bariatric operations, 8 Roux-en-Y Gastric Bypasses, 1 Modified Duodenal Switch. This group comprised 5 males and 35 females, with a mean age of 44.2 and a mean BMI of 44.4. In this group, two out of ten (20.00%) revision cases experienced misfire, and none of the primary cases misfired (p=0.057). Both of these patients subsequently developed staple line leak complications, whereas none of the other patients that underwent robotic stapling did. Out of a total of 278 total robotic staple loads fired, two misfired, giving a total misfire rate of 0.72%. Two hundred eighteen robotic staple loads were fired in primary operations with no misfires (0.00%) and 60 were fired in the revision group with two misfires, giving a misfire rate of 3.33% (p=0.046).
Conclusion: This study demonstrates the safety of robotic staplers in primary bariatric surgery. However, in the revision group there were two misfired staple loads suggesting that the safety may not be as well established in this population. Possible explanations could be surgeon technique, differences in tissue quality in revision surgery, and instrument malfunction. Further investigation is needed to fully establish the safety of the robotic stapler in revision bariatric surgery.

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Bi-Phasic Learning Curve of Robotic-Assisted Lobectomy with Video-Assisted Thoracoscopic Experience

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Introduction: Use of minimally invasive surgery (MIS) has increased for lung resection, such as robotic-assisted video-assisted thoracoscopic (R-VATS) lobectomy, but little is known about its learning curve. A surgeon's surgical training, previous experience with MIS, and inclusion of more advanced cancers can define the learning curve. The purpose of this study was to determine the learning curve for R-VATS lobectomy by a surgeon with significant VATS lobectomy experience.
Methods and Procedures: We retrospectively analyzed perioperative outcomes of consecutive patients who underwent robotic-assisted lobectomy by one surgeon at our institution between September 2010 and January 2015. Patients were grouped chronologically into five quintiles. Operative times, intraoperative estimated blood loss (EBL), perioperative complications, chest tube duration, hospital length of stay (LOS), and in-hospital mortality were compared among the quintiles.
Results: A total of 287 patients were identified as having undergone R-VATS lobectomy by one surgeon between September 2010 and January 2015. Each of the 5 quintiles had emergency conversion rates of ≤5%. In-house mortality showed a decreasing trend with each subsequent quintile, while hospital LOS significantly decreased with subsequent quintiles. In addition, pulmonary and cardiac-related postoperative morbidity showed a decreasing trend with subsequent quintiles.
Conclusions: In the hands of a thoracic surgeon with significant conventional VATS lobectomy experience, a bi-phasic learning curve for R-VATS lobectomy was demonstrated by increased operative times with subsequent extension of R-VATS to more complicated cases after establishment of initial R-VATS lobectomy success (the 1st phase), while operative times, hospital LOS, and in-house mortality decreased with improved patient selection together with additional R-VATS experience (the 2nd phase). Based on our experience, overall surgical proficiency can be seen within approximately 114 cases, after which there is a significant decrease in adverse events. However, efficacy of MSLND for NSCLC is achieved after approximately 171 cases.

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Effectiveness, Safety and Feasibility of Robotic-Assisted Gastric Neurostimulator Placement

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Background: Gastric neurostimulation with Enterra® therapy device (Medtronic, Minneapolis, MN) provides the last resort for patients with refractory gastroparesis. Currently, the device has Humanitarian Use status by Food and Drug Administration (FDA), thereby requiring further investigation. We aim to describe the feasibility and clinical outcomes with device placement using robotic technique in patients with refractory gastroparesis.
Methods: From June 2014 to September 2016, 15 patients underwent robotic-assisted insertion of Enterra® gastric neurostimulator device. Patient demographics, comorbidities, and clinical outcomes including mortality, length of stay (LOS), readmission rates, reoperation and complications were retrospectively described. Patients were followed up and assessed based on a validated 14-point questionnaire regarding satisfaction with the operation, quality of life and symptomatic relief. The answers were scored 0–4 based on 2 categories: severity (absent to extremely severe requesting bed rest) and frequency (absent to extremely frequent, >7times/week).
Results: Mean age was 41.6 years±13.8 (25–81) and there were 11 females (73.3%). Ethnicity included African-American (53.3%), Caucasian (40%), and Middle-eastern (6.7%). Etiology of gastroparesis included idiopathic (46.7%), diabetic (46.7%) and Arnold-Chiari type I malformation (6.7%). Most frequent comorbidities were gastroesophageal reflux (33.3%) chronic kidney disease (26.7%), anxiety disorder (26.7%) and depression (13.3%) and five (33.3%) patients had prior cholecystectomy. Four (26.7%) patients required readmission within 30 days of placement. No mortality was reported and length of stay was 2.3 days±1.9. There was statistically significant reduction in the number of hospital admissions per year after gastric neurostimulator (2.5±4.1 vs. 3.6±4.4, $p<0.05$). Two (13.3%) patients opted for device removal laparoscopically after 6 months and 1 year due to lack of symptomatic relief. During the follow-up, a statistically significant decrease was noted regarding the severity of emesis ($p=0.03$), postprandial fullness ($p=0.03$), and abdominal bloating ($p=0.01$). The frequency of nausea ($p=0.03$), early satiety ($p=0.02$), postprandial fullness ($p=0.02$), and abdominal bloating ($p=0.01$) was also decreased after device placement.
Conclusion: This is the first report to describe the clinical experience with gastric neurostimulator device placed robotically. This approach is safe and feasible and seems to have similar outcomes as laparoscopic technique. Potential advantages to robotic technique include enhanced dexterity and suturing of the device within gastric wall. Further experience with large comparative studies and clinical trials are warranted.

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Robotic Pyloroplasty for the Treatment of Refractory Gastroparesis

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Introduction: Pyloroplasty for refractory gastroparesis has traditionally been performed laparoscopically. We believe pyloroplasty performed robotically using the Heineke-Mikulicz technique is a viable treatment method for refractory gastroparesis. Many patients who have failed medical management will seek surgical options including gastric stimulator implantation, subtotal gastrectomy, or pyloroplasty. We present our own institution experience of robotic pyloroplasty (RP) as a treatment for refractory gastroparesis.
Methods and Procedures: This is a case series looking at our patients who had undergone robotic pyloroplasty since December 2015. Charts were reviewed for indications, complications, and outcomes. Gastroparesis was defined by abnormal gastric emptying study, endoscopic visualization of retained food after prolonged NPO status, or suspicion of vagal nerve injury. Patients that had recalcitrant gastroparesis who had failed medical treatment and/or gastric pacemaker placement were treated with robotic pyloroplasty. The surgical technique was the same in all patients, using the DaVinci system to accomplish a hand sewn Heineke-Mikulicz pyloroplasty. Of our 7 patients, we have followed their levels of nausea, vomiting, bloating, reflux, and early satiety every 30 days since their operation. We also investigated operative time as we believe the robotic procedure may help to decrease time and cost.
Results: More than half of our 7 patients reported improvement in their symptoms and were happy with their results. None of our patients had any major complications (leaks, bleeding) due to the robotic procedure. Our operative times ranged from 54 min to 108 min, averaging 85.43±17.39 min with a median of 86 min.
Conclusions: Patients with recalcitrant gastroparesis can be very difficult to manage, especially those who fail medical therapy. These patients tend to seek surgical options like gastric pacemaker placement or pyloroplasty. Due to the nature of the pyloroplasty procedure, sewing with the enhanced dexterity offered by the robot makes sense. From our series, we believe robotic pyloroplasty is a viable method for treating recalcitrant gastroparesis.

