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Poster Presentations

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P018

Probe-Based Confocal Laser Endomicroscopy (Cellvizio®) and Enhanced-Reality for Real-Time Assessment of Intestinal Microcirculation at the Future Anastomotic Site

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Objective: Cellvizio® (Mauna Kea Technologies, France) is a probe-based high-resolution Confocal Laser Endomicroscopy (CLE) system that fits in standard endoscopes. Fluorescence-based Enhanced Reality (FLER) is a novel technique to evaluate intestinal perfusion based on the use of a Near Infra-Red endoscope (D-light P, Karl Storz®) to detect the Indocyanine Green (ICG) fluorescence signal. Fluorescence intensity is directly correlated to perfusion, and an ad-hoc software (VR-Render® PERFUSION) allows to construct a virtual mapping of the perfused area overlaid on laparoscopic images achieving Augmented Reality. The aim of this study was to assess the ability of the Cellvizio® system, to discriminate mucosa ischemic changes in a porcine model of mesenteric ischemia, and to compare clinical evaluation with Enhanced-Reality to identify the transition from ischemic to vascular areas.

Methods: Six pigs underwent laparoscopic sigmoid segmental ischemia by sealing some terminal arterial branches sparing the Inferior Mesenteric Artery. After 1 hour, the ischemic area was evaluated by clinical assessment and FLER (after injection of 0.5 mg/kg of ICG) to determine presumed viable margins based on the serosa aspect. For each sigmoid, 5 regions of interest (ROIs) were identified: ischemic (ROI 1), presumed viable margins ROI 2a and 2b (respectively distal and proximal to the ischemic zone), and vascular areas 3a (distal) and 3b (proximal). After injection of fluorescein, Cellvizio® scanning of the intestinal mucosa was performed starting from the ischemic area and moving towards presumed viable margins. Capillary blood samples were obtained by puncturing the serosa at the ROIs, and capillary lactate was measured using the EDGE® analyzer. Full-thickness biopsies were taken at the ischemic zone and at a control area for standard pathology evaluation.

Results: Mean capillary lactate levels were statistically significantly higher at the ischemic ROI 1 when compared to presumed resection margins as assessed by FLER (2aFLER+2bFLER; Mean 2.8 mmol/L; SD 1.69; mean difference: 2.11; 95% CI 0.26–3.97; $p < 0.05$) and to vascular areas (3a+3b; mean 1.9 mmol/L; SD 0.48; mean difference: 3.01; 95% CI 1.163–4.871; $p < 0.001$). There was no statistically significant difference in lactates between the ischemic zone and presumed viable margins as assessed by clinical evaluation (2aCLINIC+2bCLINIC). In 50% of cases, resection lines 2aCLINIC+2bCLINIC were considered to match (<1 cm distance) with 2aFLER+2bFLER. In 5 cases, 2aCLINIC+2bCLINIC were closer to the ischemic zone with a mean distance of 2.2 cm (SD 1.78) when compared to 2aFLER+2bFLER. Confocal analysis revealed specific clues to identify the ischemic area and the transition from the ischemic to the viable area. An almost constant clue is a blurred image due to the fluorescein lack in the ischemic zone with a sudden change when reaching some vascular area corresponding to the ones identified by 2aFLER-2bFLER in 11/12 cases vs. 7/12 in 2aCLINIC-2bCLINIC.

Conclusions: Confocal analysis showed specific features to identify intestinal perfusion and confirmed that FLER is effective to discriminate the transition zone at the future anastomotic site. FLER was more accurate than clinical evaluation to determine adequate resection lines as expressed by the level of capillary lactates.

P019

Tissue Tension is an Important Factor to Avoid Urinary and Sexual Dysfunction After Rectal Surgery

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Introduction: Recently, high precision nerve-sparing has become possible with minute anatomical recognition in laparoscopic rectal surgery. However, it has been considered that thermal damage of the nerve tissue caused by the energy device (ED) can lead to postoperative urinary and sexual dysfunction in many cases. We studied the relation between the tissue tension, which has been considered technically important in rectal surgery, and thermal diffusion to the peripheral tissue through the use of ED.

Materials and Methods: We excised the mesentery of pigs with three types of ED including an electric scalpel (ES), LCS and a bipolar sealing system (BSS) at three levels of tissue tension (0, 300, 600 g). The excision time for each ED was measured and the area reaching a temperature above 70°C was monitored using thermography. The correlations between the tissue tension and the thermal diffusion area were studied.

Results: The excision time inversely correlated strongly with the tissue tension for all EDs (ES: $r = 0.718$, LCS: $r = 0.949$, BSS: $r = 0.843$). Furthermore, the tissue tension inversely correlated strongly with the thermal diffusion area in ES ($r = 0.718$) and BSS ($r = 0.869$).

Conclusion: This study shows the potential that thermal damage is avoided with adequate tissue tension in particular in ES and BSS.

P020

The Evaluation of Oxidative Stress as an Indirect Marker of the Surgeon's Intraoperative Stress During Laparoscopic Colorectal Surgeries

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Introduction: Although physical and mental fatigue may affect surgeons during surgery, few studies have so far evaluated the surgeon's stress objectively. The purpose of this study was to investigate the burden on the surgeon while performing an operation. We selected biomarkers of oxidative stress as indicators of a breakdown of the normal physiological balance.

Methods: One surgeon with 18 years of experience was evaluated in this study. Blood samples were collected from the surgeon before and after the operations, and the serum Diacron-reactive oxygen metabolites (d-ROMs) and Biological Antioxidant Potential (BAP) were measured to assess the levels of oxidative stress.

Results: Twenty-five consecutive laparoscopic surgeries for colorectal cancer were evaluated in this study. The surgeon participated in the operations as an operator in nine cases and as an assistant in 14 cases. In all of the cases, the serum level of d-ROMs was significantly increased after surgery compared with that before surgery ($p = 0.017$), while the BAP did not change. The d-ROM level dramatically increased in the cases where he was the operator ($p = 0.006$). In the cases where he was the assistant surgeon, there were no statistically significant differences between the d-ROM and BAP levels before and after the surgeries. We could not find any significant correlation between the length of the operation or the estimated blood loss of the patient and the oxidative stress in the surgeon in this series.

Conclusions: A surgeon may suffer from oxidative stress during surgery, especially when serving as the operator. Additional studies in a large number of surgeons in different fields are therefore warranted.

P021

Interaction Between Gastric Carcinoma Cells and Neural Cells Promotes PNI by Activation of VCAM-1/ Integrin $\alpha 4\beta 1$ Pathway

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Introduction: Perineural invasion (PNI) is one of important routes for the local spread of gastric carcinoma associated with poor prognosis. However, the exact cellular characteristics and molecular mechanisms of PNI are still unclear. The objective of our study was to identify the process and pathogenesis of PNI in gastric carcinoma.

Methods and Procedures: we adopted in vitro cell co-culture assay to investigate the cellular and molecular interaction between gastric cancer cells and nerve cells.

Results: We found that gastric cancer cells promote proliferation of neural progenitor cells and induce the processes elongation of mature neuron. These effects can be attenuated by blocking VCAM-1/integrin $\alpha 4\beta 1$ interaction with anti-VCAM-1 blocking antibody. Furthermore, Migration and invasion assay revealed that nerve cells have ability to induce gastric cancer cells migration and invasion. The migration and invasion effects can also be reversed by blocking VCAM-1/integrin $\alpha 4\beta 1$ interaction.

Conclusions: Our study demonstrated that neural-tumor interaction is a mutually beneficial process. It is possible that interaction between nerve cells and tumor cells might contribute to PNI of gastric carcinoma. Inhibition of the activity of VCAM-1 and its ligand integrin $\alpha 4\beta 1$ may be potential targets for PNI in gastric carcinoma therapy.

P022

The Expression of Msp58 is Up-Regulated in Gastric Carcinomas and Contributes to a Poor Prognosis of the Neoplasms

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Introduction: To explore the expression level of Msp58 in gastric carcinomas and tumor cells, and to find any correlation between it and clinicopathologic features of the patients and between it and the growth of gastric tumor cells.

Methods and Procedures: The detection of the expression of Msp58 were gone through immunohistochemistry in 268 cases of gastric tumor paraffin-embedded specimens, western blot in 30 pairs of fresh frozen specimens and 3 cell lines. Flow cytometric analysis and MTT was performed in a certain cell line. Statistical analysis of clinicopathologic features was done by SPSS 17.0.

Results: The expression of Msp58 showed a positive correlation with tumor size ($p < 0.05$), site of the tumor ($p < 0.05$), TNM stage ($p < 0.05$), metastasis ($p < 0.05$) and prognosis ($p < 0.05$). The Msp58 positive-expressing cells sorted by FCM grow significantly faster than the others ($p < 0.05$).

Conclusions: Msp58 expression was up-regulated in gastric carcinomas and correlated with the malignancy of the carcinomas in human body, such as metastasis, poor-prognosis, etc. The same effects were also conformed in gastric tumor cells.

P023

The Impact of Sleeve Gastrectomy versus the Adjustable Gastric Band on Active Ghrelin and Metabolic Hormones: Relationship to Measures of Satiety and Hunger

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Introduction: Laparoscopic sleeve gastrectomy (LSG) is a relatively new bariatric procedure that has been proposed as definitive treatment for severe obesity. However, the mechanism of action of LSG remains unclear.

Methods and Procedures: A cross-sectional study of 30 matched obese patients following LSG, Laparoscopic Adjustable Gastric Banding (LAGB) and obese controls. Hormones (active and total ghrelin, Glucagon-like peptide-1 (GLP-1), peptide YY (PYY) and Insulin) and satiety scores were compared among the groups before and after a standardized test meal.

Results: Weight loss defined as excess weight loss percentage (EWL%) was 39.9 ± 18.7 for SG versus 20.8 ± 21.45 for LAGB group ($p = 0.068$). Average follow-up time for the LSG group was 16.7 month versus 25.2 month for the AGB group. Ghrelin area under the curve 0–120 (AUC) for both active and total were significantly suppressed in the LSG group as compared to AGB group ($P < 0.0001$). Furthermore, AUC 0–120 of GLP-1 and PYY were significantly elevated for the LSG group as compared to LAGB ($p < 0.0001$). These hormonal changes translated to a significant decrease in hunger and increase in fullness as determined by VAS AUC 0–120 ($P < 0.05$).

Conclusions: The changes in active ghrelin, GLP-1 and PYY 3-36 after LSG appear to be related to the augmented satiety effect suggesting that LSG is an effective metabolic procedure for the treatment of severe obesity.

P024

A Rare Case of Hepatic Flexure Diverticulitis After Pelvic Laparoscopy and Review of Literature for Management

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Diverticulosis commonly affects the geriatric patients, 10–15% of whom ultimately develop diverticulitis. Diverticulitis has many known complications, such as the formation of phlegmon, fistulas, bowel obstruction, bleeding, perforation and colonic abscess. Diverticulitis in the western world most commonly affects the sigmoid colon and presents as “left-sided appendicitis” in that location. A perforated sigmoid diverticulum is often recognized preoperatively. Diverticulosis involving the transverse colon, however, is a rare finding and a perforated diverticulum of the hepatic flexure is seldom considered in the differential diagnosis of acute abdomen. Right sided diverticulitis lacks the more specific signs and symptoms of sigmoid diverticulitis and is therefore a more difficult diagnosis based on clinical exam alone. We present a rare case of perforated hepatic flexure diverticulitis in a 57-year-old female who presented with free air in the abdomen after pelvic laparoscopy.

The patient presented with a 5 day history of acute non-radiating right upper quadrant pain, which worsened with motion. A diagnostic laparoscopy done 5 days before for an ovarian cyst that was abandoned due to multiple intraabdominal adhesions in the pelvic area. Patient was tachycardic and febrile, the abdomen was soft, distended with rebound tenderness in the right upper quadrant. Laboratory studies revealed elevated white blood cell count of 15,000/ mL with 53% bands. We expected some iatrogenic injury to the lower colon but to our surprise noncontrast CT of the abdomen and pelvis revealed interloop bowel abscess with a lot of free air and thickening of the proximal transverse colon. On exploratory laparotomy patient was found to have a diverticular abscess due to perforated diverticula in the hepatic flexure and short segment of the proximal transverse colon. A partial transverse colectomy with end colostomy and distal mucus fistula was performed. The postoperative course was complicated by an intraabdominal abscess treated conservatively. The patient had reversal of the colostomy with colo-colonic anastomosis.

Diverticulitis frequently involves the sigmoid colon in Western populations and the right-sided colon in Asian populations. Extensive literature search indicates that 80% of patients with diverticulosis had diverticula in the descending and sigmoid colon, 10% in the transverse colon, 4% in the ascending and 2% in the cecum. Transverse colon diverticulitis can be managed with both medical and surgical interventions. In conclusion transverse colon diverticulitis is a rare cause of acute abdomen and needs to be included in the differential diagnosis of our aging population

P025

Laparoscopic Reversal of Hartmann’s Procedure

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The Hartmann’s procedure, consisting of sigmoidectomy, rectal stump closure and terminal colostomy, was originally performed only in case of neoplastic obstructions, but current indications include also complicated diverticulitis, traumatic colonic lesions, volvulus and perforated recto-sigmoid tumors. So there has been recently a growing number of patients undergoing a Hartmann’s procedure (HP) and, subsequently, waiting for their continuity to be restored. But, reestablishing continuity after a Hartmann’s procedure (Hartmann’s reversal, HR) is considered a major surgical procedure and carries serious risk of both morbidity and mortality.

The aim of this study was to assess the short- and mid-term outcome of laparoscopic restoration of bowel continuity after Hartmann’s procedure.

A prospectively collected database of colorectal laparoscopic procedures (over 800) performed between June 2005 and June 2013 was used to identify 20 consecutive patients who had undergone laparoscopic reversal of Hartmann’s procedure (LHR).

Twenty patients (15 males, 75%), with a median age of 65.4 (Interquartile Range [IQR]:53.1–72.1) and BMI of 25.8 (IQR: 23.9–28), had undergone LHR attempt over an 8-year period. There were 14 (70%) and 6 (30%) ASA II and III patients, respectively. Ten (50%) had undergone surgery for perforated diverticulitis, 3 (15%) for cancer, 7 (35%) for other reasons, including volvulus, post-traumatic perforation, sigmoid perforation from foreign body. Previous HP had been performed laparoscopically in 3 patients and with open surgery in the remaining 17. The median operative time was 162.5 min (IQR: 127.5–217.5). All the 20 procedures were completed laparoscopically and performed by two surgeons. We did not encounter intraoperative complications, although the operation lasted longer in patients with severe adhesions from previous open surgery. Post-operative mortality and morbidity were respectively 0% and 10%, including one patient with pneumonia and another one with bowel obstruction from post-anastomotic stenosis (not reported in pre-operative colonoscopy of the rectal stump) which required resection and re-do of the anastomosis. According to the Dindo-Clavien classification of complications, one was grade I and one grade IIb. Median time to first flatus was 3 days (IQR: 3–4) and median time to normal diet 5 days (IQR: 4–5). Median hospital stay was 9 days (IQR: 8–10). There was no readmission. We followed-up the patients for a median of 40 months (IQR: 20–55). They were all doing well and were satisfied with the operation: when asked, all 20 (100%) said they would undergo the operation (LHR) again. Three (15%) had been re-operated of laparoscopic mesh repair for incisional hernia, during follow-up.

When performed by experienced surgeons, LHR is a feasible, safe and reproducible operation, which allows early return of bowel function, early discharge and fast return to work for the patient. It has a low morbidity rate. Severity of adhesions from previous open and difficulties in finding the rectal stump may prolong the duration of the operation and eventually require conversion.

P026

Surgical Outcomes of Ileal Pouch Anal Anastomosis (IPAA) in a Community Based Hospital

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Background: Ileal pouch anal anastomosis (IPAA) is the treatment of choice for chronic, medically refractory ulcerative colitis (CUC), familial adenomatous polyposis (FAP), and selective cases of Crohn disease

Aim: The aim of this study is to evaluate the outcome of IPAA in a community based hospital.

Methods: A retrospective chart review was performed on patients who underwent IPAA between Jan 2005–Dec 2012. Data gathered included, patient demographics, indications, pouch related complications, and pouch excision. Statistical analysis was performed with Fischer’s Exact Test and Pearson Chi-Square with statistical significance set at $p < 0.05$.

Results: A total of 149 patients were identified. Indications were CUC (81.2%), FAP (15.4%), Crohn disease (0.6%) and Lynch Syndrome (1.3%). Pouch related complications: abscess (16.2%), pouchitis (15.5%), fistulae (6.7%), leak (4.6%) and stricture (2.6%). Interestingly there were a statistically higher percentage of patients on steroids that had no pouch related complications (38% vs 16%, $p = 0.005$). Pouch excision was performed in 7 (4.6%) patients and was related to chronic abscesses with fistulae (57%), Crohn disease (28.5%) and anal squamous cell cancer (14%). Overall mortality rate was 0%.

Conclusion: Community based hospital can provide outcomes comparable to high volume centers with regards to pouch related complications and failure rates.

P027

Abdominal Drainage to Prevent Intra-Peritoneal Abscess After Appendectomy for Complicated Appendicitis (A Cochrane Review)

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Background: Appendectomy is performed primarily for acute appendicitis. Patients who undergo appendectomy for complicated appendicitis, defined as gangrenous or perforated appendicitis, are more likely to suffer from postoperative complications. The routine use of abdominal drainage to reduce postoperative complications after appendectomy for complicated appendicitis is controversial. The aim of this systematic review is to assess the safety and efficacy of abdominal drainage to prevent intra-peritoneal abscess after appendectomy for complicated appendicitis.

Methods: The Cochrane Library (Issue 11, 2012), MEDLINE (1946 to November 2012), EMBASE (1974 to November 2012), Science Citation Index Expanded (1900 to November 2012), and Chinese Biomedical Literature Database (1978 to November 2012) were searched to identify relevant randomized controlled trials (RCTs).

Results: Five RCTs involving 505 patients with complicated appendicitis were included in the review. The patients were randomized to the drainage group ($n = 243$) and the no drainage group ($n = 262$) after emergency open appendectomies. All of the trials were of high risk of bias. There were no significant differences between the two groups in the rates of intra-peritoneal abscess, wound infection, morbidity, or mortality when the random-effects model was adopted. The rates of wound infection and morbidity were significantly higher in the drainage group when the fixed-effect model was used. The hospital stay was longer in the drainage group than in the no drainage group.

Conclusions: Abdominal drainage after an emergency open appendectomy delays hospital discharge and may increase the rates of wound infection and morbidity for patients with complicated appendicitis. Based on five high risk of bias trials, there is no clear evidence to support routine abdominal drainage to prevent intra-peritoneal abscess after open appendectomy for complicated appendicitis. The role of abdominal drainage after laparoscopic appendectomy for complicated appendicitis requires further assessment.

P028

Preoperative Repeat Endoscopy for Colorectal Cancer: Attitudes, Perceptions and Practices of General Surgeons

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Introduction: Colorectal cancer (CRC) remains the third leading cause of cancer-related deaths in the United States and Canada. Colonoscopy is the current gold standard for detection of CRC, but given an estimated error rate between 11% and 21%, surgeons are often faced with uncertainty in the operating room, particularly in laparoscopic cases. While the rate of screening colonoscopy has increased significantly over the past 15 years, little is known about the current rate and indications for preoperative repeat endoscopy for CRC.

Objectives: We examined the perceptions and attitudes of general surgeons and trainees practicing in Ontario regarding re-endoscopy prior to elective CRC surgery and identified associated factors related to this practice.

Methods: A survey with 17 questions was distributed among the participants of two national Canadian meetings and through a provincial repository of practicing general surgeons. Univariate analysis was performed using the Chi-squared test. Weighted ranking of indications for repeat endoscopy was calculated using the Borda Score. Logistic regression analysis with a backward elimination of variables was used to determine factors associated with repeat endoscopy. A two-sided p-value of less than 0.05 was considered statistically significant.

Results: 175 questionnaires were completed representing approximately 25% of all general surgeons and trainees in Ontario. The majority of respondents were fully trained surgeons (70%), male (74%), with 5 to 20 years of experience (42%), in a non-academic practice setting (53%). In terms of volume, 53% reported that they had performed more than 200 colonoscopies in the preceding 12 months, while 65% performed less than 20 elective colorectal surgeries in the past year. 45% of respondents indicated that >50% of their elective colorectal cases were performed using a laparoscopic approach. Preoperative planning and tattoo localization were the top two indications for re-endoscopy. The majority agreed that repeat colonoscopy prior to surgery had minimal impact on time to definitive surgery (64%) and that the findings of a repeat colonoscopy resulted in a change in the operative plan (56%). Univariate analysis demonstrated that surgeons in an urban setting (OR 2.111, $p = 0.038$) and within a teaching facility (OR 3.069, $p = 0.003$) were more likely to perform repeat endoscopy. Furthermore, surgeons with a high volume colorectal practice (OR 3.041, $p = 0.002$) and who frequently employed a laparoscopic approach (OR 4.295, $p < 0.001$) were more likely to offer repeat colonoscopy in the preoperative setting. In contrast, additional provider demographics including gender or years in practice did not influence the likelihood of re-endoscopy. In the multivariate analysis, all identified factors maintained significance except for a surgeon's primary practice setting (OR 0.887, $p = 0.797$).

Conclusion: Colonoscopy, while the gold standard used in the detection of CRC, has a significant error rate in tumor localization. This study demonstrates that surgeons practicing in a teaching hospital with a high volume elective colorectal practice and who favor a laparoscopic approach are more likely to perform repeat colonoscopy prior to elective surgery. Further research is needed to formulate practice recommendations that guide the use of re-endoscopy and to identify circumstances where it may be safely omitted.

P029

Totally Laparoscopic Left Hemicolectomy for Splenic Flexure Tumors

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Introduction: splenic flexure tumors are rare and compose less than 5% of all colonic tumors. Left hemicolectomy is performed usually as an open procedure due to technical and anatomical difficulties. Totally laparoscopic colon resections have led to better recovery with no oncological compromise. We present here our experience with elective laparoscopic left hemicolectomies for splenic flexure tumors with intra-corporeal anastomosis.

Methods: we retrospectively analysed our prospectively collected database. Demographic, peri-operative and follow up data are presented for those who went through totally laparoscopic left hemicolectomy (TLLH), and compared with the open technique. Operative technique includes medial to lateral dissection of the meso-colon with high and early vessel ligation, intracorporeal resection and anastomosis with linear stapler. Data is presented as mean \pm SD.

Results: between 2009–2012 eighteen patients (10/8 F/M) aged 62 ± 12 went through TLLH. Operative time was 132 ± 44 min. EBL was 107 ± 207 cc. Pathological report revealed stage II (T3-4, N0) for 14 patients and Stage III for 4 patients, with 15 ± 5 lymph nodes harvested. No significant differences were found in oncological results with 20 patients who went through the procedure with the open technique. After 28 ± 13 months of follow up 17/18 are alive and disease free.

Conclusions: TLLH is feasible and oncologically safe. The medial approach allows for better recognition and respect of the anatomical planes. Long term results should be compared with open and laparoscopic assisted approaches for better understanding the advantages of this technique.

P030

Plasma Levels of Human Chitinase 3-Like 1 (CHI3L1), A Proangiogenic Protein, are Persistently Elevated During the First Month After Minimally Invasive Colorectal Cancer Resection

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Introduction: Blood levels of at least 6 proangiogenic proteins, including VEGF, monocyte chemoattractant protein-1 (MCP-1), and Interleukin-8 (IL8), have been shown to be elevated for 2–4 weeks after minimally invasive colorectal resection (MICR). Chitinase 3-like 1 (CHI3L1) protein, also known as YKL-40, is a member of the Chitinase family of proteins and has chemotactic and proangiogenic effects similar to those of MCP-1 and IL8. This study's goal was to assess blood levels of CHI3L1 for 2 months after MICR (lap. assisted or hand-assisted) for colorectal cancer (CRC). Tumor expression of CHI3L1 has been noted in patients with colon, breast, and hepatocellular carcinoma. CHI3L1 regulates cellular and tissue responses via IL-13 receptor alpha 2. CHI3L1 may utilize its chitin binding ability to communicate with other signal transduction pathways to modulate inflammation, apoptosis, tissue remodeling, cell growth and angiogenesis. CHI3L1 promotes in vitro cancer cell proliferation, macrophage recruitment, human endothelial cell migration and tube formation, and contributes to wound healing. The impact of MICR for CRC on plasma levels of CHI3L1 is unknown.

Method: Patients enrolled in an IRB approved data/plasma bank who underwent elective MICR for CRC for whom adequate plasma samples were available were included. The prospectively gathered clinical, demographic, pathologic and short term outcome data were reviewed. Blood samples were collected preoperatively (PreOp) and at a variety of post operative (PostOp) time points. Plasma was isolated and stored at -80°C . Late samples were bundled into 7 day blocks and considered as single time points. CHI3L1 levels (ng/ml) were determined in duplicate via ELISA and results reported as mean \pm SD. The paired t-test was used for statistical analysis (significance $p < 0.008$ after Bonferroni correction).

Results: PreOp and, at least, 1 late postoperative plasma sample were available for 80 MICR cancer patients (colonic 60%; rectal 40%; 42 males/38 females, mean age 65.6 ± 12.8 years). The mean incision length was 7.8 ± 3.6 cm, mean operative time 308.3 ± 124.2 min, and mean length of stay was 6.6 ± 4.3 days. The final cancer staging breakdown was: Stage I, 25%, Stage II, 31.3%, stage III, 40% and stage IV, 3.7%. The mean PreOp CHI3L1 level was 93.3 ± 108.9 ng/ml ($n = 80$). When compared to PreOp levels significantly elevated ($p < 0.0001$) mean CHI3L1 plasma levels (mg/ml) were detected on POD1 (679.7 ± 405.2 ; $n = 79$), POD 3 (204.7 ± 221.9 , $n = 76$), POD7-13 (182.9 ± 201.5 , $n = 62$), POD14-20 (225.3 ± 222.2 , $n = 22$, $p = 0.001$), and POD21-27 (145.0 ± 212.6 , $n = 20$, $p = .002$). No significant difference in plasma levels were noted on POD27-41 (vs. PreOp, $n = 15$, $p = 0.011$).

Discussion: Plasma CHI3L1 levels are significantly elevated over PreOp levels for a month after MICR for CRC. The increased blood levels during the early postoperative period may be associated with the short lived acute inflammatory response that occurs after surgery and resolves in the first week. In contrast, the later and persistent elevation noted during weeks 2–4 after MICR may be related to wound healing. Persistently elevated CHI3L1 levels, together with the similarly increased levels of the other proangiogenic proteins mentioned, may collectively promote the growth of residual tumor after MICR.

P031

Comparison of Outcomes After Hand-Assisted, Total Laparoscopic and Open Restorative Proctocolectomy with Ileal Pouch-Anal Anastomosis

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Background: The aim of this study was to compare outcomes after hand-assisted (HAL), total laparoscopic (TL), and open restorative proctocolectomy with ileal pouch-anal anastomosis (IPAA).

Methods: After IRB approval, all patients undergoing HAL, TL or open IPAA at our institution between 2000 and 2013 were identified from a prospectively maintained database. Data including demographics, preoperative and operative details, and postoperative complications were compared among the three groups.

Results: The groups included 36 HAL, 100 TL and 107 open IPAA patients. Patients in the open and HAL groups were older than those in the TL group ($p = 0.03$, $p = 0.0001$, respectively). The three groups were similar in terms of gender, BMI, ASA score, preoperative use of immunosuppressants, diagnosis, anastomosis type, pouch configuration, and use of ileostomy. Operative time was longer in HAL and TL when compared to open IPAA (mean, 270 vs 273 vs 226 minutes, respectively). Estimated blood loss was greater in open versus HAL or TL IPAA (mean, 284 vs 208 vs 186 ml, $p = 0.001$). The mean incision length was 7.7 cm in both successful HAL and TL groups, and 12 cm in converted HAL and 20.6 cm in converted TL groups. The length of hospital stay was shorter in the HAL versus TL or open groups (mean, 6.7 vs. 8.5 vs 8.6 days, respectively). No differences in the type or incidence of morbidity were found among the groups.

Conclusions: Although there are differences in terms of operative time, estimated blood loss, and length of hospital stay, HAL, TL and open IPAA are associated with similar morbidity.

P032

Validation of a Colonoscopic Grading System for the Intraoperative Evaluation of Rectal Anastomoses

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Introduction: Anastomotic leaks remain a source of morbidity following proctectomy. We have developed an intraoperative grading system utilizing flexible endoscopy to identify rectal anastomoses at high risk of anastomotic leak (AL).

Methods: Intraoperative flexible endoscopic assessment was performed on a series of 75 patients undergoing proctectomy. A 3-tiered endoscopic anastomosis grading system was developed. Grade1 anastomosis was defined by circumferentially normal mucosa on both sides of the staple line. Grade2 anastomoses had <30% of the mucosa on one side of the staple line with evidence of ischemia. Grade3 were those where 30% or more of the mucosa appeared ischemic on one side of the staple line. All patients were followed longitudinally.

Results: Of 75 patients evaluated: 63 were Grade1, 8 were Grade2, 4 were Grade3. The air leak test was negative for all patients except one. The total anastomotic leak rate for this series was 15%. Seven patients with Grade1 anastomoses developed AL (11%). Three of these represented symptomatic AL requiring minor drainage procedures. The remaining three patients had an incidental finding of AL for which no intervention was necessary. Among Grade2 anastomoses, 4 of 8 patients experienced an AL (50%). All Grade3 anastomoses were reconstructed immediately at time of the index surgery; none subsequently leaked. 13 mid rectal anastomoses were not diverted based upon the healthy endoscopic appearance of the anastomosis. Only 1 of these patients experienced a minor symptomatic leak.

Conclusions: This study demonstrates that endoscopic evaluation of the perianastomotic mucosa is useful in stratifying patients at high risk of anastomotic leak.

P033

Appendix Mucocele: Case Series And Literature Review

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Background: Appendiceal Mucocele is a very rare disease and found in only 0.3–0.4% appendectomies. It is characterized by mucoid accumulation in the appendix lumen and can present with diverse clinical features or just as an asymptomatic mass. It can be distinguished based on pathology as simple appendiceal mucocele, mucocele with epithelial hyperplasia, cystadenoma and cystadenocarcinoma. The last two are classified as neoplastic forms. Dissemination of neoplastic cells and mucoid material in abdominal cavity by appendiceal perforation results in pseudomyxoma peritonei seen in 10–15% of cases. There exists no uniform consensus on diagnosis and treatment.

Materials and Methods: We present an interesting case series of three patients with mucocele of appendix in a community hospital in the span of one month for which one patient underwent laparoscopic assisted right hemicolectomy and 2 cases of mucocele appendix that was managed with laparoscopic appendectomy with partial cecectomy. We did extensive literature search on the topic to find out appropriate management of mucocele of appendix.

Conclusion: All three patients were found to have Cystadenoma of appendix. Choice between appendectomy, appendectomy with cecectomy and right hemicolectomy is not very clearly outlined. Benign mucocele of appendix with no involvement of base can be treated with appendectomy where as cystadenocarcinoma with no metastasis and pseudomyxoma peritonei need right hemicolectomy for adequate resection.

P034

Usefulness of Vascular Ligation of the IMA Using Linear Stapler in Rectal Cancer Surgery

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Introduction: Low ligation of the IMA in colorectal cancer surgery were reported to be beneficial for some patient. But there is no report so far about how and where the IMA should be tied. This study analyzes long-term outcomes of the low tie by using a surgical stapler with implantable staples (Covidien Endo GIA™) vs. standard low tie ligation in laparoscopic high/low anterior resection of the rectum.

Methods: All laparoscopic high/low anterior resections performed from August 2005 to February 2009 were reviewed from a hospital database retrospectively. Patients without lymph node metastasis evident on their preoperative CT scans were selected. In all patients, low/high anterior resection with standard low tie ligation or with cutting and ligation by using surgical stapler with implantable staples was performed. The Kaplan-Meier survival curve was created, and the Logrank test was used to compare the overall survival and recurrence free survival between two groups. $P < 0.05$ was considered a significant value.

Results: Fifty-one patients were diagnosed as rectal cancer with no lymph node metastasis by colonoscopy and CT scan preoperatively. Thirty-four patients underwent low or high anterior resection by using a surgical stapler with implantable staples (group A). In these cases, the inferior mesenteric artery (IMA) was dissected after the left colic artery (LCA) branched. Seventeen patients underwent low/high anterior resection with standard low tie ligation; the IMA and the LCA was detected and the IMA was clipped and dissected after the LCA branched (group B). Average age and sex were not significantly different between group A and B. Average age was 65.8 years old in group A, and 69.6 in group B. The male to female ratio was 24:10 in group A and 11:6 in group B. In group A, UICC TNM classification stage 0, I, IIA, IIB, IIIA, and IIIB were 2, 16, 8, 0, 4, and 4, respectively. In group B, counterparts were 0, 5, 4, 0, 0, and 8, respectively. The difference between TNM classification stages in group A and that of group B were not significant. Overall survival (OS) was 59.5 months (range 0–91) in group A, and 59.0 months (16–94) in group B. There was no significant difference ($P = 0.75$). Recurrence free survival (RFS) was 59.4 months in group A and 55.1 months in group B. There was no significant difference, either ($P = 0.07$).

Conclusion: Low tie ligation by using a surgical stapler with implantable staples is an easier way to dissect the IMA after the LCA branching and, not significantly different in OS and RFS, compared with standard low tie ligation.

This study was retrospective and a small group study, so further studies are required.

P035

Analysis of Outcomes for Single Incision Right Colectomy Reveals a Minimal Learning Curve

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Introduction: Single incision right colectomy has emerged as a safe and feasible alternative to standard laparoscopic resection. As with any new surgical approach, definition of the number of procedures required to optimize the technique is an important goal. This learning curve for single incision right colectomy has yet to be defined; therefore we report the outcomes of consecutive single incision right colectomies to identify the procedural learning curve.

Methods and Procedures: We retrospectively reviewed 70 consecutive single incision right colectomies performed by a single surgeon from May 2010 to May 2013. Patients with benign and malignant indications for right colon resection were offered single incision right colectomy. Patients were evaluated in groups of 10 to minimize individual patient variability and selection bias. Demographics and peri-operative outcomes among groups were evaluated using ANOVA or Kruskal-Wallis. Statistical improvement was assessed between groups using Student T-tests or Mann-Whitney U-tests.

Results: The average age of patients in this series was 66.7 ± 14.5 years and 40% were male. 58.6% had prior abdominal surgery. 68.6% of patients were undergoing resection for malignancy. There were no differences in patient demographics throughout the groups, suggesting that selection bias did not influence outcomes. There was a statistical improvement in operative time after the first 10 cases (102.8 vs 129.5 min, $p = 0.01$, Fig. 1). A second statistical improvement in operative time occurred after 40 cases (96.9 vs 114 min, $p = 0.03$). There was no statistical improvement in estimated blood loss, lymph node harvest, conversion rate, length of stay, or post-operative morbidity throughout the experience (Table 1).

Conclusions: Analysis of our large series of consecutive cases indicates that, for a surgeon trained in advanced laparoscopic techniques, outcomes from the procedure are quickly optimized with a minimal learning curve. Operative time is optimized following 40 procedures. Identification of the learning curve is critical for surgeons wishing to implement a single-incision approach and to ensure outcomes are optimized prior to thorough comparison to standard laparoscopic or open approaches.

Table 1 Outcomes of seventy consecutive single incision right colectomies

Groups (Cases)	All	11–10	211–20	321–30	431–40	541–50	651–60	761–70	P
OR Time (min)	106.6 ± 31.8	129.5 ± 54.1	107.4 ± 35.2	105.7 ± 20.1	113.2 ± 27.2	94.9 ± 24.9	95.4 ± 22.5	100.4 ± 19.3	0.2
EBL(mL) n = median (IQR)	50 (20–50)	50 (21–50)	25 (20–56)	50 (25–50)	50 (50–88)	37.5 (21–50)	20 (10–50)	50 (10–50)	0.49
Nodes*	21.7 ± 7.2	25.7 ± 8.3	21.7 ± 7.1	19 ± 4.5	20.7 ± 5.3	21.3 ± 5.7	17.8 ± 3.4	27 ± 12.2	0.17
LOS (d), n = median (IQR)	6 (5–7)	6.9 (5.3–6.9)	6 (5.9–9.1)	5.1 (4.2–5.3)	5 (5–7.5)	6 (5–8.3)	6 (5–7)	7 (5–7)	0.37
Clinically-significant complications**	6 (8.6)	0 (0)	1 (10)	0 (0)	2 (20)	2 (20)	1 (10)	0 (0)	0.42
Conversions, n (%)	2 (2.9)	1 (10)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (10)	0.55

* n = Total nodes harvested in malignand cases only

** Clavien-Dindo grade ≥ 3

P036

Sentinel Lymph Node identification with a Fluorescent Dye in Colorectal Cancer: A Comparison of Two Injection Techniques

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Introduction: We present a novel technology for laparoscopic sentinel lymph node (SLN) mapping in colorectal cancer patients. The sentinel lymph node (SLN) procedure is a standard staging technique in several types of cancer. One of the major problems of SLN mapping in colorectal cancer is the lack of an optimal dye and technique for identification of the nodes. In this study we used the Near-Infrared (NIR) dye Indocyanin Green (ICG) to identify nodes with a newly developed NIR laparoscope. We compared two different injection techniques; subserosal and submucosal injection.

Methods and Procedures: Patients planned for a laparoscopic resection of a colorectal carcinoma without distant metastases were included. Dye was injected in the subserosa or submucosa of the bowel. Ten minutes after injection we searched for fluorescent nodes with the NIR laparoscope. Fluorescent nodes were harvested and analyzed by the pathologist using H&E and additional immunohistochemistry.

Results A total of 25 patients were included. The dye was injected in the subserosa in 14 patients and in the submucosa in 11 patients. In all patients that were injected in the subserosa, we identified at least one fluorescent node, non of which was positive for metastases. In 4/14 patients, non-fluorescent regional nodes were positive for metastases.

Using the submucosal injection technique, 9/11 patients showed at least one fluorescent node, in 6 patients these were negative for metastases. Of the remaining three patients, the fluorescent lymph was positive for metastasis in one. Another node, negative on fluorescence but positive for metastasis, was identified in that same patient. In the other two patients, fluorescent positive nodes contained isolated tumour cells as only indication of metastatic disease. In 2/11 we could not identify fluorescent nodes. In one of these patients the pathologist identified three solitary tumour nodi > 3 mm considered as lymph node metastasis.

Conclusion: Laparoscopic identification of the SLN in colorectal cancer seems possible by using the NIR-dye ICG. Results of the submucosal injection were more reliable compared to the subserosal injection. With some difficulties to overcome, submucosal injection of ICG appears a promising technique in the identification of colorectal lymph nodes.

A future study will focus on combining a fluorescent dye with a radioactive tracer to improve tissue penetration, to enable pre-operative visualization of the SLN and improves detectability during the operation.

P037

Strategy and Results of Laparoscopic Splenic Flexure Resection for Colon Cancer

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Purpose: Splenic flexure colon cancer resection is technically difficult because it is anatomically close to the spleen and the pancreas, also feeding artery is various from the superior mesenteric and the inferior mesenteric artery. This study demonstrates our technique and results.

Technique: First, origin of the inferior mesenteric artery is skeletonized and removed lymph nodes. The left colic artery is divided at the origin and the inferior mesenteric vein is divided in the same part. The mesocolon is mobilized widely as medial to lateral approach. Second, lateral attachment of the sigmoid and descending colon is divided. Lesser sac is opened and the transverse mesocolon is divided at the lower edge of the pancreas. Third, the middle colic artery is skeletonized and lymph nodes are removed. The left branch of the middle colic artery and vein are divided. Occasionally accessory middle colic vessels are confirmed at the left colon. This should be divided at the edge of the pancreas. Forth, the skin is incised, the specimen is extracted and resected. Finally anastomosis and wound closure are performed.

Results: Fifty-three patients underwent splenic flexure resection for colon cancer since 2007 to March of 2013. Mean age was 67.1, 23 males and 30 females, mean lymph node harvests were 22.2, mean operative time 195 minutes, and mean blood loss was 26 g. Dukes' stage was A: 17, B: 20, C: 14, D: 2. There were 4 recurrence, all patients were Dukes' C and recurrent part were 3 liver and 1 abdominal wall.

Conclusion: Medial to lateral approach and lymphadenectomy of middle colic and left colic part was safe and effective for colon cancer in splenic flexure.

P038

Single-Fire Versus Double-Fire Technique for Functional End-to-End Anastomosis: Does Size Matter?

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Background: Traditionally, stapled side-to-side functional end-to-end anastomoses are fashioned with a linear stapler between two bowel limbs and closure of the subsequent common enterotomy using a thoracoabdominal (TA) stapler. The combination of transverse closure of the anastomosis combined with physiologic postoperative bowel edema can narrow the anastomosis, leading to a delay in return of bowel function (ROBF) and as such, hospital length of stay (LOS). We hypothesized that the use of a double-fire technique (2 sequential fires of the linear stapler) would result in a wider anastomosis and thus more rapid ROBF and decreased LOS.