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Outcomes Associated with Robotic Approaches to Pancreatic Resection

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Introduction: Robotic assisted surgery allows for resection and reconstruction of complex abdominal procedures. We report our series with application of this technology to major pancreatic resections.
Methods and Procedures: A retrospective review of a prospective robotic database was performed from 2012 to 2016. Peri-operative outcomes were analyzed. Chi-square or Fisher's exact test was used to compare categorical variables as appropriate and Wilcoxon rank-sum test was used for non-normally distributed variables. P-values<0.05 were considered significant.
Results: We identified 116 patients who underwent major robotic pancreatic procedures: pancreaticoduodenctomies (RPD=71), distal pancreatectomies (RDP=32), total pancreatectomies (RTP=6), enucleations (RE=6), and cyst gastrostomy (RCG=1) with a median age of 71 (24–92) and BMI of 27.2 (18.4–39.9). There were no mortalities among the study population. Mean length of operation for the 2 most common procedures was 466±162 min for RPD and 268±95 min for RDP. Operative times improved over the course of the experience for RPD $p<0.01$. Conversion to open was required in 6 (5.2%) patients, (4 (5.6%) in the RPD, 1 (16.7%) RTP and 1 (3.1%) conversion to hand assist in the RDP). We compared robotic outcomes with pancreatic resection to a historical cohort of laparoscopic pancreatic resections in which the conversion rate was 24.6% $p<0.001$. The median estimated blood loss was 150 overall and 175 ml for RPD, 50 ml RDP, 275 ml RTP and 25 ml RE. R0 resections were performed in 114 (98.2%) patients and the median lymph node harvest was 18 (2–31) RPD, 13 (2–27) RDP, and 27 (14–37) RTP. The ISGPF grade C fistula was 2 (1.7%)%. Rate of Clavien 3 and 4 complications was 15 (12.9%) and 3(2.6%). The median length of hospitalization for the RPD was 7 (5–34) days and 5 (2–19) for the RDP. Readmissions were required in 19 (16.5%).
Conclusions: Robotic approaches to pancreatic resections are safe with excellent operative and oncologic outcomes. LOR steadily decreases as does post operative morbidity as the surgeon experience increases. The conversion to an open approach is lower then those who undergo laparoscopic approaches.

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New Application for the Robotic Platform: Gender Reassignment (Sex Change) Surgery

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Background: Traditional male to female sex change surgery involves external genital amputation and the creation of a neovagina by penile and scrotal skin inversion. These procedures frequently fail due to neovagina obliteration or development of recto-neovaginal fistula. This study examines the potential of the robotic platform in redo pelvic surgery with special focus on gender reassignment procedures (male to female).
Material and Methods: Six operations were conducted between 2013 and 2016 which involved robotic-assisted anterior pelvic dissection with resection of failed neovaginas (6) and two fistula repairs between rectum and neovagina. The sigmoid colon was used for creation of intestinal neovagina (INV) in 5 patients and the caecum in one patient.
Results: Patients were on average 45 years old with a body mass index of 27.8. Mean surgical time was 342 min, estimated blood loss 175 mL and length of hospital stay 7.7 days. There were no intraoperative complications. Two protective ileostomies were created in patients who had rectal fistulas and needed low rectal repair. One conversion to open surgery was necessary due to INV reach problem (caecum was used in the end). Late complications included a mild introitus skin stenosis and 2 mild INV prolapses. One revision of the colorectal anastomosis was needed for stricture. Both ileostomies were reversed 3 months after initial surgery without complications. All patients resumed satisfactory receptive intercourse via INV.
Conclusions: Use of the robotic daVinci surgical system is feasible, helpful and safe in difficult redo pelvic surgery, as seen after failed traditional gender reassignment surgery. We experienced no operative and minimal post-operative complications with excellent functional results.

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Robotic vs Laparoscopic Cholecystectomy: Which Technique is Optimal in Morbidly Obese Patients?

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Background: Obesity plays an important role in the preoperative evaluation when considering the optimal surgical approach for a patient. Obese patients generally have longer operative times, are technically more challenging and are at a higher risk of complications. However, robotic surgery excels over traditional laparoscopic surgery in dexterity and visualization and may be advantageous in this population. Our objective is to compare the feasibility and outcomes of the robot cholecystectomy (RC) vs traditional laparoscopic cholecystectomy (LC) in the morbidly obese patients.
Methods: This is a case control study of 139 patients who underwent robotic and laparoscopic cholecystectomy from 2014 to 2016 at an academic non-bariatric teaching hospital. We evaluated BMI, type of biliary disease, operative time, length of stay and intraoperative/postoperative complications. We used a BMI>35 as a cutoff for morbidly obese. Regression analysis was utilized to associate factors that affect operative time.
Results: Out of the 139 patients, 69 (49.6%) were performed robotically and 70 (50.4%) were done laparoscopically. 42 patients with RC and 19 patients with LC were considered morbidly obese. The RC group had an operative time of 32.8 min longer than the LC counterpart in patients with BMI>35 (p=0.001) and 13.7 min longer than LC group in patients with BMI<35 (p=0.044). Obesity increased operative time on the robot by over 20.1 min (p=0.025) while minimally increasing the duration of laparoscopic cases by 1 min (p=0.885). Multiple regression models confirmed that RC increases operative time among both BMI groups and when accounting for age (p=0.003) and similar biliary disease (p=0.064). There were no significant differences in postoperative outcomes or complications between the RC and LC groups.
Conclusion: The robot has a perceived advantage in overcoming technical challenges of abdominal surgery in the morbidly obese. We found that while the safety and outcomes of the robotic approach are similar to laparoscopy, the operative duration is significantly longer for the robot. Further studies will need to account for time utilized in robot docking and cholangiography to better demonstrate the robot's efficacy and role in gallbladder surgery.

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Safety and Feasibility of Robotic Assisted Ivor Lewis Esophagectomy

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Introduction: Esophagectomy is associated with substantial morbidity. Robotic surgery allows complex resections to be performed with potential benefits over conventional techniques. We applied this technology to transthoracic esophagectomy to assess safety, feasibility, versatility, and reliability of this technology.
Methods: A retrospective review of all patients undergoing robotic assisted Ivor Lewis esophagectomy (RAIL) from 2009 to 2014 was conducted. Clinicopathologic factors and surgical outcomes were recorded and compared. All statistical tests were two-sided and an α (type I) error < 0.05 was considered statistically significant.
Results: We identified 147 patients with an average age 66 ± 10 years. Neoadjuvant therapy was administered to 114 (77.6%) patients, and all patients underwent a R0 resection. The mean OR time was 415 ± 84.6 min with a median EBL of 150 (25–600) mL. Mean ICU stay was 2.00 ± 4.5 days, median length of stay was 9 (4–38) days and re-admissions were low at 8 (5.5%). OR time decreased from 471 min to 389 min after 20 cases and a further decrease to mean of 346 min was observed after 120 cases. Complications occurred in 37 patients (25.2%). There were 4 anastomotic (2.7%) leaks. Thirty and 90-day mortality was 0.68% and 1.4% respectively.
Conclusion: This represents to our knowledge the largest series of robotic esophagectomies. RAIL is a safe surgical technique that provides an alternative to standard minimally invasive and open techniques. In our series there was no increased risk of LOH, complications, or death and re-admission rates were low despite earlier discharge.

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Inguinal Hernia Repair: Is There a Benefit to Using The Robot?