Methods: A retrospective chart review was performed on all stapled bowel anastomosis between small bowel (ileostomy reversal, small bowel resection) or small bowel and colon (right hemicolectomy, ileocolicectomy) by a single colorectal surgeon between 2007–2013. A t-test analysis was used to assess differences in LOS and ROBF between single- and double-fire techniques. Contributing factors including patient diagnosis, laparoscopic versus open surgery, and type of anastomosis (small bowel to small bowel versus small bowel to large bowel) were also examined by a Poisson family generalized linear model.

Results: A total of 152 bowel anastomoses (41 double-fire, 111 single-fire) were reviewed. There was a non-statistically significant difference in length of stay (4.5 days double-fire vs 4.9 days single-fire, $p = 0.70$) and return of bowel function (3.2 days double-fire vs 3.0 days single-fire, $p = 0.84$). Patient diagnosis ($p < 0.001$ ANOVA) affected LOS. The type of bowel involved (small bowel having shorter LOS than large bowel, $p = 0.003$, ANOVA) was also a factor.

Conclusions: In this series, the underlying diagnosis and type of bowel involved in an anastomosis were the primary determinants of return of bowel function and length of stay. The technique of double-stapled anastomoses does not appear to significantly expedite this process and as such, cannot be a currently recommended practice without further study.

P039

Primary Anastomosis with Intraoperative Colonic Irrigation in Generalized Peritonitis Due to Left Colon Cancer Obstruction

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Introduction: In general, Hartmann's procedure (HP) is considered as a treatment of choice in generalized peritonitis due to left-side colon cancer obstruction with perforation. The aim of this study was to evaluate the short term outcome of primary anastomosis with intraoperative colonic irrigation (IACI) in the same setting as peritonitis.

Methods and procedures: Prospectively collected data of peritonitis patient with colon cancer obstruction between January 2001 and March 2013 in a single institute were evaluated. Fifty-nine patients who underwent IACI and HP were included in the study.

Results: Of 59 patients, 32 and 27 patients underwent IACI and HP respectively. There were no significant differences between patients' characteristics between the groups. Purulent peritonitis occurred 8 (25.8%) in IACI and 7 (25.0%) in HP ($P = 0.943$). There were no significant difference between groups in postoperative mortality and morbidity; Postoperative mortality was 5 of 32 (15.6%) in IACI and 4 of 27 (14.8%) in HP, morbidity (postop ARF/sepsis) was 6/14 in IACI and 7/12 in HP. Postoperative anastomotic leakage was noted in two (15.5%) IACI patients. Permanent stoma rate was 6 (18.8%) in IACI and 14 (51.9%) in HP. ($P = 0.007$)

Conclusion: Primary anastomosis with intraoperative irrigation can be safely performed and reduce permanent stoma in left colon cancer obstruction with peritonitis in comparison with Hartmann's procedure.

P040

A Case of Laparoscopic Colectomy for Intestinal Necrosis After Tae to Lower Gastrointestinal Bleeding

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A 65-year-old man visited our hospital for melena. Enhanced computed tomography (CT) could not reveal the bleeding site at emergency room. He admitted our hospital on the day. Over night, he bleeds several times. On the next day, Enhanced CT revealed extravasation of contrast medium at around hepatic flexure of the colon. We choose interventional radiologic approach. The bleeding site of unknown cause was detected.

The bleeding was supplied from the right branch of the middle colic artery and right colic artery. Arterial embolization with coil was successfully for the former artery. However, it wasn't fit for the later artery. Finally, we inject N-butyl-2-cyanoacrylate (Histoacryl) and fatty acid ethyl esters of iodized poppy seed oil (Lipiodol) into the right colic artery with immaturely advanced catheter. Hemostasis was achieved. On the third day after the arterial embolization, body temperature increased over 39.5 degree Celsius. Enhanced CT revealed loss of blood supply of the colon at the splenic flexure. We diagnosed this part of the colon is necrotic. Emergency surgery of laparoscopic right hemicolectomy saved his life. In conclusion, a comprehensive knowledge of embolic materials is critical. And laparoscopic approach is challenging in this situation, however it can be feasible with skillful surgeons.

P041

Single Port Laparoscopic Colorectal Surgery Shows no Drawbacks Compared to Standard Laparoscopic Surgery: Results of a Case Match Study

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Single port (SP) colorectal surgery has been characterized as a gimmick with limited applicability in regards to procedure, disease and patient characteristics. Although theoretically attractive for patients, there is question if SP procedures can safely be performed and if it offers any disadvantages or advantages to multiport (MP) laparoscopic colorectal surgeries. We hypothesize that SP is at least equivalent to MP surgery, and can be a safe alternative. Moreover, we intend to examine SP for the full spectrum of colorectal procedures.

Case-matched retrospective analysis of a prospectively maintained database of a single colorectal surgeon to compare perioperative outcomes in single port vs. multiport laparoscopic surgery (SP/MP) for total (5/5), right (24/24) and left (51/51) colectomy, stoma (3/3), and TME (12/12) surgery was performed. Case-match (SP/MP) included preoperative diagnosis, disease location, procedure, BMI (25.6/26.2 kg/m²; 17.2–38.7), age (60/60, 19–88 yo), gender (53/53 women), history of previous abdominal operation (50/47%) and pelvic radiation (12/12%). Perioperative outcomes, morbidity, mortality, local recurrence and 5-year survival for cancer patients were analyzed. Subset analysis was performed for surgery type. Statistically significant differences were identified using Student's t-Test.

Case match of 159 SP cases with 1617 MP found 95 matches for analysis (SP/MP). Preoperative diagnoses included diverticulitis (46/46), cancer (27/27), polyps (14/14), ulcerative colitis (3/3), colonic inertia (2/2), rectal prolapse (2/2) and volvulus (1/1). There was lower mean EBL in SP (109/177cc, $p = 0.03$) but no difference in transfusion requirement (0/1). Decreased OR time for SP left colectomy (206/244 min, $p = 0.01$) with a trend to shorter for SP found in all procedures (217/249 min, $p = 0.05$). 99% SP and 98% MP had no intra-operative complications. Complications included enterotomy (0/1), lost needle (1/0) and presacral bleeding (0/1). Conversion to open was equivalent (0/1), with 6.3% of SP requiring additional ports. Mean largest incision was smaller for SP (3.1/5.2 cm, $p = 0.01$). There were no differences in specimen length (27.9/31.3 cm, $p = 0.42$). Overall LN harvest for SP compared to MP did not show a difference. There were no differences in return of bowel function (flatus (POD 2/2) and bowel movements (POD 3/3)) or length of hospital stay (POD 4/4). There were no differences in perioperative morbidity (12/17%, $p = 0.55$) such as anastomotic leak (1/1) or delayed morbidity such as wound infection (1/0) or incisional hernia (0/1). There were no mortalities. There was no difference in local recurrence, distant metastasis or overall 5-year survival (cancer patients only) between SP and MP.

Single port is a safe alternative to multiport laparoscopic colorectal surgery across the full array of procedures, in equivalent patients. This study demonstrates SP has less blood loss, smaller incisions and is quicker in left colectomy, and trends to quicker across all procedures. Conversion and morbidity rates are equivalent to MP, without compromise in quality of surgical technique. No differences in discharge criteria were shown. While proper training is essential, concerns regarding the inability to use SP laparoscopic colorectal surgery safely are unfounded. These issues will require further study as SP laparoscopic colorectal surgery is practiced more widely.

P042

Are All Laparoscopic Sigmoid Colectomy Procedures the Same? Impact of Surgical Technique on Patient Outcome

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Introduction: Laparoscopic colectomy has become a standard approach due to improved patient recovery and decreased hospital stay. There is large variability in the surgical techniques used in laparoscopic colectomy. Surgeons may use a straight laparoscopic approach, hand-assisted approach, or a laparoscopic assisted approach. We hypothesized that the benefit of a short length of stay would be most pronounced in patients who underwent a straight laparoscopic approach.

Methods and Procedures: We performed a retrospective review of all patients who underwent a laparoscopic sigmoid colectomy by one of four colorectal surgeons at an academic institution from 2012 to 2013. Operative notes were reviewed by an attending surgeon to determine which operative approach was utilized. The laparoscopic approach involved intra-corporeal colon mobilization and transection of vessels. Only specimen extraction and anastomosis were accomplished through the extraction site. The hand-assisted approach involved intra-corporeal transection of vessels and colon mobilization using a hand assisted approach. The laparoscopic assisted approach included laparoscopic mobilization of the colon and extracorporeal completion of the procedure. No enhanced recovery pathway was used in any patient. The means of normally distributed variables were compared using the ANOVA test, while the Kruskal-Wallis test was used to compare median values of continuous variables without normal distribution. Logistic regression was performed to determine factors associated with the outcome of interest, early hospital discharge (hospital discharge on postoperative day 2 or 3).

Results: A total of 48 patients underwent a laparoscopic sigmoid colectomy. Nineteen patients underwent a straight laparoscopic approach vs. 20 laparoscopic assisted and 9 hand assisted. The patient groups were identical with respect to age, gender, medical comorbidities, ASA score, and diagnosis. The only difference between the groups was a difference in the choice of procedure type by different attending surgeons. Median length of stay was significantly shorter in the laparoscopic group (4 days, IQR 4–5) vs. the laparoscopic assisted (5, 4–7) and hand-assisted (5, 5–6) groups ($p = 0.0084$). GI function returned faster in the laparoscopic group (2.3 days to flatus) vs. the laparoscopic assisted (3.3 d) and hand assisted groups (2.9 d) ($p = 0.001$). Early discharge was observed in 63.2% of laparoscopic patients vs. 30% of laparoscopic assisted patients and 22.2% of hand-assisted patients ($p = 0.006$). When controlling for patient comorbidities, operative time, blood loss, and postoperative complications, patients who had a straight laparoscopic approach were 6 times more likely to have an early hospital discharge (OR 6.1, $p = 0.013$). There were no differences in postoperative complications, or hospital readmissions between the groups.

Conclusions: Patients who undergo a straight laparoscopic approach to sigmoid colectomy experience a faster return of gastrointestinal function and significantly earlier hospital discharge compared to patients who undergo a hand-assisted, or laparoscopic assisted approach. When technically feasible, the straight laparoscopic approach should be preferred.

P043

“Maypole” Small Bowel Obstruction from Jackson Pratt Drain

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Closed system continuous suction drainage was introduced by Barron and Raffle in Great Britain in 1950s. Silicone rubber drains first became available in 1960s and its advantages were reported by Santos et al. in 1962 in the first modern experiment on surgical drainage. Jackson Pratt (JP) drains are made of silicone. There are several publications on evidence based review of regular use of surgical drains.

We report a case of 78 year old male patient who underwent low anterior resection with loop ileostomy and JP drain placement for rectal cancer, complicated by small bowel obstruction and necrosis. JP drain acted as a “maypole” around which small bowel was twisted causing obstruction and necrosis. Patient underwent an exploratory laparotomy, small bowel resection with primary anastomosis. Patient required a prolonged Surgical ICU stay, ventilator support and feeding tube placement.

Surgical drains should be used very judiciously and it should not be made a routine to place JP drains. Surgeon should keep in mind potential complications of drain placement and decide if the benefits outweigh the risks of placement.

P044

LMCP (Laparoscopic Monitored Colonoscopic Polypectomy) Feasibility And Safety in This Technique Performed: Long-Term Follow-Up

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Background: Colonoscopy is widely used to remove benign polyps. However, a variety of “difficult polyps” are not accessible for colonoscopy removal because of their size, broad base, or difficult location (impossible to see the polyp’s base, polyps behind mucosal folds or in tortuous colonic segments). The aim of the study was to evaluate the long-term follow-up and oncologic safety of laparoscopically monitored colonoscopic polypectomy (LMCP).

Methods: From May 1990 to September 2013, all the patients undergoing LMCP were analyzed and prospectively followed with colonoscopy studies at 6 months, 1 year, and every year thereafter.

Results: A total of 320 polyps were removed in 270 patients: 168 men (52.6%) and 152 women (47.4%). The mean age was 74.7 years (range 46–99 years). During a mean follow-up of 63.37 months (range 6–196 months) and median follow-up of 65 months, there has been no recurrence.

Conclusions: Long-term follow-up demonstrated that a combined endoscopic-laparoscopic approach is safe and effective. Malignant lesions identified during LMCP can be treated laparoscopically during the same operation, avoiding the need of a second procedure, with good long-term oncologic outcome.

P045

Atypical Presentation of Appendiceal Adenocarcinoma – Case Study and Review of Literature

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Introduction: Adenocarcinoma of the appendix is very rare and represents less than 0.5% of all gastrointestinal neoplasms. Primary signet ring cell carcinoma accounts for less than 4% of all neoplasms of appendix. It usually presents as acute appendicitis or palpable mass and the unusual presentations include peritoneal carcinomatosis, hematuria, hydronephrosis. Here, we present a case study of mucinous adenocarcinoma of appendix presenting as retroperitoneal abscess and its management.

Case Study: A 75-year-old white male presented with constant sharp right flank pain of 4 weeks duration. His medical history include hypertension, hypothyroidism, hypercholesterolemia, hyperuricemia, and degenerative joint disease.

Physical examination revealed stable vital signs and tender fullness in the right flank region. CT scan of abdomen showed a large retroperitoneal abscess due to perforated retrocecal appendicitis. Percutaneous drainage of the abscess was performed, cultures grew E Coli and treated with Ciprofloxacin. 3 weeks later, catheterogram performed for persistent residual cavity, revealed fistulous communication with cecum and ascending colon. Hemorrhage into the drain prompted surgical intervention and bilateral ureteric stents were placed. At laparoscopy, which was converted to laparotomy, hard large mass was found in the right lower quadrant infiltrating the posterior abdominal wall with mesenteric lymph nodes. Frozen section confirmed carcinoma. Right hemicolectomy was performed. Pathology confirmed high grade invasive mucinous adenocarcinoma of the appendix pT3No. His post-operative course was uneventful.

Patient received 6 cycles of FOLFOX treatment followed by Exploratory laparotomy, radical intraabdominal tumor debulking, omentectomy, peritonectomy, wide local excision of retroperitoneal mass involving iliac muscle down to bone, wedge resection of liver lesion and hyperthermic intraperitoneal chemoperfusion with oxaloplatin for 2 hours at 42 degree Celsius, at a tertiary care center, 7 months after the primary surgery. At 1 year, the patient is well without evidence of recurrence on PET CT scan.

Conclusion: Non carcinoid carcinoma of appendix is rare, more so is the primary signet ring type. This case study highlights the atypical presentation and multidisciplinary management of mucinous adenocarcinoma of the appendix with very gratifying results.

P046

A Comparison of Short-Term Surgical Outcomes of Minimally Invasive Colectomy for Colon Cancer: Reduced-Port Laparoscopic Surgery Versus Multi-Port and Single-Port Laparoscopic Surgery

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Currently, laparoscopic colectomy for colon cancer is performed with reducing the number of ports by experienced laparoscopic surgeons. However, single-port laparoscopic colectomy (SPLC) for colon cancer is a challenging procedure because of technical difficulties such as the handling of laparoscopic instruments and triangulation of surgical plane. To overcoming the technical challenges of SPLC, only few studies reported the feasibility and safety of reduced port laparoscopic colectomy (RPLC) for colon cancer. The purpose of this study is to evaluate the feasibility and safety of RPLC for colon cancer by comparison with multi-port laparoscopic colectomy (MPLC) and SPLC.

Totally 170 patients with minimally invasive colectomy for colon cancer between July 2010 and June 2013 were included in this study, 40 patients were treated by SPLC, 38 patients by RPLC and 92 patients by MPLC. Perioperative variables and short-term surgical outcomes, including operative time, pathological data and complication rate, were analyzed between three groups

The mean operating time for RPLC, SPLC and MPLC group were significantly different. (216.2 ± 53.7 , 207.2 ± 49.6 and 243.5 ± 59.0 minutes, respectively, $p = 0.001$). The number of harvested lymph node was significantly higher in RPLC group compared with the SPLC and MPLC group (29.9 ± 21.5 , 24.2 ± 13.8 and 21.9 ± 12.1 , respectively, $p = 0.027$). The comparison of the time to first flatus between three groups (RPLC, SPLC and MPLC) showed the statistical difference (3.4 ± 1.1 days, 3.6 ± 1.3 days and 3.1 ± 1.2 days, respectively, $p = 0.039$). No difference was found in postoperative pain scores, postoperative hospital stays and complication rate among three groups ($p = 0.187$).

Considering favorable short-term outcomes of RPLC for colon cancer regarding the operative time and the number of harvested lymph node in this study, RPLC for colon cancer seems to be feasible, safe and may be considered a surgical option in minimally invasive colectomy for colon cancer.

P047

Case-Matched Study of Short-Term Outcomes and Cost Analysis Between Simplified Hand-Assisted Laparoscopic (Totally Three-Port Approach) and Open Surgery

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Introduction: Hand-assisted laparoscopic colectomy (HALC) provides the benefit of shorter operative time and less conversion rate compared with standard laparoscopic surgery. In addition, the potential advantages of minimally invasive surgery in HALC are still retained when compared to open colectomy (OC). However, an assistant is still required in order to complete this procedure, especially for the operation of left-sided lesions. In our center, we performed HALC by using totally three-port approach (One of hand-, operative- and camera-port). The operation can be accomplished by performing surgery with a camera holder. The purpose of this study is to demonstrate the potential benefits of this technique.

Methods: A retrospective review of prospective maintained database of 100 patients with sigmoid and recto-sigmoid cancer at Department of Surgery, Siriraj Hospital was performed. Fifty of three-port HALC were case matched with 1:1 with patients who underwent OC. Short-term outcomes and Costs of treatment were collected and analyzed.

Results: One hundred patients with sigmoid and recto-sigmoid cancer (50 three-port HALC and 50 OC) were included. There were no differences of age, gender, body mass index, ASA score, Charlson comorbidity index score, and previous abdominal surgery between two groups. The three-port HALC group patients had significantly less blood loss (69 ml vs. 177 ml, $p < 0.001$), faster time to regular diet (64.6 hr vs. 97.6 hr, $p < 0.001$), less pain score at first post-operative day (4.3 vs. 5.3, $p = 0.003$), shorter hospital stay (7.5 days vs. 11.1 days, $p < 0.001$), and lower surgical site infection (0% vs. 12%, $p = 0.03$). Operative time and number of harvested lymph nodes had no significant differences between two procedures. The operative cost was significantly higher in HALC group (US \$1025 vs. \$636, $p < 0.001$). However, total cost was not significantly different between HALC and OC (US \$3220 vs. \$2765, respectively, $p = 0.11$).

Conclusion: This study demonstrated that simplified three-port HALC could be successfully and safely performed and provided several short-term benefits including less blood loss, faster time to regular diet, less pain score at first post-operative day, shorter hospital stay, and lower surgical site infection when compared to OC. In addition, the operative time and total cost were not significantly different between two groups.

P048

Laparoscopic Converted Open Colorectal Malignant Resections: A Single Centre Experience

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Introduction: Colorectal cancer is the third most commonest and the second most lethal malignancy in the UK. Since the introduction of laparoscopic colectomy in 1990, laparoscopic colorectal resection have become routine practise. The potential benefits of laparoscopic surgery are well documented. Laparoscopic open conversion has been reported to occur in 5–21 % of cases. The aim of the study is to assess laparoscopic open conversion at a single institution.

Methods & Procedures: This is a retrospective study carried out since 2008 at Macclesfield District General Hospital. Descriptive demography, co-morbidities, and surgical outcomes were collected for all elective colorectal resections. Laparoscopic and open colorectal resections carried out since 2008 were used as controls.

Results

	Lap (n = 208)	Open (n = 316)	lap-open (n = 51)	Kruskal-Wallis test
M:F	110:98	187:129	34:17	NS
age (yrs)	70.7	71.6	68.3	NS
BMI	24.8	26.7	27.5	$p < 0.001$
ASA	2	2	2	NS
Op time (min)	189.3	136.0	213.0	$p < 0.001$
LOS (days)	7.0	10.0	9.0	$p < 0.001$
1st yr survival	93.1%	89.7%	95.9%	Logrank $p = NS$
3rd yr survival	82.6%	77.3%	91.1%	
5th yr survival	75.4%	71.0%	91.1%	

Conclusion: The overall laparoscopic-open conversions occurred in 19.7 % of laparoscopic colorectal resections, and this has reduced to 7.6 % for the year 2013. Causes of conversion included: early learning curve, unfavourable patient habitus (especially males), technical difficulties (inability to localize tumour), equipment failure, significant adhesions of previous surgery, tumour fixity, other visceral involvement, intra-operative event (iatrogenic injury, bleeding), anaesthetic compromise.

P049

Emergency Versus Elective Colorectal Resections for Malignancy: A Single Centre Experience

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Introduction: Colorectal cancer is the 3rd most common malignancy in men & women in the UK. Colorectal cancer presents as a surgical emergency in 30% of cases as obstruction, perforation, abdominal pain, haemorrhage or sepsis. Emergency colorectal cancer has been associated with high post-operative morbidity & mortality. The aim of the study is to assess emergency colorectal malignant resections at a District General Hospital.

Methods & Procedures: This is a retrospective study carried out since January 2007 till September 2013 at Macclesfield District General Hospital. Descriptive demography, co-morbidities, and surgical outcomes were collected for all elective colorectal resections. A cohort of elective colorectal resections carried out since 2007 were recruited as controls.

Results			
	Emergency (n = 146)	Elective (n = 586) (lap 208: open 378)	Man Whitney U test
M:F	64:82	335:251	p < 0.05
Age (yrs)	74.0	71.0	p < 0.05
BMI	25.1	26.1	NS
ASA	3	2	p < 0.05
Op time (min)	162.3	119.4	p < 0.001
LOS	12	9	p < 0.001
1st yr survival	69.7%	91.6%	Logrank p < 0.001
3rd yr survival	47.8%	81.0%	
5th yr survival	40.3%	74.0%	

Conclusion: The patients who underwent emergency colorectal resection were generally an older population, with multiple co-morbidities (higher ASA status) and poor outcomes in terms of: longer inpatient stay and reduced survival as compared to the planned elective cases. This study supports the bowel screening initiatives to detect early colorectal cancers. In the emergency situation, an aggressive early management should be employed in the absence of widespread disseminated malignancy

P050

Ileostomy Reversal After Minimally Invasive Colorectal Surgery: Can It Still Be Considered a Minor Procedure?

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Introduction: Ileostomy reversal is often considered a relatively minor surgical procedure in comparison to the initial colorectal resection and anastomosis. However, no studies have been done comparing outcomes between these two procedures. The aim of the study was to compare and contrast the morbidity and mortality of ileostomy reversal with the original minimally invasive colorectal surgical procedure that required ileostomy creation. In this age of minimally invasive and robotic surgery, we hypothesize that the differences in morbidity between procedures may have decreased.

Methods and Procedures: 89 consecutive patients undergoing laparoscopic and robotic-assisted colorectal surgery followed by interval ileostomy reversal, from June 2009 to August 2013, were selected from a retrospective database. The cohort was comprised of 47 laparoscopic and 42 robotic cases, performed by 4 surgeons at a single institution. An internal comparison was done comparing outcomes of the index procedure with respective ileostomy reversal for each patient. Index procedures included low anterior resection (52.8%) proctocolectomy (39.3%), sigmoid resection (2.2%), colectomy (1.1%) and small bowel resection (2.2%). Data was analyzed for postoperative outcomes and 30-day morbidity and mortality. Statistical analysis was done using Chi square test, student t-test, analysis of variance and Fischer's test where applicable. GraphPad Software, Inc. 2013 was used. Follow up was studied for a period of 30 days after the day of the procedure.

Results: 42% of patients were female and the mean age was 58 years old. Cancer was a primary diagnosis in 57% of patients. Other diagnoses included inflammatory bowel disease (29%), Familial Adenomatous Polyposis (3.3%) and diverticulitis (2.2%). Perioperative chemotherapy was administered in 41.5% of patients, and 27% received perioperative radiation therapy. The mean duration of the ileostomy prior to closure was 107 days. Median length of stay (LOS) was significantly longer for the index procedure compared to the ileostomy reversal (6.0 days versus 4.0 days, p = 0.0001). Mean estimated blood loss was higher (153 ml versus 25 ml, p = 0.0001) in the index procedure. There were no statistically significant differences in outcomes between groups for cardiac complications, bleeding, ileus, wound infection, urinary retention and urinary tract infection. There were no mortalities in either group. In a subset analysis of patients with a high BMI (>30, n = 18), there was no statistically significant difference in LOS between the index procedure and the ileostomy reversal (5.0 versus 4.0 days, p = 0.4), while patients with a lower BMI (<30) had a significantly lower LOS (6.0 versus 4.0, p = 0.01) for the ileostomy reversal.

Conclusion: In the setting of minimally invasive colorectal surgery, we find that a subsequent ileostomy reversal has equivalent morbidity and mortality, but a shorter hospital stay and less blood loss. In patients with a higher BMI, however, ileostomy reversal was found to be equivalent to the initial colorectal resection in length of stay, blood loss, morbidity and mortality.

P051

Sacral Nerve Stimulator Use In A Patient With Low Anterior Resection Syndrome

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Introduction: Patients with locally advanced rectal cancer are treated with neoadjuvant chemoradiation and surgical resection. Advanced surgical techniques such as mesorectal excision have enabled sphincter sparing surgery to be accomplished for patients with distal cancers. Although these procedures are being done more frequently, they remain fraught with both immediate perioperative and long term complications. Fecal Incontinence (FI) is a significant long term postoperative complication which can result following such surgical intervention. While reports show improvement over a 1–2 year period, a significant number of patients continue to experience FI and the so called Low Anterior Syndrome (LAS). Sacral nerve neuromodulation has been traditionally used for treatment of urinary incontinence with the use of Sacral Nerve Stimulator (SNS) implantation and is now being utilized to treat FI. We report the initial successful use of SNS to treat fecal incontinence secondary to radiation and post-operative changes following treatment for rectal cancer. A 70 year old Asian female was diagnosed with stage III rectal cancer and underwent neoadjuvant chemoradiation followed by low anterior resection with diverting ileostomy in 2011. Her ostomy was reversed in August 2012 and she developed fecal incontinence. Non-operative measures were taken in attempt to improve her incontinence without success including fiber supplementation and pelvic floor therapy.

Methods: Prior to SNS implantation the patient was given a Cleveland Clinic Fecal Incontinence Score (CCFIS). Patients rate daily incontinence episodes on a 4 point scale in 5 categories including incontinence to solids, liquids, gas, frequency of protective undergarment pads and need to modify lifestyle. A score of 0 in each category is equivalent to never events and a score of 4 is equal to always with 20 being a maximum score. The patient then underwent placement of the SNS probes into the S3 foramen. This was followed by a 1 week test period in which the patient had the probes connected to an external modulator. Following the test phase she then was reassessed with the CCFIS.

Results: The patients initial CCFIS was the maximum score of 20. Following insertion of the probe at 1 week the patient reported an improvement in her CCFIS to 11. She maintained incontinence to solids usually (score of 3), liquid never (0), gas always (4), use of pads always (4), lifestyle modification never (0).

Conclusion: Sacral Nerve Stimulator insertion is potentially an effective treatment for fecal incontinence for patients that have undergone neoadjuvant chemoradiation and resection for rectal cancer. Further study is warranted on larger sample sizes to ensure consistency of results and long term outcomes should be measured.

P052

Laparoscopic Lavage and Drainage in Acute Diverticulitis. Case Series

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Introduction: The aim of this work is to show that laparoscopic lavage is a reliable and effective method to treat patients with complicated acute diverticulitis. In industrialized countries, diverticulosis of the colon has a prevalence of 5% in people under 40 years, and the prevalence increases with age. An estimated 10 to 25% of these patients will develop acute diverticulitis.

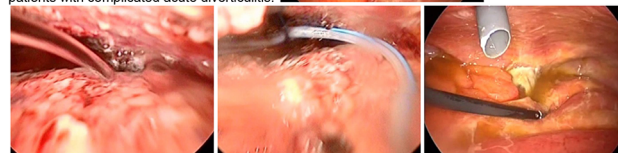
In the U.S. this results in approximately 130,000 hospitalizations per year at considerable cost to the health system. Frequent clinical manifestations are fever, leukocytosis and abdominal pain typically located in the lower left quadrant of the abdomen and may be accompanied by signs of mild peritoneal irritation to a frank generalized peritonitis. According to CT findings is classified as uncomplicated (mild to moderate) and complicated (severe), the latter with four stages according to the Hinchey classification, which traditionally allows us to make therapeutic decisions. Although the absolute prevalence of perforated diverticulitis complicated by generalized peritonitis is low, its importance lies in its significant postoperative mortality. Until now the treatment of choice has been a topic of debate. In recent decades, the “gold standard” has changed several times. Primary resection has become a common practice, but the fear of anastomotic leakage often deters many surgeons performing primary anastomosis. Therefore, for many surgeons, Hartmann procedure has remained the favored choice for these patients. Recently, laparoscopic lavage and drainage without resection has been used successfully for patients with generalized peritonitis caused by perforated diverticulitis. Currently the treatment of choice for grade Hinchey II is the percutaneous drainage. However, in our country there is not always staff trained to perform interventional radiology procedures in order to drain an abdominal abscess. Therefore we offer laparoscopic lavage in these circumstances. This approach has shown a decrease in-hospital stay, lower costs, morbidity and mortality.

Methods and Procedures: We present 8 cases of patients with clinical and tomographic diagnosis of complicated acute diverticulitis, with Hinchey II–III grades, which showed poor response to antibiotic treatment and were managed by laparoscopic lavage and drainage.

Laparoscopic lavage and drainage represents an approach accessible, safe and minimally invasive in



patients with complicated acute diverticulitis.



Results: The 8 patients underwent a laparoscopic approach with a conversion rate of 0%. Mean operative time was 93 minutes. Three laparoscopic ports were placed in all cases, lavage was performed with 4 liters of saline solution on average and placed a Blake drain in all cases. Diet was initiated on the third post surgical day. Disappearance of symptoms occurred at 24 hrs. We obtained an average post-operative hospital stay of 4 days. The drainage retirement was performed at 7 days. We conducted a follow up of 6 months to a year and there were no complications or need for surgical reoperation.

Conclusions: Laparoscopic lavage and drainage represents an approach accessible, safe and minimally invasive in patients with complicated acute diverticulitis.

P053

Laparoscopic Total Colectomy For Refractory Ulcerative Colitis: Prospective Single-Port Versus Multi-Port Comparative Cohort And Case Control Analysis.

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Background: Single port laparoscopic surgery is a modified access technique that allows total colectomy and end ileostomy for medically uncontrolled ulcerative colitis solely via the stoma site incision. While intuitively appealing, there is sparse evidence for its use beyond feasibility.

Methods: All patients presenting either electively, urgently or emergently over a 32 period at a tertiary referral centre under three specialist teams were studied prospectively. One team commenced its operative cohort via single access laparoscopy via the stoma site on a near-consecutive basis using a 'surgical glove port' as compared to a conventional four trocar, multiport approach. This allowed cohort comparative and case control analysis. Standard, straight rigid laparoscopic instrumentation were used and no additional resources were allocated.

Results: Of 45 consecutive patients presenting for surgery, 38 (83%) had their procedure begun laparoscopically. 27 patients (67%) were commenced by single port access with an 88% completion rate (3 were converted to and completed by multi-trocar laparoscopy). Overall, single port access proved significantly more effective in comparison to multiport access regardless of disease severity (significantly reduced access costs, operative times and postoperative length of stay, $p < 0.05$) but was especially efficient for patients with preoperative albumin >30 g/dL ($n = 20$). This was further confirmed by formal case-match analysis (10 pairs matched for gender, BMI and preoperative albumin).

Conclusions: Single port total colectomy proves routinely useful in both planned and acute settings for patients with medically refractory colitis especially in non-toxic patients. Assumptions regarding duration and cost should not be barriers to single port techniques.

P054

Single Institution Review Of Cost Analysis Of Laparoscopic Versus Open Colorectal Procedures

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Introduction: Laparoscopic colorectal surgery has become increasingly popular option owing to its advantages of faster post-operative recovery, decreased length of hospital stay and better post-operative pain management compared to open procedures. However, laparoscopic surgery has been criticized for being more costly than open cases due to longer operative time and conversion of laparoscopic cases to open. This study aimed at evaluating our institutions cost analysis of laparoscopic cases in comparison to open.

Methods and Procedures: The Henry Ford Health System No-Harm Campaign database was used for this study. The database compiles clinical, claims and NSQIP data for an ongoing quality assurance project. Queries were made for the years January 2009–January 2012 of patients that underwent colectomies using CPT codes. Patient account cost was provided by the Operational Analytics department's year end summaries. Differences in cost between open and laparoscopic cases were analyzed using univariate and t-test analysis.

Results: A total of 447 patients who underwent colectomies at Henry Ford Hospital were included in the study, 65.1% (291) underwent open colectomy and 34.9% (156) underwent laparoscopic colectomy, of which 47 of the cases were done robotically. Open cases' total technical cost was found to be \$3,170 more than laparoscopic cases (\$13,000 \pm \$9,637 vs \$9,400 \pm \$8,509, $P < 0.05$). The variable cost was only found to be \$1800 more for laparoscopic cases as compared to open (\$15,100 \pm 4,900 vs \$13,200 \pm 5,600, $P = 0.001$). In addition, open colectomy cases were found to have increased in hospital LOS (10.56 \pm 11 days vs 6.38 \pm 4.4 days, $P < 0.05$), increased ICU stays (2.19 \pm 8.6 days vs 0.74 \pm 3.2 days, $P = 0.048$) and more ventilator dependent days (0.57 \pm 2.2 days vs 0.19 \pm 0.7 days, $P = 0.04$).

Conclusion: Although laparoscopic colorectal surgeries have been found in the past to be more costly compared to open cases, our institutional review found that laparoscopic cases are relatively less expensive. The added benefit of shorter hospital and ICU LOS as well as less vent dependent days in the laparoscopic group make it an even more cost effective choice.

P055

Is There A Role For Laparoscopic Surgery In Recurrent Crohn's Disease?

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Introduction: Recurrence of Crohn's disease after initial resection is a complex condition to manage surgically. The role of laparoscopic technique for treatment of recurrent Crohn's disease remains unclear. In this study, we aimed to evaluate outcomes of laparoscopic surgery for recurrent Crohn's disease by comparing it with open surgery in a case-matched setting.

Materials and Methods: Patients undergoing elective laparoscopic intestinal resection for recurrent Crohn's disease between 2003–2012 were case-matched with patients undergoing open surgery based on disease phenotype (penetrating, stricturing, non-stricturing and non-penetrating) and year of surgery. Comparisons of the groups were performed by using χ^2 or Fisher exact tests with respect to categorical data and by using the Wilcoxon rank-sum test with respect to quantitative data. Parametric data were reported as means and nonparametric data as numbers.

Results: Forty-eight patients undergoing laparoscopic intestinal resection were matched to 48 counterparts. Age (28 vs. 30 years, $p = 0.1$), American Society of Anesthesiology score (2 vs. 2, $p = 0.08$), gender (F/M; 20/28 vs. 27/21, $p = 0.15$), body mass index (32 vs. 29 kg/m², $p = 0.16$) and number of previous abdominal operations (1 vs. 1.5, $p = 0.18$) were comparable between the groups. Type of intestinal resection ($p = 0.67$) and intraabdominal findings which were noted during surgical exploration were similar between the groups (table). Six cases (12.5 %) were converted to open surgery and a hand port was used in one case. Operating time (159 vs. 190 min, $p = 0.31$), blood loss (216 vs. 256 ml, $p = 0.82$), postoperative complications, return of bowel function (4 vs. 4, $p = 0.54$), reoperations (2 vs. 1, $p = 1$) and readmissions (8 vs. 4, $p = 0.22$) were comparable between the groups (table). Length of hospital stay was shorter after laparoscopic surgery (6 vs. 10, $p = 0.004$). Postoperative follow-up after surgery for recurrent disease was similar (31 vs. 37 months, $p = 0.38$). During the follow-up period, three patients had surgical recurrence in the laparoscopy group, none in the open group ($p > 0.05$).

Conclusions: Laparoscopic intestinal resection for recurrent Crohn's disease provides faster recovery without worsening the postoperative outcomes when compared to open surgery. Laparoscopic surgery may safely be offered to patients who had previous resection for Crohn's disease.

Resection type for recurrent disease, disease phenotype, intraoperative findings, and specific complications

	Laparoscopy (n = 48)	Open (n = 48)	p value
Operation performed, n			0.67
Ileocectomy	15	13	
Segmental colectomy	4	8	
Colon and small bowel resection	24	22	
Small bowel resection	5	5	
Disease phenotype, n			0.97
Non stricturing, non penetrating	24	25	
Stricturing	14	14	
Penetrating	9	9	
Intraoperative findings, n			
Abdomino-pelvic abscess	2	3	1
Phlegmon	6	9	0.4
Fistula	6	9	0.4
Adhesion	35	35	1
Specific postoperative complications, n			
Ileus	12	10	0.63
Wound infection	2	6	0.14
Abdomino-pelvic abscess	1	2	1
Anastomotic leak	1	2	1
Bleeding	1	1	1
Fistula	0	2	0.5
Dehydration	1	1	1
Urinary tract infection	1	1	1
Acute renal failure	0	1	0.32

P056

Massive Gastrointestinal Bleeding: A Rare Case Of Extrarenal, Visceral, Rectal Fibromuscular Displasia

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Introduction: Fibromuscular dysplasia (FMD) is a non-inflammatory and non-atherosclerotic disorder, which causes renal disease in 60–75%, cerebrovascular disease in 25–30%, visceral in 9% and extremity arteries are affected in 5% of the cases. There are just a few cases reported in literature, it was first described in 1938 by Leadbetter and Burkland. It is an extremely rare cause of gastrointestinal bleeding. We report the first known case in our country of rectal fibromuscular dysplasia.

Case Report: A 46 years old male was admitted with history of pelvic pain, urinary urgency and dysuria of one week evolution. An abdominal CT scan showed thickening of the rectum wall and distal sigmoid with increased vascularity of the area, as well as rectal and peri-rectal inflammation. A colonoscopy was completed, which revealed the presence of blood in the transverse colon with active arterial bleeding 10 cm from the anal margin. An attempt to stop bleeding was made with adrenaline injection and clips without success, bleeding control was finally achieved with Ligasure®.

An angiography was performed due to the high clinical suspicion of an arteriovenous malformation; it revealed an area with apparent hypervascularity and arteriovenous malformations. The patient underwent low anterior resection /colo-anal anastomosis and protective ileostomy. Patient outcome was favorable.

Pathology reports: Ischemic colitis, ulcerated and recent bleeding secondary to FMD of the rectal arteries

Discussion and Conclusions: The pathogenesis of FMD is still unknown, it has been associated with various collagen disorders and alpha antitrypsin deficiency. Symptoms depend on the affected arteries, ranking from abdominal pain to gangrene and bleeding (ischemia or aneurysm). There are no management guidelines, nor randomized controlled trials. To our knowledge this is the first case of visceral FMD reported in our country, and one of the few in the world.

P057

Robotic Versus Laparoscopic Single Port Anterior Resection For Sigmoid Colon Cancer

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Purpose: Previously we reported our technique of robotic single port anterior resection using current da Vinci S or Si system. The purpose of this study is to compare short term operative outcomes between robot and laparoscopic single port anterior resection for the treatment of sigmoid colon cancer

Methods: We retrospectively reviewed medical records of the patients who had received either robotic or laparoscopic single port anterior resection for the treatment of their sigmoid colon cancer at Yonsei University Severance Hospital, Seoul, Korea from 2008 to 2011. Clinical parameters were statistically compared between robotic and laparoscopic group.

Results: Total 69 patients (37 robotic, 32 lap) were enrolled. The general patient characteristics including age, sex, BMI were not different. Short term operative outcomes such as TNM stage, tumor size, hospital stay, overall morbidity were similar in both group. Total operative time (skin-to-skin) were similar (161.9 min in robotic vs. 167.4 min in lap), however when robotic console time was significantly shorter (105.9 min) than laparoscopic time (127.8 min; $P = 0.017$). Total number of retrieved lymph nodes was not different, but the number of cases where less than 12 nodes were retrieved was significantly higher in lap (5 cases) than in robotic (2 cases; $P = 0.018$). Estimated blood loss was less in robotic (44.1 mL) than in lap (91.2 mL; $P = 0.039$). However incision length were higher in robotic (3.8 cm) than in lap (3.4 cm; $P = 0.001$).

Conclusions: Our initial experience showed both robotic and laparoscopic single port anterior resection were feasible and safe. Robotic approach seemed to have some benefit over laparoscopic approach except longer incision. Further investigation including cost analysis is mandatory to confirmative results.

P058

Laparoscopic Sigmoidectomy in Diverticular Disease

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Introduction: The treatment of diverticular disease has undergone a paradigm shift over the last decade. While many reports attest to the safety and benefits of laparoscopic treatment of acute and non-acute diverticular disease, it is difficult to ascertain the overall penetrance of its usage in general surgical practice. The objective of this study was to evaluate the usage of laparoscopic treatment of diverticular disease in a VA system general surgery service over a 10 year period of time.