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Introduction: The number of robotic surgical procedures performed in the United States is constantly rising. Robotic surgery provides the surgeon with improved dexterity and visualization capabilities compared with conventional methods. We hypothesized that outcomes after inguinal hernia repair using the robot would be superior to outcomes after laparoscopic or open repair.
Methods and Procedures: All patients undergoing inguinal hernia repair at a single-institution between 2012–2016 were identified using institutional American College of Surgeons National Surgical Quality Improvement Program data. All cases with robotic assist were identified using a prospectively collected dataset. Demographics along with preoperative, intraoperative, and postoperative characteristics and outcomes were evaluated based on method of inguinal hernia repair (robotic, laparoscopic, or open). Categorical variables were analyzed by Chi-square test and continuous variables using Mann-Whitney U.
Results: A total of 510 patients were identified, 69 (13.8%) robotic, 241 (48.1%) laparoscopic, and 191 (38.1%) who underwent open inguinal hernia repair. There were no demographic differences between the groups in terms of sex, race, body mass index, hospital status (inpatient/outpatient), or functional health status, but there was a significant difference in American Society of Anesthesiologists classification and age (Table 1). There were also no differences in prevalence of preoperative comorbidities, including hypertension, chronic obstructive pulmonary disease, diabetes mellitus, heart failure and kidney failure. The majority of patients received only an inguinal hernia repair and no other concurrent operation (Robot: 98.6% [68] vs. Lap: 99.2% [239] vs. Open: 98.4% [188], p=0.76). Rates of postoperative occurrences (complications, readmissions, and death) were similar between the groups as seen in Table 1. There were no operative mortalities and all patients except one were discharged home the same day. Although rare, there was a significant difference in rate of postoperative skin and soft tissue infection (Robot: 2.9% [2] vs. Lap: 0% [0] vs. Open: 0.5% [1], p=0.02). Median [IQR] operative duration was also significantly different depending on method of inguinal hernia repair (Robot: 105 [76–146] vs. Lap: 81 [61–103] vs. Open: 71 [56–88] minutes, p<0.001). There were no hernia recurrences within one month after repair.
Conclusions: Surgeon comfort level and patient preference should dictate whether inguinal hernia repair is approached robotically. Longer operative duration during robotic repair may contribute to higher rates of skin and soft tissue infection. As use of the robot becomes more routine and robot access becomes more ubiquitous, operative times will likely decrease to a level comparable with laparoscopic repair.

Table 1: Demographics and postoperative complications

	Robot (n=69)	Laparoscopic (n=241)	Open (n=191)	p-value
Age (years)	52 [39-62][1]	57 [45-67]	56 [48-67]	0.034
Body Mass Index (kg/m^2)	24.9 [22.9-28.7]	25.8 [23.1-28.4]	25.1 [23.2-27.8]	0.7
ASA[2] Classification 3 or 4	15.3 (37)[3]	28.8 (55)	14.5 (10)	0.003
Postoperative occurrence	2.9 (2)	3.3 (8)	5.2 (10)	0.53
Skin and soft tissue infection	2.9 (2)	0 (0)	0.5 (1)	0.02
Operative duration (minutes)	105 [76-146]	81 [61-103]	71 [56-88]	<0.001

[1] Median [IQR], all such values, [2] American Society of Anesthesiologists, [3] % (n), all such values

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Robotic-Assisted Laparoscopic Surgery: The Experience of a Resident

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Introduction: Robotic surgery is an adjunct method of laparoscopic training that can be safely performed by residents. Surgical residencies are unique as they require not only attaining knowledge, but also technical skills. The newest extension of minimally invasive surgery is robotic surgery. As a hotly-debated topic, it is difficult to gain exposure to robotic training. Laparoscopic skills are very similar to robotic ones. However, there are nuances for robotic surgery that require specific training outside of laparoscopy. While training, certification in robotic surgery can be obtained by completing didactic and laboratory sessions to become familiar with robotic technology. In addition, a training surgeon must perform cases as the bedside assistant and as the console surgeon.
Method: All procedures were performed electively between July, 2015 and June, 2016 by a single surgical resident under supervision from two attending surgeons in two institutions with a da Vinci SI robotic platform. The first assistant was another resident. All patients were given the option for non-robotic laparoscopy. The patients who selected the robotic approach were included in this study and data was collected prospectively. Those who selected laparoscopy were excluded.
Results: We planned 19 cholecystectomies, 1 enterolysis, 1 gastrectomy and 1 esophagogastrectomy. Of the 22 surgeries, we performed 21 with the robot and 19 were completed as planned. One cholecystectomy was aborted due to inflammation and a cholecystostomy tube was placed. The gastrectomy was aborted as a small metastatic lesion was encountered after dissecting into the lesser sac. The majority of the abdominal portion of the esophagogastrectomy was performed with the robot until ligating the left gastric pedicle. It was converted to open due to radiation changes. The operative time was not outside the standard range. The only complication was a cystic stump bile leak that presented 2 weeks after surgery. There were no mortalities.
Conclusion: In this series, we provided evidence that robotic surgery can be safely performed by residents without added time. The morbidity and mortality rates were 4.7% and 0%, respectively. In the General Surgery world, two topics guaranteed to spark discussion are residency training and robotics. Many surgeons feel that duty-hour limitations have led to inadequate surgical education and operative experience. There has also been pushback to the inclusion of robotics in General Surgery. Most studies have shown similar outcomes between laparoscopic and robotic surgery with higher cost for robotic surgery. However, this technology is still in its infancy.

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Robotic General Surgery: National Trends from 2008 to 2013

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Introduction: The purpose of this study was to evaluate nationwide trends in robotic-assisted General Surgery procedures (RAGS).
Methods: The Nationwide Inpatient Sample, which captures approximately 20% of all US inpatient admissions, was queried from October 2008 (the inception of the robotic ICD-9-CM code) to December 2013 (the last available information) for patients undergoing elective abdominal RAGS.
Results: From October 2008-December 2013, 676,354 elective, abdominal, minimally invasive General Surgery operations were performed, of which 9,874 (1.5%) were RAGS. From 2008 to 2013 the incidence of RAGS significantly increased each year ($p<0.001$). In 2008, RAGS comprised 0.33% of elective abdominal general surgery cases; by 2013, the prevalence had risen to 3.3%.
From 2008 To 2013, 9,874 RAGS were performed, of which 39.5% were in 2013. When comparing RAGS of 2013 with earlier experience (2008–2009), there was no change in age or gender of the patients. Those who underwent RAGS in 2013 had more overall comorbidities (4.2 ± 2.6 vs 3.7 ± 2.3; $p<0.001$): a higher prevalence of liver disease (4.3% vs 2.4%; p=0.02). Complication rates (8.9% vs 9.5%; p=0.5) and mortality rates (0.10% vs 0.15%, p=0.7) did not change. Length of stay lessened (3.4 ± 2.7 vs 3.7 ± 2.6; p=0.0005). Total costs for RAGS procedures increased over the same 5 years ($65,601±$40612 vs $54,609±$33,244; $p<0.001$).
In 2013, zip codes with median household incomes ≥$64,000 had the highest percentage of RAGS (27.0%), however the percentage performed in zip codes with median household incomes <$38,000 increased (20.9% vs 14.5%; p=0.0001) and fewer RAGS were performed in patients with private insurance (52.0%vs 57.8%; p=0.01) when compared to 2008–2009. Regionally, the South had the highest proportion of RAGS and the largest regional growth (38.6%vs 30.7%; $p<0.001$). While the vast majority of RAGS procedures were done in urban teaching settings during both time periods, there was a significant shift to more rural hospitals in 2013 (3.18% vs 1.03%; p=0.04). A lesser percentage of RAGS were performed in teaching hospitals (65.4% vs 79.9%; $p<0.001$) and more commonly performed in medium-sized hospitals (26.4% vs 10.0%; $p<0.001$).
Conclusions: This nationwide study evidences RAGS increasing incidence across the country. RAGS numbers have increased, as have costs, while complications and mortality have remained the same. Robotics in general surgery remains regionalized to urban teaching centers in higher income areas, though there is an increasing trend for RAGS to be performed in smaller, non-teaching hospitals, and in less affluent locations.

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Endowrist Equipped Robotic Laparoendoscopic Single Site Access Cholecystectomy Versus 4 Port Laparoscopic Cholecystectomy. A Prospective Comparative Study

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Background: Laparoendoscopic single-site surgery (LESS) allows the performance of surgery through a single wound. However, the LESS approach complicates surgery by limiting the dexterity of the laparoscopic instruments. The use of a robotic system equipped with the endo-wristÒ technology may significantly reduce the difficulty of LESS. Thus, the aim of the current study is to compare an endo-wristÒ equipped robotic LESS (R-LESS) cholecystectomy with 4-port laparoscopic cholecystectomy (LC) in a prospective comparative study.
Methods: This was an ongoing prospective comparative study conducted between September 2015 to September 2016 in one University and one Day surgery hospital. Consecutive patients that suffered from symptomatic gallbladder pathology indicated for cholecystectomy were included. They received either R-LESS cholecystectomy with the Da Vinci S system that is equipped with the endo-wristÒ technology using 5 mm instruments or conventional LC. The primary outcome was the overall pain score. Secondary outcomes included activity pain scores, activity scores, patient satisfaction and comesis scores, analgesic requirements, conversion, morbidity rates and quality of life assessment scores.
Results: A total of 24 patients were recruited to the study (14 R-LESS vs 10 LC). There were no differences in background demographics. None of the procedures required conversion. There were no differences in mean (S.D.) operative time [62.3 (22.6) vs 72.1 (19.2) minutes, P=0.274), hospital stay [1.4 (0.7) vs 1 (0) days, P=0.104) and morbidity rates (14.3 vs 0%, P=0.216). There was also no difference in the overall difficulty of the procedure [1.4 (1.5) vs 2.9 (2.5), P=0.128) and the overall post-operative pain at days 1, 2, 3, 5, 7 and 4 weeks. There was a trend to more pain at D1 after standing for 5 min [5.4 (2.7) vs 2.8 (2.5), P=0.053). No difference in satisfaction scores [6.6 (3.2) vs 8.8 (1.5), P=0.107] was noted between the groups but worst cosmesis scores [5.8 (3.6) vs 8.8 (1.5), P=0.045] were observed in the R-LESS group. No differences in quality of life assessments scores [22.9 (2.7) vs 24.4 (3.1), P=0.371] were noted.
Conclusions: R-LESS and conventional laparoscopic cholecystectomy were comparable in perioperative outcomes. The use of the robotic approach with the endo-wristÒ function improves the ease of performing LESS cholecystectomy. The R-LESS approach was associated with slightly more pain and worst cosmetic appearance (Fig. 1).

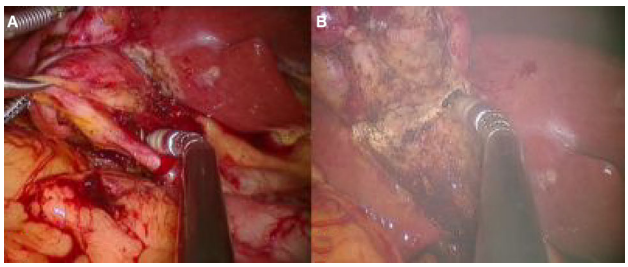

Fig. 1 The R-LESS cholecystectomy

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A Meta-analysis of Robotic-Assisted vs Laparoscopically Assisted Gastrectomy

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Purpose: This meta-analysis was carried out to evaluate whether Robotic-assisted gastrectomy (RAG) could be safer and more effective than conventional laparoscopically assisted gastrectomy (LAG) for gastric cancer.
Methods: We searched two operation types (RAG and LAG) in Pubmed, Embase and The Cochrane Library, and manual searches were performed up to April 30th, 2016. Six non-randomized control trials were included. Outcomes evaluated were operation time, number of retrieved LN, blood loss, length of the resection margin, complications, postoperative hospital stay.
Results: 2454 patients in six studies were included (731 patients in RAG group and 1723 patients in LAG group). Operation time was significantly shorter in LAG group (WMD 37.92(95% C .I. 33.25 to 42.60) mins ; $p<0.00001$). Blood loss volume and postoperative stay were less in RAG group (the former $p=0.008$; the later $p=0.01$). The differences of the length of distal resection margin were slight between the two groups ($p<0.00001$). The number of retrieved lymph nodes, length of the proximal resection margin and postoperative complications were similar in both groups.
Conclusions: We may conclude that RAG is a safe and comfortable treatment for gastric cancer patients instead of LAG. Major research of RAG in the future should focus on evaluating long-term therapeutic effect and reducing cost.

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Open Versus Robotic-Assisted Transabdominal Preperitoneal (TAPP) Inguinal Hernia Repair: A Single Institution Experience with Primary Unilateral Hernia

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Introduction: Robotics technology has facilitated the performance of advanced laparoscopic procedures. Laparoscopic inguinal hernia repair has a steep learning curve and has served as a barrier to adoption of minimal invasive repair of inguinal hernias. This study examines a single surgeon's early outcome with robotic-assisted TAPP compared with open (plug/patch) repair in patients undergoing unilateral primary hernia in terms of safety and feasibility for a surgeon with predominately open experience.
Methods and Procedures: We performed a retrospective review of 157 consecutive patients (66 robotic and 91 open) who underwent unilateral primary inguinal hernia repair between September 2012 and March 2015 at a single institution by a single surgeon. Data examined included gender, age, BMI, operative times, recurrence, perioperative complications and conversions.
Results: Patients in both groups were similar for age, gender, BMI and ASA. The groups were also matched for direct and indirect hernias. The mean operative time (31.9 vs. 65 min, $p=0.0001$) was significantly longer for the robotic vs. open. There was no significant difference in perioperative complications, readmission, reoperation or recurrence (0% for open and 1.5% in robotic). There was no conversion to open in the robotic group. The length of stay for both groups was similar.
Conclusion: Robotic TAPP inguinal hernia repair has longer operative times compared to open plug and patch technique. Early outcomes demonstrate no increased morbidity. Robotic TAPP inguinal hernia repair can be performed safely for a surgeon with predominately open inguinal hernia experience.

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Surgical and Oncologic Outcome of Robotic Surgery for Colon Cancer: Comparison with Open and Laparoscopic Surgery Using Propensity Score Matching

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Purpose: Robotic surgery (RS) is an emerging technology that has technical advantages over traditional laparoscopic surgery (LS). In colorectal cancer, robotic surgery has been used increasingly but there is still no consensus on its comparative merit compared with LS, especially in colon cancer than rectal cancer. The aim of this study was to investigate surgical and oncologic outcome after RS for colon cancer in comparison with open surgery (OS) and LS. Further, we assessed the impact on inflammatory reaction according to the surgical modalities.
Methods: Using propensity scores for adjustment of age, gender, American society of anesthesiologists (ASA) grade, body mass index (BMI), location of primary tumor, pathologic stage, extent of resection and operating surgeon, a well-balanced cohort with 66 patients in each group was created by matching each patient who underwent RS as the study group with one who underwent OS, LS as the control group (RS:OS = 1:1, RS:LS = 1:1 match). Surgical and long-term oncological results were compared between the 3 groups. In addition, to access the difference of inflammatory reaction between the groups, biochemical indices (leukocyte count, neutrophil count and minimal prognostic nutritional index (PNI)) were compared.
Results: In RS and LS, time to first flatus and resumed soft diet were significantly shorter than in OS. LS shortened postoperative hospital stay than OS, significantly. RS did not show significant difference of postoperative hospital stay compared with OS. There was no difference with significance in patients' recovery between RS and LS. Comparing postoperative inflammatory indices of leukocyte and neutrophil between the groups, RS and LS showed significantly higher leukocyte and neutrophil count than OS. Between RS and LS, there was no significant difference. Analyzing PNI, RS showed significantly higher result than LS and OS. In complication rate and oncologic outcome (5-year disease free survival and overall survival), no significant difference was observed among three groups.
Conclusion: In this study, RS showed better patients' recovery and less inducement of inflammatory reaction after surgery than OS. In addition, PNI, an indicator for immune-nutritional status, was relatively preserved after RS than OS and LS. Further study is required to clarify this issue.