Methods and procedures: We performed a retrospective chart review of patients undergoing surgical intervention for diverticular disease at a single VAHCS institution between 2003 and 2013 documented in the CPRS EMR using CPT coding. Inclusion criteria included all patients who received either elective or acute surgical treatment for diverticular disease. Outcomes included age of intervention, BMI, diagnosis, and surgical technique. Statistical analysis was used student's t-test with $p < 0.05$ considered significant. IRB approval was obtained.

Results: Between January 2003–September 2013, 93 patients underwent surgical intervention for diverticular disease. Of these, 96% were male (4:89 F: M) with an average age of 56 years old (range 29–86 y/o). Indications for surgical intervention included recurrent disease(51/94;55%), failed antibiotic treatment (2/93;2%), colovesicle/colovaginal fistula (9/93;9%), stricture(5/93;5%)bleeding (2/93;2%) and perforation(24/93;26%). There were 32 (34%) cases of non-elective surgical intervention for acute disease. In total 33/93 (35%) cases were performed laparoscopically, while 61/93 (65%) were performed open. Of the open procedures, 14 (23%) were Hartmann procedures. Of the non-elective cases, 3/32 (9%) were performed laparoscopically, with the majority being performed open. In the elective cases, 30/61 (49%) were performed laparoscopically. In the first 5 years of the study 2003–2007, 11 of 45 (24%) cases were performed laparoscopically. In the last 5 years 2008–2013, 22 /48 (46%) procedures were performed laparoscopically ($p < 0.05$). Between laparoscopic and open cases there were no statistical differences between age (54 vs. 57 $p = NS$) or BMI ($p > 0.05$).

Conclusion: In our single institutional study the majority of surgical interventions for diverticular disease, especially non-elective cases, are still performed with the open surgical technique. There is a significant increase in percentage of patients treated laparoscopically in the last half of the last decade (2008–2013) as compared to the first half (2003–2007). However, only 9% of the non-elective cases are performed laparoscopically. In conclusion, in our institute, the surgical intervention for diverticular disease is increasingly performed laparoscopically however open surgical technique is preferred for acute surgical management.

P059

Short-Term Results Of Laparoscopic Pelvic Sidewall Dissection For Low Rectal Cancer

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Backgrounds: Lymph node metastasis in pelvic sidewall space was found in 15 to 20 % of T3 low rectal cancer and pelvic sidewall dissection was performed as a standard procedure in advanced low rectal cancer in Japan. The dissection was usually done by open approach and laparoscopic pelvic sidewall dissection is not yet established as standard procedures. Objective of the study: The aim of this study is to compare short-term clinical results after laparoscopic pelvic sidewall dissection with conventional approach and to clarify benefit of laparoscopic pelvic sidewall dissection.

Methods: A total of 98 consecutive resections between July 2010 and September 2013 were included in this study. Conventional open approach was performed in 79 patients and laparoscopic approach in 19. Pelvic sidewall dissection was performed for clinical stage II or III low rectal cancers. We evaluated intra- or post-operative clinical results, and described the merits of laparoscopic sidewall dissections.

Results: Median operative time was 412 min in open group and 409 min in laparoscopic group. Blood loss was significantly lesser in laparoscopic group than in open group (1021 ml in open groups vs 211 ml in laparoscopic groups, $p < 0.01$). Number of dissected lymph nodes in pelvic sidewall was 10 (4–27) in open group and 12 (1–22) in laparoscopic group. Hospital stay is shorter in laparoscopic group than in open group (10 days versus 13 days). Sexual function was preserved in all male patients with active sexual activity before operation in laparoscopic group.

Conclusion: The short-term results of laparoscopic pelvic sidewall dissection were clinically acceptable. Laparoscopic procedures might lead better sexual function by appropriate preservation of autonomic nerves.

P060

The Effect Of Three-Dimensional Versus Two-Dimensional Imaging Displays On Task Performance By Laparoscopy-Naïve Subjects

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Introduction: Inanimate laparoscopic training techniques such as the Fundamentals of Laparoscopic Surgery (FLS) have a proven benefit on operative skills in trainees with little to no laparoscopic experience. In conjunction with these training techniques, three-dimensional (3D) imaging provides an added benefit to novice trainees with laparoscopic experience. However, the utility of 3D imaging with FLS based tasks in laparoscopy-naïve trainees is unclear. We aim to investigate the role of 3D imaging in laparoscopy-naïve participants using two FLS based tasks. We hypothesize that participants who utilize 3D imaging during these tasks will perform better than participants who utilize two-dimensional (2D) imaging.

Methods and Procedures: First through fourth year medical students at The Ohio State University were recruited. Participants were randomized to either 3D or 2D imaging prior to performing two FLS tasks – peg transfer and circle cut. For each task, time to completion and number of errors were recorded. A numerical global performance score was calculated for each participant on each task, where higher scores indicate better performance. Scores accounted for time to completion and number of errors committed. A non-parametric test, Wilcoxon Rank Sum Test, was used to draw inferences between experimental groups on peg transfer time, peg transfer score, circle cut time, and circle cut score. Fisher's Exact Test was employed to draw inferences between experimental groups on peg transfer errors and circle cut errors.

Results: Seventy-nine medical students participated; 39 students were randomized to the 3D group and 40 were randomized to the 2D group. The median peg transfer time was significantly shorter in the 2D group (270 seconds vs. 325 seconds), $p = 0.033$, and the median peg transfer score was significantly higher in the 2D group (330 vs. -25), $p = 0.032$. Peg transfer errors did not differ significantly between groups ($p = 0.41$). Circle cut time, errors, and score did not differ significantly between groups, $p = 0.43, 0.65, 0.91$, respectively.

Conclusions: Laparoscopy-naïve participants in the 3D group performed similarly to participants in the 2D group on the circle cut task and worse than participants in the 2D group on the peg transfer task. These findings suggest that educators may wish to avoid 3D imaging in laparoscopy-naïve trainees during inanimate laparoscopic training tasks.

P061

Laparoscopic Surgery Training Program For Residents: Experience In Latinamerica

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Introduction: The economic and ethical considerations about perform procedures on patients during the training program of residents have been widely discussed but it is unquestionable that laparoscopic surgery requires a highly qualified staff and the surgeons in training programs need quality education before apply the knowledge in humans.

Methods: Prospective-observational trail in the tertiary care school Mexico City General Hospital, during 8 years evaluated the training tutorial program for residents of General Surgery which included three phases: Basic practice in inanimate simulator, advanced practice in biological models, Clinical practice performing supervised laparoscopic surgeries.

Results: 355 residents evaluated who completed laboratory practice. Weekly evaluations by an experienced surgeon. The monthly percentage improvement was: movement skills 7.9%, Dissection 6.4%, suture 6.4% and mixed skills 4.6%. Advanced level evaluated biological models skills whit time progress: appendectomy 34%, cholecystectomy 43%, nephrectomy 58% and funduplicature 47%. 3454 laparoscopic cholecystectomies were performed, 1071 performed by residents assisted by expert surgeons. The mean duration of operation was 98.2 minutes compared with the general surgeons who made 90.5. Conversion rate 1.66% vs 1.64%. Bleeding 0.68% vs 0.41%. Bile duct lesion 0.20% vs 0.4%. Mortality 0.43% vs 0.40%.

Conclusions: It is necessary an intense structured training program enabling learning with a high level of assurance with clinical simulation as close as possible to reality. The experimental laboratory practice enables the development of primary skills, reducing operating times and complications. The education in laparoscopic surgery should supervised by experienced surgeons to supplement the training process and reduce the risk to the patient.

P062

Development Of A Standardized Training Course For Laparoscopic Procedures Using A Delphi Methodology

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Background: Content, evaluation and certification of laparoscopic skills- and procedure training lack uniformity among different hospitals in the Netherlands. Within the process of developing a new regional laparoscopic training curriculum, a uniform and transferrable curriculum was constructed for a series of laparoscopic procedures.

The aim of this study was to determine regional expert consensus regarding the key steps for laparoscopic appendectomy and cholecystectomy using a Delphi methodology.

Methods: Lists of suggested key steps for laparoscopic appendectomy and cholecystectomy were created using surgical textbooks, available guidelines and local practice. Twenty-two experts, working for teaching hospitals throughout the region, were asked to rate the suggested key steps for both procedures on a Likert scale from 1–5. Consensus was reached with Cronbach's alpha ≥ 0.90 .

Results: Out of the twenty-two experts, twenty-one completed and returned the survey (95%). Data analysis already showed consensus after the first round of Delphi on the key steps for laparoscopic appendectomy (Cronbach's alpha 0.92) and laparoscopic cholecystectomy (Cronbach's alpha 0.90). After the second round, 15 proposed key steps for laparoscopic appendectomy and 30 proposed key steps for laparoscopic cholecystectomy were rated as important (≥ 4 by at least 80% of the expert panel). These key steps were used for the further development of the training curriculum.

Conclusion: By utilizing the Delphi methodology, regional consensus was reached on the key steps for laparoscopic appendectomy and cholecystectomy. These key steps are going to be used for standardized training- and evaluation purposes in a new regional laparoscopic curriculum.

P063

Preparing Residents for the FLS Skills Exam: A Competition Based Approach

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Introduction: The purpose of this educational study was to assess the progress of the Fundamentals of Laparoscopic Surgery (FLS) skills among General Surgery residents when they participated in a competitive tournament. Our hypothesis was that this competition would motivate residents to practice the FLS skills—resulting in improved times. Also, we hoped that this competition would prepare residents for the FLS exam and would result in improved intra-operative skills.

Methods and Procedures: In March of 2013, nineteen General Surgery residents at William Beaumont Army Medical Center participated in a competition based on the five FLS manual skills. Five months prior to the competition, residents recorded baseline times in each skill. Residents were notified of the competition and encouraged to practice.

The tournament was a single elimination tournament in which two residents competed against each other in all five of the FLS manual skills. All times were added for a total time. The resident with the fastest total time advanced in the tournament. One round of matches was done per week to allow residents time to practice between each round. Either an attending staff surgeon, or an observing resident proctored each match.

Some minor adjustments were made to the rules of FLS to create a fair competition and to assess accuracy as well as speed. Penalties of 10 seconds were added for deviations or errors during the competition in each event. For example, a 10 second penalty was added when a peg was dropped during the peg transfer.

Results: Individual resident times improved on average from baseline in all five events. On average, residents improved their peg transfer time from baseline by 18.6%, circle cut by 37.5%, endoloop by 37%, extra-corporeal knot tie by 33.3%, and intra-corporeal knot tie by 46.6%. Among first year interns who had little prior exposure to the FLS events, the improvement was greater in 4 of 5 events.

EVENT	Ave. Improvement Time (%)	Ave. Improvement Time-Interns (%)
Peg Transfer	18.6	33.9
Circle Cut	37.5	40.5
Endoloop	37.1	20.5
Extra-corporeal Suture	33.3	43.7
Intra-corporeal Suture	47.6	53.6

Conclusion: Resident times improved in each FLS manual skill. This was likely due to practice done by each resident—motivated by the added incentive of participating in a friendly competition. Such an event is a creative and enjoyable way a residency program can encourage residents to practice FLS skills in order to prepare for the FLS manual skills exam and improve intra-operative skills.

P064

A Novel Model For Teaching Intracorporeal Knot Tying

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Introduction: The Fundamentals of Laparoscopic Surgery (FLS) is an ideal training program for teaching basic laparoscopic skills. Students proceed through simplified tasks with progressive level of difficulty. Still, a steep learning curve exists for intracorporeal knot tying. The purpose of this study was to design a new model for teaching intracorporeal knot tying to act as an intermediate between basic hand eye co-ordination skills (FLS task 1) and intracorporeal knot tying (FLS task 5). We hypothesized the model would enhance learning of laparoscopic suturing through isolating and simplifying intracorporeal knot tying.

Methods: The model was built to fit inside a laparoscopic trainer box (Fig. 1). Twenty medical students were randomized to learn laparoscopic suturing with intracorporeal knot tying for 1 hour on FLS task 5, or for the 30 minutes on the intracorporeal knot model, followed by 30 minutes on FLS task 5. Participants were scored based on total time and error using the FLS score on FLS task 5 before, during and after the session. A questionnaire was completed by participants assessing their perceptions in regards to the teaching models. Mean FLS scores were compared between the groups with a Student's t-test.

Results: Pre-test FLS scores were not significantly different between the control and intervention groups (2.5 vs. 3.8; $p > 0.6$). After the training session, FLS scores improved in both groups; however, FLS scores were not significantly different on the post-test between the control and intervention groups (69 vs. 71; $p > 0.8$). The intervention group completed 6.6 successful attempts, compared with 4.3 successful attempts in the control group ($p < 0.05$). Further, the intervention group found the model to be helpful (4.3/5; 1—not helpful, 5—very helpful) and worth recommending to other novice trainees (4.6/5; 1—definitely no, 5—definitely yes).

Conclusion: Participants trained on the intracorporeal knot-tying model were able to perform a greater number of successful attempts at laparoscopic suturing than those trained solely on the FLS model. Although no objective differences were seen in the post-test FLS score, subjectively, the model was found to be helpful and participants would recommend it to other novice trainees.



Fig. 1 Novel intracorporeal knot tying model utilizing contrasting ropes at fixed lengths to isolate and error proof intracorporeal knot tying

P065

Advanced Laparoscopic Fellowship Training Decreases Conversion Rates During Laparoscopic Cholecystectomy for Acute Biliary Diseases

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Introduction: The purpose of our study was to compare outcomes of surgeons who have completed additional training in a laparoscopic fellowship to those surgeons without additional formal laparoscopic training when performing laparoscopic cholecystectomies (LC) in patients with acute biliary disease.

Methods: We retrospectively reviewed 1383 consecutive patients who underwent a LC for acute cholecystitis, gallstone pancreatitis, choledocholithiasis, cholangitis, biliary colic/symptomatic cholelithiasis, biliary dyskinesia, gallbladder polyps, chronic cholecystitis, and adenomyosis of the gallbladder from January 2008 to August 2011. A total of 9 surgeons participated in the study (3 with advanced laparoscopic training). We then selected the 592 consecutive patients who underwent a LC for an acute process, including acute cholecystitis, gallstone pancreatitis, choledocholithiasis and acute cholangitis. Preoperative variables included demographics, body mass index (BMI), ASA score, and abdominal surgical history. Surgical variables included number of ports, total operative time, estimated blood loss (EBL), conversion data, performance of an intraoperative cholangiogram (IOC), complication rate, morbidity, and length of stay (LOS). Our primary end-points were conversion rates and surgical morbidity. Our secondary end-point was length of stay.

Results: Demographics, ASA score, and history of previous abdominal surgery did not differ between the two groups (Table 1). The fellowship trained group (Fellowship Group) operated on patients with significantly higher BMI (35.6 ± 14.4 vs. 33.3 ± 13.7 kg/m², respectively; $P = 0.005$), performed significantly more single-incision LC (SILC) (5.5% vs. 0%, respectively; $P < 0.0001$) and IOCs (57% vs. 20%, respectively; $P < 0.0001$). Total operative time was significantly longer in the Fellowship Group (111 ± 42 vs. 104 ± 39 min, respectively; $P = 0.04$). However, conversion rates were significantly lower in the Fellowship Group (1.7% vs 8.5%, respectively; $P = 0.0004$). There was no difference in EBL, and postoperative surgical morbidity. The intraoperative complication rate was almost twice as high in the non-fellowship trained group; however, this did not reach statistical significance (4.8% vs. 2.5%, respectively; $P = 0.20$). The LOS was significantly lower in the Fellowship Group (median 28 hrs vs. 39 hrs, respectively; $P = 0.03$). On multivariate analysis (MVA), the most significant predictor of avoiding conversion and intraoperative complications were fellowship training (OR 0.211 \pm 0.478, 95% CI: 0.089–0.503; $P < 0.0001$) and (OR 0.371 \pm 0.082, 95% CI: 0.177–0.779; $P = 0.009$), respectively. The most predictive variable on MVA of a postoperative complication was ASA score (OR 2.656 \pm 0.695, 95% CI: 1.590–4.437; $P < 0.0001$).

Conclusion: Our data demonstrates that advanced laparoscopic surgical training decreases the need for conversion during LC for an acute process. Moreover, intraoperative complication rates may be decreased with advanced laparoscopic training.

Table 1

	Fellowship Trained Group (N = 237)	Non-fellowship Trained Group (N = 355)	P Value
Preoperative Data			
Male patients, (N)	36% (86)	39% (140)	0.9
Age (yrs), mean \pm SD	51 \pm 8 (med 51, range 16–69)	52 \pm 18 (med 51, range 18–91)	0.50
Race			
White	27% (64)	32% (114)	0.42
Black	4% (10)	5% (16)	
Hispanic	10% (23)	11% (40)	
Unknown/Other	59% (140)	52% (185)	
BMI (kg/m ²)	35.59 \pm 14.42	33.34 \pm 13.66	0.005
ASA score	2.16 \pm 0.69	2.14 \pm 0.65	0.75
Any previous abdominal surgery, (N)	32% (77)	34% (122)	0.66
Any previous upper abdominal surgery, (N)	9% (22)	9% (32)	1.0
Surgical Data			
SILS,(N)	5.5% (13)	0	<0.0001
IOC performance, (N)	57% (134)	20% (72)	<0.0001
OR time (min), mean \pm SD	111 \pm 42	104 \pm 39	0.04
Estimated Blood Loss (ML)	78 \pm 165 (med25, range 5–1000)	64 \pm 110 (med25, range 0–1100)	0.57
Conversion rate, (N)	1.7% (4)	8.5% (30)	0.0004
Intraoperative complication rate, (N)	2.5% (6)	4.8% (17)	0.20
Postoperative Data			
Postoperative complication rate, (N)	12.2% (29)	9.6% (34)	0.28
Major complication rate (Clavien Grade \geq III), (N)	3.8% (9)	6.2% (22)	0.26
Length of stay (hrs), mean \pm SD	50.4 \pm 74.0 (med 28, range 2.25–840)	61.4 \pm 76.3 (med 39, range 1.2–640)	0.03

P066

Colonoscopy Simulator Training And Transfer Of Skills To Clinical Practice

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Introduction: Surgical residents have learned flexible endoscopy techniques by practicing on patients in hospital settings under the strict guidance of experienced surgeons. Simulation is often used to “pre-train” novices on endoscopic skills before practicing on actual patients; nonetheless the optimal method of training remains unknown. The purpose of this study was to compare endoscopic virtual reality and physical-model simulators and their respective roles in transferring skills to the clinical environment.

Methods and Procedures: Twenty-seven novice surgical interns served as participants in this study. At the beginning of a skills development rotation, each intern performed a baseline colonoscopy on a real patient under faculty supervision. Their performance was scored using the Global Assessment of Gastrointestinal Endoscopic Skills (GAGES). Subsequently, interns completed a three-week flexible endoscopy curriculum developed at our institution. One-third of the residents were assigned to train with the GI Mentor platform exclusively, one-third of the residents were assigned to the Kyoto simulator, and one-third of the residents trained using both simulators. At the end of their rotation, interns performed one posttest colonoscopy on a different real patient, again under the guidance of experienced faculty and scored using GAGES. A survey was administered after completion of study participation to evaluate self-reported levels of anxiety, colonoscopy performance and simulator preference.

Results: A statistically significant improvement in the GAGES total score ($p < 0.001$) and on each of its subcomponents ($p = .001$) was observed from pre- to post-test when analysis was performed for all groups combined. When subgroup analysis was conducted, trainees using the GI Mentor or both simulators showed significant improvement from pre- to post-test in terms of GAGES total score ($p = .017$ vs. $p = .024$ respectively). No single training condition was shown to be a better training modality when compared to others in terms of total GAGES score or in any of its subcomponents (Table 1).

Table 1

Simulator	Pretest GAGES Score (Median)	Posttest GAGES Score (Median)	P value
GI Mentor	6	10	.017
Kyoto	6	8	.072
Both	6	10	.024
All combined	6	10	<.001

Survey analysis reported that trainees in the GI Mentor and Kyoto groups had a statistically significant decrease of self-reported anxiety ($p = .014$, $p = .038$ respectively) and self-reported improvement in their performance ($p = .005$, $p = .008$ respectively) in the post-testing phase. However, these differences were not significant for trainees assigned to both simulators despite showing statistical significant improvement in their post-testing GAGES total score ($p = .024$).

Other variables such as total colonoscopy time, time to reach the cecum, and time with a clear lumen were not significantly different between groups. The same applied for case difficulty, degree of bowel preparation and faculty intervention showing similar characteristics for patient selection among groups.

Conclusion: Colonoscopy simulator training with the GI Mentor platform exclusively or in combination with a physical model simulator improves skill performance in real colonoscopy cases when measured with the GAGES tool.

P067

Laparoscopic Surgery Skills Evaluation: Motion Analysis Based On Accelerometers

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Introduction: Technical skills are essential in the practice of surgery. Performance evaluation through objective metrics is important to be used for formative and summative assessments. Motion analysis represents an area of focus. We proposed a low-cost and readily available method to evaluate movement patterns based on accelerometers of the iPod touch device of Apple Inc®.

Methods: The study includes two groups of individuals with different laparoscopic surgery skill levels (experts vs novice) which performed a certain task with the device (iPod touch) placed on the dominant hand wrist. Accelerometer Dato Pro application (Wavefront Labs®) was used to obtain movement related data detected by accelerometers and exportation to Excel (Microsoft®) for tabulation and analysis. Studied variable were average acceleration and peak acceleration in each axis (x, y, z). Statistical analysis was performed using StatCalc.

Results: The analysis of the average acceleration and peak acceleration showed statistically significant differences between both groups in both “y” axis ($p = 0.04$, $p = 0.03$) and “z” axis ($p = 0.04$, $p = 0.04$) demonstrating the method capability to distinguish between experts and novices. The analysis and comparison of these variables in “x” axis showed no significant differences between groups which could be explained by the fact that the task involves few movements on “x” plane.

Conclusion: The accelerometer based analysis of movement patterns allows to distinguish individuals with different laparoscopic skills level. Therefore it would be a useful tool for assessing the skills development of surgeons in training.

P068

Assessment of Performance During Advanced Laparoscopic Fellowship- A Single Subject Design

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Introduction: The objective of this study was to investigate the acquisition of advanced laparoscopic technical skills and to determine the association between continuous self-assessment of a trainee and that of an attending, using a single-subject design. Single subject designs are used widely in educational and behavioral research, where the subject serves as the control. The study was designed based on the “Practice-Based Learning and Improvement” ACGME competency that has been adopted by the Fellowship Council. Minimally invasive surgery fellows are required to use feedback from faculty and their own self-assessments to develop a plan for filling gaps in knowledge or skills.

Methods and Procedures: This study collected yearlong consecutive assessments using valid technical assessment tools completed by a minimally invasive fellow (continuous self-assessments) and one faculty member at the University of North Carolina. Three commonly performed procedures in this fellowship included Heller myotomy (HM), paraesophageal hernia repair/ Nissen fundoplication (PEH/NF), and Roux-en-Y gastric bypass (RYGB). We used the Global Operative Assessment of Laparoscopic Skills (GOALS) and the Objective Structured Assessment of Technical Skills (OSATS) to assess general laparoscopic skills, and we used procedure-specific rating tools to assess performance during HM, PEH/NF, and creation of the jejunojunostomy portion of the RYGB. In addition to descriptive statistics, a t-test and a linear mixed-effects regression were used to compare the ratings between assessors and measure changes in ratings throughout the year, accordingly. The scores for each assessment were averaged by month across assessors to determine incremental changes. Assessments with missing data and delayed completion were excluded, as were recurrent and revisional cases.

Results: A total of 76 procedures (HM: n = 16, PEH/NF: n = 19, RYGB: n = 41) were included (152 assessments by the fellow and the attending). The average ratings increased for each assessment every month by approximately 0.11 points (based on 5-point assessment tool scales), $p < 0.001$, indicating a significant learning effect. The differences between baseline and 12-month ratings ranged between 1.00 and 1.57 points, depending on the procedure and assessment tool used. There were significant differences between ratings by trainee and faculty; ratings by faculty were significantly higher than the fellow’s self-assessments, indicating more stringent ratings by the fellow.

Conclusion: Our study demonstrates the feasibility of using objective assessment tools for assessment of performance during an advanced laparoscopic fellowship. These tools can be used as a quantitative index to monitor fellows’ learning curve and to provide objective feedback during self-directed learning to improve performance.

P069

Superiority of 3D Imaging In Endoscopic Surgery Training

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Objectives: 3D surgery has recently been attracting attention with the gradual increase in the use of surgery-assisting robots with 3D imaging and the development of 3D endoscopy. There have been no multifaceted studies on the superiority of the 3D endoscope compared with the 2D endoscope in surgical procedures. Thus, we performed a following examination and report our findings herein.

Subjects and Methods: The subjects were 12 surgeons who were engaged in endoscopic surgery. A consumer camera, which was capable of obtaining both 2D and 3D images, was used. The time to perform 1 suture and 3 ligations was measured using a dry box. 2D and 3D endoscopes were alternately used to perform the measurement, 6 times in total. The number of mistakes in catching the string was also counted. In addition to the overall comparison of 3D and 2D endoscopes, a comparison was also made between the proficiency group of surgeons, who were skilled in performing endoscopic surgery, and the training group of surgeons, who were undergoing training for the surgery. Lastly, we administered a questionnaire survey regarding the superiority of 3D imaging using a Visual Analog Scale (VAS).

Results: The time for suture and ligation was significantly shorter with 3D than with 2D endoscopy ($P = 0.016$), with a significant difference in the training group ($P = 0.002$), but not in the proficiency group. The number of mistakes in catching the string decreased significantly ($P = 0.008$) in both groups (n = 10) with 3D imaging. Using the VAS, it was found that suturing, ligation, surgical technique, depth perception, accuracy, and usefulness were 73, 77, 65, 81, 70 and 77 points, respectively, with the 3D imaging.

Conclusion: It was suggested that 3D imaging might contribute to a shorter time for suture and ligation, and also increase the accuracy of the surgical technique, with a decrease in the number of mistakes in catching the string. In addition, 3D imaging was especially useful for the training group. A high satisfaction level was confirmed based upon the results of the questionnaire survey.

P070

Laparoscopic Simulation In Reverse And Side Alignment Does Not Improve Task Performance In Forward Alignment: A Randomized Controlled Trial

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Introduction: Because the influence of visual-spatial discordance during training on laparoscopic skills acquisition is poorly understood, we hypothesized that forward alignment surgical skills performed on a laparoscopic trainer would improve following simulation experiences that create a situation of extreme visual-spatial discordance (e.g., reverse and side alignment). We conducted a randomized controlled trial to test this hypothesis.

Methods: A trainer box was configured to view forward, side, and reverse camera angles of the visual field to perform Fundamentals of Laparoscopic Surgery peg transfers. Medical students (n = 60) without laparoscopic experience were randomized to one of three groups, each group practicing in a different order of alignment (forward, side, reverse). Each group had four peg transfer practice sessions and was tested at the end of each session in forward alignment only (Table 1). Group A practiced all four sessions in the forward alignment. Group B practiced in the forward, forward, side, and reverse alignment. Group C practiced in the forward, side, reverse, and forward alignment. The practice and testing was completed in one session. Test scores for each group were compared using General Linear Modeling ($P < 0.05$). Likert-based pre- and post-trial surveys were completed by participants (e.g., demographics, dexterity, video-gaming experience), analyzed by χ^2 ($P < 0.05$).

Table 1. Algorithm

Group A (n = 20)	Group B (n = 20)	Group C (n = 20)
3 practices—forward	3 practices—forward	3 practices—forward
Pre-test peg transfer—forward alignment		
10 practices—forward	10 practices—forward	10 practices—side
1st test peg transfer—forward alignment		
10 practices—forward	10 practices—side	10 practices—reverse
2nd test peg transfer—forward alignment		
10 practices—forward	10 practices—reverse	10 practices—forward
3rd test peg transfer—forward alignment		

Results: Group A students performed better when compared to Group B and C students (Table 2) in their final test ($p = < 0.001$). Group B and C students’ test performance in forward alignment was significantly worse after side and reverse practice sessions ($p = 0.044$). Since Group C students’ last practice session was in forward alignment, their final test performance was the same as Group A ($p = > 0.999$). We found no significant difference in test performance related to dexterity, gender, age, or video-gaming experience.

Table 2. Final test scores after three practice sessions

Groups	Mean Score	P Value
A vs. C	70.7 ± 12.9 vs. 74.2 ± 16.4	>0.999
A vs. B+C	70.7 ± 12.9 vs. 101.8 ± 32.0 & 74.2 ± 16.4	0.01

Conclusions: Our results show that side and reverse alignment practice does not improve laparoscopic skills in forward alignment, refuting our hypothesis. The visual-spatial discordance caused by the side and reverse alignment practice resulted in no improvement in forward alignment testing. Since the statistical final tests for Group C were the same as Group A, it proves that once the visual-spatial discordance is corrected by practicing in the forward alignment, students performed the same as those who never experienced the discordance.

P071

Establishment Of Animal Lab For The Evaluation And Training Of Advanced Laparoscopic Surgery

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Introduction: The use of trainer box for the training of fundamental laparoscopic skills has spread widely, however, the training tools and the system of advanced laparoscopic surgery have not yet been common in the residency curriculum due to the lack of environment and instruction method. Although animal lab using porcine model is one of the best places to practice advanced procedures with similar anatomy capability of encompassing all the aspects of a real surgical experience outside of the operating room, there are few institutes that use animal lab for the training of surgical residents in Japan. We established animal lab in our institute for the training of advanced laparoscopic surgery and started the evaluation and training for surgical residents from 2012. In this study, we describe our initial experience of animal lab and demonstrate its educational potential for the evaluation and training of laparoscopic surgery in residency curriculum.

Method: The training sessions of advanced laparoscopic surgery were held 3 times at the animal lab in Hokkaido University from April 2012 to January 2013. Residents and practicing surgeons took part in the training session. The contents of the training were Nissen Fundoplication, gastrectomy and dissection of regional lymph node around the stomach using porcine model. Each task time and individual performance was measured using Global Operative Assessment of Laparoscopic Skills (GOALS), which was developed and validated, and was used widely as a scale of the laparoscopic surgery skills. The learners were queried about their impression of the value of the training and assessment on a scale of 1 to 5 after their training session.

Results: Total 9 surgeons participated in the program. Learners level were postgraduate year (PGY) 5 to 8. The mean number of their experiences for endoscopic surgery was 98 (30–156) cases, and mean hour of previous simulation training using trainer box was 8 (1–24). The GOALS score of lymph node dissection and case number had good correlation ($r = 0.6$). On a scale of 1 to 5, 9 learners evaluated the animal lab session to be very useful for training (4.8 ± 0.5), excellent teaching and feedback (4.4 ± 0.5). They considered that the training sessions of advanced laparoscopic surgery might have most educational impact for the resident level PGY 3 to 5.

Conclusion: We established animal lab for the training of advanced laparoscopic surgery. The training of laparoscopic surgery using porcine model has potential of implementation into surgical training curriculum and may better prepare residents to start advanced laparoscopic surgery.

P072

The Effect of Caffeine on Laparoscopic Skills Performance in Simulated Settings

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Introduction: Coffee is commonly consumed by many surgeons due to its suspected effect on both performance and mental alertness. Our objectives in this study were to evaluate the effect of different doses of caffeine on performance of laparoscopic skills in a virtual setting.

Methods: We recruited 28 medical students who fulfilled the inclusion criteria (no prior laparoscopic experience, virtual or otherwise). They performed laparoscopic tasks under three conditions: decaffeinated, 100 mg caffeine and 200 mg caffeine taken as coffee one hour before the task. Candidates were crossed over to the other caffeine doses on different days.

The tasks performed were: Hand-eye Coordination (task 3), Two-handed Manoeuvres (task 6), Cutting task (Task 7) and Electrocautery task (Task 8) using the Lap Mentor™ (Simbionix®). All the candidates performed 3 repetitions of each task. Performance was compared by measuring completion time, accuracy, number of movements and total path length. All data was collected in Excel and analysed using SPSS version 21. We used a tailed T-test and p-values <0.05 were considered statistically significant at 5% level.

Results: Seventeen out of twenty eight candidates completed the study. There were 8 males and 9 females with a mean age of 22.4 years. Table 1 shows the difference by the candidates under the 3 different doses.

Table 1

Task	Total Completion Time/s			Accuracy/%			Total Number of Hand Movements			Total Path Length/cm		
	Decaf	100 mg	200 mg	Decaf	100 mg	200 mg	Decaf	100 mg	200 mg	Decaf	100 mg	200 mg
Task 3	687	755	713	92.59	95.19	94.28	779	845	842	3819	4000	4121
Task 6	1877	1922	1801	92.59	94.12	94.34	2671	2722	2652	9237	8743	8772
Task 7	1576	2024	1810	99.49	99.07	99.28	2614	3335	3026	5693	7018	6349
Task 8	3155	3428	3337	96.45	97.01	97.10	2513	2824	2776	6556	6841	7025

The decaffeinated group had a faster completion time than 100 mg in task 3 ($p = 0.193$), 6 ($p = 0.371$), 7 ($p = 0.004$) and 8 ($p = 0.049$) and a faster completion time than 200 mg in task 3 ($p = 0.527$), 7 ($p = 0.071$) and 8 ($p = 0.188$) but not task 6 ($p = 0.525$).

The decaffeinated group only showed a higher accuracy score compared to 100 mg and 200 mg of caffeine in task 7 ($p = 0.24$ and 0.604 respectively) but showed a lower accuracy score compared to 100 mg and 200 mg caffeine in task 3 ($p = 0.062$ and 0.290 respectively), 6 ($p = 0.469$ and 0.466) and 8 ($p = 0.477$ and 0.932 respectively).

The decaffeinated group had fewer hand movements than 100 mg and 200 mg caffeine in task 3 ($p = 0.218$ and 0.230 respectively), 7 ($p = 0.007$ and 0.122 respectively) and 8 ($p = 0.154$ and 0.055 respectively) and 100 mg in task 6 ($p = 0.840$).

The decaffeinated group had a shorter path length than 100 mg and 200 mg caffeine in task 3 ($p = 0.035$ and 0.210 respectively), 7 ($p = 0.039$ and 0.154 respectively) and 8 ($p = 0.526$ and 0.138 respectively) but not in task 6 ($p = 0.393$ and 0.344 respectively).

Conclusions: Caffeine had little effect on laparoscopic performance of basic tasks (task 3, 6), but had more negative effects on advanced tasks (task 7, 8) in a simulated setting though the difference was not dose dependent. Further studies may aim to evaluate whether this has any significance on clinical practice.

P073

Development Of A Virtual Reality Robotic Surgical Curriculum Using The Da Vinci Si Surgical System

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Introduction: Prior literature has shown content and construct validity for the “da Vinci skills simulator” package available in the “da Vinci Si system”. It is unclear which of the many provided virtual reality (VR) modules are useful for skills evaluation or how many training trials are necessary to reach the manufacturer’s preset proficiency goal of 80%. This study aimed to develop a training curriculum to evaluate the basic robotic skills necessary to reach this preset proficiency score and correlate the level of surgical experience with the overall performance obtained using this simulator.

Methods and Procedures: Twenty-two participants (4 faculty, 4 senior, and 14 junior residents) were enrolled in a 4 week VR robotic training curriculum developed at our institution. A set of seven robotic skills (Table 1) were selected based on the manufacturer’s exercise primary endpoint.

Table 1

Skill	Robotic Skill	Pre-testing Overall Score %	Post-testing Overall Score %	No. Trials to Proficiency	P value
1	Camera control	72.5	90	3	<.001
2	Energy control	68	84.5	2	<.001
3	Endowrist manipulation	86	96	2	<.001
4	Basic needle driving	54	80	3	<.001
5	Advanced needle driving	50.5	73.5	6	<.001
6	Needle control	71.5	85	2	<.001
7	4th arm control	30.5	69	6	<.001

During their pretesting session, participants completed one trial of each of the seven selected robotic exercises. In two individual sessions over a two week period, trainees practiced a different set of exercises that evaluated the same basic robotic skills assessed during pretesting with the objective of reaching an overall score of 80% on two consecutive attempts. If proficiency was not achieved, then a maximum of 6 trials per exercise was allowed before advancing to the next simulated skill. During their fourth week of training, participants completed a post-testing session that used the same set of exercises that were used during pre-testing. Participants’ overall performance and various metrics were recorded in an online database for further analysis.

Results: A significant skills gain from pre- to post-test was observed for each of the seven basic robotic skills regardless of participant’s level of training ($p < 0.001$). Interestingly, participants achieved an overall score of 80% or more on only five of the seven exercises suggesting that more complex skills will require more than 6 practice trials to reach the preset proficiency score. Additionally, no statistical difference in gain of skills was found between groups suggesting robotic skills development is independent of level of expertise.

Conclusion: A dedicated virtual reality robotic training curriculum significantly improves the seven basic robotic surgical skills necessary to operate the da Vinci Si surgical console. Nonetheless, more than 6 training trials appear to be necessary to reach proficiency levels on more advanced skills.

P074

Reliability of GOALS Scores Using Generalizability Theory

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Background: The Global Operative Assessment of Laparoscopic Skills (GOALS) is an objective assessment tool that had been used to assess performance in the operating room. Its reliability has been demonstrated using traditional methods such as inter-rater reliability. However, these methods cannot assess if the reliability of an instrument is affected by other factors such as different procedures, the attending or the difficulty of the procedure. Generalizability Theory (GT) calculates the independent variability attributed to external factors, and therefore can assess how these factors may affect reliability while also incorporating test-retest and inter-rater reliability. The purpose of this study was to use GT to determine if external factors affect the reliability of GOALS scores.

Methods: A sample of general surgery residents and attending staff at a single teaching institution between 2003 and 2009 underwent GOALS assessment (5 items, maximum score 25) after laparoscopic cholecystectomy, inguinal, or incisional hernia repairs. Participants must have undergone two GOALS assessments completed by 2 independent trained observers. Inter-rater reliability at each case (traditional method) was demonstrated by intra-class coefficient (ICC). Reliability was also calculated using GT, with participants, raters, and occasions included as factors, along with their interaction terms. Factors such as case differences, the attending or the case difficulty were included in the definition of occasion. The independent effect of each factor is expressed as a percentage of total adjusted variance. GT analysis was performed using G-STRING 4, and other analysis using SPSSv20.

Results: A total of 17 subjects (11 cholecystectomy, 3 inguinal, 3 incisional) were included in this study, for a total of 68 GOALS assessments. The mean GOALS score at baseline was 17.3 ± 3.6 , and 18.8 ± 3.7 at the second assessment ($p = 0.08$). The mean time to complete both assessments was 32.2 days. The inter-rater reliability using traditional methods was good (ICC = 0.85). However, GT analysis reported that participants only accounted for 63.4% of the total variability in GOALS scores, occasion accounted for 4%, while the interaction between participants and occasion accounted for 25.0% which means all factors related to occasion (the different cases, the attending and the difficulty) contribute to the reliability of the GOALS score. The high impact of the interaction of participants and occasion means that there is a tendency for surgeon performance to be affected by a particular case. The raters did not account for any variability in GT. **Conclusion:** The reliability of GOALS assessments is dependent on other factors apart from participants and raters. When assessing operative performance using GOALS, these factors could be taken into account using GT.

P075

Starting A Minimal Invasive Surgery Program In Colorectal Cancer At The National Cancer Center Mexico. A Challenging Environment For New Procedures

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Introduction: Minimal invasive surgery in colorectal cancer is a common practice in countries as US, this is still not true in countries as Mexico. In tertiary referral center and most of the hospitals run by the government, young surgeons have to face running minimal invasive programs under a challenging environment, having to face critical aspects that slow down the use of this approach in their daily practice. We are still struggling with resistance from surgeons who don’t believe in this approach, we have social problems as the majority of patients can’t afford the cost of the devices used and neither the hospital so we have to manage working with fewer devices that sometimes are not quite optimal, and a significant amount of patients have very large tumor and poor conditions by the time they are diagnosed. Also we don’t have many fellowship programs in advanced minimal invasive procedures, so most of the surgeon interested, have to travel around the world to learn new techniques.

Besides of these factors at the National Cancer Center we started in 2010 a minimal invasive program at the gastrointestinal tumor department. Most the cases have been done by two young surgeons (1 male, 1 female), who were backed up by the authorities of the Institutions. During this period, we have developed a learning center to perform workshops, we have had three International courses that took place at our hospital where different international professors have had participated with talks and live surgery cases showing us their techniques, and we have had started to train oncology surgeons residents.

Materials and Methods: we present a prospective study that includes patients with colorectal cancer treated with minimal invasive surgery from march 2010 to July 2013. We included patient with colorectal cancer, tumor size less than 8 cm, no occluded, no perforated. Statistical descriptive was used for the variable analysis

Results: A total of 160 cases with colorectal cancer treated with laparoscopic surgery were included of which 72 were rectal cancer and 88 colon cancer. All procedures were lap assisted. Conversion rate was 8%. The morbidity rate was 29% and mortality rate 2%, recurrence rate was 9%. The surgical mean time was 210 min, the mean number of resected nodes was 22, all margins were negative excepted for 5 cases.