P693

Robotic Assisted Splenectomy in a Patient with Massive Splenomegaly Secondary to Sarcoidosis

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Introduction: Minimally invasive splenectomy is gaining popularity for non-traumatic splenic disorders requiring splenectomy. We report a case of successful robotic assisted splenectomy for massive splenomegaly in a patient with history of sarcoidosis. To our knowledge, our case is the largest intact spleen removed without fragmentation by minimally invasive approach.
Case Report: A 40-year-old female with history of sarcoidosis and diabetes was considered for splenectomy. She had significant weight loss, fatigue, abdominal pain and vomiting for several months. CT scan revealed retroperitoneal and mediastinal lymphadenopathy along with massive splenomegaly (Fig. 1). CT guided biopsy of retroperitoneal lymph node was negative for lymphoproliferative neoplasm. We recommended minimally invasive splenectomy due to symptomology and to facilitate diagnosis.
The Si robot was used for the placement of ports in the right and left mid abdomen. Three robotic arms and an assistance port were used to take down the medial attachments of spleen The hilum was then isolated and taken down with a 60 mm white load stapler. As access to the lateral attachments of the spleen was limited by its weight, laparoscopy was used in final stage. Tilting of the table facilitated the dissection of superior attachments of spleen. The spleen was placed in a bag and removed intact through a small midline incision. Her post-operative recovery was uneventful and was discharged on day five. Gross weight of the spleen was 1905 grams and measured $34 \times 20 \times 6.5$ cm (Fig. 2). Pathology revealed complete replacement of spleen by non-necrotizing epithelioid granuloma suggestive of sarcoidosis
Conclusion: Although laparoscopic approach is feasible in majority of cases requing splenectomy, it does have limitations especially with massive spleens. Robotic assisted splenectomy is a viable alternative for massive spleens which are technically difficult with standard laparoscopic approach.

Fig. 1 Coronal section of CT abdomen and pelvis demonstrating massive spleen measuring $23 \times 16.2 \times 10.6$ cm

Fig. 2 Gross specimen of intact spleen removed without fragmentation with robotic assistance

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Robotic Inguinal Hernia Repair

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Introduction: Robotic surgery adds high definition visualization and articulating instruments which enhances dexterity that makes laparoscopic hernia repair very refined. The Urologic literature reports 25% of patients undergoing robotic radical prostectomy have inguinal hernias. A series of robotic, laparoscopic, inguinal hernia repairs by a single surgeon with an extensive laparoscopic hernia experience at a single institution was undertaken to determine the role of robotic laparoscopic inguinal hernia repair in minimally invasive surgery.
Methods: Five hundred seventy-seven (577) laparoscopic inguinal hernia operations were performed from April 2012 through May 2016. There were 172 patients having 220 robotic TAPP (trans-abdominal pre-peritoneal) procedures done during that time. Hospital records and follow up care were prospectively reviewed and data collected for age, sex, American Society of Anesthesia (ASA) class and operative time. Follow up was done at 2 weeks, 8 weeks and 16 weeks following surgery. All patients consented for study.
Results: Ninety percent (90%) of the patients were male. Age averaged 56.1 years with a range of 21–85 years. ASA averaged 2.01 with co-morbidities of hypertension, hypercholesterolemia and GERD being the most common. BMI was between 19-31.6, averaging 27.01. Thirty-two patients (18.6%) had an umbilical hernia repair done concomitantly. OR time ranged from 25 to 140 min with an average of 63.1 min decreasing as experience increased. One patient with a large, left scrotal hernia was converted to open, two patient developed perforated sigmoid diverticulitis 7 days post op and case #5 recurred indirectly after a direct hernia repair. Four patients required prolonged post-operative foley catheterization.
Conclusion: Robotic inguinal hernia repair is safe and effective. OR time was longer than standard laparoscopic herniorraphy but decreased with experience. In addition, robotic prostatectomy patients have a high incidence of inguinal hernias. The newly released robotic single port platform may have use in inguinal patients with umbilical hernias, 19%, and this will need to be studied further.

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Robotic-Assisted Paraesophageal Hernia Repair in a Non-University, Minimally Invasive Fellowship Council Accredited Program

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Introduction: Paraesophageal hernia repair (PHR) has seen a dramatic evolution with the introduction of laparoscopic surgery and its feasibility and clinical outcomes well demonstrated. The adoption rate of robotic-assisted PHR has not been as widely accepted. In analyzing the University Health data of 12,079 patients, robotic fundoplication repair made up 2.8% of all operations with open repair at 18% and laparoscopic at 79.2%. The same data demonstrated higher costs in open surgery due to increased length of stay and complications compared to robotic-assisted surgery. The purpose of our study is to share our experience with one of the largest retrospective series in robotic PHR in a non-university, minimally invasive surgery fellowship program. Furthermore, our training model is able to achieve excellent patient outcomes.
Methods: A retrospective chart review was performed of 135 large minimally invasive PHRs between January 1st 2008 – August 1st, 2016. The data was filtered for Da Vinci robot-assisted PHR. This data was then analyzed to assess the patient characteristics, surgical methodology, fellow participation, as well as outcomes.
Results: Out of a total of 135 cases utilizing a minimally invasive approach, 44 patients in our series underwent a robotic PHR. The hiatal hernia types: four (9.1%) type 2, 36 (81.8%) type 3, and four (9.1%) type 4. The average age of patients was 67 years old and median American Society of Anesthesiologist (ASA) class of III. All cases were performed with robotic-assistance, however, one case required conversion to laparoscopy. Three patients were revisional cases and two patients had concomitant bariatric procedures. Twenty-seven patients (61.4%) had a Nissen fundoplication, 12 (27.2%) patients had a partial fundoplication, and five (11.4%) had no fundoplication. Six patients had mesh reinforcement. Fellows participated in 82.9% of robotic-assisted cases. The average length of stay was 3.1 days. Two (4.5%) patients suffered perioperative complications including reintubation and transfusion of one unit of blood. No mortalities were noted in our series.
Conclusion: The utilization rate of robotic-assisted surgery in foregut has been well described, but still under utilized compared to open surgery. Our series demonstrates the ability to achieve comparable outcomes to laparoscopic surgery utilizing robotic-assistance in a fellowship training environment. Further investigation into open to laparoscopic and robotic surgery learning curves could highlight described advantages to robotic surgery and advance patient surgical care.

P696

Robotic, Laparoscopic and Open Surgery in Gastric Cancer Treatment. Retrospective and Comparative Study

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Introduction: Traditional surgery has major morbility and worst postoperative quality of life than mininvasive surgery (MIS). MIS advantages are magnified viewing and image high definition, minor lenght of hospital stay (LOS), less postoperative pain and better aesthetic results. In particular, 3D vision, Endo-wrist, absence of physiological tremor and redundant movements are prerogatives of robotic surgery, which improve surgeon performance. Main target of this study is defining feasibility and safety of robotic technology in gastric cancer surgery, comparing 3 series of patients operated, in the same period, respectively, with robotic, laparoscopic and traditional techique.
Materials and Methods: From December 2008 to December 2015, 52 patients were submitted to curative gastric resection for primary adenocarcinoma. 23 patients were submitted to robotic, 14 to laparoscopic and 15 to traditional gastric resection. Extension of surgery and lymphadenectomy were based on Japanese Gastric Cancer Treatment Guidelines 2010. Demographic, tumor site, type of intervention, histological, postoperative course, overall and disease freee survival (OS and DFS) data were collected in a database for statistical analysis.
Results: Demographic and ASA score, tumor site, histological type and type of intervention variables were distributed evenly among the three groups. 2 robotic and 6 laparoscopic patients needed conversion to traditional surgery. Time of intervention was significantly greater in robotic group (350.77±59.28 min. $p<0.05$). Intraoperative blood loss was 30ml±28 in robotic, 76ml±23 in laparoscopic and 90±43 in open group ($p=0.7$). The mean number of retrived lymph nodes was 29.95±8.41 in robotic, 27.43±8.16 in laparoscopic and 34.93±15.38 in traditional group ($p=0.1$). 100% of radical resections (R0) were obtained for both robotic and traditional group, 85.7% in laparoscopic group ($p=0.1$). First flatus was significantly earlier in robotic group (3rd p.o. day, $p<$ 0,05), as diet recovery (3rd p.o. day) and drains removing (5th postoperative day). No significantly differences were found in perioperative morbility and mortality ($p=0.8$). Median hospital stay was better in mininvasive group, in particular, 9±4.15 in robotic, 10.21±3.06 in laparoscopic and 13.73±4.39 in traditional group ($p<0.05$). Readmission rate was 4.3% in robotic, 7.1% in laparoscopic and 13.3% in traditional group ($p=0.6$). No differences were found in 5 year OS and DFS. At multivariate analysis only Lauren Classification and grading (G) variables significantly influenced OS, as Lauren Classification, pN and G significantly influenced DFS.
Conclusions: Robotic gastrectomiy is safe and feasible. It is a viable alternative to laparoscopic and traditional surgery, with satisfactory results in terms of oncological and perioperative outcomes.