Conclusion: During a period of three years we did 160 procedures, despite the adversities in which we work. During this period of time we have been able to make a lot of positive changes in our environment, we have had started to teach advanced techniques to our residents and more cancer patients are getting the benefit of this approach. Our results have been better as we have had more number of cases, but we believe that in our environment learning curve is slower than in other developed countries. In spite of this our results are similar to that reported in literature. To our knowledge this is the largest series in minimal invasive surgery and colorectal cancer in our country.

P076

One Size Fits All? The New Surgical Innovation Philosophy

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Introduction: The growing importance of novel technologies in medical science and healthcare demands tighter collaborations between engineering and medicine. Professionals from both worlds have to master a wide range of clinical knowledge and technical skills to succeed in the field of minimally invasive surgery (MIS) and surgical device development. Due to lacking practical experiences, medical students, and particularly young engineers often possess a solid theoretical background which they are not able to translate into a clear understanding of healthcare needs for which a solution must be developed. The key element to overcome this gap is to mix and expose early in their training students from both backgrounds to the real challenges of surgical techniques and technologies. The aim of this study is to explore an innovative teaching method designed to bring together medical and engineering students and provide them with a structured, step-by-step, concentrated learning experience in the field of MIS.

Methods and Procedures: For two consecutive years (August 2012–2013), a yearly 5-day intensive summer school for young professionals in medicine and engineering was organized at the IRCAD-IHU institute in Strasbourg, France. The program offered a total of 20 hours of hands-on training in open surgery, laparoscopy, flexible endoscopy, and robotic surgery. The training consisted of a series of progressive structured exercises involving first box trainers, ex-vivo tissue and virtual simulators, then experimental animal models. The LASTT® method was administered to participants at day 1 and 5 to objectively measure students' learning curve and psychomotor skills development in the following domains (1) camera navigation, (2) laparoscopic forceps handling and (3) bi-manual coordination. A 1-to-5 Likert scale satisfaction survey was administered to all students to determine if they judged the course to be a profitable learning experience.

Results: Sixty students (30 medical students, and 30 engineering students, mean age 23.8; SD 2.84) from 15 countries participated in this study. A significant ($P < 0.001$) improvement of psychomotor skills in exercise 1, 2, and 3 throughout the course was seen for both medical participants (49.8%, 24.1%, 17.2% respectively) and engineering participants (22.4%, 24.1%, 17.2% respectively). Overall, the medical students performed significantly better in all of the exercises compared to the engineering students. There was no significant correlation between the two groups and their demographic characteristics. An overall mean satisfaction rate of 4.71 (SD 0.10) and 4.94 (SD 0.09) was awarded to the training method by the engineering and medical participants respectively.

Conclusion: The method proved to be successful in improving MIS psychomotor skills, demonstrating that with a structured training method the students' performances could be enhanced by 25% in only 5 days, regardless of their background. The method was very well received by all participants who identified it as a potential important strategic tool to succeed in future identification of clinical needs and medical device development related to the surgical field.

P077

Assessment Of Medical Student Laparoscopic Skills Using Virtual Reality And Fundamentals Of Laparoscopic Surgery™ Tasks

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Introduction: This study evaluates if undergraduate medical trainees' laparoscopic skills acquisition could be monitored and assessed using a virtual reality (VR) simulator and how the resultant metrics correlate with actual performance of Fundamentals of Laparoscopic Surgery™ (FLS) tasks. We studied the use of VR to characterize and assess the laparoscopic skills attained in a competency-based curriculum designed for graduating medical students applying for general surgery residency. Our overall goal is to integrate milestone competencies for surgery across the educational continuum and document trainee progress toward proficiency.

Methods: Ten fourth year medical students applying for surgical residency completed a monitored, self-paced virtual reality training curriculum comprised of camera navigation (CN), hand eye coordination (HEC) and FLS tasks: circle cutting (CC), ligating loop (LL), peg transfer (PT), and intracorporeal knot tying (IKT). Performance goals were those of the simulator for CN and HEC tasks and the standard goals given in the instruction manual for FLS tasks. Progress through the VR curriculum was monitored weekly by a single faculty member (FLS certified) using online software (Mentorlearn™). After eight weeks, students were observed and recorded performing FLS tasks. The best VR performance for each FLS task and the observed performance of the FLS tasks were scored by assigning penalties as described in the FLS instruction manual. The ability of the VR simulator to detect penalties in each of the FLS tasks and agreements of time taken to complete tasks are reported. Additional metrics from the VR simulator (speed, number of movements, path length, strain, needle drops, passes, and loading time) were examined for correlation to the commission of penalties. The VR simulator's sensitivity and specificity was assessed on FLS task penalties; Bland Altman plots evaluated the agreement between the VR simulator and observed time of performance; and a bivariate cumulative logit analysis assessed the correlation of metrics to the commission of penalties.

Results: All ten students trained in 100% of the curriculum and were proficient in CN and HEC tasks, though no student achieved proficiency in all of the VR modules assigned. Proficiency was achieved in CC, LL, PT and IKT by 8, 6, 8, and 1 student, respectively. VR simulation showed high specificity for predicting zero penalties on the observed CC, LL, and PT tasks (78%, 80%, and 60%). VR consistently underestimates time for CC, LL, PT, and IKT tasks. Additional variables did not correlate with penalties for any task.

Conclusions: VR can be used to monitor and assess medical student acquisition of laparoscopic skills. The absence of penalties in the simulator reasonably predicts the absence of penalties in manual demonstration of CC, LL and PT skills, but not IKT. The documented skills acquired by trainees can be transferred to a graduate medical education program for further monitoring of progress toward proficiency.

P078

The Successful Development And Implementation Of A Novel, Acute Care Surgical Simulation Pathway Training Curriculum

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Introduction: The role of simulation in surgical education is to provide an efficient training method that improves patient safety by better preparing trainees prior to actual clinical encounters. Integrating non-technical skills, such as communication and decision-making, is equally important to teaching conventional technical skills. We designed and implemented a PGY-1 surgical simulation training curriculum concentrated on developing both technical and nontechnical surgical skills utilizing a dynamic acute care surgical patient across the entire care continuum: pre-op, intra-op, and post-op.

Methods: Over a 3 day period, trainees were exposed to case-based simulations and didactics using Standardized Patients (SP). At the beginning and end of the 3 day module, there was a comprehensive and summative session, providing proficiency assessments of resident performance in the pre-op, intra-op, and post-op phases of care. Residents completed each phase in succession. First, the resident interacted with a SP presenting with acute appendicitis in the emergency department. Following that encounter, they immediately went to the intra-op phase where they performed a laparoscopic appendectomy. This phase was held in a high-fidelity simulated operating room that included a confederate anesthesiologist, a confederate scrub tech, and utilized a synthetic retrocecal appendix model contained within a phantom abdomen. Following the intra-op phase, the resident performed a post-op visit with the SP presenting with a normal course on post-op day 1. Resident performance during each phase of the pathway was rated by a faculty member, resident self-assessment, and the SP. Bracketed by the summative pathway sessions were formative sessions designed to improve resident knowledge and skill when managing an acute care surgery patient. These sessions were comprised of didactic lectures, SP encounters, and hands-on technical skills sessions.

Results: Five residents have completed the training module. Faculty perception of resident performance for each phase of care showed improvement. Mean overall improvements for each phase were (before training to after training): Pre-op 3.4 to 3.8 (out of 5); Intra-op 2.0 to 2.2 (out of 5); Post-op 5.8 to 7.2 (out of 9). The resident self-assessments also showed improvements: Pre-op 3.0 to 3.8; Intra-op 2.0 to 3.2; Post-op 6.2 to 7.4.

Conclusion: A pathway based surgical simulation training curriculum targets an important gap in current surgical simulation training methodologies by linking the individual components of a disease process and management. The results of our innovative and unique curriculum indicated an improvement in intern performance across the entire surgical care pathway, likely through stronger learning associations and retention of knowledge due to the more-realistic pathway experience.

P079

Advances In Surgical Education: Using The iPad and iTunes U To Deliver A Mobile Digital Curriculum

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Objective: The 80-hour workweek has necessitated a shift in surgical training toward better utilization of time outside the operating room. Tablets provide immense potential to complement the surgical trainee's experience by providing just-in-time access to clinical resources. A digital curriculum can assist in all aspects of education, particularly in learning laparoscopic and endoscopic procedures. We hypothesize that by providing iPads to surgical residents with an organized digital curriculum, their access to quality references will improve, resulting in increased clinical efficiency, higher American Board of Surgery In-Training Exam (ABSITE) Scores and better patient education.

Description of Methods: iPad tablets were distributed to all residents and fellows in our general surgery program. Specifically tailored iTunes U courses were constructed for each surgical rotation. Once enrolled in the courses, each resident was given access to a digital course curriculum. These course curriculums include goals and objectives tailored toward each Post Graduate Year level, academic materials chosen by attending faculty, key published articles, and links to recommended Surgical Council on Resident Education (SCORE) modules. Courses pertaining to laparoscopic and endoscopic surgery include technical videos that are high quality and have been selected by minimally invasive surgeons. Rather than utilizing unreliable resources, our residents and fellows now have easy access to credible media that can be viewed instantaneously on a tablet.

Preliminary Results: A survey was handed out to all residents prior to iPad distribution. Of 31 completed surveys, 100% stated they used a smartphone and 90% stated they used their smartphone for clinical applications. 68% of residents agreed or strongly agreed that an iPad would add significant value to their current workflow. 71% stated that they currently use applications on their smartphone or tablet to perform clinical work such as looking up labs or writing electronic orders. 71% agreed or strongly agreed that an iPad would improve their ABSITE scores. Only 19% had concern about how to learn to use their iPad. Resident utilization of the educational material provided on their tablets will be followed with interval questionnaires, clinical observation, and ABSITE score analysis.

Conclusions: The iPad tablet and iTunes U platform for organizing educational resources provides a mobile and innovative method of surgical training. Preliminary results show that the majority of residents are already utilizing mobile applications to assist with their clinical workflow. A digital curriculum can provide quality references and media to aid in training a new generation of surgical residents and fellows.

P080

Medimq: A Medical Image Diagnostic Learning and Assessment Tool

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Introduction: New endoscopic technologies in the hospital operating room (OR) have dramatically improved the technical performance of surgical procedures. Where open surgery and traditional literature provides teaching from an external view, endoscopes provide a completely different internal perspective. This vision shift challenges the endoscopists' anatomical and diagnostic knowledge, as high resolution imagery of internal tissue can be provided. In bronchoscopy and colonoscopy for example, high definition images can be captured using short focal distance camera in narrow band imaging (NBI), ultrasound or auto fluorescence techniques.

Training practitioners to identify the previously invisible features of pathologies now observable using new imaging techniques, or visible in higher resolution images, is key to utilising the enhanced diagnosis potential of this technology.

Although it has been shown that frequent assessment can be used to enhance and reinforce learning, current literature-based image recognition learning is passive with no frequent testing available.

As the early training phase (understanding and remembering) can be done with atlas images and videos, the next learning phases (analysing and applying) have to be done with an interactive tool before working on patients. These training activities need to be followed by rehearsal sessions to improve skill and confidence.

We describe here a Medical Images Quiz (medimq.appspot.com), an online interactive image-based training tool that can provide immediate feedback on pathology recognition. The tool allows trainees to directly mark up medical images (see Fig. 1) to show where biopsy/procedure sites should be. The sensitivity and the specificity of the trainees' answers can then be compared to the experts'.

Methods and Procedures: Two training sessions were performed with 40 thoracic doctors, all novices in NBI diagnostic tasks. The trainees were evaluated on their ability to find normal and abnormal vessels in NBI images, and their ability to recognize anatomy (mucosal or submucosal vessels).

Results: Trainees improved in Specificity from 0.67 to 0.90 during the training, but decreased again after eight weeks in a retention test, showing the importance of follow-up training.

Conclusions: With computer-based training systems, medical educators have access to a new tool to train their students, but also to perform a formal evaluation based on their pre-set assessment criteria. This tool can be used before (pre test), and during the training sessions, on the same or different sets of images. After the training, it can be used as a rehearsal or retention test. The Medimq provides a self-guided training program in medical image analysis by providing assessment and online interactive training in addition to traditional methods.

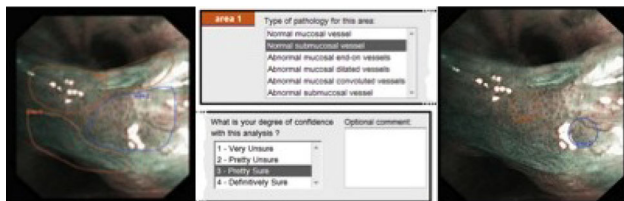


Fig. 1 Preparing the test, the expert (left image) marks the right answers in the whole image, by drawing and describing areas with its own taxonomy (centre image). During the test, the trainee (right image) marks biopsy sites interactively and describes them with the same taxonomy

P081

Laparoscopic Training In Virtual Reality: Haptic Vs. None Haptic

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Background: The efficacy of Simulation training is undoubted, however the superiority of different simulators remains disputable. In our study, we examine the effect of haptic feedback on learning processes.

Methodology: 42 novices were randomly recruited and trained using validated training curriculum with proficiency criteria, using commercially available VR simulators, with and without haptic feedback.

Results: Thirty-nine novices completed the training curriculum and reached proficiency levels. In the Haptic (HF): In basic tasks 5 proficiency reached in mean total simulator time (MTST) of 12:49 compared to 16:28 minute for none haptic (NHF), with average number trials of 7.3 compared to 7.7 respectively. In basic tasks 6, HF proficiency reached in MTST of 12:20 minute compared to 19:22 minute for NHF with average number of trials of 7.2 compared to 9 respectively. In procedural task 3 HF proficiency reached MTST of 26:42 minute compared to 59:19 minute for NHF with average number of trials of 5.33 compared to 12.4. In procedural task 4 HF proficiency reached in MTST of 27:40 compared to 1:05:25 minute for NHF with average number of trials of 5.2 compared to 8. In full Procedural LC HF proficiency reached in MTST of 30:04 compared to 1:27:43 minute for NHF with average number of trials of 3.4 compared to 8.1.

Conclusion: The superiority of haptic feedback is prominent exceptionally with increased task complexity. While both groups reached proficiency at rather close averages, the novices trained on haptic feedback simulator demonstrated faster learning curve and required less simulator time.

P082

Laparoscopic Skills, Like Riding a Bike or You Lose What You Do Not Use!?

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Background: The validity of virtual reality training has been repeatedly proven. However, The ideal time to start training remains a question that still needs to be answered. Is learning laparoscopic skills like riding a bike or you lose what you do not use?

Aim: To investigate the learning curves toward proficiency in laparoscopic cholecystectomy using virtual reality and the to test the retainability of skills after a significant time of no training and no laparoscopic exposure

Methods: We randomly recruited and progressively trained 30 novices toward full laparoscopic cholecystectomy procedure, on a high-fidelity, commercially available Virtual Reality simulator (Lap Mentor, Simbionix) using a validated training curriculum with expert performance used as proficiency criteria. We re-tested the novices one year after the initial training to investigate the skills retainability.

Results: All novices reached proficiency level in all tasks, ($P < 0.000$) Time taken to finish the full procedure decreased from 9:57 to 7:10 min in MTST of 30:04 minute. Economy of movement improved from 551 to 363 and the Total path length improved from 1368–807 cm number in of 3.4 trials. One year after the initial training with no further exposure to laparoscopy or simulation we investigated the retainability of the skills. 90% of the participants kept their time proficiency, 80% kept the economy of movement and 60% remained within the TPL proficiency.

Conclusion: The role of Virtual reality is evident and more prominently the skills obtained using VR were kept even after significant time of no training and no exposure.

P083

Outcomes Of Resident Versus Fellow Assisted Bariatric Surgery

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Introduction: Bariatric surgeries performed at our institution consist of Laparoscopic Roux-en-Y Gastric Bypass (LGBP) or Laparoscopic Sleeve Gastrectomy (SG). These are done with either a surgical resident or a minimally invasive fellow as the assistant. The purpose of our study was to compare outcomes of resident or fellow assisted bariatric surgery.

Methods and Procedures: Patients undergoing LGBP and SG between January 2008 and December 2012 were retrospectively reviewed. Body Mass Index (BMI), demographics, co-morbidities, operative time, length of stay (LOS), readmissions, complications, and percent excess weight loss at one year (EWL) were compared between the two groups. All analyses were done using SPSS v22.

Results: A total of 282 patients were reviewed. 127 operations were performed by a resident (LGBP 45, SG 82) and 158 by a fellow (RYGB 68, SG 87). Preoperative comorbidities, including diabetes, hypertension, coronary artery disease, asthma, and hyperlipidemia, were similar in both groups. The incidence of obstructive sleep apnea was higher in the fellow group (52 vs 25 $p = 0.021$). BMI was higher in the fellow group (46.58 vs 44.12 $p = 0.003$). There was no significant difference between the groups in length of hospital stay (2.13 vs 2.31 days $p = 0.163$), complications (18 vs 17 $p = 0.417$), or readmission (17 vs 9 $p = 0.262$). In looking at readmissions after SG (6 vs 3 $p = 0.349$) and LGBP (11 vs 6 $p = 0.67$), there was no difference between the groups. Operating room time was significantly shorter in the fellow group for all operations (153 vs 194 minutes $p < 0.001$). When comparing SG (132 vs 162 minutes $p = 0.008$) and LGBP (180 vs 252 $p < 0.001$) independently, the fellow group still had shorter operating room time. The percent EWL at one year did not differ between the two groups in both SG (52.42 vs 60.15 $p = 0.24$) and LGBP (55.22 vs 62.44 $p = 0.109$).

Conclusion: Resident assisted bariatric surgery is safe and does not increase complications when compared to fellow assisted. The operating room time is increased with resident involvement in bariatric surgery.

P084

Effects Of Experience And A Reference Tool In Laparoscopic Length Measurements

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Introduction: Various gastrointestinal operations necessitate the measurement of a specific length of small intestine; however, the accuracy of surgeons, and surgeons-in-training, performing these measurements laparoscopically is unknown. In this study, we evaluated the accuracy and precision of laparoscopic length measurements performed by surgical attendings, residents, and medical students using a box-trainer model with and without a measuring tool.

Methods and Procedures: Surgical attendings and residents who perform laparoscopy, and medical students were studied. To simulate measurement of the small intestine, a 500 cm length of rope was placed within a laparoscopic box-trainer and affixed at one end. Study subjects completed two length measurements (LM). For LM#1, they were asked to measure 150 cm from the affixed rope using two laparoscopic graspers. The actual length measured and time required was recorded. For LM#2, subjects repeated the task with the aid of a 10 cm suture to act as a reference. Measurement accuracy was tested by comparing mean measurement lengths between training level groups using an independent t-test. Measurement precision was tested by comparing the mean deviation of measurements from 150 cm. Within-subject change was evaluated using a paired t-test.

Results: 40 attendings, 40 residents, and 50 medical students were studied. For LM#1, in terms of measurement accuracy, there were no differences in mean length measured between training level groups (attendings: 144 ± 45 cm vs. residents 128 ± 42 cm vs. students: 145 ± 51 cm, $p = ns$ for each comparison). However, residents were the only group to significantly underestimate the true 150 cm length (95% CI: 114 cm–141 cm). In terms of precision, there were no differences in the mean deviation from 150 cm between groups (attendings: 34 ± 30 cm vs. residents 38 ± 28 cm vs. students: 40 ± 32 cm, $p = ns$ for each comparison). Attendings performed LM#1 faster than both residents and students, and residents performed faster than students (mean 66 ± 33 seconds vs. 89 ± 46 s, 121 ± 48 s, $p < 0.05$ respectively). When LM#1 and LM#2 were compared, attendings' mean measurement length did not change (144 ± 45 cm vs. 136 ± 16 cm, $p = ns$) but their mean deviation from 150 cm decreased (i.e. precision improved) (34 ± 30 cm vs. 18 ± 12 cm, $p < .01$). Residents' mean measurement length increased at a trend level (128 ± 42 cm vs. 141 ± 18 cm, $p = .08$) and their deviation from 150 cm decreased (mean 38 ± 28 cm vs. 16 ± 12 cm, $p < .001$). Students' mean measurement length did not change, but their deviation from 150 cm similarly decreased (40 ± 32 cm vs. 22 ± 21 cm, $p = .001$). For LM#2, there were again no differences in mean measurement length and deviation from 150 cm between groups. Attendings performed the measurement faster than both residents and students in LM#2 ($p < .01$ for both comparisons).

Conclusions: In this study, there were no differences in the accuracy or precision of simulated laparoscopic small intestine length measurements between surgical attendings, residents, and students. More experienced operators required less time for completion of the task. Use of a measuring tool improved precision of measurements regardless of experience level.

P085

Resident-Led Deliberate Practice Utilizing Simulation

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Objectives: Simulation training is becoming standard in most teaching institutions across the country. It is a valuable teaching technique which provides opportunities for residents to learn and practice skills without affecting patient care. Simulation allows residents to practice skills in a deliberate fashion with clear objectives, feedback from someone more expert in the skill set and with proper evaluation, the ability to advance to the next level of skill. This process of deliberate practice allows the resident to focus on their areas of strength and weaknesses. It affords them the opportunity to self-assess and therefore begin the process of life-long learning.

At our institution, residents voiced an interest in spending more time practicing in the simulation center. Deliberate practice sessions were developed by the chief residents based on junior resident self assessment.

Methods: General surgery residents were asked to perform a personal needs assessment for technical skills. It was felt that as adult learners, if they were able to identify their own learning needs they would be highly invested in the learning process. Their responses were used to create a series of sessions held in the simulation center. A senior resident and the simulation center education staff organized all sessions.

The sessions followed the American College of Surgeons/Association of Program Directors in Surgery (ACS/APDS) surgical skills curriculum, and were modified as needed for each session. A novel session was created for sessions without an appropriate ACS/APDS session.

Attending physicians were present for all sessions proctoring and providing contemporaneous feedback to the residents.

Results: Over the span of six months, five sessions were developed. One session a "trocar placement lab," utilized a torso box trainer containing a watermelon under the simulated skin as the abdominal wall. The junior residents were able to place the ports for a laparoscopic cholecystectomy with repetitive practice if needed under the guidance and coaching of the senior residents.

Wet labs were developed for many of the sessions. In one session, porcine carotids and jugulars were used to perform closures of arteriotomies with a vein patch.

Discussion: All sessions were well received by the residents and attendings. Resident self-assessment led to focused deliberate practice sessions. Residents were highly invested in the sessions and given the immediate feedback for skill correction and advancement.

It is often difficult to garner attending participation in simulation sessions due to their busy clinical schedules. However it was clear that attending physicians were more eager to attend sessions when residents sought their participation. Perhaps it was the drive of the residents to further their own education that energized the attendings, making it easy to garner more than expected involvement. Or that they could begin lessons with the residents that would continue into the operating room.

The responsibility of the sessions will be handed down to new chief residents each year. Feedback and residents assessments will be tracked over time to determine the impact of this innovative teaching tool.

P086

Communication Skills Training Through the Use of Virtual Simulation for General Surgery Residency

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Objectives: Simulation labs have enabled surgical residents to become familiar and gain proficiency on various procedures prior to operating on real patients. Not only can residents practice their technical skills, but the simulation lab can also be utilized to foster and improve communication skills.

The goal of this station is to assess the role of proper communication in the operating room between senior and junior residents.

Methods: The residents were randomly divided into two groups, the "study group" and the "control group," equally distributing each PGY class. Within each group, a senior (PGY4 or PGY5) resident was randomly paired with a junior (PGY1 or PGY2) resident. The task to be performed by the junior resident involved placement of trochars in preparation for a laparoscopic cholecystectomy.

The abdominal cavity was simulated using a laparoscopic torso simulator. The seniors from the study group received a didactic focusing on the importance of accurate, concise, and clear communication in the operating room. The importance of utilizing anatomy references was stressed to the senior residents in this group. The seniors from the control group received a "sham" didactic.

The junior residents were explained the task by the senior resident. The senior helped instruct the junior on placement of those trochars through verbal cues. Each pair was given 15 minutes to complete the task.

The trocar placement in each room was videotaped for review. The assessment included clarity and frequency of communication, efficiency, utilization of anatomic references, proper trocar placement and time to completion.

Results: A total of eight pairs of residents were included in the study, four in each group. When the times for the two groups were compared using the Student's t-test, the p value was 0.80. The percentages of the task completed for the control and study groups were compared using the Student's t-test, the p value was 0.65.

The pairs were each videotaped during the completion of their task. A third-party observer reviewed the videos to evaluate the communication between the junior and senior resident.

Conclusions: The overall experience of learning trocar handling and placement was positive for the junior residents, especially the interns. Giving them the ability to place trochars in a controlled, simulated environment gave them confidence when they entered the operating room.

The control and study groups had similar strengths and weakness when their ability to communicate was assessed. All of the senior residents were able to provide a clear briefing of the task at the onset. Most of the senior residents in both groups failed to give a concise debriefing at the conclusion of the task. Strengths and weaknesses were often not addressed and feedback was not elicited.

The two groups were not significantly different when comparing length of time for completion of a task and percent completion.

The pairs will be debriefed on their performance. All pairs will be included in this debriefing. Future tasks will be reviewed to assess if communication skills have been learned and implemented into their repertoire of teaching skills.

P087

3D Vision Systems And Our Surgical Performance; Superior Performance Or Unwarranted Discomfort? A Cross-Over Study

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Introduction: Our aims is to objectively assess the adverse effects of the two display systems 2D and 3D and their impact on surgical trainee's laparoscopic performance.

Methods: 24 novices with no medical or visual problems were prospectively recruited and randomised to 3D and 2D groups. Candidates were trained to perform laparoscopic intracorporeal suturing according to the fundamentals of laparoscopic surgery (FLS) curriculum until task proficiency is achieved. Performance times, number of repetitions and errors were appraised. The candidates were swapped to the other vision system in a crossover design.

The assessment of the adverse effects of 2D and 3D vision system was performed using the Standardized Simulator Sickness Questionnaire (SSSQ). SSSQ is a validated self-reporting questionnaire composed of a 16-item symptom checklist reported as 3 main categories: nausea, Oculomotor and disorientation, specifically designed to investigate the vision systems. Candidates filled in the questionnaire after reaching proficiency in both vision systems. Scores more than 20 indicate candidates are appreciating sufficient discomfort, scores below 5 indicate symptoms are negligible.

Results: In regard to performance, there was no statistical significant difference between the two groups in the total time to reach proficiency. Number of repetitions to reach proficiency and accuracy errors were significantly lower in the 3D group compared to 2D group. ($P < 0.0002$)

By analyzing the SSSQ, The median and Interquartile range of the Nausea subscale score was 9.5 with IQR of 18.6 and 9.6 for 2D and 3D respectively ($P < 0.144$). Oculomotor symptoms score was higher in 3D group resulting in 22.7 with IQR of 15.2 compared to 15.16 score with IQR of 22.7 for the 2D group ($P < 0.032$).

Disorientation related score was drastically higher in 3D group with median of 13.9 with IQR of 9.3 compared to 0 in 2D group with 41.7 IQR ($P < 0.257$).

The total score differences between the two groups was vastly evident at median of 14.9 with IQR of 9.3 for 3D group compared to 9.3 with IQR of 8.4 for the 2D group ($P < 0.019$)

Conclusion: Although oculomotor and disorientation symptoms are more prominent in the 3D group in comparison with 2D group, the candidates demonstrate statistically significant superior performance. However this technology still needs to overcome the draw backs of the induced oculomotor symptoms.

P088

Surgeons' Perceptions In Relation To The Minilaparoscopic Instruments In Surgical Knots Confection

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Introduction: Evaluate the surgeons' perceptions after a surgical knot confection using minilaparoscopic instruments (MINI).

Methods: Thirty surgeons, familiar with conventional laparoscopy (CL), agreed to tie one simple surgical knot in a neoderm model. With no preview instruction, first using CL material and then using MINI instruments of 3 mm. Hereafter, willing to compare both experiences, 7 questions were proposed with the following score: three points were given as a pattern answer to all 5 mm instruments (CL). When the 3 mm material provided a better experience, it received score 4 or 5; when similar, got 3 points, and when worse 1 or 2. The questions focused in if the diameter was proper (1), if the movements were as accurate as wanted (2), if the surgeons felt comfortable tying the knot (3), if the result was expected (4), if the knot was easier to tie (5), if the instruments had proper flexibility (6) and if the material provided superior visualization (7).

Results: In all items MINI, compared to CL, had a higher score. In relation to the adequacy of the diameter scored 4,8; in relation to the movements' accuracy, 4,5; in comfort while tying, 4,5; in relation to the result, 4,4; in the visualization due the smaller diameter, 4,8. The average MINI's score was 4,5.

Conclusion: The procedure with MINI had an average score 50% higher in comparison to the conventional method. Therefore, Minilaparoscopic instruments can provide a better quality and precision in surgery experience.

P089

Hand Dominance Matters for Novel Laparoscopic Task Performance

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Introduction: Most advanced laparoscopic procedures nowadays require the surgeon to operate with both hands with a high level of performance. Particularly, common laparoscopic procedures, such as Nissen fundoplication, demand a thorough and precise work with surgeon's non-dominant hand. The purpose of this study was to investigate the level of muscle exertion, errors and performance of dominant and non-dominant hands from subjects with different laparoscopic experience. Our hypothesis was that hand dominance did matter while performing a novel laparoscopic task.

Methods and Procedures: Six healthy participants (3 medical fellows, all right-hand dominant) were recruited to perform a novel laparoscopic training task. They were asked to pass a ring (8 mm in diameter) from one end of a 4-coiled model to another end, and return it back to starting point using only one standard laparoscopic instrument in a standard FLS trainer box. The electromyography (EMG) data of two-sided anterior deltoid, biceps and triceps brachialis, flexor carpi radialis, and extensor digitorum were collected using the Delsys Trigno™ Wireless System (Delsys, Inc., Boston, MA). The raw EMG signals were sampled at 4000 Hz using the EMGWorks Acquisition software (Delsys, Inc., Boston, MA). Data were processed with band-pass filter of 20–300 Hz and smoothed by root mean square (RMS) algorithm with 150 ms moving window to compute the EMGRMS data. Each EMGRMS data were normalized by individual maximal voluntary contraction (MVC) and were presented as the percentage of MVC (%MVC). Time needed to perform the task and the numbers of errors (e.g. dropped ring) were recorded. Two-way ANOVA (hand dominance and task direction as within-subject factors) with repeated measures was applied to examine the two-factor effect on %MVC. The post-hoc comparison with Bonferroni correction was applied when significant main effect was found ($\alpha=0.05$). Separate independent t-tests were applied to examine the differences on time and the number of errors.

Results: There was a significant main effect of hand dominance on biceps brachialis for %MVC ($F_{5,1} = 6.71$; $p = 0.049$). The %MVC of non-dominant biceps brachialis showed more muscle activations than in dominant side (7.08 ± 2.43 versus 5.78 ± 2.26 , respectively). Time needed to complete the task was significantly longer ($p < 0.05$) using non-dominant side than dominant side (37.5 ± 7.5 seconds versus 23.4 ± 8.3 seconds, respectively), but the number of errors was not statistically different between non-dominant (14) and dominant (10) side.

Conclusions: This study confirms the significant effect of hand dominance in performing a laparoscopic task. Subjects spent more time to complete the task using non-dominant hand and utilized more muscle efforts of the non-dominant hand than the dominant hand. This finding suggests an emerging need to focus on hand dominance during laparoscopic surgical skills training. It might reduce muscle effort for alleviating potential peripheral fatigue while performing common laparoscopic surgical procedures (such as Nissen fundoplication) using non-dominant hand.

P090

Evaluating The Learning Curve Of No Previous Experienced Laparoscopic Surgeon In Laparoscopy Assisted Distal Gastrectomy (LADG)

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Background and Purpose: Laparoscopic distal gastrectomy (LADG) is a new standard surgical treatment for early gastric cancer in Japan. Our Hospital is a core hospital of a local city, bearing emergency care, doctor dispatch in the remote areas other than the cancer care. Surgeons play a great part in these health care programs, the introduction of LADG has been barred greatly before. Last year LADG was formally introduced, we decided to standardize an operation. We compared the perioperative complications and early patients outcomes from our initial 50 cases of LADG.

Methods: In 2012, 50 LADG with cholecystectomy were performed by two surgeons, one with previous experience of more than 100 LADG, another with no previous experience of LADG. Operative equipments and procedure are simplified and we made it easy repeatedly. As for energy device, only LCS was employed and used only for its suitable procedure. Operative time and complications were compared with between the first 25 cases and the last 25 cases.

Results: The patient's characteristic showed no significant differences between the two periods. Operative time (200.7 vs 173.7 min) showed significantly declining curve. Postoperative complications such as leakage did not appeared in all cases.

Conclusions: Our Standardization of LADG may have played an important role in getting a good learning curve for LADG.

P091

Assessment of Baseline Da Vinci Skill Sets and Knowledge in a Robot Naïve Academic General Surgery Program

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Background: As robotic surgical systems become more commonly used for general surgery procedures, growing numbers of residents will desire exposure to these systems during their residency training. Currently, residents finish their training with various levels of knowledge and ability in regard to robotic-assisted surgery. Currently there is no Resident Review Committee requirement for robotic-assisted surgery, however as robotic surgery becomes more common, appropriate training may be necessary during residency. The aim of this study was to assess the baseline skill sets of da Vinci naïve surgical residents and to identify initial resident impressions and knowledge regarding robotic surgical systems. Our study also examines the effectiveness of a brief training session and orientation to these systems.

Methods and Procedures: General surgical residents ($n = 8$) in an academic program (that does not currently perform robotic surgery at its main teaching hospital) were offered an online orientation to the Da Vinci Surgical System (DVSS), followed by a three hour hands-on orientation by an Intuitive representative and a DVSS-certified general surgeon. A pre- and post- orientation survey was administered to each participant to evaluate impressions and knowledge of the DVSS. During the hands-on orientation, the participants were asked to perform a session of the Camera Targeting 1 and Peg Board 1 simulation. Scores were recorded and expressed as mean with standard deviation.

Results: Eight participants ranged in PGY level from 1–4. The percent of subjects who participated in da Vinci cases prior to orientation was 37.5%. No participants were FLS certified. The mean score for the Camera Targeting 1 simulation was 61.7 ± 17.4 , while the mean score for the Peg Board 1 simulation was 69.7 ± 10.2 . The current suggested general surgery resident da Vinci clinical pathway scores are 75% or greater. Sixty-two percent of participants were able to name five procedures performed by the DVSS prior to orientation, while 87.5% were able to after orientation. No participants were able to name five advantages of the DVSS described by Intuitive prior to or after orientation. The most common cited disadvantage prior to orientation was cost, the most common after was additional training or learning curve. Sixty-six percent of participants had interest in learning the DVSS during residency.

Conclusion: Residents have varied exposure to the DaVinci surgical system during their training. First-time simulation scores in robot naïve residents are only slightly below the pathway scores recommended by Intuitive, inferring that novice robot surgeons would likely achieve these recommended scores by completion of the pathway. In addition, a simple introductory training course effectively orients residents to the limitations and qualities of this operating system with improvement in basic knowledge of the DVSS.

P092

A Prospective, Multi-Institutional Study To Determine The Effect Of Sages Patient Information Brochures On Patient Satisfaction - Preliminary Results

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Introduction: An important aspect of proper informed consent is the adequate and impartial transfer of information to the surgical patient prior to surgical treatment. Since 2007, the SAGES Educational Resources Committee has produced Patient Information Brochures (PIBs) for various laparoscopic procedures that can be used by surgeons to educate patients. We present preliminary results of a prospective, multi-institutional study investigating whether the use of the laparoscopic cholecystectomy (LC) or laparoscopic inguinal hernia (LH) SAGES PIBs resulted in a difference in patient understanding, anxiety, or satisfaction.

Methods: Eleven centers of laparoscopic excellence across the USA agreed to collaborate on this trial. Of those eleven, four centers were able to successfully collect data for this study. The study was conducted in two arms at each center: the control arm and the PIB arm. In the control arm, 20 patients were recruited to participate (10 LC and 10 LH) and pre-operative informed consent was delivered as per current practice. Patients completed anxiety and satisfaction questionnaires both pre-operatively, and at their post-operative follow-up visits. In the PIB arm, 20 patients were recruited to participate and pre-op informed consent was delivered with inclusion of PIBs. As per the control arm, patients completed anxiety and satisfaction questionnaires pre and post-operatively.

Results: A total of 43 control patients and 5 PIB patients participated in this study. 23 control patients underwent a LC and 20 underwent a LH procedure. Four PIB patients underwent LC whilst 1 underwent LH. Preoperatively, control LC patients rated high positive emotions (8.9 ± 1.1 out of 12) and low negative emotions (4.7 ± 0.8 out of 12). Similar results were noted for preoperative LH control patients (positive 9.5 ± 0.9 out of 12, negative 4.4 ± 0.7 out of 12) and preoperative LC PIB patients (positive 10.5 ± 0.9 out of 12, negative 4.0 ± 0.8 out of 12). With regard to satisfaction with the consent process, all patients rated this extremely highly (LC control 1.5 ± 0.6 ; LH control 1.4 ± 0.5 ; LC PIB 1.8 ± 1.0 ; scale 1 to 5, with 1 strongly content). Postoperatively, LC (2.3 ± 1.4) and LH control patients (3.0 ± 1.7) were less satisfied with the consent process than LC PIB patients (1.7 ± 1.2). Finally, LC (2.2 ± 1.3) and LH control patients (2.8 ± 1.8) were less satisfied with the outcome of their surgery than LC PIB patients (1.5 ± 0.7).

Conclusion: Patients in this study undergoing LC and LH procedures exhibited high positive and minimal negative emotions preoperatively, across all groups. Patients were satisfied with their consent preoperatively, though this level of satisfaction deteriorated post-operatively for the control patients, whilst remaining similar for PIB patients. Furthermore, overall contentment of surgical outcomes was superior for the patients exposed to PIBs. Though preliminary, the results of this study support the use of SAGES PIBs for the consent process of patients undergoing common, ambulatory laparoscopic procedures.

P093

Endoscopic Latissimus Dorsi Muscle Harvesting – Experimental Study

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Aim: The latissimus dorsi muscle is one of the most frequent used free flaps in reconstructive surgery. Endoscopic harvesting of free flaps is increasingly used in reconstructive surgery due to minimal donor site morbidity. The present study aims in establishing a comparison between the experimental model of the latissimus muscle endoscopic harvesting technique and the open harvesting technique in pigs.

Material and Methods: The study was conducted on 12 pigs with an average weight of 25–30 kg. 5 muscle were harvested by endoscopic technique and 5 muscle through the open technique After orotracheal intubation and anesthesia, a 4–5 cm incision is made and prolonged to the lateral margin of the caudal segment of the latissimus muscle. Laparoscopic surgery instruments were used along with the Emory retractor. The anterior and posterior side of the muscle is dissected using a forceps and a Hook. After the muscle is sectioned using the hook, the pedicle is isolated and clipped on the desired length. The work chamber is created using Emory retractors.

Results: Operating time was 135 minutes for the open technique and 210 minutes with the endoscopic technique. During the study, the rate of conversion, bleeding, surgery duration, flap viability, length and aspect of the pedicle and moment of mobilization were followed. One pedicle was damaged during endoscopic surgery with following seroma development. Morbidity was lesser in animals where endoscopic harvesting was performed.

Conclusions: Endoscopic harvesting of the latissimus dorsi muscle leads to minimal donor site complications. At the same time, this techniques represents an excellent training model for developing endoscopic and open flap harvesting skills.

P094

Rendezvous Technique For Treatment Of Complete Common Bile Duct Transection After Multiple Hepatobiliary Ferneries

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Common bile duct (CBD) injury during surgical procedures is a serious complication. Partial injury can usually be managed by a combination of percutaneous or endoscopic techniques. However, the management of complete transection of the CBD is very challenging. There are small case series of non-surgical management of complete CBD transection during laparoscopic cholecystectomy. In this particular case, a 55 year-old female patient had multiple operations due to malignant pheochromocytoma with liver metastases. Her surgery was complicated by a complete CBD transection during right hepatectomy. A biloma was managed with image-guided percutaneous drainage. However both attempts of percutaneous transhepatic cholangiography (PTC) and endoscopic retrograde cholangiopancreatography (ERCP) for placement of a CBD stent were unsuccessful, as the native CBD was partially resected during the injury. A rendezvous procedure, in which a guidewire was placed through the distal CBD and into a biloma by ERCP, and simultaneously snared via a PTC approach allowed for a biliary-duodenal catheter to be placed successfully and achieve continuity of the patient's biliary tree and the patient was discharged the next day. In 2 months interventional radiologist placed a metal stent which was removed by the endoscopist 4 months later. Internal and External biliary catheter was gradually upsized up to 12 Fr and eventually removed in 9 months after the original procedure. During the 9 month-period of the follow-up, the patient was stable and surgical procedure was not required.

P095

Learning Efficacy Between 30° A Rigid Scope And A Flexible Scope In Newly Educated Medical Personnel For Laparoscopic Colorectal Procedure: A Prospective, Comparative Study

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Background: During laparoscopic surgery, the scope is often maneuvered by novice in operation. This study was designed to find out which of the two types of scopes (30° rigid scope and flexible scope) is easier to learn and manipulate on the operating table.