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Robot-Assisted Versus Laparoscopic Liver Resection: A Review of the Literature and a Cost-Benefit Analysis from a Single High-Volume Center

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Objective: Questions of superiority and cost-effectiveness of robot-assisted compared with laparoscopic approach to hepatectomy remain unanswered. To understand outcomes and challenges of each, we reviewed published reports and conducted cost-benefit analyses for major hepatectomy performed at a high-volume hepatopancreatobiliary surgery center.
Methods: Reports of minimally invasive hepatectomy published from 2008 to 2016 were reviewed. Patient data, operative characteristics, and outcomes were compared between robot-assisted and laparoscopic approaches. A retrospective analysis was conducted of patients who underwent minimally invasive major hepatectomy (≥3 segments) at our center from 2008 to 2016 (n=181). Patient data, operative characteristics, and outcomes were compared between robot-assisted (n=57) and laparoscopic (n=124) hepatectomy.
Results: Published reports of both approaches demonstrated similar perioperative characteristics and post-operative outcomes; however, a paucity of data precludes any valid conclusion on superiority or relative cost-effectiveness. Patients undergoing robot-assisted versus laparoscopic major hepatectomy at our center were older (58.1±15.7 versus 53.1±15.6 years, respectively; $p=$ 0.029), went to the ICU post-operatively less often (46.3% versus 62.8%, respectively; $p=0.041$), and were readmitted less often within 90 days (5.3% versus 20.2%, respectively; $p=0.010$). No significant differences were found between groups for blood loss volume, operative times, transfusion volume, and length of stay. Mean total cost was not significantly different between the robot-assisted versus laparoscopic approach ($31,732 versus $27,053, respectively; $p=0.057$).
Conclusion: Robot-assisted hepatectomy is safe, feasible, and effective with no significant cost differential compared to laparoscopic hepatectomy.

P699

Laparoscopic Posterior Retroperitoneoscopic Adrenalectomy for Primary Hiperaldosteronism. Experience in IV Level Clinic in Colombia

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Introduction: Primary hyperaldosteronism or Conn disease has an incidence of 10% of the causes of hypertension. This is curable disease and 70% of these have an adenoma associated .The symptoms are hypertension, hipokalemia and fatigue. The treatment is remove the lesión by minimally invasive approach.
Main: Describe the technique and results of posterior retroperitoneal approach in patients with primary hiperaldosteronism.
Material and Methods: retrospective descriptive. 7 patients (3 females/4 males) 45 y/o, between April 2015 and September 2016 with diagnosis by CT SCAN or RMN of adrenal mass+biochemical findings in blood test and selective catheterization of adrenal vein of high aldosterone levels, hypokalemia plus characteristic symptoms such as cramps, fatigue and hypertension. One patient has a left incidentaloma with a history of colectomy for colon cancer, open eventrorraphy with mesh. All patients were managed with endocrinology.
Results: All patients under general anesthesia in prone position with knees bent Fig. 1. We drawn a line to identify the limits of dissection: the rim of the 11 and 12 rib and spine, with a 3 ports technique: # 2 of 5 mm and 1 of 12 mm. we started introduce on midline below of 12 rib 12 mm incision, open the fascia until retroperitoneal space and with dissecting balloon wecreate the retroperitoneal space, then with the finger we felt the tip of the two additional trocars and started with 30 mm Hg CO2 pressure. our landmarks were: the superior kidney pole and with bipolar disected all the fat tissue. We disecced and clipped with 5 mm Hemolok the médium adrenal vein and finish the disection with bipolar. We used a endobag to extract the gland and diminished the gas pressure to checked hemostasia.
All patients refered no pain after de surgery and the scale of pain was minimal, the OR time was 30 min and the patients started oral intake 4 h after de surgery. Discharge next day with oral paracetamol and all the patology study demostrated adenoma Fig. 2
Conclusion: Minimally invasive surgery is the standard of many of the surgical procedures. For adrenal diseases, transabdominal approach is the most used. The posterior retroperitoneoscopic approach has proven to be faster, blood less, does not produce the effects of diaphragmatic irritation or cardiovascular side effects to using CO2 and the more important is painless.

P700

Older Adults Also Benefit from Laparoscopic Splenectomy: A Single Center Experience Over 9 Years

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Introduction: Though many open splenectomies are still performed4, most consider laparoscopic splenectomy the standard3. Patient age, co-morbidities and the presence of splenomegaly may influence the operative approach. Our group has previously reported on the safety of laparoscopic and hand-assisted splenectomy in the elderly with splenomegaly.1,2 Few studies have compared outcomes between older and younger adults in laparoscopic splenectomy.5
Thus, we retrospectively reviewed our experience in laparoscopic splenectomy comparing outcomes between younger (<65) and older (≥65) adults. We hypothesized older adults would experience higher complication rates and length of stay.
Methods: Elective laparoscopic and hand-assisted splenectomies performed between 2003–2012 at our institution were retrospectively reviewed. Patients were excluded if splenectomy was not performed alone or if splenulectomy only was performed. Patients were stratified into younger (< 65) and older (≥65) adults. Patient characteristics (age, gender, BMI, Charlson comorbidity index, ASA), operative characteristics (OR time, approach, blood loss, spleen weight, and spleen interpole length) and post-operative characteristics (length of stay, Clavian-Dindo score, and re-operation or death within 30 days) were compared between groups.
Continuous variables were analyzed using student t-test and categorical variable by Chi-squared test. $P<0.05$ was considered significant.
Results: One hundred forty-six splenectomies were performed. The average age in each group was significantly different (45.4 vs 74.8 years). There were no differences in gender distribution between groups. Older patients had significantly lower BMI's (27 vs 30); potentially due to chronic disease. Older patients were more co-morbid; evidenced by significant differences in ASA, Charlson comorbidity index, and frequency of hematologic malignancy. (2 vs 3, 2 vs 5, 23.4 vs 46.4%)
Operative times, blood loss, and frequency of accessory spleens were not different between groups. (128 vs 141 min, 154 vs 159 ml, 9.2 vs 15.9%) Older patients were significantly more likely to need a hand-assisted approach (39.1 vs 19.5%) due to the significant difference in weight and interpole spleen length. (555 vs 1025 g, 13.8 vs 16.4 cm)
There were no differences in length of stay and re-operation or death within 30 days. (4.3 vs 6.9, 1 vs 4, 0 vs 1) There were significantly more complications in the older group. This difference is almost entirely represented by grade 1 and 2 Clavian-Dindo complications.
Conclusion: Despite differences in co-morbidities and the technical challenges with massive splenomegaly in older adults, perioperative complications were only modestly increased. Laparoscopic splenectomy should be the preferred operative approach in most elective splenectomies.