Methods: Twenty interns, sub-interns and medical students who were new to laparoscopic surgery were involved. Prior to surgery, handling of the two different scopes, the 10-mm 30° rigid videoscope (EndoEye WA50013A, Olympus) and the flexible laparoscope (LTV-VH, Olympus), were briefly educated and instructed how to manipulate. The first scope to be used was randomly selected between the two and the scopes were changed 3 times alternatively during the entire procedure. After surgery, the participants were given five parameters to score, from 0 (the hardest) to 5 (the easiest): (1) understandability of initial scope handling instructions, (2) easiness to attain proficiency, (3) feasibility of scope operation, (4) convenience of providing adequate views for colonic procedures, and (5) convenience of providing adequate views for rectal procedures. The ratings were collected and analyzed by Kruskal-Wallis test.

Results: Understandability scores for the 30° rigid and the flexible scope were 69 and 73 respectively ($p = 0.450$), proficiency scores were 58 and 72 ($p = 0.039$), feasibility scores were 57 and 63 ($p = 0.198$), convenience scores for colonic field visualization were 65 and 74 ($p = 0.044$), and convenience scores for rectal field visualization were 61 and 68 ($p = 0.172$), respectively. The total sum of all 5 parameters was 310 for the 30° scope and 350 for the flexible scope ($p = 0.001$).

Conclusions: The flexible scope obtained higher score totals on all 5 learning efficacy parameters. A flexible scope seems easier than a 30° rigid scope for novice surgeons to use during laparoscopic colorectal procedures.

P096

Is 10 Years Too Long? Development Of Interval Colorectal Cancer Despite Following Recommended Colonoscopic Guidelines

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Background: Colorectal cancer is a leading cause of cancer mortality. Screening protocols have led to decreases in the incidence of colorectal cancer. Currently, average-risk individuals are recommended to undergo colonoscopy every 10 years starting at age 50. This recommendation has been based on the hypothesis that polyps have a growth rate of 0.5 cm in 2–5 years, while cancer develops from polyps in approximately 7–10 years. However, lesions are estimated to be missed 5% of the time. We have observed a number of patients who presented with colorectal cancer despite following established guidelines after screening colonoscopy. Our aim is to quantify the number of patients who develop colorectal cancer or high-grade dysplasia in the interval period between their prior colonoscopy and recommended follow-up screening exam.

Methods: A retrospective review of all patients with colorectal adenocarcinoma or high-grade dysplasia referred to two colorectal surgeons from October 2007 through September 2012 were included in our study. Exclusion criteria included patients at higher risk of developing colorectal cancer such as those with inflammatory bowel disease, familial polyposis, hereditary non-polyposis colorectal cancer or familial risk factors. Current colonoscopic guidelines were used to identify those patients who developed interim cancer despite following recommendations.

Results: Of 287 patients with colorectal cancer, 46 (16%) patients developed interval colorectal cancer despite undergoing screening colonoscopy and following recommended colonoscopic guidelines. Aside from 1 transverse colon cancer, distribution was otherwise relatively uniform: right colon 18, left colon 12, and rectum 15. Mean time from screening colonoscopy to diagnosis of cancer was 4.5 years. 32 of 46 (70%) cancers were discovered in 5 or fewer years.

Conclusions: 16% of patients presenting with colorectal cancer or high-grade dysplasia in our practice followed appropriate screening recommendations, with the majority of lesions discovered within 5 years. Our findings indicate that current screening recommendations for average-risk individuals may need to be re-examined.

P097

The Preoperative Endoscopic Drainage In The Malignant Obstructive Jaundice

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Background: Preoperative biliary drainage (PBD) in Malignant Obstructive Jaundice (MOJ) remains controversial.

Aim: This project is a meta-analysis that compares the impact of PBD and Surgery (DS = S, pancreatotomy and/or hepatobiliary resection) on morbidity and mortality after PBD+S in comparison with Surgery alone.

Material and Methods: The impact of PBD on morbidity and mortality in MOJ preoperative endoscopic treatment was assessed by: 1. Systemic referencing in PUBMED 2. Typing the key words "obstructive jaundice, biliary drainage, liver surgery, complications, morbidity, mortality" under the following selection criteria: (a) the articles should have been published between 2000–2010, (b) all or the majority of data should have been collected between 2000–2010, (c) MOJ patients should have undertaken pancreatic, biliary and/or hepatic therapeutical resection, (d) MOJ patients should have undertaken endoscopic PBD. Five final articles fulfilled the stated criteria consisting 386 MOJ patients (114 underwent pancreaticoduodenectomy, 51 hepatobiliary resections, 102 PBD).

Results: 1. There was no significant difference in the mortality rate between DS and PBD+S (OR = 0.39, 95% CI: (0.10–1.57)). 2. Patients treated with PBD+S demonstrated no significant difference in the morbidity rate compared to those treated only with DS (OR = 3.75, 95% CI: (0.76–18.51)). 3. Comparison of the morbidity rate between PBD alone and S alone showed a significant difference favouring the latter. (OR = 0.04, 95% CI: (0.00–0.37)).

Conclusion: There is no significant difference in the mortality rate between DS and PBD+S. Comparison of data showed that the morbidity rate of surgery alone for MOJ is significantly higher than that of PBD alone so that surgery seems to be the decisive factor that finally forms the morbidity rate after PBD+S and not the PBD.

P098

PER-Oral Endoscopic Myotomy (POEM) Following Previous Laparoscopic Heller Myotomy Is Feasible And Safe In A Porcine Survival Model

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Introduction: Recurrent or persistent dysphagia after a Heller myotomy occurs in up to 10–15% of patients. Current surgical options for these patients include revisional Heller myotomy or esophagectomy. Both have significant associated morbidity. Recently, per-oral endoscopic myotomy (POEM) has been introduced as a novel therapeutic approach for the primary treatment of achalasia. POEM has shown encouraging early results in human clinical trials, but this technique has not been fully evaluated as a treatment for recurrent or persistent dysphagia following Heller myotomy. Our objective was to evaluate the feasibility of performing the POEM procedure in the setting of a prior Heller myotomy using a survival porcine model.

Methods: After obtaining IACUC approval, a laparoscopic Heller myotomy with Dor fundoplication was performed on 4 animals under general anesthesia. The Heller myotomy was positioned on the anterior esophagus and was at least 7 cm long with at least 2 cm extending onto the stomach. Four weeks after the initial operation, each animal underwent a second myotomy using the POEM procedure. An additional two animals served as controls and underwent only the POEM procedure. The POEM was performed on the posterior esophagus with a length of at least 7 cm and at least 2 cm of extension onto the stomach. Two weeks after each POEM procedure, animals were sacrificed and necropsy performed. The primary outcome measures were feasibility and survival. Secondary outcome measures included intra-operative complications, post-operative complications, and procedure difficulty. Procedure difficulty was assessed by total time of procedure, time of each procedure component, workload using the NASA-TLX validated scale, and objective scales for measuring dissection difficulty.

Results: The POEM procedure was successfully completed in all animals. Each of the 4 experimental animals survived and thrived following both the laparoscopic Heller myotomy and the subsequent POEM procedure. No intra-operative or post-operative complications were noted. There was no significant difference in operative time for the POEM after Heller compared to primary POEM (125.5 min vs. 117.5 min; $p = 0.84$). At time of necropsy, the myotomy was found to be complete and the animals were without infection, perforation, hematoma, or injury to nearby structures in all cases. Dissection difficulty was rated slightly higher for the POEM after Heller compared to the primary POEM; however, this was not statistically significant. NASA-TLX scores for the primary POEM and the POEM after Heller were similar suggesting equivalent workload (36 vs. 24.5; $p = 0.24$). The POEM procedures showed a significantly lower workload score when compared to the laparoscopic Heller myotomy (31.6 vs. 52.1; $p < 0.001$).

Conclusions: The POEM procedure for revisional myotomy after Heller myotomy is both safe and feasible in the porcine model. POEM has potential as a viable treatment option for patients suffering from recurrent or persistent dysphagia after prior myotomy. A POEM after previous myotomy does not appear to be more technically difficult or demanding than a primary POEM procedure. The POEM procedure may be associated with a reduced workload on the operating surgeon when compared to laparoscopic Heller myotomy with Dor fundoplication.

P099

Video-Assisted Thoracoscopic Surgery For Respiratory Disease In Children

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Background: An operation case of children's respiratory surgery increases by progress such as an imaging, prenatal diagnosis. A minimally invasive thoracoscopic surgery offers several options in diagnosis and surgical treatment in pediatric surgery. We would like to review our surgical experience during thoracoscopic surgery for children's respiratory disease in our institute.

Patients and Methods: From November 1993 to June 2013, 51 patients underwent thoracoscopic surgery for respiratory diseases, except pectus excavatum and pigeon chest. Age ranged from 3 months to 15 years old (an average of 10.8 years old). The patients were positioned in a modified prone or supine position, and single lung ventilation was performed on the contra lateral side. Video-assisted thoracoscopic surgery was performed through a small chest incision (minithoracotomy) with two or three trocar ports with 3 and 5-mm instrumentation. Thirty degrees thoracoscopy of 5 or 10-mm was used. Anomalous blood vessels were clipped, stapling, ultrasonic vessel sealing system and/or ligated.

Results: There was no morbidity or mortality associated with the video assisted thoracoscopic surgical procedures. None of the patients required a conversion to standard thoracotomy. The thoracoscopic surgical procedures were feasible in 47 children with respiratory diseases including 29 spontaneous pneumothorax, 9 mediastinal tumors (including 4 Myasthenia Gravis), 4 congenital cystic adenomatoid malformation (CCAM), 1 pulmonary nodule, 2 pulmonary sequestration, 1 pulmonary A-V malformation (bilateral and two times), 1 hemopneumothorax and 3 empyema. Single lung ventilation was insufficient in 3 cases under 2 years old. Video-assisted thoracoscopic surgery was effective in these cases.

Conclusions: We considered that video-assisted thoracoscopic approach is surgical treatment of children. Cosmetic benefits were also obtained for girls. However, the most important consideration is the decision on a treatment strategy made by both pediatrician and thoracic surgeon.

P100

Univariate And Multivariate Analyses Of Preoperative Factors Influencing Symptomatic Outcomes Of Transoral Fundoplication

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Objective: Identification of preoperative factors that predict symptomatic outcomes of transoral fundoplication (TF) in chronic gastroesophageal reflux disease (GERD) patients refractory to proton pump inhibitor (PPI) therapy.

Methods: Univariate and multivariate logistic regression analyses were performed on data from 158 consecutive patients who underwent TF with the EsophyX device between January 2010 and June 2012 in 14 community centers. Variables included age, gender, body mass index, GERD duration, PPI therapy duration, presence of hiatal hernia, esophagitis, Hill grade, quality of life scores (QOL) on PPIs, % total time pH < 4 and DeMeester score on 48-hour pH monitoring. Covariates with P values ≤ 0.25 on univariate analyses underwent backwards stepwise multivariate regression analyses. P value ≤ 0.05 was considered significant. Symptomatic outcomes were grouped as follows: (1) *Successful*, completely off PPIs and $\geq 50\%$ reduction of a Gastroesophageal Reflux Disease Health-related Quality of Life (GERD-HRQL) score or normalization of Reflux Symptom Index (RSI) score (≤ 13); (2) *Partially successful*, on PPIs and $\geq 50\%$ reduction in GERD-HRQL score or normalization of RSI score; (3) *Poor*, reoperation or < 50% reduction in GERD-HRQL or abnormal RSI score. Analyses were performed separately on patients with typical and atypical symptoms before TF.

Results: All patients suffered from typical GERD symptoms. Additionally, 78% (124/158) of patients suffered from atypical symptoms (RSI score > 13). Median age was 59 (range 19–80) years; 71% (112/158) were female. Six percent (10/158) with recurrent GERD symptoms refractory to PPI therapy underwent revisional procedure (9 laparoscopic Nissen, 1 TF). Globally, at a median follow-up of 22 (10–43) months, 70% of patients (111/158) had successful or partially successful outcomes; 30% (47/158) had poor outcomes. Seventy-seven percent (121/158) of patients were off daily PPIs; 70% (110/158) were completely off PPIs. The median GERD-HRQL score improved from 28 (10–50) before TF on PPIs to 5 (0–45), $P < 0.001$. In 124 patients with atypical symptoms, the median RSI score improved from 26 (14–45) before TIF on PPIs to 5.5 (0–41), $P < 0.001$.

In patients with typical symptoms, univariate analyses revealed 4 preoperative factors predictive of successful outcomes: age ≥ 50 [odds ratio (OR) = 2.4; 95% confidence interval (CI) = 1.2–4.8, $P = 0.014$]; GERD-HRQL score ≥ 15 on PPIs (OR = 6.0, CI = 1.2–29.4, $P = 0.026$, RSI score ≥ 13 on PPIs (OR = 2.4, CI = 1.1–5.2, $P = 0.027$) and GERSS score ≥ 18 on PPIs (OR = 2.6, CI = 1.2–5.8, $P = 0.018$). Female gender approached closely the significance level (OR = 2.0, CI = 1.0–4.0, $P = 0.053$). Age and GERD-HRQL score on PPIs remained significant predictors at the multivariate level. In patients with atypical symptoms, the only factor associated with successful outcomes was GERD-HRQL score ≥ 15 on PPIs (OR = 9.9, CI = 0.9–4.6, $P = 0.036$).

Conclusions: Elevated preoperative QOL scores and age ≥ 50 were most closely associated with successful outcome of TF in this analysis; objective measures were not. Further studies are needed to confirm these findings.

P101

Antegrade Wire, Rendezvous Cannulation of the Biliary Tree May Reduce the Incidence of Post-ERCP Pancreatitis

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Introduction: Post-procedural pancreatitis (PPP) is a common serious complication of therapeutic and diagnostic endoscopic retrograde cholangiopancreatography (ERCP) with a reported incidence of up to 10%. Multiple cannulation attempts, as well as mechanical trauma and injection of the pancreatic duct are causative factors for the development of PPP. Preventative strategies for PPP minimize these events. To efficiently access the biliary tree and minimize inadvertent trauma to the pancreatic duct, we have begun utilizing an Antegrade Wire, Rendezvous Cannulation (AWRC) technique in patients undergoing laparoscopic cholecystectomy (LC) with an indication for ERCP.

Methods: Eight patients underwent AWRC during LC in the setting of acute cholecystitis and choledocholithiasis with or without preoperative biliary pancreatitis. Informed consent was obtained for both procedures (LC and ERCP) pre-operatively. Under general anesthesia in supine position, patients underwent standard 4 port LC with routine intraoperative cholangiography. Following confirmation of a biliary filling defect not able to be cleared with flush and glucagon administration, a 0.035" 450 cm flexible tip guidewire was inserted in an antegrade fashion through the cystic ductotomy into the common bile duct, through the duodenal papilla and into the duodenum. A therapeutic duodenoscope (TJF-160VR, Olympus, Center Valley, PA) was then inserted and advanced until the duodenal papilla and wire were identified. A standard polypectomy snare was used to grasp the guidewire and withdraw it through the accessory channel of the duodenoscope. Over this guidewire a biliary sphincterotome was backloaded and the biliary tree directly cannulated. The antegrade wire was subsequently removed and a new 0.035" 260 cm flexible tip guidewire was positioned retrograde beyond the hepatic duct bifurcation. Subsequent retrograde cholangiography, biliary sphincterotomy, balloon extraction of choledocholithiasis and stent insertion were performed as indicated using a short-wire ERCP method. The LC was completed in standard fashion.

Results: Eight patients (2M:6F), age range 20–74, underwent intraoperative ERCP with stone extraction utilizing an AWRC technique during LC. Two patients had their ERCP performed via a transgastric route because of a previous history of Roux-en-Y gastric bypass. Average operative time for all patients was 208 min with a range of 107–295 min. Median length of stay was 2.5 days with a range of 1–12 days. There were no wire cannulations or injections of the pancreatic duct. There were no intra-operative or postoperative complications and no patients developed PPP. One patient with severe biliary pancreatitis preoperatively had no evidence of worsening pancreatitis postoperatively. She had gradual resolution of her symptoms with supportive care. There were no hospital readmissions and all patients had uncomplicated outpatient biliary stent removal.

Conclusion: AWRC is a novel technique for efficient cannulation of the biliary tree for therapeutic ERCP in the setting of choledocholithiasis at the time of LC. Our report demonstrates good results with this technique with no identified PPP in eight consecutive patients. Although this represents a small case series, we believe the AWRC technique holds merit for reducing the incidence of PPP following therapeutic ERCP.

P102

Two-Stage Optical System For Colorectal Polyp Assessment

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Macroscopic evaluation of the degree of invasion of colorectal polyps allows to choose the most adequate method of endoscopic treatment. Narrow Band Imaging is a new image enhancement system employing optic digital methods to enhance images of blood vessels on mucosal surfaces, allowing improved visualization of mucosal surface structures. However, the superiority of such an imaging over a standard one has not been reported until now.

The aim of this study is to determine if two-stage optical system in new generation of endoscopes will increase diagnostic accuracy in colorectal polyp typing.

Materials and Methods: The study comprised 270 patients, in which 386 colorectal polyps were diagnosed and removed. Polyps were assessed in white light and NBI with use of one and two-stage optical system respectively. Polyps were classified according to pit pattern scheme developed by Kudo and subsequently verified histopathologically. Evaluation was performed during colonoscopic examination as well as retrospectively on the basis of recorded images by 3 experienced endoscopists. ClinicalTrials.gov number, NCT01688557

Results: There was no difference in the evaluation of polyps regarding the group of non-neoplastic polyps (Kudo I and II). The diagnostic accuracy was 91.6% with application of near focus function vs 89.7% with use of a standard optical system. The diagnostic accuracy of non-invasive adenomas has also risen (Kudo III, IIS, IV) (91.5% vs 87.2) $P < 0.05$. The same observation concerned invasive lesions (Kudo V) (94.1% vs 91.7%). There were no differences in the evaluation of polyps during colonoscopy in comparison to the retrospective group.

Conclusions: Two-stage optical system with electronic colorization of the mucosa (NBI) increases diagnostic accuracy for the differentiation of neoplastic colorectal polyps. Preliminary evaluation of a polyp type and character remains the same precise during endoscopic examination as in retrospective analysis.

P103

Intraoperative Endoscopy May Decrease Post Operative Leak & Stenosis In Gastric Bypass And Sleeve Gastrectomy

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Introduction: Morbid obesity is a global epidemic and bariatric surgery is the only available long term solution. Laparoscopic Roux en Y gastric bypass (RYGB) and laparoscopic sleeve gastrectomy (LSG) are among the possible solutions for this problem. Anastomotic or staple line leaks as well as stenosis after RYGB and LSG are causes of major morbidity and mortality. Many ways has been used to reduce these risks. The aim of the study is to evaluate the role of intraoperative endoscopy in reducing these risks.

Methods: We retrospectively reviewed our entire consecutive primary and revisional RYGB and LSG cases done between June 2009–Sep 2013. Our technique for RYGB is hand sewn gastrojejunostomy and for LSG is to oversew and invert the entire staple line. We perform intraoperative endoscopy to check for leak, bleeding or stenosis at the end of all cases with an adult 32 Fr endoscope. No drains are placed and we do not perform UGI study after surgery. Whenever an intraoperative leak test under water is positive, we reinforce with sutures, omental patch and fibrin sealant agent. In addition, a drain or Gastrostomy tubes are placed and an UGI study is done on postoperative day number 1.

Results: We performed 444 cases (299 RYGB and 145 LSG) during the study period. Intraoperative endoscopy was performed in 100% of our cases. An intraoperative leak test was positive in 6/299 (2%) RYGB and 0/145 LSG cases. We had 3/299 (1%) clinical leaks after RYGB, and 0/145 clinical leaks after LSG. one of the 3 RYGB leaks had a positive intraoperative leak and that patient had a drain and a gastrostomy tube placed and did not need reoperation. In addition, the intraoperative endoscopy detected 3 cases where we detected a LSG that was too tight, and sutures were removed to correct the size or the configuration of the LSG. We had no clinical stenosis or twist in our LSG.

Conclusion: We believe performing intraoperative endoscopy has allowed us to change our intraoperative management strategy in RYGB and LSG cases. This changes has led to a low leak and stenosis rate in our series.

P104

Implementation Of Direct Peroral Cholangioscopy For Common Bile Duct Stones

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Objective: To evaluate the process and the initial results of implementing Direct Peroral Cholangioscopy (DPC) as a new treatment modality in patients with common bile duct stones refractory to retrieval by conventional Endoscopic Retrograde Cholangiopancreatography (ERCP).

Methods: Retrospective analysis of 5 cases, which were performed in secondary referral center during a period of one year from August 2012 to August 2013, with a special focus on logistic and technical problems associated with introduction of Direct Peroral Cholangioscopy (DPC). Indication for the procedure was common bile duct stones on which the previous attempts of extraction by ERCP have failed.

A subsequent cholangioscopy was performed using a nasal gastroscope over a guidewire, with the possibility of laser lithotripsy.

All procedures were performed by a very experienced endoscopist.

Results: In all cases the common bile duct was intubated successfully with the nasal gastroscope. Mean age of the patients was 71 years [51–84], and the mean procedure time was 121 min [50–215].

In 4 out of 5 patients clearance of the common bile duct was achieved. One patient was referred to a tertiary referral center because of a stenosis of the CBD.

One patient required two procedures before a clearance of CBD stones was achieved, and one had an additional ERCP with extraction of stone remnants.

No severe complications occurred.

An analysis of logistic and technical problems associated with introduction of DPC, a review of the results with a video presentation and a review of literature, as well as advantages and complications will be presented.

Conclusions: DPC appears to be a feasible, useful and safe, however very demanding modality for the treatment of difficult common bile duct stones. It can be implemented quickly in the hands of an experienced endoscopist.

P105

Tailored Minimally Invasive Treatment Of Biliary Leaks

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Objectives: The goal of this study was to find the most optimal treatment for biliary leaks after a surgery.

Methods: Records from secondary referral centre ERCP database of 47 consecutive patients (22 women and 27 men) with biliary leaks, treated between November 2006 and July 2013, in the setting of Sygehus Lillebaelt, Kolding, Denmark, were analyzed. All patients were treated according to the minimally invasive management protocol, which included drainage, endoscopic Retrograde Cholangiopancreatography (ERCP), endoscopic transpapillary biliary stent placement with or without endoscopic sphincterotomy (ES). Three major groups were identified and compared. Patients from group 1 were treated with drainage, ERCP with endoscopic sphincterotomy and endoscopic transpapillary biliary stent placement. Group 2 and group 3 were treated with drainage and endoscopic transpapillary biliary stent placement, however in group 3 the preventive stent placement during primary operation was performed as a rendezvous procedure, when the biliary leak observed during the primary procedure was difficult to treat.

All data were analyzed statistically using T-tests for continuous variables distributed normally, and Mann-Whitney Ranksum tests for continuous variables not-normally distributed. Statistical significance level was set to 5%. The software package SPSS ver. 17.0 was used for the statistical analyses in this paper.

Results: The groups consisted of 16, 26 and 5 patients respectively. All patients were treated with drains placed either during primary procedure or radiologically guided. ERCP were performed in groups 1 and 2 between 1 and 13 days after the primary procedure (mean 3,62 (±2,64) days). In two cases two ERCP attempts with 4 days interval were needed to place a stent. Leak stops were observed between 1 and 9 days (mean 3,52 (±1,94) days). There were no statistically significant differences between the intervals in which the biliary leak stopped in group 1 and 2. In group 3, with preventive placed stent, two patients had bile leaks in 1 and 2 days respectively while in three others bile was only observed in drains without leak. The stents were removed between 14 and 90 days (mean 48 (±17,2) days).

Detailed results including timing of ERCP after primary procedures, intervals of biliary leak stops and complications will be presented.

Conclusions: Minimally invasive management of biliary leaks including all modalities like drainage, endoscopic transpapillary biliary stent placement and preventive stent placements as well as sphincterotomy when needed is an effective and safe treatment. Preventive ERCP with stent-ing as a rendezvous procedure is technically demanding but safe and feasible option when available for avoidance of biliary leaks when visualisation of bile leak localisation is difficult.

P106

Endoscopic Management Of Postoperative Esophageal Strictures

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Background: Postoperative esophageal strictures may happen in 30% of patients at the anastomotic site following reconstruction for esophagectomy using gastric or colonic conduit. Those strictures must be treated in order to resume diet in this population.

Patients and methods: Patients that were referred to our surgical endoscopy unit because of swallowing problems after esophageal surgery were retrospectively studied. Endoscopy was performed using mostly conscious sedation and sometimes using general anesthesia in non-tolerant cases. Various sizes of endoscopes were utilized based on the degree of the stricture. Once the stricture is located and assessed the dilation procedure was performed using balloon dilation. Fluoroscopy guidance was used when needed. If required, subsequent serial dilations were performed using either balloon or Savary-Gilliard dilators employing mainly direct visualization technique without fluoroscopy. The procedure was performed on outpatient basis and the patients were kept in the recovery room for a couple of hours after the procedure and they were allowed to resume diet at the same day. They were instructed to call back only if they re-develop dysphagia. Data were presented in median (min-max) format unless otherwise stated. Nonparametric statistics were used when needed.

Results: A total of 62 patients were treated between March 2009 and May 2013 because of postoperative esophageal strictures. Forty four pts were male and 18 were female and their median age was 65 (21–84). All had stricture at the anastomotic site. While 33 pts (53%) required only 1 session of dilation, 10 pts required 2 (16%), 3 patients required 3 (5%), 3 pts required 4 (5%), 5 pts required 5 (8%), 2 pts required 6 (3%), 1 pt required 7 (2%), 1 pt required 8 (2%), and 4 pts required more than 10 (6%) sessions of dilation respectively. Overall, 3 different patterns emerged in terms of response to treatment. First pattern was the **good responder group** that needed only 3 or less dilations (75%) and it constituted the biggest group. Second group was the **medium responder group** that needed between 4 to 7 dilations (19%). The third group was the **poor responder group** (6%) that needed more than 7 dilations which was the smallest group. Poor responders tended to have frequent recurrences and some needed up to 25 or more sessions of dilations over a year or longer time with no definitive palliation.

Conclusion: Postoperative esophageal strictures at the anastomotic level can effectively and safely be managed by serial endoscopic dilations and good response can be obtained in 94% of patients. The number of poor responders is 6% and we think that their resistance to treatment needs to be addressed with alternative methods.

P107

Case Report: Use of a Stent to Treat a Colonic Anastomotic Leak
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Anastomotic leaks are a serious complication in colorectal surgery that often require operative intervention and fecal diversion. Use of uncovered self-expanding metal stents in the colon has gained wide acceptance, especially in the treatment of malignant obstruction. However, there is limited data on the use of stents for benign colorectal disease. The successful management of benign leaks, perforations, and fistulae of the upper GI tract has been described using covered self-expandable metal and plastic stents. These covered stents are a potentially useful tool for the treatment of benign colorectal conditions. We describe the results of endoscopic stenting of an ileorectal anastomotic leak with a covered self-expandable stent.

Case Report: A 68-year-old male with history of left colon resection in November 2011 for intractable diverticular bleeding presented with a colorectal anastomotic leak. He subsequently underwent a subtotal colectomy with an ileostomy. Following elective ileostomy reversal and hernia repair in July 2012, the patient developed a leak of the ileorectal anastomosis. Conservative treatment with CT-guided drainage, bowel rest, hyperalimentation and intravenous antibiotics was started but it proved unsuccessful. The patient was taken to the operating room for an exploratory laparotomy and abdominal washout. The anastomotic leak was identified and approximated with interrupted sutures. Fibrin glue was applied. Flexible sigmoidoscopy was then performed intraoperatively by the GI service. The colonic anastomosis was identified at 20 cm. A Jagwire™ straight tip high performance guidewire was placed endoscopically and the stent was introduced over the wire. A WallFlex™ Esophageal 23 mm × 125 mm expandable fully covered stent was deployed endoscopically over the anastomosis. The distal edge of the stent was 8 cm from the anal verge. The proximal end of the stent was anchored with endoclips. The abdomen was closed and reinforced with a Strattice mesh. There were no operative complications. After 14 days, flexible sigmoidoscopy was performed and the stent was removed with anastomosis intact upon examination. The patient was discharged home on a regular diet two days later.

Discussion: Anastomotic leakage following colorectal surgery is a serious complication and a major source of morbidity and mortality with a reported incidence of 6% to 22%. There is limited data on the use of covered stents for colorectal leaks with only two case series reports to our knowledge. Abbas described a case report of two patients in 2009 treated with a self-expandable covered nonmetal stent for a colorectal and an ileorectal anastomotic leak resulting in no operative intervention. One patient was found to have migration of the stent twice and underwent two subsequent procedures to replace the stent. DiMaio et al. reported a case series of 5 patients treated for post-operative colorectal anastomotic leak with covered self-expandable metal stents successfully in 4 out of 5 patients, with one patient requiring surgical diversion. In conclusion, we believe that some colorectal anastomotic complications may be amenable to endoscopic management sparing the need for a diverting stoma or other surgical interventions.

P108

Sedation and Bowel Preparation For Colonoscopy In Elderly: A Nationwide Survey in Ireland

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Background and Aims: The practice of colonoscopy in elderly is not standardized in Europe. Recent European Society of Gastrointestinal Endoscopy (ESGE) guidelines are concerned primarily with safety aspects of the procedure in this age group. In view of this, a national survey of sedation and bowel preparation for colonoscopy in elderly was performed to assess the current practice in Ireland.

Material and Methods: A structured 21 item questionnaire was mailed to 204 consultant surgeons and adult gastroenterologists. Endoscopists' routine of elderly patients monitoring, sedation, and bowel preparation methods for colonoscopy were assessed. The endoscopists' perceived barriers to optimal bowel preparation were also evaluated.

Results: A 48.5% (99 endoscopists) response was obtained. The respondents performed an average of 13 colonoscopies per week. The majority of colonoscopies in elderly patients (95%) were carried out under sedation. The most frequently used agent for sedation in elderly was midazolam in 90%, while propofol and diazepam were preferred in 6% and 4% of the cases, respectively. Respondents routinely monitored vital signs and pulse oximetry (100%), and/or electrocardiography (35%), and supplemental oxygen was routinely administered in 90% of the cases. Endoscopists' satisfaction with sedation was greater among those using propofol than in the groups using conventional sedation (score on a 10-point visual analogue scale, 9.5 ± 0.8 vs. 8.3 ± 0.9 , $p = 0.003$). Sixty-two percent of the respondents used polyethylene glycol for bowel preparation in elderly, and 88% respondents believed that patients-related factors were the main barriers to optimal bowel preparation.

Conclusion: Use of sedation and physiologic monitoring is currently the standard practice during colonoscopy in elderly Irish patients. Benzodiazepines remain the most commonly used sedative agents. Patients-related barriers are the prime contributors to poor bowel preparation in the geriatric population.

P109

Surgical Outcomes of Lateral Transperitoneal Adrenalectomy and Posterior Retroperitoneoscopic Adrenalectomy in Consecutive Patients by a Single Surgeon

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Background: Among several minimally invasive adrenalectomy techniques, laparoscopic transperitoneal adrenalectomy (LTA) has been the standard method for benign adrenal gland tumors; however, recently posterior retroperitoneoscopic adrenalectomy (PRA) has been performed widely. This study presents the outcome of these two approaches performed by a single surgeon in retrospective and consecutive patient cohorts.

Methods: Thirty-eight patients underwent LTA from 2009 to 2011, and 22 patients underwent PRA from 2012. Of these, 29 patients in the LTA group and 19 in the PRA group met selection criteria (unilateral benign tumor, pheochromocytoma ≤ 5 cm, and the other benign tumors ≤ 7 cm) and were enrolled. The medical records of these 48 patients were reviewed and compared retrospectively.

Results: No significant differences were observed in operation time, postoperative analgesics use, first oral intake, hospital stay, or complication rate between the two groups. The PRA group showed less blood loss ($p = 0.017$), a lower highest systolic blood pressure during surgery ($p = 0.041$), and a lower pain score in the second and third postoperative day ($p = 0.006$, $p = 0.002$, respectively). In the right adrenalectomy, operation time was significantly shorter in the PRA group ($p = 0.009$) but similar in the left adrenalectomy ($p = 0.380$).

Conclusions: PRA was performed safely and showed a better outcome than LTA in terms of blood loss and postoperative pain. PRA is a challengeable operative technique for an endocrine surgeon who is experienced in the transperitoneal approach.

P110

Self Expandable Metal Stents (SEMS) As An Alternative Treatment Option In Perforated Duodenal Ulcers, Comparison With Surgery

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Introduction: The objective of this study was to compare a new treatment method using stent-placement with the traditional surgical suture for perforated duodenal ulcers. Standard treatment for perforated duodenal ulcer is surgery with sutured closure. Treatment with nasogastric tube and suction is sometimes used in patients with high co-morbidity but has shown poor results. We started to use stent treatment as an alternative treatment option in old and co-morbid patients in 2009.

Methods & Procedures: Retrospective series comparing two treatments. All patients with perforated duodenal ulcer admitted to our hospital during 2009–2012 were included in a retrospective study. No randomisation was performed. Choice of treatment was based on the patients clinical status and the skills available. Age, ASA-score, method of treatment, complications and hospital stay were recorded. Surgery was performed with standard open or laparoscopic techniques. For stent treatment a partially covered duodenal stent (Hanaro, MI-tech) was placed over a guide wire through the gastroscope.

Results: In total 27 patients were included. 19 of them had surgery, open or laparoscopic. 18 had simple sutured closure and one had a BII resection. Eight patients were treated with a partially covered duodenal stent, six of these patients also received a percutaneous drain. There was no significant difference between the groups concerning age, ASA-score, complication rate or hospital stay. However, there was a tendency towards higher age, higher ASA-score and less severe complications in the stented group. Patients with complications were significantly older ($p = 0.028$) than those without. The median age in the surgical group was 77 years (43–95) with a mean ASA score of 2.5. The median age in the stent group was 81 years (62–87) with a mean ASA-score of 2.9. 8/19 patients in the surgical group had complications (5 abscesses, 1 leakage, 1 respiratory insufficiency, 1 abdominal compartment syndrome). Two out of these patients died. In the stented group 2/8 patients had complications. (1 abscess, 1 multiorgan failure) The patient with multiorgan failure had a delayed diagnosis and was stented one week after admission. She died on day one post stenting. There was no statistically significant difference between the complication rates. Median hospital stay was 19 days (5–72) in the surgical group and 18 days (6–36) in the stent group.

Conclusion: Stent treatment together with percutaneous drainage seems to be a safe and effective alternative to traditional surgical closure for treatment of perforated duodenal ulcer and might be an option in co-morbid or old patients.

P111

Economic Impact of Per Oral Endoscopic Myotomy Versus Laparoscopic Heller Myotomy and Endoscopic Pneumatic Dilatation

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Background: Per Oral Endoscopic Myotomy (POEM) has proven to be a viable therapeutic modality for the treatment of idiopathic achalasia. Cost data has not been reported which evaluates the cost of POEM. The purpose of this study was to retrospectively collect and compare cost data for laparoscopic myotomy (LM), POEM, and pneumatic dilatation (PD).

Methods: A single institution retrospective review of patients undergoing therapy for achalasia from January 1, 2007 to August 31st, 2013 was performed. Professional fees and hospital charges were collected. Professional and facility charges were obtained for LMs coded under Current Procedural Terminology (CPT) 43279 (Laparoscopy, surgical, esophagomyotomy (Heller type), with fundoplasty, when performed). This included the overnight hospital stay and Gastrografin swallow study. Professional and facility charges were obtained for POEMs coded under CPT 43499 (Unlisted procedure, esophagus). This included the overnight hospital stay and Gastrografin swallow study. Professional and facility charges were obtained for PDs coded under CPT 43249 (Upper gastrointestinal endoscopy with balloon dilatation of esophagus). All charges were then adjusted for inflation utilizing the Consumer Price Index.

Results: One-hundred-and-thirteen patients underwent treatment for achalasia during the study period. Total charges, including professional fees and total hospital charges, were collected for LM (n = 95), POEM (n = 18), and PD (n = 13). Laparoscopic Heller myotomies were charged on average \$44,839 while Per Oral Endoscopic Myotomies comparably cost \$41,730. Representative dilatation cost was found to be \$9,190 per episode of endoscopic outpatient dilatation. For serial dilations, cost savings was realized for LMs at 4.87 dilations and realized for POEMs at 4.54 dilations.

Conclusions: Retrospective financial analysis reveals that the operative cost of POEM is similar to that of LM. In the absence of serious complications, pneumatic dilatation remains less costly than surgical myotomy when fewer than four treatments are required. As experience with POEM increases, its cost may decrease, particularly if it can be safely performed as an outpatient procedure.

Key words: Achalasia — Laparoscopic Heller Myotomy — Per Oral Endoscopic Myotomy — POEM — Pneumatic Balloon dilatation — Myotomy — Cost — Laparoscopy

P112

Percutaneous Endoscopic Gastrostomy For Prolonged Ileus And Non-Malignant Obstruction

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Introduction: The utility of percutaneous endoscopic gastrostomy (PEG) decompression for inoperable malignant bowel obstruction is well documented. However, there is limited data on the use of decompressive PEG in the setting of prolonged ileus and complicated non-malignant bowel obstruction. Publications addressing this indication are few in number and tend to address feasibility, not outcomes. The aim of this study was to assess the safety and short-term outcomes of decompressive PEG for prolonged ileus and complicated non-malignant obstructions.

Methods: After IRB approval, we conducted a retrospective chart review of all PEG insertions completed by 5 surgical endoscopists at Cleveland Clinic main campus between 2010 and 2013. Cases were identified by our financial department based on billing codes. We identified and analyzed a total of 50 consecutive decompressive PEG cases for prolonged ileus or non-malignant obstruction. Pre-procedural, perioperative, and post-procedural data was extracted for analysis from our computerized charting system.

Results: Our cohort of 50 patients (28 female, 22 male) had a mean age of 59.6 ± 13.9 years. To our knowledge, this is the largest series ever reported for this indication. Eight patients (16.0%) had less than 3 comorbidities, 20 (40.0%) had 3–5 comorbidities, 9 (18.0%) had 6–10 comorbidities and 9 (18.0%) had over 10 comorbid conditions. All patients had previous abdominal surgery and all but 2 PEGs were done during inpatient admission. Indications varied considerably and are listed in the table provided. No intra-procedural complications were encountered and there were no 30-day mortalities. PEG placement was successful in all 50 (100%) cases. Failed PEG attempts were included in the billing codes utilized; hence, this should reflect the true success rate over the study period. One (2.0%) outpatient PEG-associated bleed requiring a brief admission for conservative management was the only procedure-related complication encountered. One case (2.0%) ultimately required emergency laparotomy for concern of ongoing small bowel obstruction with signs of ischemia after the PEG insertion. This patient had extremely high operative risk (previous multi-organ transplant, dialysis-dependent renal disease) and was found to have a non-compromised internal hernia in a hostile abdomen. The mean pre-procedural length of stay was 14.2 ± 8.9 days as compared to 6.4 ± 5.3 days post-procedure. The 30-day readmission rate was 14.0% (7 patients). Of these, 4 (57.1%) were for unrelated issues, 2 (28.6%) were brief admissions for emesis with an appropriately functioning PEG and one (14.3%) was for definitive operative management of a chronic obstruction in a high-risk patient.

Conclusion: Decompressive PEG insertion is a safe and effective method of alleviating obstructive symptoms in patients with prolonged post-operative ileus and complicated non-malignant obstruction. It is especially useful for discharge facilitation in high-risk patients or those with a hostile abdomen and may be used as a bridge to definitive repair.

PEG Indications

INDICATION	NUMBER
Post-op ileus/small bowel obstruction (SBO)	23
Chronic/sub-acute SBO	5
SBO—extrinsic compression (non-malignant)	5
SBO—hostile abdomen	4
Benign duodenal stricture/ulcer	4
Intestinal dysmotility/inertia	4
Ileus after SMA thrombectomy, bowel resection	2
SBO—prohibitive operative risk	2
VBG with outlet obstruction	1

P113

Transgastrostomic Endoscopy-Assisted Foreign Body Removal

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Introduction: Transgastrostomic access in patients with an established gastrostomy tract has only been described recently in the literature. A novel approach enabled by advances in surgical endoscopy and minimally invasive surgery, it has been described for use in a variety of foreign body removal cases. To the best of our knowledge there are no reported experiences of transgastrostomic removal of foreign bodies. We present the unique case of a young man in whom multiple foreign bodies were removed through an established gastrostomy tract under endoscopic guidance.

Case Report: The patient is a 23-year old male with a history of Joubert's syndrome, mental retardation, and dysphagia requiring percutaneous endoscopic gastrostomy (PEG) tube nutrition, who was brought in to the emergency department from his skilled care facility with reports of nausea, vomiting and fever. His caregivers reported multiple feeding tube replacement procedures as he was prone to pulling out his enteric access. A chest radiograph revealed a right lower lobe infiltrate and a nondescript mass in the gastric body. Computed tomography scan subsequently revealed multiple tubular foreign bodies within a severely dilated stomach.

Endoscopy revealed a dense entanglement of balloon-tipped catheters in the antrum. The existing feeding tube was removed and the stoma was dilated with a 6 mm bougie dilator, through which a 5 mm laparoscopic grasper was introduced. Under endoscopic guidance, a total of 74 feeding tube remnants were removed from the stomach, each approximately 24 cm in length. All remnants were removed without difficulty and inspection of the gastric lumen revealed only mild gastritis. A new, shorter gastrostomy feeding tube was placed.

Postoperatively, tube feeds were restarted and tolerated well. He was maintained on antibiotics for aspiration pneumonia and discharged to his care facility shortly thereafter.

Discussion: In the current literature, flexible endoscopy is the accepted standard in retrieving foreign bodies in the upper gastrointestinal tract, with most experiences involving singular items. However, given the large quantity and the entangled nature of the foreign bodies visualized on endoscopy, retrieval was performed via a transgastrostomy route with endoscopic guidance. We found this route to be technically easier and less time-consuming.

Endoscopy-assisted transgastrostomic access has been previously described in the literature for intragastric procedures, including submucosal gastric dissection for gastric tumors, transgastrostomic ERCP and stone retrieval for choledocholithiasis, and treating a bleeding gastric ulcer using a transgastrostomic suturing device. There are no reported experiences with using a similar approach in foreign body retrieval. The technical advantage of a transgastrostomic approach is the direct visualization of both retrieving instrument and foreign body. In the case of this patient, transgastrostomic access prevented repeated esophageal instrumentation for removal of multiple foreign bodies and the significant morbidity of a laparotomy. Larger, multicenter experiences using transgastrostomic access are needed to better describe its potentially broad utility and safety in surgical endoscopy.

P114

Risk Factors of Fecal Diversion for Colonoscopic Perforation: A Review of 35,361 Endoscopic Procedures

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Introduction: Colonic perforation is considered as one of severe complications for endoscopic procedure of colon, including colonoscopy and sigmoidoscopy. This complication is unusual but has a high rate of mortality and morbidity. Fecal diversion (colostomy) may needs as a part of treatment in selected patients. The purpose of this study was to determine the risk factors influencing colostomy rate in the setting of iatrogenic colonoscopy perforation.

Methods: A retrospective analysis was conducted of all patients who underwent surgical treatment for colonoscopic perforation between January 2005 and August 2013. Patients underwent single-stage operation, including primary repair and segmental resection with anastomosis, were compared with the fecal diversion group. The potential risk factors of fecal diversion in terms of age, perforated size, location of perforation, contamination, colonic pathology, and timing of diagnosis were reviewed and analyzed.

Results: There were 31 colonic perforations from 35,361 endoscopic procedures of colon, 32,426 colonoscopies and 2,935 flexible sigmoidoscopies (incidence 0.09%). Thirty patients underwent surgical treatment divided into single stage operation in 21 patients (70%) and fecal diversion in 9 patients (30%). Age, timing of detection, perforated size and location of perforation were not significantly influenced the rate of fecal diversion. All 4 patients who had pathology at rectosigmoid colon (3 inflammatory bowel diseases and 1 radiation proctitis) underwent fecal diversion compared with 5 patients (19.2%) in normal rectosigmoid group ($p = 0.005$). Patients, who had moderate to severe intraabdominal contamination, were more likely to have colostomy (80% vs. 5%, $p < 0.001$).

Conclusions: Intraabdominal contamination and underlying colonic pathology were risk factors of fecal diversion for colonoscopic perforation in this recent study.

P115

Endoscopic Proximal Gastroplasty For Obesity Using A Novel Full-Thickness Suturing Device

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Introduction: An outpatient transoral endoscopic procedure for morbid obesity would be appealing: if safe, effective and durable. Previous endoluminal gastroplasties have had only transient effectiveness due to mucosa to mucosa gastric wall apposition or superficial staple/suture purchase. We present early clinical results for 13 patients undergoing gastroplasties with a novel endoscopic full-thickness suturing device to form an internal restrictive ring just distal to the gastroesophageal junction.

Methods: Thirteen patients with morbid obesity (BMI 35–62) were selected according to an IRB approved study protocol. All patients underwent a psychological evaluation, a history and physical examination, blood tests including a lipid profile and A1c level and quality of life and reflux questionnaires. After informed consent and under general anesthesia, an endoscopic procedure was performed. Using a proprietary suction mucosectomy device, two mucosal excisions were created just below the gastro-esophageal junction. A second device was used to perform full thickness suturing of the excision beds for apposition of the anterior and posterior gastric wall. Injection of hypertonic saline on the lesser curvature side was used to decrease fundic compliance.

Results: All patients had a completed procedure although 4 had significant bleeding (150–275 cc) from the mucosal excision site. Mean operative time was 161 minutes (82–297). There was no post procedure bleeding or need for blood transfusion. No other complications were encountered although one patient required hospitalization 2 weeks after surgery for unrelated viral enteritis and dehydration. Patients were encouraged to eat frequent small protein heavy meals after 2 weeks of a pureed diet. At 3 month follow-up, the average excess weight loss was 26.4% (6%–36%), 3 of 4 diabetic patients had normalization of their A1c and 2 of 8 patients with pre-procedure hypertension normalized their blood pressure.

Conclusion: For this first human experience with a new endoscopic suturing device we found the procedure and devices to be safe and effective. We report promising early results using the device as an endoluminal treatment for morbid obesity.

P116

Fast Access to the Common Bile Duct During Endoscopic Retrograde Cholangio-Pancreatography, Our Experience With A Double Wire Technique

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Introduction: Repeated cannulation of the pancreatic duct (PD) while attempting to cannulate the common bile duct (CBD) is often encountered during Endoscopic retrograde cholangiopancreatography (ERCP). This often leads to unsuccessful cannulation or post procedure complications. The use of a double wire technique, in which, once wire guided access is obtained in the PD, a second wire is used to gain access into the CBD, has shown to aid in the successful cannulation of the CBD. We propose a series to evaluate success and time to successful cannulation if the double wire technique is employed as soon as PD cannulation is achieved.

Methods and Procedures: A total of 39 patients required an ERCP over a three month period. Of these, 7 patients required the use of the double wire technique as cannulation of the PD was the first duct accessed. Data was collected on these 7 consecutive patients undergoing ERCP in which the double wire technique was used. Time from wire cannulation of pancreatic duct until successful cannulation of CBD was recorded. Patients were followed for post ERCP complications

Results: Time from cannulation of PD until successful cannulation of CBD was as follow: The average time to cannulation post PD wire access was 120 seconds. All attempts of using the double wire were successful in gaining access into the CBD. There were no reported complications on this series.

Conclusion: The use of double wire technique to gain successful cannulation of CBD after gaining access to PD has been reported. No clear consensus has been established as to how early in the intervention should one proceed with double wire technique prior to continuing reattempts at CBD cannulation. This small series demonstrate quick cannulation is achieved when proceeding with double wire cannulation post first access to PD. The early conversion to this technique should minimize ampullary trauma and post intervention complications.

P117

Endoscopic Argon Plasma Coagulation Can Alleviate Dysphagia from Malignant Esophageal Masses

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Background: Dysphagia is a common symptom for advanced esophageal cancer. Both chemoradiation and/or stent placement may not fully alleviate dysphagia and are not without its morbidities. Argon plasma coagulation (APC) is characterized by noncontact coagulation and ablates the tumor site circumferentially. APC can be performed endoscopically as an outpatient and has been well-described in treating Barrett's esophagus. Its utility in alleviating malignant dysphagia has not been well-described.

Methods: A retrospective chart review was conducted on patients who underwent palliative endoscopic APC for distal gastroesophageal junction (GEJ) tumors from 2010 to 2013 at a tertiary academic center. Data included patient demographics, procedure details, 30-day complications, and symptoms related to esophageal mass.

Results: Four patients with advanced esophageal cancer and symptomatic dysphagia treated with APC were identified. The mean age was 65 years old (range: 58–84) and were followed for a mean 2.5 years (range: 2 to 4 years). All patients had an American Society of Anesthesia (ASA) Classification 3. The mean procedure time of APC was 38.3 ± 31.8 minutes. Dysphagia improved immediately post-procedure. There was no post-procedural morbidity or mortality. Two patients had complete absence of gross lesions on surveillance endoscopy. One patient (Patient 3), who had a prior heart transplant, had both a distal GEJ tumor and a gastric tumor. Ablation of his distal GEJ tumor allowed for subsequent formal resection (Table 1).

Conclusions: APC therapy is a safe and useful treatment for patients with malignant dysphagia who are not surgical candidates and cannot tolerate stents. Repeat endoscopic APC is feasible with minimal morbidity.

Table 1 Staging and Procedure Characteristics

	Staging	#of Procedures	Mean time	Prior Stenting
Patient 1	T3N1M0	2	24.7	Yes
Patient 2	T3N1M1	3	36.3	Yes
Patient 3	T1N0M0	1	82	No
Patient 4	T2N0M0	2	26	No

P118

A Novel Endoscopic Approach To Managing High Output Entero-Atmospheric Fistulae

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Introduction: Entero-atmospheric fistulae (EAF) continue to be surgical dilemmas with significant morbidity and decreased quality of life. Current non-surgical management methods have limited success with EAF closure, therefore, minimally invasive interventions are being developed for EAF management. Goals of therapy include reducing fistula output, ameliorate electrolyte and nutritional derangements, resolve infectious processes, and reduce the complex wound problems associated with EAF, thereby making patients safer candidates for definitive surgery. We present a novel endoscopic EAF management approach utilizing covered enteral stents as a bridge therapy prior to formal surgical resection.

Methods and Procedures: Prior to procedures, the etiology of the EAF was determined and rectified or controlled (e.g. foreign body, infection, distal obstruction). Under anesthesia, a slim diagnostic endoscope was used to evaluate the small bowel proximal and distal to the EAF. With fluoroscopic guidance, a flexible-tip guidewire was positioned within each lumen. A partially or fully covered self-expanding metal enteral stent was deployed in two steps. Using Seldinger technique and fluoroscopic guidance, stent deployment began in the more tortuous limb, allowing for manual placement in the remaining, straighter, limb. The stent was fully deployed, leaving 30–50% of the stent extracorporeal. This end was collapsed utilizing the drawstring, secured with a Kelly clamp, and manually guided into the other, straighter, lumen utilizing fluoroscopy and the previously placed guidewire. Once positioned, the stent was re-expanded by releasing the clamp. The covered portion of the stent traversed the aperture of the EAF. In two patients, biologic sealant was used to cover the location of the EAF.

Results: Five patients underwent stent placement for high-output EAF. Preoperatively, all five patients experienced significant skin, wound, and/or ostomy issues requiring prolonged and repeated hospitalizations and total parenteral nutritional (TPN). The mean starting fistula output was 1,577 ml/day. Four of the five patients (80%) required at least one re-intervention for stent migration, dislodgement, or incomplete seal (range: 1–4 re-interventions). Post-procedure, fistula output decreased by a mean of 82% (range: 56–95%; 80–530 ml/day). Subjective wound complications and management were improved. All but one patient were advanced to regular diets; three required supplemental long-term TPN. Two patients were re-admitted for wound complications secondary to the EAF. After a mean of six months (range: 4–12 months) following stent placement, three patients completed definitive surgical repair with EAF take-down, stent removal, and abdominal wall reconstruction. With a mean follow up of three months, all three operative patients are doing well without recurrent fistulae.

Conclusions: Covered enteral stents can be used to control high-output EAF, reducing their associated morbidity. Wound care, TPN requirements, and oral diet tolerance were improved post-EAF stent. In three patients, the technique permitted a delay in surgery until conditions were optimal for definitive operative intervention. It is understood that this technique may necessitate multiple endoscopic interventions, as the majority of patients required revisions for stent migration/dislodgement/suboptimal EAF coverage. Further studies and alterations to current stent platforms are needed to improve this novel approach to a challenging disease.

P119

PEG Tube Placement: Do We Do It Better Than Gi?

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Introduction: Percutaneous endoscopic gastrostomy (PEG) tube placement is a valid mechanism of enteral support when oral feeding is contraindicated or not possible and is commonly performed by both surgeons and gastroenterologists. Our objective was to compare outcomes of PEG placement by surgeons versus gastroenterologists (GI).

Methods and Procedures: A retrospective chart review of patients undergoing PEG tube placement at our institution between May 2011 and May 2013 was performed. Demographics, comorbidities, perioperative details, complications, hospital length of stay (LOS), and mortality were collected. Univariate analysis was performed with $p < 0.05$ deemed statistically significant.

Results: Over the two-year period, 643 patients had PEG tubes placed: 273 (42.5%) by surgeons, 370 (57.5%) by GI. Comparing surgeons vs. GI, a higher number of PEG tubes were placed on an inpatient basis by surgeons (92% vs 73%; $p < 0.001$). In both groups, 62% were male; 68% Caucasian. Surgeons operated on slightly younger patients (56.0 ± 19.8 vs 64.3 ± 13.5 years; $p < 0.001$). Comparing surgeons to gastroenterologists, GI tended to place PEGs in more comorbid patients: CAD (8.1% vs 13.0%), history of cancer (12.1% vs 35.1%), hypertension (38.8% vs 53.2%), anti-platelet therapy (25.8% vs 36.1%), risk of aspiration (20.0% vs 36.1%), pneumonia (31.6% vs 19.1%); all $p < 0.05$. Illicit drug use (5.3% vs 1.4%) and respiratory failure as indicated by tracheostomy at any time during admission (58.7% vs 16.8%) were higher in the surgeon group; $p < 0.05$. When PEG placement was by a surgeon, concomitant tracheostomies were performed in 48% of cases, compared to 14% in GI group ($p < 0.001$). The most common indications for PEG were CNS impairment (43% vs. 35%), dysphagia (34% vs. 31%), enteral access (12% vs. 4%), oropharyngeal neoplasm (6% vs. 25%), and gastric decompression (5% vs 6%); $p < 0.001$. Although overall intraoperative and postoperative complications were higher among GI, they were not statistically significant ($p > 0.05$). The pre-procedure LOS (13.8 vs 9.1 days; $p < 0.0001$) and post-procedure LOS (13.0 vs 5.1 days; $p < 0.0001$) were longer in the surgeon group.

Conclusions: Surgeons and gastroenterologist have similar technical outcomes and no significant difference in complications. The longer LOS in the surgeon group may be attributed to prolonged respiratory failure (Table 1).

Table 1 Peri-Procedural Complications

	Surgeon n (%)	GI (%)	n	P value		Surgeon n (%)	GI n (%)	P value
Inability to be placed	9 (3.6)	11 (3.2)	0.77	Buried bumper syndrome	0 (0.0)	4 (1.0)	0.14	
Complication of upper endoscopy	2 (0.7)	6 (1.5)	0.48	PEG Site Herniation	0 (0.0)	1 (0.3)	1.00	
Procedure-related Complications	4 (1.4)	4 (1.0)	0.72	GI bleeding	2 (0.7)	3 (0.8)	1.00	
	0 (0.0)	1 (0.3)	1.00	Ulceration	1 (0.4)	4 (1.0)	0.41	
Bleeding	3 (1.1)	2 (0.5)	0.65	Gastroparesis	0 (0.0)	1 (0.3)	1.00	
Post-procedure Complications	14 (4.9)	29 (7.4)	0.20	Gastric outlet obstruction	0 (0.0)	1 (0.3)	1.00	
Wound cellulitis	2 (0.7)	3 (0.8)	1.00	Post-procedure pneumonia	20 (8.4)	23 (7.4)	0.66	
Wound infection	2 (0.7)	10 (2.6)	0.08	Malfunction	12 (4.3)	17 (4.4)	0.96	
Erythema	2 (0.7)	11 (2.9)	0.08	Aspiration	1 (0.4)	0 (0.0)	0.42	
Tube leakage	5 (1.8)	10 (2.6)	0.60	Tumor at PEG site	1 (0.4)	0 (0.0)	0.42	
Peristomal pain	1 (0.4)	8 (2.1)	0.09	intraproctoneal air	3 (1.1)	0 (0.0)	0.72	
Necrotizing fasciitis	0 (0.0)	1 (0.3)	1.00	PEG dislodgement	3 (1.1)	2 (0.5)	0.65	
Abscess	1 (0.4)	2 (0.5)	1.00	30-day mortality	47 (14.7)	48 (11.1)	0.13	

P120

Endoscopic Fundoplication for the Management of Gastroesophageal Reflux: A Community Hospital Experience
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Objective: Transoral Incisionless Fundoplication (TIF) continues to be evaluated as a potential alternative to both conventional surgical and medical options for certain patients with gastroesophageal reflux disease (GERD). Most studies and case series that have been published, however, have been conducted in academic tertiary care centers. We report our initial experience with this approach in a community hospital setting.

Methods: Over a three year period, 13 patients underwent the TIF procedure. 10 patients were males and 3 patients were females. The mean age of the patients was 51.3. All 13 procedures were performed by the same surgeon with one surgical assistant. Primary endpoints of the procedure included post operative remission of GERD symptoms (based on remission, ongoing or continued symptoms questionnaire) and need for post operative PPI use. Complications were classified as minor (bleeding requiring no intervention) or major (bleeding requiring intervention, perforation or intractable dysphagia). Pre-Operative workup included EGD for Hiatal Hernia size evaluation, barium esophagogram and gastric emptying studies. Only 6 underwent ph studies due to atypical symptoms.

Results: Mean procedure time was 86 minutes (range 50–125 minutes). Mean hospital stay was 1.2 days. One patient was admitted with chest pain but sent home with a negative workup. There was one minor complication (patient with bleeding that formed from suture but required no intervention). There were no major complications. 11 patients had a mean follow up of 17 months with two patients lost to follow up. Of the 11 patients, all had follow up greater than 180 days. Of these 11 patients, all but 2 had complete remission or improvement of index symptoms. The two patients who had ongoing symptoms subsequently underwent Nissen fundoplication. One patient who had improvement of symptoms required repeat TIF due failure of the fundoplication at 6 months post index procedure.

Conclusions: TIF performed in the community setting appears to be as safe and effective at short term follow up in patients with GERD when compared to larger case series in tertiary care centers. However, long term follow up and randomized trials are needed to fairly assess the community experience to the tertiary care center one.

P121

The Role Of Endoscopic Retrograde Cholangiopancreatography (ERCP) In Acute Care Surgery

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Introduction: The feasibility and utility of surgeon performed intra-operative ERCP (INOPERC) has firmly been established in previous studies performed by our group at UNSOM/UMC. Furthermore, several studies at our institution have reported success with performing ERCP exclusively in the supine position, most notably with our One-Step Laparoscopic Cholecystectomies. The ability to perform ERCP intra-operatively on a patient in the supine position allows great versatility for the Acute Care Surgeon to exclusively manage patients with acute hepatopancreaticobiliary (HPB) conditions and complications. Acute Care Surgery is an evolving branch of General Surgery that now has its own service in many General Surgery Programs. Over the past four years, over 200 INOPERC have successfully been performed by our surgical service for a variety of indications. This paper will highlight select cases where surgeon-performed ERCP played a role in the management of patients with various HPB conditions.

Methods and procedures: The following patients were admitted through the emergency room at University Medical Center of Southern Nevada where they presented with a variety of acute complaints. Cases selected were as follows: 1. Obstructive jaundice 2. Biliary pancreatitis 3. Biliary leak following penetrating abdominal injury 4. Cholangitis All patients selected were admitted to the surgical service and underwent appropriate surgical and medical workups. Operative procedures were completed in either a One-Step or a Two-Step approach. For the patients with obstructive jaundice and biliary pancreatitis, INOPERC was performed in the supine position during the same anesthesia as the laparoscopic cholecystectomy. ERCP performed prior to the lap chole (in the case of acute cholangitis) and in the case of penetrating abdominal injury were performed in the prone position.

Results: All cases selected were successfully treated with some variation or combination of lap chole, intra-operative cholangiogram, and ERCP with papillotomy, stent placement, or other necessary ERCP adjunctive measure. All aspects of the procedures were performed exclusively by surgical residents under direct supervision of an attending surgical endoscopist. Selective cannulation of the common bile duct was achieved in 100% of ERCPs. There were no morbidities or mortalities and no complications to report.

Conclusions: ERCP is an additional tool for the appropriately trained Acute Care Surgeon to apply in the management of patients admitted to a surgical service. It can be used alone or in combination with other surgical procedures and can be safely performed in a variety of patient positions. Surgeons trained in ERCP can use this skill for diagnostic and therapeutic purposes in general surgery and trauma patients. ERCP has a steep learning curve but the UNSOM/UMC Las Vegas experience led by Dr. Nathan Ozobia has shown that surgical residents can be trained to independently perform both diagnostic and therapeutic ERCP under strict supervision and guidelines.

P122

Partial Balloon Deflation For Controlled Withdrawal Of Single Balloon Enteroscopy

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Case: An 80 year old female with chronic paroxysmal atrial flutter on Aspirin and Coumadin presented as an outpatient for evaluation of iron deficiency anemia. She denied any abdominal pain, weight loss, hematemesis, melena or hematochezia. Physical examination was normal; hemoglobin was 11.5, hematocrit was 34.9.

Upper endoscopy and colonoscopy were performed and found to be negative. A video capsule endoscopy revealed a suspicious area that was oozing fresh blood. Visualization was poor and neoplasm could not be ruled out. Localization was difficult and thus single balloon enteroscopy was performed. We were able to advance the scope to the ileum confirmed by biopsy. After tattooing the most distal point, withdrawal began. Using the pause button on the Olympus inflator device we achieved partial balloon deflation. The proper amount of deflation was determined by trial and error. After 2 seconds of deflation we pressed the pause button and checked the resistance to withdrawal. Adequate deflation was considered the point where withdrawal was controlled with minimal resistance. In this way we were able to prevent rapid unplaiting of the small bowel off the over tube, and flatten the small bowel folds for better visualization. Glucagon was also utilized to reduce motility. The area in question was found, biopsied and tattooed. Pathology revealed chronic inflammation with a hyperplastic component. NSAID enteropathy secondary to the patient's daily aspirin was the most likely diagnosis.

Discussion: The small bowel had long been considered a black box for endoscopists due to its long length, and multiple complex loops, making it impossible to evaluate with conventional endoscopy. Although the wireless video capsule allows for the visualization of the small bowel its major drawbacks are the inability to accurately localize and biopsy lesions as well as a high negative predictive value. In 2007 single balloon enteroscopy was introduced, allowing endoscopists to intubate deep into the small bowel by plaiting it onto the scope and over tube. The single balloon system consists of an Olympus 200 cm enteroscope, a disposable silicone splinting tube with an inflatable balloon, and an inflation control unit. After deep intubation of the small bowel, which is a timely and tedious process, the conventional technique for withdrawal is to deflate the over tube balloon and retract both the scope and over tube together. The drawback of this technique is rapid unplaiting of the small bowel off the over tube, often resulting in incomplete visualization. Using our technique of partial balloon deflation described above we were able to achieve a smooth controlled withdrawal with excellent visualization. In addition, the balloon allows for traction of bowel folds, similar to the traction obtained in cap assisted endoscopy. With more video capsule endoscopies being performed, more small bowel lesions are being discovered. Single balloon enteroscopy provides a way to localize, diagnose and treat them. As studies with colonoscopy have shown, controlled withdrawal increases lesion detection and therefore is desirable. With partial balloon deflation in single balloon enteroscopy one can achieve a similar degree of controlled withdrawal to that of colonoscopy

P123

Laparoscopic Total Gastrectomy For Adenocarcinoma In A Western Country Community Hospital: Safety, Oncological Issues And Mid-Term Survival

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Laparoscopic total gastrectomy (LTG) for adenocarcinoma is a widely diffused operation in Eastern Countries but there are only few reports from Western centers (mostly focused on partial/distal gastrectomy). The aim of this study was to assess safety of the surgical procedure, adherence to the oncological principles (margin clearness and lymph node clearing) as in open surgery and mid-term survival.

We evaluated the short- and mid-term outcome of patients undergoing LTG for adenocarcinoma between June 2005 and October 2012. Perioperative morbidity included any minor/major, medical/surgical complication.

Out of 45 patients referred for total gastrectomy for adenocarcinoma, 24 patients underwent open surgery or immediate conversion after explorative laparoscopy, for advanced disease (bleeding, perforated or bulky mass, with infiltration to the adjacent organs, including pancreas or colon). The remaining 21 patients (11M:10F) formed our study population. Their median age was 65.6 years (IQR: 58–71). The median operative time was 240 min (IQR: 210–300), R0 resection was obtained in all patients and the median number of lymph nodes retrieved was 39 (IQR: 33–48). Median tumor diameter was 3 cm (IQR: 2–4 cm). All patients had a D2 lymphadenectomy. There were 9 (42.9%), 5 (23.8%) and 7 (33.3%) patients stage I, II and III, respectively. Mortality and overall morbidity rates were 0% and 42.9%, respectively, including 1 leak (requiring reoperation, 4.8%), 3 abdominal abscesses (1 drained radiologically, 2 treated with antibiotics) and 2 deep vein thrombosis with pulmonary embolism. According to the Dindo-Clavien classification, we had seven grade II, one grade IIIa and one grade IIIb complications, respectively. Median follow-up was 39 months. Median overall and disease-free survival was 94.7% and 72.3%, respectively, at 3 years.

Short- and mid-term outcomes of LTG for adenocarcinoma, even in a community hospital setting, are good in terms of safety for the patients and respond to oncological criteria used in open surgery, with good mid-term survival results.

P124

The Selective Use Of Laparoscopy-First Approach For High-Risk Patients Suffering Perforated Peptic Ulcer Is Safe

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Background: Since the conclusion of a randomized trial, the laparoscopy-first approach (LFA) was adopted as a routine in our institution for managing patients suffering from PPU. The aim of the current study was to review the outcomes of LFA for PPU and to assess if the approach is applicable to high-risk patients.

Method: This was a retrospective study of all patients who were diagnosed with PPU admitted between January 2002 and December 2012. LFA was offered unless the patient condition were deemed inappropriate for the approach. Data retrieved included peri-operative and operative parameters, morbidities and mortalities.

Results: 373 patients suffering from PPU were included in the study and 50.9% received laparoscopic repair. There was a significant increase in the number of operations performed yearly by the LFA ($P < 0.001$). 25.2% of the patients had a Boey score of ≥ 2 . High-risk patients that received LFA suffered from larger ulcers ($P < 0.001$) with more severe contamination ($P = 0.006$) that required conversion ($P = 0.002$). When compared to open surgery, more patients in the open group had ASA grade ≥ 3 ($P = 0.007$) and suffered from mortality ($P = 0.001$). The only significant predictor to mortality in high-risk patients was ASA grade ≥ 3 ($P = 0.014$).

Conclusion: The adoption of LFA in patients suffering from PPU was associated with acceptable rates of mortality and morbidity. The approach could also be selectively adopted in patients with Boey score ≥ 2 provided their ASA grading is low and hemodynamically stable.

Comparison of patients with Boey score ≥ 2 that received laparoscopic or open surgery.

	Laparoscopic N = 29	Open N = 63	P value
Age (years)	66.62 (15.49)	70.41 (16.77)	0.292
ASA grade ≥ 3 (%)	7 (24.1)	34 (54)	0.007
Time to presentation (hours) *	46.30 (22.65)	50.57 (23.24)	0.448
Size of ulcer (mm) *	10.77 (8.52)	12.14 (10.72)	0.547
Operation time (minutes) *	131.31 (66.33)	113 (63.67)	0.254
Simple patch repair / other procedures (%)	12 (41.4) / 17 (58.6)	28 (44.4) / 35 (55.6)	0.783
Peri-operative inotropes (%)	1 (3.4)	10 (15.9)	0.163
Admission to intensive care unit (%)	6 (20.7)	20 (31.7)	0.274
30-day Mortality (%)	2 (6.9)	26 (41.3)	0.001

P125

Twenty-Year Trend in the Utilization of Heller Myotomy for Achalasia in the United States

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Background: The objective of this study was to determine the U.S. national trend in the utilization of Heller myotomy (HM) for achalasia over a twenty year period.

Methods: Using the Nationwide Inpatient Sample (NIS) of between 6 and 8 million patient records per year, we extracted and analyzed data for achalasia and HM during the years 1991–2011. We then used procedure specific codes to calculate the national estimates for HM for the time under review. We cross referenced this data with laparoscopic procedure codes to evaluate changes in technique. Finally we analyzed patient, institutional and outcome characteristics as well as in-patient mortality.

Results: The total number of HM performed nationally has increased steadily over the last twenty years (1342 cases in 1991 to 5046 cases in 2011) and the percentage of laparoscopic HMs has also increased. In addition, HMs have increased in frequency at urban teaching hospitals as compared to urban non-teaching hospitals (40% vs 49% in 1991 to 78% vs 18% in 2011, $p < 0.001$). Conversely, the in-hospital mortality rate has decreased over this period of review (average mortality of 0.95% for 1991–1995 and 0.29% for 2007–2011, $p = 0.0056$). The median length of hospital stay (LOS) has also decreased (7 days in 1991 to 2 days in 2011, $p < 0.001$). The majority of patients returned home following discharge (range 86% to 95%).

Conclusion: These data show an increase in the number of HMs performed between 1991 and 2011 in the U.S. There has also been an increased utilization of the laparoscopic approach and an increase in the percentage of procedures done in urban teaching hospitals. Patient outcomes have improved over this time period, including decreased in-hospital mortality and LOS, and consistently high rates of discharge to home.

P126

“Solo” Laparoscopic Funduplications With AESOP ROBOTIC ARM

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Introduction: From 2003 to 2013 we had performed 200 laparoscopic funduplications with the AESOP ROBOTIC ARM as the treatment for gastro esophageal reflux disease. We found that the surgery could be performed safely with only the surgeon acting in “solo” surgery. We present our experience and the standard technique used in all cases, including the four main steps for achieving good surgical results.

Material: 200 patients had GERD demonstrated by : 24 pH -study, flexible endoscopy or esophagogram in the preoperative evaluation. Age: 20–65 years, Sex: 145 male–55 female, ASA I–II, Barrett esophagus: 30 %, Hiatal hernia : 70%. BMI: 25–35.

Results: 200 Laparoscopic funduplications with the AESOP robotic arm : using 4 trocars, operating time: 50–120 min, conversions: 0, morbidity: 4%, mortality: 0%. Robotic arm malfunction: 0. Preoperative setting robotic arm: 10 min/GERD control in 95% of the patients during follow up 1 to 10 years

Conclusion: Surgery can be safely performed only by the surgeon acting in “solo” with the AESOP ROBOTIC ARM. Using the robotic arm for controlling the laparoscopic view gives back the control of all the steps of the procedure to the surgeons resulting in a short operating time, with minimum errors and more precise rhythm. In terms of GERD control is effective in 95% of the cases.

P127

Iatrogenic Gastrobronchial Fistula Following A Thoracic Spine Neurosurgical Procedure: Report Of A Case

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Gastrobronchial fistula(GBF) is a known rare complication. Most recent reports are associated with bariatric surgery as these procedures typically involve working with the stomach and diaphragm. We report a case of a 60 year-old female who presented with complaints of recurrent cough and dyspnea nine months after an elective neurosurgical procedure for chronic pain done through a lateral thoracic approach. The patient was evaluated with a computed tomography(CT) scan with oral contrast, which showed extravasation of the contrast from stomach to lung. The patient was stabilized and subsequently taken to the operating room for a laparoscopic partial gastrectomy and diaphragmatic hernia repair.

P128

The Effect Of Laparoscopic Paraesophageal Hernia Repair On Pulmonary Function Test

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Objective: A retrospective cohort study was conducted to examine the impact of laparoscopic paraesophageal hernia repair on the pulmonary function test (PFT).

Methods: Between 2001 and 2005 there were 39 patients diagnosed with paraesophageal hernia. Patients were evaluated by history, physical examination, CXR, barium swallow and upper endoscopy. Pre-operative PFT was done within the 3 months prior to surgery and post-operative PFT was done at least 1 month after surgery.

Results: Thirty-four patients (87%, 8 males, 26 females) were included in the study with a mean age of 71 y (± 12 y). Presenting symptoms included GERD (47.0%), dysphagia (35.2%), anemia (20.5%), dyspnea (32.4%), chest pain (61%), and cough (6%). Six patients had type II hernia; 22 had type III and 6 had type IV. The mean ASA was 2.5 (± 0.7). Significant improvement was noted in mean FEV1 (10.0%, pre: 2.17 ± 0.78 L, post: 2.38 ± 0.92 L, $p = 0.002$), FVC (9.3%, pre: 3.01 ± 1.05 L, post: 3.27 ± 1.22 L, $p = 0.001$) and TLC (8.3%, pre: 5.95 ± 1.59 L, post: 6.43 ± 1.49 L, $p = 0.002$). Improvements were also seen in FEV1/FVC (2.0%, pre: $71.57 \pm 8.5\%$, post: $72.87 \pm 9.04\%$, $p = 0.166$) and RV (7.8%, pre: 2.34 ± 0.68 L, post: 2.51 ± 0.45 L, $p = 0.123$), however, they were not statistically significant. The mean length of stay was 2.6 days (± 1.9). Minor post-operative complications occurred in 5 patients (14.7%). There was no in-hospital or 30-day mortality.

Conclusion: Laparoscopic repair of paraesophageal hernia results in a significant improvement of PFT and is well tolerated by elderly patients with other comorbid diseases.

P129

Laparoscopic Heller Myotomy: Lessons Learned. The Baylor Experience 1997–2012

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Background: Laparoscopic Heller myotomy has become the surgical procedure of choice for the treatment of esophageal achalasia. A certain percentage of patients will develop recurrent symptoms and require further surgical treatment. The purpose of this study is to define the recurrence rate of symptoms for laparoscopic Heller myotomy, define the causes and patterns of recurrence, and assess the outcomes of re-operation.

Methods: Between 1997 and 2012, 300 consecutive patients underwent laparoscopic Heller myotomy for achalasia by three surgeons in a single surgical practice. All procedures were performed laparoscopically and included partial fundoplication in all but 16 patients. All patients had intra-operative flexible endoscopy by the surgical team. Demographics and clinical data were collected after IRB approval.

Results: We identified 21 patients who required re-operation for recurrence of symptoms including 4 patients who had their initial procedure elsewhere. There were 13 females and 8 males with a mean age of 51 years. Average interval to re-operation was 45 months. Factors contributing to failure of the primary operation included scar / adhesions ($n = 9$), inadequate myotomy ($n = 9$), incarcerated hiatal hernia ($n = 3$), and delayed gastric emptying ($n = 3$). All re-operations were performed laparoscopically and included: division of scar tissue; and/or extension of myotomy; and/or reduction and repair of hiatal hernia; and/or pyloroplasty. There was no mortality but two patients sustained intraoperative perforations that were repaired laparoscopically and two patients developed postoperative evidence of perforation and required laparotomy for repair. Six patients required additional procedures including 2 patients that ultimately required esophagectomy for subsequent recurrent symptoms.

Conclusion: Our data defines the recurrence rate of symptoms after primary laparoscopic myotomy at approximately 5.67% (17/300). Recurrence is typically due to scar and incomplete myotomy although hiatal hernia and gastroparesis occasionally occur. Thorough preoperative evaluation is essential for planning reoperation. Esophagectomy is not necessary as the initial reoperation; laparoscopic techniques are preferable with satisfactory outcomes. Multiple procedures are not uncommon in this subset of patients.

P130

Our Simple And Practical Procedure In Anti-Reflux Surgery 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 a simple and practical procedure.

Surgical Procedure:

Setting

Our 5-trocar setting with patients in the reverse Trendelenburg's position for laparoscopic Nissen fundoplication is as follows. A 5 mm trocar was inserted just below the navel for a laparoscope (A). A 5 mm trocar was inserted in the upper right abdomen for a snake-retractor to pull up lateral segment of the liver, and a holder was used for a snake-retractor. A 5 mm trocar was inserted in the upper right abdomen for operator's right hand. A 5 mm trocar was inserted in the upper left abdomen (B). A 5 mm trocar was inserted in the middle left abdomen (C). The operator is positioned between the patient's legs.

Step 1

Under laparoscopic view, left part of the lesser omentum was cut with preserving the hepatic branch of vagus nerve. The right crus has been dissected free, and the esophagus is being recognized. The soft tissue at the posterior side of the abdominal esophagus was carefully dissected. Then the left crus of the diaphragm was recognized from the right side. In this part of the procedure, laparoscope uses 12 mm trocar (A), the assistant uses 12 mm trocar (B) to pull the stomach to left lower side and the operator's right hand uses 12 mm trocar (C).

Step 2

The branches of left gastroepiploic vessels and the short gastric vessels were divided with LCS. The left crus of the diaphragm was exposed and the window at the posterior side of the abdominal esophagus was widely opened. In this part of the procedure, laparoscope uses 5 mm trocar (A) at the beginning of dividing left gastroepiploic vessels, 5 mm trocar (C) when dividing short gastric vessels and 5 mm trocar (B) at the last part of opening the window at the posterior side of the abdominal esophagus. The assistant uses 5 mm trocar (B-C-A) to pull the stomach.

Step 3

The right and left crura are sutured with interrupted sutures to reduce the hiatus. From the right side, the stomach is grasped from behind the esophagus. Then the form of the stomach is pulled to obtain a 360 degree "stomach-wrap" around the esophagus (fundoplication). Such as taping technique is not needed. Using nonabsorbable braided suture, sutures are placed between both gastric flaps.

The characteristic features of our procedure:

1. Floppy Nissen fundoplication
2. No use of bougie device or taping technique for esophagus
3. Rotation of scope site

Results: We have performed this procedure in over 60 cases. This procedure needs 2 surgeons (the operator and the assistant (scopist)). The mean operation time was about 60 min. A favorable outcome was assessed by radiograms performed during hospital stay. Resolution of the symptoms was noted at follow-up 1 month postoperatively in mostly all cases.

P131

Concurrent Gastrointestinal Stromal Tumour Of Large And Small Bowel - A Rare Case

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Background: Concurrent gastrointestinal stromal tumour (GIST) in large & small bowel is unreported in the literature. Over the last years the management of GISTs has evolved rapidly. A lot of changes have been reported in histological diagnostic criteria, in understanding of GISTs' molecular biology and pathogenesis, in imaging strategy, in surgical and adjuvant treatment [1]. Although the outcomes of several published series helped in understanding their pathogenesis, little is known about their coincidence with other tumors of different histogenesis. There are some data regarding the co-occurrence, the association and the potential common origin (genetic pathways of tumorigenesis), between GIST and other tumors [2,3]. The limited number of these cases can not confirm the existence of a common factor in tumorigenesis of these histopathologically completely different tumors and further studies are needed to clarify the possible association [3]. The coexistence of GISTs with other primaries is usually discovered incidentally during GI surgery for carcinomas [4].

Design Objectives & Procedure: A 59 year old female was admitted with chief complaints of abdominal pain in right upper quadrant with loss of weight & appetite since 6 months. No history of gastrointestinal bleed, back pain, jaundice. On physical examination abdomen was normal. Blood investigations revealed low haemoglobin with rest all parameters being normal. Colonoscopy showed proliferative friable growth at ascending colon with histology showing poorly differentiated adenocarcinoma (Fig. 1). CT scan of abdomen & pelvis showed large intraluminal polypoidal growth 4.6 x 3.8 cm in ascending colon, with no local infiltration & rest of bowel loops normal (Fig. 2).

Laparotomy revealed large polypoidal growth of 7 x 4 cm size in ascending colon with concurrent growth in small bowel of 4 x 3 cm size 60 cm from ileocecal junction. Right hemicolectomy done with ileotransverse anastomosis (Fig. 3). Post operatively she received imatinib therapy. **Results:** Histopathological examination of resected specimen showed malignant epithelioid GIST with marked necrosis, marked pleomorphism and atypical mitoses more than 20 mitoses/10 high power field (Figs. 4, 5). Immunohistochemistry analysis revealed CD 117/KIT positive with brisk mitosis more than 25/10 high power field in both large & small bowel tumours (Figs. 6, 7).

Conclusion: Incidence of concurrent GIST in large & small bowel is unreported. In any case of GIST surgeon should be alert to recognise a possible co-existent tumour which secures the patient's best prognosis.

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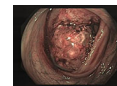


Fig. 1

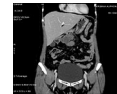


Fig. 2



Fig. 3

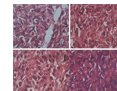


Fig. 4

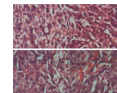


Fig. 5

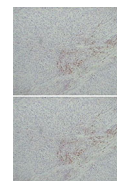


Fig. 6

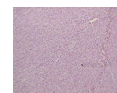


Fig. 7

P132

Our Standard Procedure In Laparoscopic Total Gastrectomy (D1+) For Gastric Cancer Patients With Coaxial Scope Setting

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Introduction: Laparoscopic total gastrectomy (LTG) with dissection of the regional lymph nodes has some technical difficulties in dissecting lymph nodes at the supra-pancreatic area. To reduce this difficulty, we have used coaxial scope setting.