P701

Sclerosing Angiomatoid Nodular Transformation of the Spleen (SANT): Case Series and Literature Review

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Introduction: Splenic masses often come to surgical attention after being found incidentally on imaging. It is important for surgeons caring for patients with solid splenic mass to have an understanding of the a broad range of lesions and their imaging characteristics to avoid over-treatment or under-treatment. Sclerosing Angiomatoid Nodular Transformation is a rare, benign tumor of the spleen, first described in 2004 by Martel et al. The incidence and natural history of SANT is still unclear. Most patients present with asymptomatic solitary solid mass seen incidentally on imaging. Surgeons faced with a patient splenic mass may not be familiar with this diagnosis. We report three cases of SANT treated with laparoscopic splenectomy, each presented with different clinical and imaging characteristics.
Results: The first case was a 48 years old man with multiple previously treated malignancies and newly diagnosed rectal lymphoma. During staging, he was found to have a 2.3 cm splenic mass in a mildly enlarged spleen. Imaging was unable to specify the nature of the mass. The lesion was not FDG-PET avid. The patient underwent a laparoscopic splenectomy and a diagnosis of SANT was confirmed.
The second case was a healthy 44 year old lady. A splenic mass was found incidentally on an ultrasound done for biliary colic. MRI confirmed a 5.1 cm lesion. A PET scan showed a hypermetabolic lesion with SUV max of 4.4. The patient underwent a laparoscopic splenectomy and the diagnosis of SANT was confirmed.
The last case was a 41 years old man found to have a splenic mass on ultrasound performed during work up for hematuria. A CT scan confirmed a 2.3 cm splenic solid mass. The lesion was stable for 5 years on annual imaging. Several years later, re-imaging was performed with MRI and it had increased significantly in size to 5.7 cm. The patient underwent a laparoscopic splenectomy to rule out malignancy. The diagnosis was then confirmed to be SANT.
Conclusion: SANT is a newly characterized vascular lesion of the spleen which has the potential to grow in size. Its variable clinical presentation and overlapping radiologic features made it difficult to preoperatively differentiate SANT from other lesions. Emerging series have described several characteristic imaging features on CT and MRI to assist in the diagnosis. As we gain experience, we might be able to identify a subset of patients who can be serially monitored. At this time, splenectomy is needed for diagnostic purposes and is curative

P702

A New Approach for Single Port Laparoscopic Adrenalectomy Using Low Profile Trocars

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Background: Minimally invasive techniques have gained popularity during the recent decades. The aim of this study was to evaluate a new approach for Single incision laparoscopic adrenalectomy (SILA).
Methods: Between 2008 and 2015, the patients who underwent laparoscopic multi-port transabdominal adrenalectomy (LMTA) and SILA were evaluated in terms of patient demographics, duration of hospital stay, operative time, tumor size and final pathology. LMTA procedures were performed by conventional trocars and SILA procedures were performed by low profile trocars which were used from a single 3 cm skin incision.
Results: The study included a total of 42 patients. There were 15 male and 28 female patients. LMTA was performed in 21 patients and SILA was performed in 21 patients. Average operative time was 83.9 min in LTA group and 98.6 min in SILA group. Average duration of hospital stay was 3 days in both study groups. Mean tumor size was 41.9 mm in LTA and 32.4 mm in SILA group. 25 of the patients were operated for cortical adenoma, 7 pheochromocytoma, 5 metastasis of adenocarcinoma, 2 adrenal cyst, 2 for myelolipoma and one patient ganglioneuroma. All patients were discharged uneventfully on postoperative day 2 and there were not any complication developed.
Conclusion: Single-incision laparoscopic adrenalectomy technique provides good cosmetic results and similar outcomes compared to multiport technique. We believe that the use of low profile trocars for SILA technique is also lower the cost of surgery compared to other single incision torcars.

P703

Porto-mesenteric Thrombosis After Laparoscopic Splenectomy for at Public Teaching Hospitals in Abu Dhabi

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Introduction: Laparoscopic splenectomy for hematological conditions is the standard method for splenectomy. One of the potential rare complications following laparoscopic splenectomy is porto-mesenteric thrombosis. Our aim is to compare the outcomes of laparoscopic splenectomy for hematological conditions in two public hospitals in the emirate of Abu Dhabi.
Methods: We conducted a retrospective chart review for all splenectomy cases from January 2009 to March 2015 at two teaching public hospitals in Emirate of Abu Dhabi (Tawam hospital & Sheikh Khalifa Medical City (SKMC). The primary outcome is the development of porto-mesenteric thrombosis postoperatively and secondary outcomes included duration of surgery, hospital stay and other postoperative complications. We excluded all patients younger than 15 years of age or patients after trauma.
Results: During study period, 50 splenectomies were performed (21 at Tawam hospital & 29 at SKMC). After excluding children and trauma patients, 36 patients met the inclusion criteria (18 at each site). Mean age (mid 30 s), gender (50% females), BMI (25.5 kg/m2), and splenomegaly (50%) was equal in both groups. Obesity (BMI>30 kg/m2) (30% versus 22%), laparoscopic approach (88% versus 83%) were more common at SKMC compared to Tawam. In addition, more patients received LMWH at SKMC (72% versus 55%) for a longer duration (10 versus 2.9 days). PMT was less common at SKMC (5.5% versus 22%).
Conclusion: PMT was less common at SKMC despite higher prevalence of obesity possibly due to more liberal use of LMWH for a longer duration.

P704

Laparoscopic Partial Splenectomy in a Case of a Congenital Epidermoid Cyst

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Introduction: Splenic congenital epidermoid cysts are rarely seen and 3% of all splenic cysts. Despite not constituting a problem if they are small in size, they might become symptomatic with pain because of bleefing inside the cyst, rupture or inflection. Larger cysts may cause nausea, vomiting, left arm pain and respiratory distress by compression in addition to the aforementioned symptoms. Surgery is recommended in symptomatic cases or cysts larger than 5 cm. Early and late complications of splenectomy can result in serious morbidity and mortality. The best way to avoid post-splenectomy sepsis, which has a very high mortality rate and can be seen in spite of vaccination for encapsulated bacteria is partial splenectomy. We aimed to present our case of splenic congenital epidermoid cyst in which we performed laparoscopic partial splenectomy.
Presentation of Case: A male patient at the age of 20 presented with the symptoms of nausea and abdominal pain that had occurred intermittently for the past few months. He did not have a remarkable medical history. Medical imaging of the abdomen was ordered after finding dullness in Traube's space during his physical examination. In the abdominal CT scan with contrast, a cystic mass lesion with the radius of 11 cm that was located in the upper pole of the spleen and consistent with epidermoid cyst. A partial splenectomy was decided on after examining the CT images carefully. The patient got vaccinated for encapsulated bacteria before the splenectomy. Laparoscopic exploration was followed by the entry with standard ports. The upper pole branch of the splenic artery was dissected, clipped and cut. Subsequently to the formation of ischemic demarcation line, partial splenectomy was completed with using bipolar vessel sealing device. Leaking blood despite demarcation was halted by Argon plasma coagulation. The operation ended after applying some biological hemostatic agents on the incision surface. The patient was discharged from hospital on the postoperative 3rd day without any complications.
Discussion and Conclusion: Splenic congenital epidermoid cysts are rarely seen. Symptomatic cases are treated surgically regardless of the size. The common surgical method is open or laparoscopic splenectomy, however the complications related to splenectomy can cause serious morbidity and mortality. Partial splenectomy can be performed in convenient cases where there is no necessity to take out the whole spleen, and especially in younger patients. Laparoscopic partial splenectomy can be preferred in convenient cases at experienced centers.
Keywords: splenic congenital epidermoid cyst, laparoscopic splenectomy, partial splenectomy

P706

Comparison of Clinical Outcomes of Single Incision Versus Multiport Laparoscopic Distal Pancreatectomy

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Background: Single incision laparoscopic procedures are gaining more popularity over the recent years due to providing less incisional morbidity and beter cosmetic outcomes. Herein, we will discuss the feasibility and clinical outcomes comparing single incision and multiport laparoscopic distal pancreatectomy.
Patients and Methods: From March 2007 to February 2014, patients who underwent either single incision or conventional multiport laparoscopic distal pancreatectomy consecutively were included to study. The patients were divided into two groups based on the surgical approach: single incision laparoscopic surgery (Group 1) and multiport laparoscopic surgery (Group 2). Outcomes including estimated blood loss, operative time, postoperative pain, duration of hospital stay, complications, conversion to open surgery and final pathology were evaluated. Clinical and perioperative parameters were analyzed using Student-t and Chi-square tests.
Results: There were a total of 20 patients, 10 in each study groups. Baseline characteristics were similar and there were no mortality in both gorups. Low-flow pancreatic fistula was the most seen morbidity which was ceased spontaneously in each group with a ratio of 30%. Operative time was significantly shorter in group 2 with a mean of 116 min versus 180 min, respectively ($p<0.001$). There were 1 conversion to open in group 2 due to peroperative bleeding. The median follow-up of the patients was 22 versus 56 months, respectively. Spleen was preserved in only one patient in gorup 1, whereas in group 2 spleen preservation was achieved in 5 patients.
Conclusion: Single incision laparoscopic technique is a safe and effective alternative to standard laparoscopic distal pancreatectomy. We believe that in tertiary centers where advanced laparoscopic procedures performed, minimal invasive techniques may be preferred over the conventional multiport laparoscopy technique.

P707

Prediction of Outcomes Following Laparoscopic Splenectomy for Splenomegaly in Patients with Hematological Malignancies

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Introduction: Laparoscopic splenectomy for patients with splenomegaly due to hematologic malignancy is a high-risk procedure performed to improve patients' quality of life (QOL). A new grading score was recently published using age, gender, diagnosis and spleen weight to predict technical difficulties and complications after laparoscopic splenectomy. We wanted to validate the approach for patients with splenomegaly due to malignancy. Also, we hypothesized that patients reported outcomes (PRO) might be useful to estimate postoperative complications and aid patient and surgeon decision making for patients with splenomegaly due to hematological malignancies.
Methods: Patients with splenomegaly (spleen weight>400 g) due to a hematological malignancy who underwent elective splenectomy at our institution between 2008 and 2014 and had PRO measures available were identified retrospectively. Demographics, spleen weight, operative approach, preoperative QOL, pain and fatigue scores, the length of hospital stay (LOS), estimated blood loss (EBL) and complications were abstracted. Student t-tests and ANOVA were performed in intention to treat analysis.
Results: Data of 101 patients with splenomegaly who had PROs available was analyzed. Mean age was 63 years,40 patients (31%) were women. Using the recent grading system, all patients in this data set were in the high-risk group. There was no 30-day mortality. Successful minimally invasive procedures were reported for spleens weighing less than 2540 g (see Table 1). Nine patients (22%) with splenomegaly required conversion from laparoscopic to open splenectomy; mean spleen weight 1625 g(575-2540g). This group had the highest morbidity (22%) and EBL (886±872).
For the whole cohort; patients with higher preoperative fatigue (p-value0.013) and pain scores (p-value<0.001) had higher complications rate.
In patients undergoing laparoscopic splenectomy, preoperative pain predicted morbidity (p-value0.005) and LOS (p-value0.003). In patients undergoing open splenectomy preoperative pain and fatigue were predictors for complications.
Patients with a preoperative hemoglobin<11 g/dL had LOS>7 days (p-value<0.001).
Conclusion: The recently published grading system did not add differentiating features to patients with splenomegaly for malignancy. Preoperative Patients Reported outcomes and preoperative anemia may be useful predictors of morbidity and LOS following laparoscopic and open splenectomy in patients with hematological malignancies.
Table 1

	Laparoscopic (n=40)	HALS (n=15)	Open (n=46)
Age(years)*	64±12	67±14	62±11
LOS(Days)*	5.5±4.3	4.0±1.1	7.2±4.4
Complications	12.5%	0%	19.6%
EBL(ml)*	451±521	248±209	570±743
Spleen Weight(g)*	1062(2540−400)	1558(2535−705)	2785(6210−710)

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Retroperitoneoscopic Versus Laparoscopic Left Adrenalectomy: Immediate Results of Prospective Randomized Trial

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Introduction: Laparoscopic adrenalectomy (LA) is the "gold standard" approach for benign adrenal tumours. Retroperitoneoscopic adrenalectomy (RA) for left adrenal glands can be a valuable alternative. Aim of the study was to compare results of LA and RA for left adrenalectomy.
Methods and Procedures: From 2010 to 2015, 68 patients with tumours of left adrenal glands were randomized into two groups: 35 patients with LA (group I), and 33 patients with RA (group II). Both groups were comparable with regard to demographic and clinical parameters.
Results: Conversions were done in 1 case (2,9%) in group I, and in 4 cases (12,1%) in group II ($p<0,05$) due to size of tumours. Operative time, time to first oral intake, analgesic requirements, length of hospital stay, postoperative complications were all significantly lower in the RA group.
Conclusions: RA provides better perioperative outcomes compared to LA. RA is a good alternative to LA for small tumors of left adrenal gland.

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Laparoscopic Splenectomy for Massive Splenomegaly in Myelofibrosis with Myeloid Metaplasia

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Introduction: Massive splenomegaly is common in myelofibrosis with myeloid metaplasia (MMM). Splenectomy via laparotomy has been performed for MMM since 1937, and fell out of favor due to a high rate of perioperative morbidity, with no survival benefit. The utility of splenectomy for MMM is being explored again. Stem cell transplant (SCT) now offers the possibility for cure of MMM; patients who undergo splenectomy have a faster hematopoietic recovery after SCT. In addition, laparoscopic techniques offer the possibility of lower perioperative morbidity. Our aim was to evaluate perioperative complications and long term survival among patients with MMM who underwent a laparoscopic splenectomy in preparation for SCT.
Methods and Procedures: This is a series of patients with MMM and massive splenomegaly treated at an academic tertiary care hospital from 2012 to 2016. All underwent laparoscopic splenectomy in preperation for SCT. The main outcome measures were survival, perioperative complication rate, and postoperative length of stay. Survival was predicted prior to surgery using the Dynamic International Prognostic Scoring System (DIPSS plus).
Results: Eight patients (4 male) with a median age of 69 (range 34–81) underwent laparoscopic splenectomy. Hematologic abnormalities were common, and included leukopenia (4/8), leukocytosis (2/8), thrombocytopenia (7/8), and anemia (7/8). The median spleen size was 900 g (range 300-6620g). Five of eight patients had complications, including deep venous thrombosis, atrial fibrillation, superficial wound infection, colitis, hemorrhage and pneumonia. One mortality resulted from respiratory failure due to leukemic transformation. The median hospital length of stay was 5 days (range from 3 to 40 days). Six subjects have undergone SCT a median of 83 days following splenectomy. The Kaplan Meier probability of survival following splenectomy is 65% at three years and 33% at five years, which compares favorably with the DIPSS predicted survival (median 16 mos).
Conclusions: Laparoscopic splenectomy for individuals with MMM may allow the procedure to be performed more easily, and with lower rate of intraoperative complications. However, post-operative complications of hemorrhage, thrombosis and infection are still common; these are likely related to the disease process. Although perioperative morbidity is high, splenectomy followed by SCT does appear to offer a better prospect for long term survival.

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Reduced Port Cholecystectomy for a 21 Week Pregnant Patient with a History of Laparoscopy-Assisted Distal Gastrectomy

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Introduction: Single incision laparoscopic surgery is increasingly being performed for cosmetic reasons and is commonly used for cholecystectomy and appendectomy. Reduced port surgery may assist in difficult cases or complicated cases. We performed a cholecystectomy using reduced port surgery (single incision laparoscopic surgery plus one port) in a patient who was 21 weeks pregnant and had a history of laparoscopy-assisted distal gastrectomy (LADG) for early gastric cancer.
Methods and Procedure: The patient was a 31-year-old woman with a gall bladder polyp which had increased in size from 8 mm to 13 mm in diameter over a 1 year period. Nine years previously she had undergone a LADG with lymph node dissection for early gastric cancer, and 4 years ago had a hemi-thyroidectomy for papillary carcinoma. A 3 cm skin incision was made in the cranial side of the umbilicus and EZ accessTM and Lap-ProtectorTM (Hakko Co. Ltd., Nagano, Japan) were used as single-access system. Three trocars were inserted through this system. The laparoscopic findings demonstrated an omentum with major adhesions to the gall bladder. The 12 mm trocar was inserted through the LADG skin incision scar.
Results: The patient underwent cholecystectomy successfully. Operation time was 97 min without blood loss. The patient was discharged from hospital on post-operative day 4 without any complications. Histological examination revealed the polyp was not neoplastic.
Conclusions: Due to the pregnancy, the uterus was enlarged up to the umbilicus level, and the site of the first incision required careful selection. For safety reasons, a multi-channel system is superior to multiple port insertion through a single incision. To reduce operation time and avoid compression of the uterus, another port in the previous skin incision was useful without spoiling the cosmetic outcome.