Our procedure is shown as follows:

Surgical Procedure:

- Five trochars were used in this procedure.
- The operator was located between patient legs and the monitor was located over the patient head. Under laparoscopic view, the left gastroepiploic vessels were clipped and cut and the dissection for lymph nodes along the left gastroepiploic vessels was made. The right gastroepiploic vessels were clipped and cut and the infapyloric lymph nodes were dissected. The duodenum was cut using linear stapler.
- The lymph nodes along the proper hepatic artery was dissected and the right gastroepiploic vessels were clipped and cut. The infapyloric lymph nodes were dissected. The common hepatic artery and the splenic artery were exposed, and the lymph nodes along these vessels were dissected. The left gastric vein was clipped and cut. This procedure was performed under a very nice surgical view by pulling up the gastropancreatic folds to the anterior abdominal wall. The lymph nodes around the left gastric artery and the celiac artery were dissected. The left gastric artery was divided after double-clipping.
- The abdominal esophagus was exposed and clamped. The esophagus was cut and sutured as a preparation for 25-mm anvil. Then 25-mm anvil was placed in the esophagus. The stomach was put into the plastic bag not to contaminate the peritoneal cavity.
- The small 45-mm incision was made below the navel and the stomach was taken out from the body. The jejunojejunostomy of Roux-en Y anastomosis was made first and the small incision was sealed using the glove. Under a very nice laparoscopic view the esophago-jejunosomy was made by 25-mm circular stapler inserted through the glove.

Results: We have performed LTG with dissection of the regional lymph nodes (D1+) for gastric cancer patients. Dissecting lymph nodes at the supra-pancreatic area was easier in our procedure with coaxial scope setting.

P133

Our Standard Procedure In Laparoscopic Distal Gastrectomy (D2) For Gastric Cancer Patients

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Introduction: Laparoscopic distal gastrectomy (LDG) with dissection of the regional lymph nodes has become a common procedure among endoscopic surgeons. But it has still some technical difficulties in dissecting lymph nodes at the supra-pancreatic area especially for beginners. To reduce this difficulty, we have stuck to coaxial scope setting. Our procedure is shown as follows:

Surgical Procedure:

- A 12-mm trocar was inserted below the navel for a laparoscope. Four 5-mm trochars were inserted in the upper right, median left, left abdomen and middle right abdomen. One 12-mm trocar was inserted in the middle left abdomen. In total, six trochars were used in this procedure.
- The operator was located between patient legs and the monitor was located over the patient head. Under laparoscopic view, the greater omentum was cut by LCS. The left gastroepiploic vessels were clipped and cut by LCS and the dissection for lymph nodes along the left gastroepiploic vessels was made. The right gastroepiploic vessels were clipped and cut by LCS and the infapyloric lymph nodes were dissected. The duodenum was cut with an endoscopic linear stapler.
- The lesser omentum was cut and the right crus of the diaphragm was exposed. The lymph nodes along the proper hepatic artery was dissected and the right gastroepiploic vessels were clipped and cut by LCS. The infapyloric lymph nodes were dissected. The common hepatic artery and the splenic artery were exposed, and the lymph nodes along these vessels were dissected. The left gastric vein was clipped and cut by LCS. This procedure was performed under excellent surgical view by pulling up the gastropancreatic folds to the anterior abdominal wall and pushing the pancreas gently. The lymph nodes around the left gastric artery and the celiac artery were dissected. The left gastric artery was divided after double-clipping. Then the dissected lymph nodes were attached to the resected stomach and the stomach was cut by the endoscopic linear stapler.
- The duodenogastrostomy was made with a method of intracorporeal gastroduodenostomy, the delta-shaped anastomosis, in which only endoscopic linear staplers are used. After the anastomosis was made, the resected stomach was taken out from the body through the widened navel port site.

Results: We have performed LDG with dissection of the regional lymph nodes (D2) for gastric cancer patients. Dissecting lymph nodes at the supra-pancreatic area was safely performed in our procedure with coaxial scope setting, because the operator could see the lesion in front of him in the coaxially set monitor over the patient head. This setting was also helpful to the procedure in the intracorporeal gastroduodenostomy.

P134

An Initial Experience With And Safety Of A Novel Approach To Treatment Of Gastroesophageal Reflux Disease

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Introduction: The hypothesis that there could be a minimally invasive, safe operation with few side effects, and few failed hiatal hernia repairs led to the use of a combination of laparoscopic anterior hiatal hernioplasty with the Transoral Incisionless Fundoplication. This was evaluated in a single center, single surgeon study.

Methods and Procedures: Since April of 2010, 61 patients with gastroesophageal reflux disease underwent a laparoscopic anterior hiatal hernioplasty and fundoplication using the EsophyX device trans orally. All varieties of hiatal hernia were approached with the exception of the shortened esophagus. Symptoms caused by reflux included heart burn, epigastric pain, uncontrolled emesis, severe chest pain treated unsuccessfully with coronary artery stenting, Barrett's esophagitis, respiratory compromise from an intrathoracic stomach, volvulus of a partial intrathoracic stomach, failed Nissen Fundoplication, sore throat, sinusitis, and the presence of nighttime oral gastric contents. This is a retrospective review collected from a prospectively maintained data base of a single surgeon in a small rural hospital.

Results: Complications in these 61 patients who represented all types of hiatal hernias and defects, with the exception of a shortened esophagus, included one infection which occurred prior to the use of routine antibiotics (a mediastinal abscess treated successfully with excellent results). There have been no recurrences of an esophageal hiatal defect or evidence of reflux at a median of 21 (range 5–48) months. One elderly patient who was treated because of nighttime reflux insisted postoperatively that he still had a bad taste in his mouth in the morning even though his Barrett's had healed and he had a Hill grade I gastroesophageal junction. Another patient treated for vague complaints after a previous Nissen Fundoplication continued to have unchanged complaints, but not reflux. All patients were capable of emesis and eructation without difficulty. No patient suffered symptoms that could be attributed to vagal injury.

Conclusion: The results from this study suggest that the combined laparoscopic anterior hiatal repair and Transoral Incisionless Fundoplication can be safely used for all types of esophageal hiatal hernias, excluding the shortened esophagus, with excellent resolution of symptoms of reflux, without recurrent hiatal hernias. The incidence of bloating was not observed. Patients were able to vomit and eructate after this combination of procedures.

P135

High Resolution Manometry Sub-Classification of Achalasia: Does It Really Matter?

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Background: Three variants of achalasia have been described using high resolution esophageal manometry (HRM). While manometrically distinct their clinical significance has yet to be established. Our objective was to compare the response to myotomy in patients with these achalasia subtypes.

Methods: A retrospective chart review was performed to identify patients with achalasia who had HRM and who underwent laparoscopic Heller myotomy or Per Oral Endoscopic Myotomy (POEM). Symptoms and esophageal clearance by timed barium study were compared before and after treatment. Median values are reported except when indicated.

Results: We identified 43 patients, 19 males and 24 female, with a median age of 50 years. The primary symptom in all patients was dysphagia, with a median duration of 4 years (range 4 months to 50 years). Based on HRM 27 patients (63%) were classified as Type I, 9 (21%) as Type II and 7 (16%) as Type III. Patient characteristics and outcome are compared in the table. Relief of dysphagia was similar for the three achalasia subtypes, and the Eckardt score was below 3 in all but one patient. Dysphagia was relieved in 85% of Type I, 100% of Type II and 86% of Type III achalasia patients. Dysphagia persisted in five patients, all of whom had a laparoscopic Heller myotomy. There was no significant difference in dysphagia relief between POEM and laparoscopic myotomy. On pre-treatment timed barium study, no patient had complete emptying at 1 and 5 minutes. After myotomy complete emptying occurred within 1 minute in 52% (16/31) and within 5 minutes in 58% (18/31) and was similar across groups.

Conclusion: Myotomy for achalasia results in excellent symptomatic outcome and improvement in esophageal clearance. There was no difference among the described HRM achalasia variants. This calls into question the clinical relevance of achalasia sub-classification and affirms the benefit of myotomy for this disease.

	Type I (n = 27)	Type II (n = 9)	Type III (n = 7)	P value
Sex (Male: Female)	12:15	3:6	4:3	0.04
Age (range)	50 (24–76)	33 (20–65)	62 (20–67)	0.13
Duration of Symptoms	4 yrs	5 yrs	4 yrs	0.48
Pre-Operative LES Characteristics				
Resting Pressure	25 mmHg	26 mmHg	28 mmHg	0.91
Residual Pressure	21 mmHg	31 mmHg	21 mmHg	0.51
% Relaxation	21%	25%	32%	0.67
Operation				
Heller Myotomy with Fundoplication	23 (85%)	7 (78%)	5 (71%)	0.21
POEM	4 (15%)	2 (22%)	2 (29%)	
Relief of Dysphagia	23/27 (85%)	0/9 (100%)	6/7 (86%)	0.3
Post-Op Eckardt Score	1	0	0	0.18
Post-Op Timed Barium				
Complete Emptying @ 1 min	(n = 20) 8 (40%)	(n = 8) 6 (75%)	(n = 3) 2 (67%)	0.89
Complete Emptying @ 5 min	10 (50%)	6 (75%)	2 (67%)	0.29

P136

Surgical Treatment of Duodenal Perforation After Endoscopic Retrograde Cholangiopancreatography (ERCP): A Community Hospital Experience

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Introduction: Duodenal perforation is a serious rare complication that occurs in about 1% of the patients After ERCP. The aim of the present study was to report the outcomes of patients who underwent surgical treatment of duodenal perforation after ERCP at a community hospital.

Methods: A retrospective chart review was performed including all patients who had undergone surgical treatment after ERCP duodenal perforation at a single institution between July 2007 and February 2013. The data analyzed included age, sex, ERCP indications and findings, surgical procedures, postoperative complications and mortality.

Results: 12 patients underwent emergency surgery. 11 patients were females (91.6%), main age was 68. The indications for ERCP were choledocholithiasis in 7 patients (58.3%), dilated CBD in 3 patients (25%), dilated pancreatic duct (PD) in 1 (8.3%) and ampullary bleeding in 1 (8.3%). A total of 42 procedures were performed at the initial operation, with a mean of 3.5 procedures for patient. Feeding jejunostomy was done in 8 patients (66.6%), gastrojejunostomy in 7 patients (58.3%), pyloric exclusion in 6 patients (50%), T tube placement in 4 patients (33.3%), cholecystectomy in 3 patients (25%), CBD exploration in 3 patients (25%), enterorrhaphy in 2 patients (16.6%) and duodenal primary repair in 2 patients (16.6%), were the most common procedures. Reintervention were required in 5 patients (41.6%), and 8 patients had complications (66.6%, with no 30 days mortality, only 2 delays death occurred from sepsis (16.6%).

Conclusions: Duodenal perforation after ERCP that requires surgical intervention has a high rate of complications and mortality, especially in older population.

P137

Surgical Treatment of Giant Small Bowel Diverticula with Acute Diverticulitis and Multiples Stones: A Case Report. 66

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Introduction: Small bowel diverticula are rare entities and usually asymptomatic. They are incidentally found on abdominal CT scan or during surgery. Complications such as bleeding, intussusception, obstruction, perforation, diverticulitis and volvulus have been reported. Diverticulitis associated with septic shock rarely complicates small bowel diverticulosis. We report a case of small bowel diverticulitis requiring urgent surgical intervention.

Case Report: A 65-year-old male with no previous surgery presented to our Emergency Department with sudden onset of pain in suprapubic region and left lower quadrant associated with high fever and chills. On examination he was febrile, tachycardic, normotensive with suprapubic and left lower quadrant tenderness, guarding and peritoneal signs. His WBC count was 18,000 and CT scan of abdomen and pelvis showed giant jejunal diverticulitis (Figures 1, 2, 3). After the patient was resuscitated and started on broad-spectrum antibiotics, he underwent exploratory laparotomy. Intra operative findings showed giant jejunal diverticulum with inflammation and not abscess (Fig. 4). At surgery the diverticulum had a narrow neck, it was resected by transverse placement of TA stapler at its non-inflamed base (Fig. 5). Upon opening the specimen, multiple enteroliths were revealed (Fig. 6). He had an uneventful recovery and he was discharge from the hospital on post op day 3. Pathology of specimen showed transmural necrosis of diverticulum and enteroliths.

Conclusion: Although jejunal diverticulosis and its complications are rare, it should be considered in the differential diagnosis of intra-abdominal sepsis and of chronic abdominal pain, especially in older patients. Awareness of the wide spectrum of presentation and potential complications of small bowel diverticulosis can prevent delay in diagnosis. CT scan is the preferred diagnostic test for complicated small bowel diverticular disease.

P138

Ten-Year Outcome In Achalasia: Prospective Study Of Surgical Myotomy And Pneumatic Dilatation

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Introduction: Less was known regarding the effectiveness of surgical myotomy and pneumatic dilatation in the treatment of achalasia. This study aimed to compare the treatment outcome of surgical myotomy and pneumatic dilatation.

Methods: Medical records of 85 patients diagnosed as achalasia (2002–2012) were reviewed. Only patients underwent surgical myotomy or pneumatic dilatation were included. Patients who lost to follow up or had treatment other than surgical myotomy or pneumatic dilatation were excluded from the study. Standardized questionnaire of 4 symptoms were prospectively collected before and after treatment (August, 2013). These symptoms included dysphagia, regurgitation, chest pain and weight loss. Each symptom was scored range from 0 to 3 depending on symptom severity. Patients who had total symptom score more than 2 or underwent second intervention were considered as unfavorable outcome.

Results: There were 46 patients fit to the criteria. 23 patients underwent pneumatic dilatation and 23 patients had surgical myotomy. There was no treatment mortality. Ten-year favorable outcome was 80% for surgical myotomy and 43% for single pneumatic dilatation ($p = 0.001$). If repeated pneumatic dilatations were not considered as unfavorable outcome in pneumatic dilatation and total symptom scores after last treatment were analysed, ten-year favorable outcome of pneumatic dilatation was comparable to that of surgical myotomy (75% vs 80%, $p = 0.51$).

Conclusion: Surgical myotomy is more effective than single pneumatic dilatation in term of ten-year outcome for treatment of achalasia. However, if repeated pneumatic dilatations are included, ten-year outcome is comparable to that of surgical myotomy.

P139

Outcome Of Bougienage Dilatation In Complex Corrosive Esophageal Strictures

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Background: Less was known regarding the effectiveness of bougienage dilatation in complex corrosive esophageal strictures.

Objective: To determine the effectiveness and factors predicting outcome of bougienage dilation in complex corrosive esophageal strictures.

Methods: We reviewed the medical records of all patients who developed corrosive esophageal stricture (2007–2012)

Results: There were 34 patients diagnosed corrosive esophageal stricture. All patients enrolled to have bougienage dilatation with Savary Gillard dilators. Because of previous corrosive related operations (total gastrectomy), history of postdilatation esophageal perforation and complete esophageal luminal strictures, 16 patients underwent esophageal replacement procedures. 18 patients continued dilatation with conversion to esophageal replacement procedure in 10 patients. Perforation occurred in 3 sessions (4.2%) from 72 sessions. We found that conversion groups had more numbers of pharyngeal involvement, high level of stricture, long length of stricture (> 10 cm), more frequency of dilatation (> 6 times per year) and more sessions of stricture tightness ($p = 0.043$, $p < 0.01$, $p < 0.01$, $p < 0.01$ and $p = 0.046$ respectively). We reported failure of dilatation in 76.5% and successful dilatation in 27.8% at a mean follow-up 19.4 months.

Conclusion: Corrosive esophageal strictures with suicidal intent are usually complex. Bougienage dilatation is only moderately effective in terms of relieving dysphagia symptom. Pharyngeal involvement, high level of stricture, length of stricture (> 10 cm), frequency of dilatation (> 6 times per year) and stricture tightness are associated with high dilatation failure.

P140

Multidimensional Analysis Of Learning Curve In Laparoscopic Gastrectomy For Gastric Cancer At A Low-Volume Center In Non-Endemic Area

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Introduction: Laparoscopic gastrectomy(LG) for gastric cancer is a complex and difficult procedure with a steep learning curve(experience of at least 50 cases). Most studies related to learning curve of LG comes from high volume centers (>50 cases per year) in endemic region like Japan and Korea. Experience of developing LG at a low volume center in non-endemic area like Taiwan is rarely reported. This study aimed to analyze the learning curve of an experienced general surgeon in performing a laparoscopic gastrectomy with lymph nodes dissection for gastric cancer at a low volume center in non-endemic area.

Material and Methods: Between Nov 2007 and June 2013, 78 patients had undergone a curative laparoscopic gastrectomy for clinically serosa-negative gastric carcinoma (cT1-3) by a single surgeon. In these patients, 1 patients underwent D1 surgery due to ESRD and CHF, and 8 patients underwent total gastrectomy were excluded. Other 69 patients were included and divided into 4 groups according to chronologic sequence. Multi-dimensional analysis was performed, including operation time, estimated blood loss, harvested lymph nodes, and complications.

Results: There was conversion to open in one patient(the 20th case) due to inadequate supra-pancreatic lymph node dissection. The extend of lymph nodes dissection was D1 in 4 patients, D1+ in 44 patients, and D2 in 21 patients. Four patients combined other procedures. The reconstruction method was Billroth II gastrojejunostomy in 51 patients, and Roux-en Y gastrojejunostomy in 18 patients. The median operation time was 300 minutes. The median estimates blood loss was 80cc. The median harvested lymph nodes was 34.5, with two patients harvested less than 15 lymph nodes. The median time to first flatus and post-operative stay were 3 and 8 days. Eight patients experienced major post-operative complications. The harvested lymph nodes significantly increased after group 2 (cases 18–34). However, the estimated blood loss and operation time achieved statistical significance after group4 (cases 52–69)

Conclusion: Laparoscopic gastrectomy with standard LND is safe and oncologically feasible at a low volume center in non-endemic area. Experience of about 20 cases is necessary for getting appropriate lymph node dissection. But shorter operation time and less blood loss would be achieved after experience of about 50 cases.

P141

The Use of Surgisis Mesh in the Treatment of Hiatal Hernia and Gastroesophageal Reflux, Long-Term Results

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Introduction: A variety of randomized studies have demonstrated the advantages of using prosthesis in the repair of a hiatal hernia. Recurrence rates drop dramatically at first in the short terms when a mesh is applied. However there is still controversy regarding what prosthesis should be used and how to place it, as well as long term results.

Methods: From January 2001 to April 2010, all patients having hiatal hernia, and gastroesophageal reflux, underwent laparoscopic hiatal hernia repair with porcine bowel derived mesh placement were prospectively studied. Indications for the use of prosthetic material initially included: Recurrent hiatal hernia, crus defect > 5 cm, obesity, chronic pulmonary disease, impaired healing (steroids use, >80 years old), and incarcerated hernia, but more recently all patients undergoing hiatal hernia repair were included on the study.

Results: One hundred and thirty two patients were analyzed, 49% of patients were female and 51% male; the mean age was 60.1 years (32–91 years).

Mean operating time was 167 minutes with a range of 75–273 minutes. EBL was 28 ml (50–100 ml). One third of patients (34%) had extensive adhesions present within the hiatal hernia. One patient required conversion secondary to these adhesions. All the patients had a follow up of 6 months, 91% of 1 year, 83% of 2 years, 65% of 3 years 52% of 4 years and more than 5 years 39%. Recurrence was seen in only one patient (0.9%). There were no complications related to prostheses placement. The mortality rate was 0%.

Conclusions: Laparoscopic placement of porcine's small bowel submucosa in the hiatus, at the time of laparoscopic repair, is a safe and effective measure to prevent recurrence of hiatal hernia.

P142

Refractory Anemia In Huge Hiatal Hernia: Surgical Management

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Background: The prevalence of hiatal hernias found on upper gastrointestinal endoscopy ranges from 0.8–2.9%. Hiatal Hernia has been notoriously associated with chronic anemia. We herein explore the prevalence and resolution of anemia after surgical treatment of hiatal hernia.

Methods: Retrospective study, of patients undergoing laparoscopic hiatal hernia repair between January 2010 and January 2013. Patient with co existing chronic anemia were included. Patient demographics, symptoms, prevalence and resolution of anemia were recorded.

Results: Forty patients underwent laparoscopic hiatal hernia repair. Mean age was 31 ± 3.4 (range 28–67 years) including 28 females (70%) and 12 males (30%). Nine (22.5%) out of 40 patients had a chronic anemia refractory to medical management. Anemia was symptomatic in 13 patients (32.5%) and was incidentally discovered in 27 patients, during their preoperative work up. Mean Hemoglobin level was 10.1 ± 0.7 mg/dl (range 9–11 mg/dl). Endoscopic examination revealed diffuse gastropathy in all patients and displayed longitudinal ulcers in 3 patients.

All patients underwent laparoscopic Nissen fundoplication. Post operative course was uneventful. Post operative follow up at 6 months revealed anemia resolution in all patients.

Conclusions: The prevalence of anemia in association to large hiatal hernia was common. Most of our patients were symptomatic. A relatively high percentage of patients were resistant to medical treatment. Surgical management was effective in curing anemia.

P143

Multiple Port Site Metastases After Laparoscopic Gastrectomy for Cancer: A Case Report And Literature Review

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Background: Port site metastases have been reported after laparoscopic resection of intra-abdominal malignancies. It is a rare phenomenon, as such, the true incidence is not known. While there have been case reports of port site metastasis for gallbladder and colorectal cancer, review of the literature reveals only two previously reported cases of port site metastasis after laparoscopic surgery for gastric adenocarcinoma.

Case Report: A 71-year old female with a past medical history of hypertension and diabetes mellitus presented with anemia, black tarry stools, generalized weakness, malnutrition and unintentional weight loss associated with vomiting. Upper endoscopy examination revealed a large bleeding and obstructing mass that extended along the lesser curvature of the stomach, from the body to the antrum. Endoscopic ultrasound revealed a T3N2 lesion and the biopsy confirmed the diagnosis of adenocarcinoma. The patient underwent an uneventful laparoscopic D2, R0 near total gastrectomy with Roux en Y gastrojejunostomy. Intraoperatively, a large 9.5 cm mass was observed, that was infiltrating serosa with no evidence of metastatic disease. There was no tumor cell spillage or compromise in the principles of oncological tissue handling. Pathology revealed 6 out of 40 lymph nodes involved with carcinoma and clear margins. The patient's recovery was uneventful and adjuvant chemotherapy was administered. Ten months after surgery, the patient presented with palpable subcutaneous nodules at the right and left subcostal 12-mm port sites. The paramedian incision from which the specimen was extracted within protection of the plastic bag was well healed without any lesions. Fine needle aspiration confirmed metastatic gastric adenocarcinoma. Subsequent CT of the abdomen and pelvis confirmed the isolated two port site nodules without evidence of distant metastases. The patient was treated with another cycle of chemotherapy after which the proton emission tomography (PET) scan did not show any other metastases and the size of the lesion was stable. The patient underwent resection of right upper quadrant abdominal mass with peritoneal biopsy and cytology. Intra-operative findings of the left upper quadrant nodule revealed infiltration of the mass to the left colon and metastatic deposit in the umbilical port site with no other metastases. Cytology was performed on 30 ml of clear peritoneal fluid and was negative for malignant cells. Currently the patient is recovering well in anticipation for adjuvant treatment and evaluation for possible second intervention.

Discussion: Port site metastases remain an infrequent clinical problem and are usually consequence of advanced peritoneal malignancy. We report on a case of advanced gastric malignancy, treated with laparoscopic gastrectomy with subsequent development of multiport metastatic disease and no evidence of distant metastases. The pathophysiology and the management of port site metastasis remain unclear.

Conclusion: Report of this rare clinical occurrence adds to the existing literature of this poorly understood phenomenon. Further studies are necessary to explore the pathogenesis of port site metastases and to elucidate the role of chemotherapy and potential benefit of subsequent surgical intervention. Photographs and radiograms will be presented.

P144

Laparoscopic Gastric Diverticulum Resection: A Novel Approach

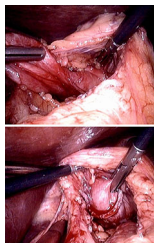
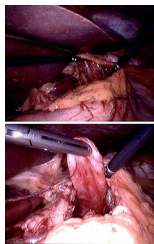
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Introduction: Gastric diverticuli are infrequent, and rarely symptomatic. Those causing symptoms are most often treated medically. Surgical treatment has been described, including laparoscopic methods. We present a novel laparoscopic method to resect a symptomatic posterior gastric diverticulum.

Case Report: A 43-year old female presented with a one-year history of postprandial nausea, epigastric pain, dysphagia and weight loss. Esophagram showed a normal esophagus with a gastric diverticulum. Computed tomography scanning revealed normal findings. We performed an esophagogastroduodenoscopy, confirming a large, broad-based posterior gastric diverticulum with mild gastritis. Antral, duodenal and random biopsies were unremarkable. Laparoscopic diverticulectomy was then performed via a pars flaccida technique, avoiding lateral dissection and short gastric ligation. Four laparoscopic ports were utilized. The liver was elevated and the lesser sac entered with the ultrasonic shears. The 8 × 3 cm diverticulum was identified and retracted medially, then resected using several gastric staple loads using the endoscopic stapler. The patient was discharged the following morning tolerating a regular diet. At follow up, her symptoms had completely resolved, and no longer required proton pump inhibitors.

Discussion: Previous reports of laparoscopic gastric diverticulectomy have focused on lateral approaches, requiring short gastric vessel ligation. We, however, proceeded with a medial approach, through the lesser sac along the lesser gastric curve. More than 75% of gastric diverticuli are located along the posterior aspect of the stomach. Our approach allows for excellent access and visualization to perform diverticulectomy for these posteriorly located lesions. Additionally, we avoid traction injury to the short gastric vessels and the spleen through the medial approach, decreasing risk of hemorrhage or conversion to open. Further, most reported cases utilized intra-operative endoscopy to aid visualization laparoscopically. We found this unnecessary with the medial approach.

Conclusion: Gastric diverticuli are rare lesions that, when symptomatic, may be safely and successfully resected using a novel laparoscopic approach through the lesser sac.



P145

Timed Barium Swallow Versus Esophageal Function Testing In The Diagnosis Of Achalasia

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Introduction: Patients with achalasia are now increasingly followed up by Timed Barium Swallow (TBS) studies both before and after interventions for achalasia. Timed barium swallow has been found in multiple studies to help with the diagnosis of achalasia however very few studies have directly compared the Esophageal Function Testing (EFT) findings with TBS.

Methods and Procedures: We carried out a retrospective analysis of all consecutive patients who underwent both EFT and TBS from January 2012 to September 2013 at our hospital. The electronic medical records of the patients were then subsequently reviewed to see what interventions were performed based upon the studies and how the patients did on post-procedural follow up.

Results: Sixty-one patients were diagnosed with achalasia based on the EFT findings during the study period. Nineteen of them (10 females and 9 males) further had a TBS either because the diagnosis was not conclusive based on the manometric findings alone or as a baseline study before intervention for achalasia. The mean age of patients was 62 years. All 10 patients who had all the classic findings of achalasia on manometry including incompletely relaxing Lower esophageal sphincter (LES), abnormal peristalsis and poor bolus transit had clearly abnormal TBS with large columns of barium at both 1 and 5 minutes. In 2 patients who had heartburn as the primary symptom but early achalasia could not be excluded on manometry due to reduced bolus transit time (1 also had incompletely relaxing LES), TBS was normal suggesting acid reflux as the etiology of impaired esophageal peristalsis rather than achalasia. In 1 of 2 patients with dysphagia in spite of a previous history of Heller myotomy, the manometry was inconclusive since LES relaxed completely and although peristaltic waves were abnormal there was 60% bolus transit, in that patient the barium column had almost completely cleared at 5 minutes suggesting that a further procedure was unlikely to benefit the patient. Two patients with a short length LES and normal residual relaxing LES pressures but impaired peristalsis and very poor bolus transit, had abnormal TBS, and had relief of symptoms after a Per-oral endoscopic myotomy (POEM). Only 1 patient who had all classic findings of achalasia on manometry, although did have a short mostly intra-thoracic LES, had a normal barium passage on TBS; the patient had a Laparoscopic Heller myotomy with relief of dysphagia.

Conclusion: Our study suggests that in patients with dysphagia, without previous myotomy the findings on manometry and TBS corroborate and both may not be necessary. However in patients where either study is inconclusive, usually in patients without dysphagia being the predominant symptom or those with previous myotomy, the findings are complementary in guiding patient management, although individual studies may not be diagnostic in themselves.

P146

Reoperation After Failed Anti-Reflux Procedures

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As laparoscopic anti-reflux surgery gained popularity as an option for treating a considerable number of patients suffering from chronic gastroesophageal reflux disease (GERD), the number of patients needing a re-intervention after this kind of surgeries also raised. We present our series and results of patients submitted to reoperations after anti-reflux surgeries.

From May/1996 to August/2013, 174 patients underwent a reoperation by our group. The mean age was 46 years old (1–78). Twenty-four (13,8%) of them were first operated by laparotomy and 150 (86,2%) by laparoscopy. We divided the patients into 3 groups regarding the main reason for reoperation: GERD recurrence, dysphagia and paraesophageal hernias.

There were 72 (41,4%) patients in dysphagia group, 72 (41,4%) in recurrence group and 30 (17,2%) in paraesophageal hernia group.

In the dysphagia group, the mean time between first surgery and reoperation was 29 months, ranging from early surgery (first weeks) to 109 months, whereas in the recurrence group, was 66 months (2–260 months).

In the dysphagia group, the procedures in the reoperation were: take down of fundoplication and new total fundoplication in 34 (47,2%) patients, myotomy plus partial fundoplication in 21 (29,2%), partial fundoplication in 13 (18%) and other procedures in 4. Follow up interview was possible in 54 (75%) patients, mean follow up period was 29 months and 41 (76%) are asymptomatic, 8 complain of reflux and 5 still experience some dysphagia.

In the recurrence group, a total fundoplication was done in 71 (98,6%) cases. There was one patient that was treated with a Roux-en-Y gastric bypass. We used a mesh to reinforce the hiatus in 16 patients in this group (22,2%). Follow up interview was possible in 53 patients (73,6%) with an average of 30 months. Forty-five (84,9%) patients are asymptomatic, 4 still complain of reflux and 2 present dysphagia. One patient with a new recurrent paraesophageal hernia complains of thoracic pain.

In the paraesophageal hernia group, a mesh was used to reinforce the hiatus in 15 (50%) patients. 13 were treated with total fundoplication, 1 with gastric bypass and simple suture of the hiatus was done in an immediate reoperation after vomiting in the first post-operative day. Objective follow up was done in 19 (63,3%) patients. Normal endoscopy was found in 12 (63%) and small paraesophageal hernias in 7 (37%), six of them are asymptomatic.

In conclusion, there are many causes for a new operation following failed anti-reflux procedures. Most of the times is the recurrence of the disease, but in our series, persistent dysphagia is still a very common reason.

The surgeon must be aware that it is a complex procedure, with more complications and longer operative times, but good results are still possible.

P147

Impact Of Obesity On The Morbidity Of Laparoscopic Paraesophageal Hernia Repair: Analysis Using The Nsqip Database

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Introduction: The impact of obesity on outcomes after antireflux surgery is controversial. It is recognized, however, that obesity increases the risk of early recurrence (ROR) for other hernias such as inguinal and ventral and increases the morbidity risk of most surgeries. The impact of obesity on the morbidity of paraesophageal hernia (PEH) repairs has not been looked at. Our objective is to investigate the impact of obesity on post-operative outcomes after laparoscopic PEH repair in a large prospective database.

Methods: We analyzed data from a population based database of primary elective laparoscopic PEH repairs. Patients who underwent a laparoscopic PEH repair without mesh (CPT code 43281) and with mesh (CPT code 43282) were identified using the American College of Surgeons National Surgical Quality Improvement Project (NSQIP) database from 2005 through 2011. Pre-operative factors including age, American Society of Anesthesiology (ASA) classification ≥ 3 , smoking and diabetes were assessed using bivariate analysis (Mann-Whitney and Fisher's exact test). Multivariate regression analysis was used to compare 30 day outcomes including pulmonary complications, cardiac events, thromboembolism, sepsis, surgical site infections (SSI), post-operative length of stay and death.

Results: A total of 2834 patients that underwent primary elective laparoscopic PEH repair were identified. Those who underwent an outpatient procedure (459 patients), underwent emergency surgery (57 patients), or who did not have height or weight data available (9 patients) were excluded. The remaining patients were divided into two groups based on calculated body mass index (BMI): group I (<25 BMI, normal weight) containing 437 patients, and group II (>25 BMI, overweight and obese) containing 1872 patients.

Compared to group I, group II was younger (60 vs 73 years median; $p < 0.001$), with more diabetics (9% vs 5%; $p = 0.001$) and with a greater female-to-male ratio (74% vs 67%; $p = 0.004$). The 2 groups were similar in terms of smoking ($p = 0.576$) and ASA class ≥ 3 ($p = 0.222$).

The overall mortality in the study group was 0.7% with no significant difference between the 2 groups ($p = 0.523$). The post-operative length of stay was 4.3 ± 7.1 days for group I and 2.9 ± 3.7 days for group II ($p < 0.001$). The difference in length of stay remains significant even when comparing the patients having complications ($p = 0.523$) in the 2 groups or the patients without complications ($p < 0.001$) in the 2 groups. The increase in length of stay in the lower BMI group may be explained by the significantly greater number of the elderly in group I.

On multivariate regression analysis, group II patients experienced more deep and organ space SSI ($p = 0.023$). Interestingly, superficial SSI ($p = 0.8$), pulmonary ($p = 0.113$), cardiac ($p = 0.605$), septic ($p = 0.796$) and thromboembolic ($p = 0.384$) complications were not different between the two groups.

Conclusion: Our analysis of short-term post operative outcomes after laparoscopic PEH repair using NSQIP database shows no increase in mortality in overweight/obese patients in spite of the significant difference in age between the two cohorts. While deep and organ space SSI are more frequent in patients with BMI>25, all other analyzed morbidities appear to be equivalent.

P148

Comparative Study Of Clinical Outcomes Between Conventional Laparoscopic Distal Gastrectomy And Pure Single-Incision Distal Gastrectomy For Early Gastric Cancer

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Purpose: Single-port surgery was introduced to reduce the invasiveness of laparoscopic surgery. The aim of this study was to show the feasibility and safety of pure single-incision laparoscopic distal gastrectomy (SIDG) by comparing its short-term outcomes with those of conventional laparoscopic distal gastrectomy (LDG).

Methods: Prospectively collected data of 90 gastric cancer patients who underwent pure SIDG from October 2010 through May 2013 were compared with the matched data of 45 patients who underwent LDG by single surgeon.

Results: All 90 patients underwent distal gastrectomy with gastroduodenostomy or uncut Roux-en-Y gastrojejunostomy without open or laparoscopic conversion. The mean operation time was similar in the both groups (149.1 vs 142.3 min, $P = 0.367$). The estimated blood loss (EBL) was lesser in the SIDG group (52.3 ± 32.8 vs. 91.4 ± 79.1 ml, $P = 0.003$), as was postoperative pain in terms of immediate postoperative visual analogue scale scores (6.2 ± 1.5 vs 7.0 ± 1.4 , $P = 0.015$) and usage of parenteral analgesics (0.77 ± 1.00 vs 1.4 ± 1.0 , $P = 0.020$). Postoperative morbidity occurred in 4 and 5 patients in the SIDG and LDG group, respectively. Cosmetic result, which was assessed by numerical rating scale, was more satisfactory in the SIDG group (9.00 vs 6.09, $P < 0.001$).

Conclusion: pure SIDG seems safe and feasible for early gastric cancer, and has similar or better short-term outcomes than does LDG in terms of postoperative pain, EBL, and cosmetic result. However, further studies are required to confirm its safety and feasibility.

P149

A Robot-Assisted Pylorus Preserving Gastrectomy for Early Gastric Cancer: Is It Better than Laparoscopic-Assisted Surgery? Young-Woo Kim, Hong Man Yoon, Daniel Reim, Ji Yeon Park, Bang Wool Eom, Keun Won Ryu, Gastric Cancer Branch, Research Institute and Hospital, National Cancer Center

Introduction: This study was to see whether a robot assisted pylorus preserving gastrectomy (RAPPG) could show benefit over laparoscopic assisted pylorus preserving gastrectomy (LAPPG) in terms of short term surgical and oncological outcomes.

Methods: We conducted single center-based case-control study. The study included 16 patients underwent RAPPG, and 24 patients underwent LAPPG at the National Cancer Center, Korea between Feb 2012 and Dec 2012. Clinicopathologic data, operation related data, postoperative morbidity and pathologic data were analyzed by Student t-test and Chi-Square test.

Results: Age of patients was 51.7 ± 10.3 in RAPPG and 57.5 ± 13.1 in LAPPG. ($p = 0.126$) BMI (kg/m^2) was 24.1 ± 2.9 in RAPPG and 24.1 ± 3.1 in LAPPG. ($p = 0.945$) Operating time was 222.2 ± 21.9 in RAPPG and 239.0 ± 62.7 in LAPPG. ($p = 0.238$) Number of dissected lymph nodes was 33.9 ± 10.4 in RAPPG and 28.0 ± 9.5 in LAPPG. ($p = 0.083$) Regarding postoperative complications, there were 1 patients (7.1%) in RAPPG and 4 patients (16.7%) in LAPPG ($p = 0.631$). Stasis occurred in 3 patients (18.8%) after RAPPG and in 6 patients (25.0%) after LAPPG. ($p = 0.717$) Differences of hemoglobin level between preoperative and immediate postoperative day were similar in both groups. (0.9 ± 0.8 vs 0.9 ± 0.7 , $p = 0.824$) Conversion rate to distal or total gastrectomy was 5.9% (1/17) in RAPPG and 11.1% (3/27) in LAPPG. ($p = >0.999$)

Conclusion: RAPPG was comparable to LAPPG regarding surgical and oncologic outcomes. We might need more cases to show the benefit of robotic surgery in pylorus preserving gastrectomy.

P150

Contemporary Outcomes of First-Time Laparoscopic Reoperative Fundoplication

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Introduction: Laparoscopic reoperation for a failed fundoplication has been associated with increased complications and worse outcomes compared to a first time operation. The aim of this study was to evaluate contemporary outcomes of initial laparoscopic redo antireflux operations to assess complications and success of the repair.

Methods: A retrospective chart review was performed of all patients who had a first-time laparoscopic reoperation for a failed antireflux procedure from May 2008 to August 2013.

Results: There were 52 patients (19 males and 33 females, median age 56 years) who underwent first-time laparoscopic re-operation after a prior antireflux procedure. The initial procedure was done at an outside hospital in 32 cases and at our facility in 20. The initial operation was performed laparoscopically in 94% (49/52) of patients. The median time from initial operation to reoperation was 4 years (range 1 month to 13 years). Reason for reoperation was a recurrent hiatal hernia and/or fundoplication disruption in 36 (69%), a slipped or misplaced fundoplication in 6 (12%), and persistent dysphagia in 10 patients (19%). Laparoscopic revisional hiatal hernia repair was performed in 39 patients (75%) and in 13 patients with no recurrent hernia only a redo fundoplication was performed. A redo Nissen fundoplication was performed in 33 patients and in 18 patients a previous Nissen was converted to a Toupet. A Collis gastroplasty was added to the fundoplication for a short esophagus in 14 patients (27%). The operation was completed laparoscopically in 94% of patients. Three patients were converted to open, two for dense adhesions around the hiatus and the third for concerns regarding the integrity of the staple line during a Collis gastroplasty. Minor post-operative complications developed in 7 patients (13%). The median hospital stay was 3 days (IQR 2–3). Symptomatic follow-up was available in 45 patients at a median of 8.5 months. Resolution of the presenting symptoms occurred in 93%. Objective follow-up was available by videoesophagram or upper endoscopy in 27 patients at a median of 12 months. There was one recurrent hernia with an intact fundoplication. Two patients needed a subsequent operation for symptomatic delayed gastric emptying.

Conclusions: First-time revisional laparoscopic antireflux surgery can be done safely with a low rate of complications or conversion to open laparotomy. The most common indication for redo fundoplication was a symptomatic recurrent hiatal hernia with or without a disrupted fundoplication. A short esophagus was frequently encountered, and in 27% of patients a Collis gastroplasty was necessary. Short term follow-up indicates excellent symptomatic improvement and a low rate of recurrent hernia.

P151

Quality of Life Assessment After Peroral Endoscopic Myotomy

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Purpose: To determine if quality of life after POEM is comparable to laparoscopic Heller myotomy.

Methods: All patients who presented to our institution for surgical treatment of achalasia between 2009 and 2013 were asked to complete quality of life (SF-36), dysphagia, reflux severity index and GERD questionnaires in clinic preoperatively and postoperatively at approximately six weeks, six months, one year and two years. Additionally all patients identified with an achalasia diagnosis in our electronic medical record were given a more brief mail-in questionnaire including dysphagia, reflux severity index and GERD questions.

Results: At average follow up of 4.4 months, POEM patients (n = 33) had significant improvement in dysphagia scores (p = 0.029), reflux severity scores (p = 0.031) and GERD scores (p = 0.0006). SF-36 questionnaires specifically demonstrated a significant improvement in both pain scores (p = 0.047) and social functioning scores (p = 0.027).

When compared to those patients who underwent treatment with Heller myotomy at follow up of 86.9 months, POEM had significantly higher post-operative dysphagia (p = 0.007), reflux severity index (p = 0.003) and GERD scores (p = 0.04). When compared to endoscopic procedures at follow up of 140.8 months, POEM had significantly better scores in reflux severity index (p = 0.03), but comparable dysphagia and GERD scores.

Conclusion: There is significant improvement in several measures of quality of life after POEM, which in some cases may be superior to that seen after laparoscopic Heller myotomy (Fig. 1).

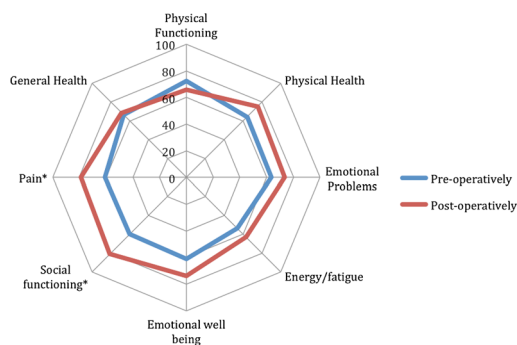


Fig. 1 Score from 36 (SF-36) for POEM pre-operatively and post-operatively at average follow up of 4.4 months. *p < 0.05

P152

Laparoscopic Repair of Paraesophageal Hernias with Falciform Ligament Buttress

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Introduction: Multiple techniques have been used to decrease recurrence rates following a paraesophageal hernia repair including buttressing the crura with synthetic and biological mesh. However, synthetic mesh is associated with erosions and dysphagia while biologic buttresses are expensive and have not shown long-term decreases in recurrence rates. This study documents clinical outcomes and recurrence rates following laparoscopic paraesophageal hernia repairs using the falciform ligament as a crural buttress.

Methods: All patients undergoing a laparoscopic paraesophageal hernia repair from January 1, 2012 to June 30, 2013 were included in the analysis. A prospective database was created to record demographics, medications, and radiologic studies. All patients underwent an endoscopic gastro-duodenoscopy with either an upper gastrointestinal (GI) series or a computed tomogram (CT). Esophageal manometry and pH monitoring were selectively performed. Inclusion criteria required a hiatal defect greater than 5 cm. Patients with recurrent hiatal hernias or prior gastric surgery were excluded. Operatively, all patients underwent a laparoscopic hiatal hernia repair with a Toupet fundoplication and a falciform ligament buttress. A total symptom score using a standard questionnaire to assess 9 symptoms was assessed for all patients pre- and postoperatively at 6 months. Symptoms were evaluated in terms of severity and frequency. An upper GI (UGI) series was obtained at 6 months. A paired t-test with a confidence interval of 95% was used with a p < 0.05 as significant.

Results: 21 patients underwent laparoscopic paraesophageal hernia repair with a falciform buttress. Mean age was 65 ± 5.4 with 18 females. All procedures were completed laparoscopically with no intraoperative complications. There was no mortality and 1 patient had a seizure postoperatively. At 6 months postoperatively, the mean symptom severity score decreased from 16.7 to 3.17, the mean symptom frequency score decreased from 16.8 to 3.67, and the mean total symptom score decreased from 33.5 to 6.83. All decreases were significant at a p < 0.05. All patients remain off H2 blockers or PPIs and there were no recurrences on UGI.

Conclusions: Early data suggests that a laparoscopic paraesophageal hernia repair using the falciform ligament as a buttress is a viable option to repair large hiatal hernias. The falciform ligament is readily available in most patients and avoids the costs of a biological mesh and the possible complications of synthetic mesh. Long-term follow up is required to verify the utility of this approach to decrease recurrence rates for paraesophageal hernias.

P153

Laparoscopic Prophylactic Gastrectomy for CDH-1 Germline Mutation

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Introduction: Hereditary diffuse gastric cancer resulting from a germline mutation of the CDH-1 gene is rare. Guidelines for the management of carriers of CDH-1 mutations have been described and include prophylactic gastrectomy at an early age.

Methods: We present the case of two siblings, age 19 and 22 years, who met clinical criteria for CDH-1 mutation testing according to the International Gastric Cancer Linkage Consortium (IG-CLC). Both tested positive for CDH-1 mutation. Prophylactic gastrectomy was recommended.

Results: Laparoscopic total gastrectomy with roux en Y reconstruction was performed on both siblings. Proximal margin was confirmed by the presence of squamous esophageal epithelium on frozen section in both cases. Length of stay was 4 days for sibling #1 and 5 days for sibling #2. There was no 30 day morbidity. Pathology specimens were analysed and revealed multiple foci of intramucosal signet ring cell carcinoma on both cases.

Conclusion: Prophylactic total gastrectomy is the only option to eliminate the risk of gastric cancer in patients with CDH-1 mutation. Laparoscopic total gastrectomy can be performed safely in these patients with excellent results.

P154

Management Of Intra-Thoracic Anastomotic Leak After Esophagectomy: A Single Center Experience

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Objective: Intra-thoracic anastomotic leak is a known complication of esophageal resection and carries a significant morbidity and mortality. The aim of this study is to review the management and outcomes of anastomotic leak after esophagectomy at our institution.

Methods: After institutional review board approval, a prospectively maintained database was retrospectively reviewed to identify patients who underwent esophagectomy from 7/2003 to 8/2013. Patients who had an anastomotic leak after intra-thoracic anastomosis were identified and formed the study cohort. Data regarding their diagnosis, management and outcomes was collected. Leaks were defined as early or late based on their diagnosis on or before postoperative day seven.

Results: Two hundred thirty-seven patients underwent esophagectomy during the study period. Sixty patients had intra-thoracic anastomoses (38 thoracoscopic, 22 thoracotomy) of which eight patients had an anastomotic leak (13.3%). Of these eight patients, three had received neo-adjuvant therapy and seven had thoracoscopic procedures. Anastomoses were EEA stapled (6), linear stapled (1), and hand sewn (1). Mean time to diagnosis was 11 days (3–32). There were three early leaks. Six patients received Polyflex (Boston Scientific) esophageal stents. Three had their stents replaced during the course of management. There were no stent migrations. Mean time to stent removal was 21 days (7–56). All patients with early leaks were stented. Three patients had adjunctive endoscopic therapy (fibrin glue [2], vacuum sponge [1], botox injection [1]). Four patients required additional chest drainage (percutaneous CT guided drainage [2], tube thoracostomy [2]). Two patients underwent reoperation with takedown or repair of the anastomosis. One patient had operative repair and stenting simultaneously. Mean hospital stay was 40 days (13–92). One patient died after operation for late gastric conduit necrosis. The remaining seven leaks resolved.

Conclusion: The majority of intra-thoracic anastomotic leaks can be successfully managed without reoperation. Excluding the leak endoscopically (via stenting, glue, vacuum sponge) and draining fluid collections is the cornerstone of treatment. Surgery should be reserved for those with clinical deterioration despite non-operative modalities. The incidence of intra-thoracic leaks following thoracotomy deserves further investigation.

P155

Esophageal Anastomoses Using The Orvil Circular Stapler In Major Upper Gastrointestinal Surgery

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Introduction: Esophageal anastomoses in major upper gastrointestinal surgery can be technically demanding, especially in patients with large proximal tumours, and in those undergoing a minimally invasive approach. The Orvil™ circular stapler is unique in its ability to be inserted via the mouth, and potentially offers an easier method of ensuring adequate margins. Little is reported in the literature regarding its outcomes and complication rates.

Methods: All patients undergoing esophageal or gastric resection between September 2008 and April 2013 were identified from a prospectively maintained surgical database. Primary outcomes were anastomotic leak and postoperative stricture. Pitfalls were also identified and recorded.

Results: We identified 67 patients in which the Orvil™ circular stapler was used to create an anastomosis. Forty had had an Ivor-Lewis esophagectomy, and 27 had had a total gastrectomy. The median patient age was 66 years, and median follow-up was 13.6 months. Median proximal clearance was 44 mm. Neoadjuvant treatment was successfully completed in 35 patients (52%). One patient (1.9%) had an anastomotic leak requiring surgical correction. During the follow-up period, 7 patients (10.5%) developed a postoperative stricture; all successfully treated by endoscopic dilatation. Two patients (3%) developed wound infections requiring medical intervention (grade II). There were no in-hospital deaths in this patient cohort.

Conclusions: The Orvil™ circular stapler is relatively easy to use and reduces some of the technical difficulty when performing esophageal anastomoses. Anastomotic leak rates and stricture formation compare favourably with historical outcomes using conventional anastomotic methods.

P156

Risk Factors For Post-Fundoplication Dysphagia: Use Of High-Resolution Manometry

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Aim: High-resolution manometry (HRM) provides more detailed assessment of esophageal function compared to conventional manometry. The aim of this study was to investigate the relationship between pre-operative HRM findings and post-operative dysphagia after fundoplication.

Methods: A retrospective review of a prospectively maintained database was conducted to identify patients who had pre-operative HRM and underwent primary fundoplication for gastro-esophageal reflux disease between September 2008 and September 2012. Patients who had a large hiatal hernia (> 5 cm) were excluded. Pre- and post-operative symptoms were evaluated using a standard questionnaire with symptoms graded on a scale of 0–3.

Results: One hundred and eight patients met the criteria (mean age of 51.4 ± 14.8 , 71 females). Eighty-three patients underwent Nissen fundoplication and 25 patients underwent Toupet fundoplication. Of the 108 patients, 81 patients (75%) had at least 1 year post-operative symptom data. Twenty-one patients (26%) had dysphagia at follow-up and among them, 5 patients (6%) had grade 2 dysphagia. There were no patients with grade 3 dysphagia at follow-up. Nine patients (11%) required post-operative dilation for dysphagia. Patients who had high lower esophageal sphincter pressure (LESP) (> 45 mmHg) and high integrated relaxation pressure (IRP) (> 15 mmHg) were more likely to have post-operative dysphagia. On multivariate logistic regression analysis, high LESP and high IRP (odds ratio=6.3; 95% CI, 1.3–31.7; $p = 0.015$) and pre-operative dysphagia (odds ratio=4.4; 95% CI, 1.3–14.3; $p = 0.025$) were identified as predictors of post-operative dysphagia.

Conclusions: Non-relaxing hypertensive LES and pre-operative dysphagia were associated with a significantly higher incidence of post-operative dysphagia.

P157

Spontaneous Pneumobilia From Duodenal B-Cell Lymphoma
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Pneumobilia occurs due to abnormal connection between gastrointestinal tract and biliary system, frequently requiring surgical intervention. There have been very few cases reporting spontaneous pneumobilia from duodenal lymphoma.

We report a case of 74 year old male who presented with abdominal pain, nausea and vomiting for few days. Patient underwent CT scan of abdomen/pelvis that showed gastric outlet obstruction from thickening of second portion of duodenum and spontaneous pneumobilia. Upper endoscopy showed mass lesion of second part of duodenum. The patient underwent gastrojejunostomy and choledochojejunostomy. Operative cholangiogram showed narrowing at the level of ampulla. Pathology showed B-cell lymphoma involving the ampulla. He was treated with post-operative chemotherapy and did well.

We did extensive literature search on this and found very few case reports on duodenal B-cell lymphoma manifesting as spontaneous pneumobilia.

P158

Laparoscopic Antireflux Procedures With Hepatic Shoulder Technique For The Surgical Management Of Large Paraesophageal Hernias And Gastroesophageal Reflux Disease: Follow-Up Series

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Background: Large paraesophageal hernias are notoriously difficult to manage via laparoscopy and are associated with a significant recurrence rate. A follow-up series of a novel laparoscopic approach was used to close the diaphragmatic defect in 48 patients diagnosed with large, paraesophageal hernias and gastroesophageal reflux disease symptomatology.

Methods: All procedures were performed via laparoscopy. Patients underwent a reduction of the paraesophageal hernia with standard crural closure (when feasible) with a Nissen fundoplication or a Collis-Nissen fundoplication. In all patients, the left hepatic lobe was freed, repositioned, and anchored under and inferior to the gastroesophageal junction, propping the gastroesophageal junction anteriorly. This maneuver is designed to entirely cover and closes the diaphragmatic defect.

Results: Postoperatively, 47 patients did well without notable, unusual complaints. Average length of stay was 2 days. One patient underwent a take-down of the repair 5 days post-op for sepsis of unknown origin. Three patients reported early significant, post-op dysphagia. To date all patients had no recurrence of symptoms or of their paraesophageal hernia.

Conclusions: In selected patients, large paraesophageal hernias can safely be managed via a laparoscopic antireflux procedure with the hepatic shoulder technique. Although no significant long-term follow-up is available, this technique continues to show good early postoperative results and can be used as an alternative to a laparoscopic Mesh reinforced fundoplication or difficult crural closure.

P159

Improvement In Mental Health And Social Functioning After Laparoscopic Heller Myotomy For Achalasia

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Introduction: Achalasia is a benign but debilitating primary esophageal motility disorder which may have a significant detriment on patients' mental health and social functioning. The gold standard for treatment is Heller myotomy with partial fundoplication. Treatment is aimed at palliation of symptoms with the hope for improved quality of life. Our aim was to objectively determine improvements in mental health and social functioning as measured by the Short Form 36 (SF-36) questionnaire after Heller myotomy for achalasia.

Methods and Procedures: Between August 2011 and September 2013 data was prospectively collected on patients undergoing Heller myotomy. Patients included in analysis underwent laparoscopic Heller myotomy with partial fundoplication for a preoperative diagnosis of achalasia. Patients underwent pre and postoperative evaluation during which health status, including mental health and social functioning, was assessed using the SF-36 questionnaire (minimum score 0, maximum score 100). SF-36 scores are presented as median with interquartile range. Statistics were performed using the Wilcoxon signed rank test.

Results: 64 patients underwent Heller myotomy. Of these, 21 underwent laparoscopic Heller myotomy with partial fundoplication for a diagnosis of achalasia and had all preoperative and postoperative SF-36 scores calculated. 12 of these patients were male and 9 were female. Mean patient age was 58.6 +/- 17.5 years. 4 patients underwent conversion from laparoscopic to an open procedure. When preoperative and postoperative data was compared, a significant increase in median mental health scores (80 [60–80] versus 88 [84–96], $p = 0.0005$) as well as social functioning scores (75 [50–100] versus 100 [87.5–100], $p = 0.025$) was observed.

Conclusion: Heller myotomy with partial fundoplication may lead to improvement in quality of life for patients with achalasia. Specifically, we observed improvements in mental health and social functioning as measured by the SF-36 questionnaire.

P160

Laparoscopic Surgery In Gastric Cancer: Why Aren't We There Yet?

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Background and Aim: The efficacy and oncologic safety of laparoscopic surgery has been confirmed by various studies. Nevertheless; the role of laparoscopic surgery in gastric cancer is still controversial.

Patients and Methods: 14 patients who underwent laparoscopic surgery for gastric cancer were evaluated in terms of surgical technique, oncologic and surgical outcomes and complications.

Results: There were 10 male and 4 female patients. The mean age of the patients was 56 (35–70) years and tumors were located in gastric antrum in 4 patients, antrum-corpus in 2 patients, cardia in 3 patients, corpus-cardia in 3 patients and corpus in 2 patients. One patient had T1, 4 patient had T2, 6 patients had T3 and 3 patients had T4 tumors. 6 patients (2 Female) with antral tumors received distal subtotal gastrectomy (STG) plus D1 (1), D1.5 (D1 α , β) (3) and D2 (2) lymph node dissection. The remaining 8 patients (2 Female) received total gastrectomy (TG) plus D1.5 (D1 α , β) (2) or D2 (8) lymph node dissection. 4 of the 8 patients that received TG underwent concomitant splenectomy. For the patients that underwent STG the mean dissected lymph node numbers were 8 nodes in D1, 15.3 (9–22) in D1.5 and 48 (28–68) in D2. On the other hand; TG-D1.5 dissection had a mean dissected lymph node number of 21 (16–26) and for TG-D2 it was 40 (20–62). There was one patient with subhepatic abscess in the postoperative period. Abscess was drained subcutaneously and an enterocutaneous fistula developed that was treated with endoscopic Tisseel® application in postoperative 21st day. One patient with anastomotic stricture was treated by a single dilatation session in postoperative 2nd month.

Conclusion: Total or subtotal gastrectomy with D1 (D1 α , β) dissection can effectively and safely performed laparoscopically without compromising the oncological principles. However; there are still technical problems for D2 dissection and it requires experience. In addition to all, lymph node dissection groups should be redefined for laparoscopic approach.

P161

Use Of Laparoscopic Approach In Gastric Tumors At The National Cancer Center (MEXICO)

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Introduction: At the Department of gastrointestinal tumors in the National Cancer Center, gastric tumors are the most frequent pathology treated at the department after colorectal cancer. The mean number of patients diagnosed per year is around 145, noticing an increased number year after year. The most common tumors are adenocarcinoma followed by gastrointestinal stromal tumors, leiomyomas and leiomyosarcomas. At diagnosis most of the cases are metastatic disease followed by locally advanced disease.

Methods and procedures: Retrospective study. We review the charts of patients with gastric tumors treated by laparoscopic approach from March 2010 to June 2013. Statistical descriptive was used for the variable analysis.

Results: In a total of 60 cases with gastric tumors laparoscopic surgery was chosen as initial approach. 45 cases were staging laparoscopies in patients previously diagnosed with locally advanced disease but with elevated CEA, large volume tumor, or doubt by CT of having carcinomatosis. Of this group 18 cases were found to have peritoneal carcinomatosis and so an unnecessary laparotomy was avoided as well as neoadjuvant treatment with quimioradiotherapy. In this group 2 laparoscopic yeyunostomies were performed, and 4 palliative gastroyeyuno anastomosis. The rest of the cases were converted to continue either subtotal gastrectomy, total gastrectomy, and in locally advanced non obstructed cases neoadjuvant quimioradiotherapy was indicated. A patient with locally advanced diseases infiltrating the pancreas and with gross node disease with poor functional outcome was performed a laparoscopic gastroyeyuno anastomosis so she could received neoadjuvant treatment and months later she was treated with total gastrectomy. We had a case of obstructing duodenal lymphoma that was treated with gastroyeyuno anastomosis. We have five cases of gastrointestinal stromal tumors, 4 of them treated with wedge laparoscopic resection and one that required a laparoscopic antrectomy. We had 4 cases of subtotal gastrectomies with lymph node dissection, and one total gastrectomy with lymph node dissection that requires conversion at the time of the esofagoyeyuno anastomosis. In total we have 3 conversions, and morbidity of 12% and mortality of 1%.

Conclusion: Laparoscopic staging is a very useful approach in locally advanced cancer avoiding unnecessary laparotomies and neoadjuvant treatment in stage IV disease. A lot of oncologic procedures in gastric tumor can be performed safely and preserving the oncologic principles, but in center where laparoscopic approaches are not that common learning curve is slow, but we are starting to increase the number of cases performed at our center.

P162

Laparoscopic Repair Of Giant Type Iii Hiatal Hernia Without Mesh Reinforcement

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A giant hiatal hernia is a hernia that includes at least 30% of stomach inside the chest, its can be type II and III. The prevalence of giant hernia represent from 0,3% to 15% of all hiatal hernias. The pathophysiology isn't entire clear and has two possible mechanism: gastroesophageal junction traction in decorence of gastroesophageal reflux disease and chronic positive pressure over diaphragmatic hiatus combined with a propensity of stomach herniation inside the chest. A strong correlation between hiatal h ernia and gastroesophageal reflux disease exist and its the basis for the performance of an antireflux procedure. Because the potential risk of incarceration, strangulation or gastric volvulus, all patients with type II or III h ernia should be taken for surgical correction, unless comorbidities are prohibitive. The surgical treatment should attempt for three basic principles: (1) hernia complete reduction, sac resection and crural defect repair; (2) assessment of intraabdominal esophageal length; and (3) antireflux procedure association. This type of hernia are usually associated with large diaphragmatic crural defect (>4 cm) and its closure technic is a matter of debate in the literature, because its synthesis fail rate can reach 40% in some studies. Some authors use synthetic or biological mesh to reinforce the crura and avoid or diminish the recurrence rate. But this prosthetics meshes can be origin of important complications such as esophageal erosion. In this video we presented a case of 58 y, caucasian, male patient with heartburn and gastroesophageal reflux symptoms and in continuous use of pr on pump inhibitors for the last 30 years. An upper endoscope was taken evidencing a giant hiatal hernia with a large crural defect. CT scan confirm the herniation and a diaphragmatic defect with at least 50% of the stomach inside the chest. The patient was submitted an elective laparoscopic surgical approach respecting the basics principles: hernia reduction, sac excision, crural repair, enough intra-abdominal esophageal length and an antireflux procedure. We did not use mesh in the crura and routinely do a floppy nissen fundoplication. The patient had a good pos operative evolution receiving a liquid diet on first pos operative day and discharged on the second. In his follow up was made a barium esophagogram without evidencing recurrence.

P163

Utilization Of Biologic Mesh Materials In Repair Of Incisional Hernias Among Peritoneal Dialysis Patients: A Novel Approach To Optimizing Outcomes

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Introduction: The use of mesh in ventral/incisional hernia repair has been well described. Currently, there are a number of mesh materials available for implantation, including those that are purely synthetic, partially biodegradable, full biodegradable, and biologic scaffold. The latter lacks widespread consensus among its exclusive utilization in complex, often contaminated abdominal scenarios. Our group has found that using biologic materials to repair ventral/incisional hernias among peritoneal dialysis (PD) patients allows for optimum outcomes. It is well known that PD patients have higher intraabdominal wall pressures, thus putting them at higher risk for the development of abdominal wall hernias at prior incision sites. This abstract seeks to explore our institution's experience with several biologic mesh products used in PD patients.

Methods: PD patients who presented with a primary or incisional (trocar site) defect were offered elective open repair using a biologic graft. The biologic grafts utilized include Stratrice (acellular porcine dermis), Permacol (cross-linked porcine dermis), and XenMatrix (cross-linked porcine dermis). Upon repair of the abdominal wall defect, patients were placed on hemodialysis for variable periods. Retrospective chart review was then conducted to assess for pertinent clinical predictors and outcomes at follow up.

Results: N = 2 patients underwent repair with acellular porcine dermis, both of which returning to peritoneal dialysis post-repair. N = 1 patients underwent repair using a heavily cross-linked porcine dermis without complication and also was able to resume peritoneal dialysis readily. Lastly, n = 1 patient underwent repair utilizing a moderately cross-linked porcine dermis and developed an enterocutaneous fistula (EC), however this only required minimal operative repair and bowel rest, not explantation of the allograft.

Conclusions: We report this small, long-term case series in efforts to understand the efficacy of biologic mesh in treating abdominal wall hernias in PD patients. We believe this is the preferred method to be applied widely among surgeons repairing such hernias, allowing for optimum results, though long-term analysis must be attained.

P164

Selective Placement of Synthetic Mesh During Clean-Contaminated Laparoscopic Bariatric Procedures is Safe

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Introduction: Simultaneous laparoscopic repair of abdominal ventral hernia with intraperitoneal synthetic mesh in patients undergoing laparoscopic-stapled bariatric surgery is generally considered ill advised due to the assumed higher risk of infectious complications. However evidence interrogating this issue is lacking. We studied hernia repair outcomes and postoperative mesh infectious complications in patients undergoing concurrent laparoscopic clean-contaminated bariatric surgery procedures and abdominal wall hernia repair.

Methods: Retrospective review of 13 consecutively sampled patients undergoing concurrent clean-contaminated bariatric surgery and hernia repair between January 2009 and December 2012. Average age was 52 ± 9.5, body mass index 45.7 ± 5.1 and male-to-female ratio 1:2.2. All patients met eligibility criteria for bariatric surgery. Decision and technique of concurrent hernia repair was made preoperatively after discussion with the patient based on the presumed risk of short-term hernia morbidity. 10 patients undergoing Laparoscopic Roux-en-Y Gastric Bypass and three undergoing Laparoscopic Sleeve Gastrectomy had 12 (nine incisional and three primary ventral) and three (two incisional and one primary ventral) hernias repaired respectively. All hernias were repaired using Parietex™ Composite (PCO) mesh except in two patients that underwent primary repair. Collectively, 13 meshes were used in 11 patients ranging in size from 9 cm round to 20 cm × 15 cm

Results: Average follow up was 1.43 years (range: 6 months to 3 years). There were no mesh infections. Five patients had hernia-related complications. One patient in whom mesh was not used had a hernia recurrence, one patient developed a chronic sterile seroma, there were two mesh eversions after substantial weight loss and one patient developed significant diastasis of the rectus muscle without hernia recurrence.

Conclusions: In selected patients, concurrent synthetic mesh-repair of abdominal wall hernia and laparoscopic bariatric surgery appears to be safe and feasible without increase in mesh infections. Weight loss induced-changes in the abdominal wall might change the ultimate cosmetic appearance after hernia repair.

P165

The Clinical Trial Of The Ideal Mesh Placement For The Laparoscopic Inguinal Hernia Repair With The Elasticated Mesh

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Introduction: The existing mesh (wired mesh, pre-shaped mesh, etc.) for inguinal hernia causes continuous discomfort at times, due to forcible adaptation. The mesh placement for the surface of an inguinal area is one of the important points for this surgery. However depending on an individual difference, the existing mesh might not be the best fitting to surgical surface. To get more closely, fitting to inguinal surgical surface of laparoscopic hernia repair, we used elasticated flat-mesh, ULTRAPRO. This mesh could be lengthened unidirectionally. This elasticated function was able to fit closely to cover the surgical surface, and examined the difference in effect by its different lengthen-able direction.

Materials and methods: For two external inguinal hernia cases, we performed trans extraperitoneal hernia repair (TEP) with two different types of elasticated flat-mesh, ULTRAPRO. One was UMN3 (10 cm × 15 cm), and the other was UMM3 (15 cm × 15 cm). These two meshes had a few blue horizontal stripes, and has lengthen-able direction perpendicular to the horizontal stripe. With a proviso that the elasticized direction of the mesh was rotated 90 degrees, UMM3 (15 cm × 15 cm) was resized as a same sized mesh to UMN3 (10 cm × 15 cm). Therefore the resized UMM3 (10 cm × 15 cm) had vertical stripes. And as a control test, polypropylene flat-mesh, PROLENE Soft (7.6 cm × 15 cm), was used to another case, and this mesh did not have elasticated function. Sites of tacking for each mesh were done at the almost same place by the same tacking device, AbsorbATack.

Result: The standard TEP procedure was performed for these three cases without complication. By placing the non-elasticated mesh, PROLENE Soft (7.6 cm × 15 cm), some excess spaces were left between mesh and surgical surface. When using the elasticated mesh, ULTRAPRO UMN3 (10 cm × 15 cm), vertical shrinkages and horizontal creases were made on the mesh. However, placing the resized elasticated mesh, ULTRAPRO UMM3 (10 cm × 15 cm), was stretched horizontally to cover the lump caused by ileac artery and it gave smooth mesh fitting to surgical surface.

Discussion: There are already many kinds of mesh for inguinal hernia repair, however existing mesh might not give the best fitting to surgical surface depending on an individual difference. Especially unique shaped mesh doesn't necessarily give the best adaptation. The unique shaped mesh might not only give forcible adaptation, but also they might get creases and/or deform. The flat mesh has good flexibility to fit to surgical surface.

Conclusion: By getting lateral elasticized function, the flat mesh will provide the best fitting to the surgical surface.

P166

Early Experience With A New Anatomical Mesh For Endo-Laparoscopic Inguinal Hernia Repair

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Background and objective: Laparoscopic inguinal hernia repair has advanced over the past decade together with the development of new biomaterials to improve clinical outcome and patient care. The use of flat or anatomical mesh and the options for fixation has been a debatable topic where sufficient evidence for the best therapeutic option is not yet available. The concept of anatomical mesh is still new to the practice and the few available do not require fixation that may increase post-operative pain. Our objective was to verify the safety and feasibility of a new anatomic mesh with a unique multi-dimensional design, C-Qur CentriFX mesh is made by polypropylene and coated with Omega-3 to reduce inflammation. The mesh has unique peculiarity with its invertible design that standardizes the use in both right and left sided hernia.

Methodology: This is a prospective observational case series. C-Qur CentriFX mesh was used in 12 consecutive patients with inguinal hernia that underwent laparoscopic hernia repair. A standard 10.5 × 16 cm size was used in all patients. Information on patient demographics, hernia description according to EHS classification, operative findings and technique, post-operative complications including pain scores and recurrence were recorded during post-operative period at 6, 12 hours and at discharge then during follow-up visits at 1 week, 1, 3 and 6 months. Visual Analogue Scale (VAS) was used to assess the pain.

Results: 20 meshes were used in 4 unilateral and 8 bilateral inguinal hernia in 12 male patients with a mean age of 61 years. According to EHS classification the size and number of defects were L1 = 8, L2 = 5, L3 = 2, M1 = 2, M2 = 7, M3 = 4, F1 = 2 and R = 2. Six patients had multiple fascial defects on at least one side. Standard 3 port totally extra-peritoneal (TEP) approach was used in 10 patients while single incision trans-abdominal pre-peritoneal (TAPP) approach was used in 2 patients. Mean operative time for unilateral hernia was 49 min (range 42–64 min) while in bilateral hernia it was 85 min (range 44–132 min). 1 patient had a left scrotal hematoma and another patient presented with local peritonitis due to small-bowel perforation on post-operative day-3 and underwent emergency laparotomy for repair of perforation and mesh removal. Both patients subsequently recovered well. Post-operatively, mean VAS at 6 hours was 0.75 (range 0–3), at 12 hours 0.58 (range 0–2) and at discharge 0.17 (range 0–2). None of the patients reported pain during the follow-up visits. No recurrence was reported during the 6 months follow-up period.

Conclusion: Our early experience with the new anatomical mesh is similar and comparable to the other meshes available in the current practice, without the need for fixation. A longer follow-up may be required for further assessment of this mesh.

P167

Single Incision Laparoscopic Transabdominal Preperitoneal Mesh Hernioplasty For Inguinal Hernia In 100 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 (SILS) 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. Herein, we report our experience with single incision laparoscopic TAPP approach (S-TAPP) for Japanese patients with inguinal hernia.

Patients and methods: A consecutive series of 100 patients (88 male, 12 female) who underwent S-TAPP during June 2010 to March 2013 in a single institution. Eleven of the patients had bilateral inguinal hernia, and all others had unilateral hernia. The mean follow-up was 488 days. The average age of the patients was 61.7 ± 16.1 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 (3DMax™ 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 sliding hernia on the right side having sigmoid colon as content of the sac. There were two recurrence cases after surgery of anterior approach, and two cases after prostatectomy. In all cases S-TAPP was successfully performed, no additional trocars were required, and there were no conversions to conventional laparoscopic or open inguinal hernia repair. There was no intra-operative complication. The mean operative time was 97.9 ± 32.9 minutes for unilateral hernia, and 136.5 ± 21.8 minutes for bilateral hernia. Blood loss was minimum in all cases but 25 g in one case. The average postoperative stay was 8.1 ± 2.2 days. There was one recurrence case (0.9%) with the right external inguinal hernia 16 months after the surgery for the right internal hernia. There was no severe complication after the surgery, but there were 6 seromas (5.4%) and 2 hematoma (1.8%). Two patients had blunt tactile sense in the area of the lateral femoral cutaneous nerve (1.8%), 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.

P168

Open Inguinal Hernia Repair With The Combined Use Of A Self-Fixating Mesh And Elective Neurectomy: A Long-Term Follow-Up

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Background: Mesh fixation and nerve entrapment are potential causes of immediate and chronic postoperative pain in open inguinal hernia repair. To minimize these risks, a self-gripping mesh along with routine elective neurectomy was used in a series of patients. We assess the immediate and long-term outcomes.

Methods: From 2008–2012, 255 patients (290 hernias) underwent open repair with a semi-absorbable, self-gripping mesh under general anesthesia. All patients underwent elective ilioinguinal and iliohypogastric nerve resection. Operative time, complications, postoperative pain (VAS score on days 1, 30, 1 year), chronic numbness and recurrence were recorded.

Results: Mean operative time was 40 min (range 25–70). There were no wound infections. The incidence of seroma/hematoma was 3.1%, that all resolved completely. There were three recurrences (1%) over a mean follow-up period of 3.3 years (range 1–5 years). The mean VAS score was 1.4 (range 0–2) at day 1, and 0 at one month and one year after surgery. Numbness was persistent in 24 patients (8.3%), but without clinical significance.

Conclusions: Use of a self-fixating mesh and elective neurectomy in open inguinal hernia repair is associated with no chronic pain, minimal recurrence and a small percentage of non-significant numbness. Therefore it can be considered as an option in the surgical management of inguinal hernias.

P169

An Observational Study Of Latent Inguinal Hernias During Laparoscopic Surgery For Other Sites

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Background: The incidence of inguinal hernia is reported to be approximately 1.5% in the Japanese population. The purpose of this study was to determine the rate of the patients who will develop a latent inguinal hernia.

Methods: During laparoscopic abdominal surgery other than for an inguinal hernia, we observed the area around the inguinal lesion from the intraabdominal space under laparoscopic view, and tried to evaluate the degree of their recessus at the lesion. The classification defined the recessus at Hesselbach's triangle as follows, Grade 0: no recessus, Grade I: slight recessus with a visible bottom, Grade II: deep recessus with an invisible bottom, Grade III: other organ invaginated into the recessus, Grade IV: confirmed bulging on the body surface.

Results: From 2009 to 2011, forty-six patients were enrolled. There were 19 males (median age 73, 50–88) and 27 females (median age 70.5, 24–93). The recessus around the Hesselbach's triangle were detected in 20 patients (43.5%). The lesions were as follows, 11 on the lateral side of the inferior epigastric artery (IFA), six on the internal side of the IFA, two at both sites and one was found at the femoral ring. By the grade classification of these inguinal hernias, 26 (57%) were Grade 0, 14 (30%) were Grade I, four (9%) were Grade II, one (2%) was Grade III and one (2%) was Grade IV.

Conclusion: This study showed that patients with asymptomatic latent groin hernias are present at a relatively high frequency in the Japanese population.

P170

Determining The Proper Distance For Trans-Abdominal Sutures In Ventral Hernia Repairs: The Higgins Formula

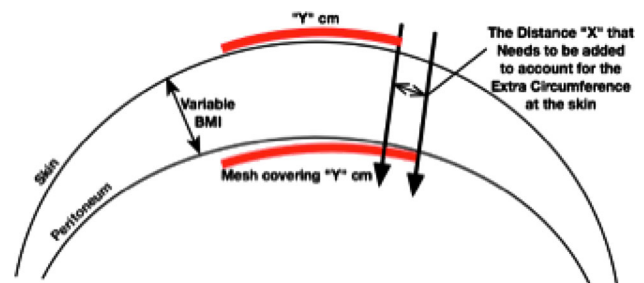
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Introduction: Laparoscopic ventral hernia repair has become widely used, however one of the more frustrating aspect of the repair is the inability to correctly place trans-abdominal sutures and still maintain the correct tension and placement in the peritoneal surface. This is especially true in patients with a high BMI. This is due to the fact that the curvature of the skin is not identical to the curvature of the peritoneum. It is common for surgeons to place the trans-abdominal sutures perpendicularly with a suture passer from the skin to the mesh. This method will only work on thin patients. In larger patients this technique usually causes the mesh to be loose and have wrinkles.

Methods: In an effort to standardize the correct placement of trans-abdominal sutures, several abdominal CT scans of patients with varying BMIs were evaluated. The curvature of the skin and the underlying peritoneum were measured to find the correct distance a trans-abdominal suture should be placed with relation to the patient's BMI.

Results: In patients with a BMI of 25 to 50, the distance "X" that needs to be added to account for the extra circumference of the skin is subject to the formula: $X \text{ cm} = (\text{BMI} - 10)/10$.

Conclusion: Any formula trying to judge the variables of distance is subject to error and interpretation. Manipulation and adjustment is occasionally necessary. However, we have found that this formula for suture placement to be correct in a majority of patients with a BMI ranging from 25 to 50. We have named this formula the Higgins Formula after Dr. Higgins who derived the formula.



P171

Readmission Rates After Outpatient Laparoscopic Ventral Hernia Repair

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Introduction: Laparoscopic repair has been shown to be safe and effective in the management of ventral hernias. As inpatient reimbursement decreases, outpatient laparoscopic ventral hernia repair (LVHR) has become more common, but there is little data to assess outcomes with this approach. The aim of this study was to evaluate short-term outcomes and readmission rate after outpatient LVHR.

Methods: The NSQP database was queried for all LVHR performed in 2011 based on CPT codes. Outpatient procedures were isolated using specific variable and null length of stay. Univariate and multivariate analysis was conducted to determine predictors of readmission in this patient population.

Results: We identified 2856 patients who underwent outpatient LVHR in this time frame. The majority were male (54.1%) with median age of 52 years (IQR 43–62). Mortality, serious and overall morbidity were observed in 0.1%, 0.6% and 1.6%, respectively. Surgical site infections were infrequent (0.6%), and so were readmission rates (3.8%). The length of operation did not predict readmission. The only independent predictor of readmission after outpatient LVHR in our study was an American Society of Anesthesiologists score of 3 or 4 (odds ratio 1.78, 95% confidence interval 1.03–3.04, $p = 0.038$).

Conclusions: We conclude that outpatient LVHR is performed safely in selected populations, with low complication and readmission rate. Patients with severe chronic systemic disease may benefit from inpatient observation status.

P172

Femoral Vs Inguinal Hernia Repair: Long-Term Clinical And Quality Of Life (QOL) Outcomes from A Prospective, International Database

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Introduction: While research devoted to QOL regarding inguinal hernia repair continues to grow, little effort has been invested in QOL outcomes of femoral hernia repair. Our aim was to compare differences in QOL between femoral (FH) and inguinal hernia (IH) repairs.

Methods: The International Hernia Mesh Registry, a prospective, multinational database, was queried for patients undergoing FH or IH repair from 2007–2013. Demographics, comorbidities, operative details, complications and QOL as measured by the Carolinas Comfort Scale (CCS) were captured. Stratified analysis was performed according to gender utilizing Chi-square, Fishers, and Wilcoxon-Mann-Whitney Tests where appropriate.

Results: In total, 73 femoral (41.1% male) and 2481 inguinal (93.5% male) hernias were identified. When comparing FH versus IH in women, cohorts revealed similar age, BMI, and comorbidities (all $p > 0.05$), except hypertension was less frequent (9.3% vs 24.8%; $p = 0.04$) and smoking was more common in FH (29.3% vs 11.7%; $p = 0.005$). Women with FH also had more recurrent repairs (18.6% vs 7.3%; $p = 0.04$) and were more likely incarcerated (18.6% vs 4.8%; $p = 0.003$). In men, there were no differences between FH and IH for age, BMI, or comorbidities. Comparing FH to IH (Table), both men and women had similar rates of preoperative pain and movement limitations, operative anesthetic type, bilateral repairs, rates of open, TAPP, and TEP repairs, types of mesh fixation, and operative times. Follow up at 1, 6, 12, 24 months was excellent: 92%, 73%, 82%, and 76%, respectively. Complications and recurrence were similar for FH vs IH for both groups, as well as CCS scores for pain, movement limitation, and mesh sensation at all follow-up time points (all $p > 0.05$).

Conclusion: Femoral and inguinal hernia repair have similar long-term outcomes for men and women in regards to complications, recurrence and QOL regardless of laparoscopic versus open repair, type of anesthesia, and patient comorbidities (Table 1).

Table 1 Outcomes for femoral vs inguinal in men and women

	Women [†]		Men [†]	
	Femoral	Inguinal	Femoral	Inguinal
Hematoma (%)	2.3	1.2	3.3	1.6
Infection (%)	2.3	1.2	3.3	0.4
Recurrence (%)	2.9	3.8	0	1.7
Reoperation (%)	2.3	3.0	0	1.5
Seroma (%)	4.6	1.8	0	3.2
Pain (1/6/12 months as %)	29.7 / 25.9 / 20.7	32.4 / 22.1 / 24.6	33.3 / 14.3 / 25.0	26.2 / 12.3 / 11.9
Mesh* (1/6/12 months as %)	11.1 / 7.4 / 6.9	16.6 / 15.5 / 18.6	14.8 / 25.0 / 10.5	13.5 / 12.8 / 12.7
Move** (1/6/12 months as %)	21.6 / 11.1 / 11.1	24.7 / 15.9 / 14.4	14.8 / 5.0 / 15.0	19.6 / 7.2 / 7.5

[†] All $p > 0.05$. * Mesh—mesh sensation. ** Move—movement limitation

P173

Does Concurrent Inguinal Hernia Repair During Robotic Prostatectomy Increase The Risk Of Infections?

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Introduction: Robotic assisted laparoscopic prostatectomy (RALP) has been increasingly used to treat prostate cancer. Patients undergoing RALP have been reported to have an incidence of inguinal hernia between 7 to 21%. Concurrent inguinal hernia repair may be a viable option, but concerns have been raised regarding the potential for mesh infection due to opening of the genitourinary tract, which classifies this operation as a clean-contaminated case. The purpose of this study was to review our experience in performing concurrent inguinal hernia repair during RALP procedures to determine the incidence of mesh infections and overall clinical outcomes.

Methods and procedures: We performed an IRB-approved retrospective review of the medical records of 236 RALPs performed by two Urologists from 2009 to 2013 at an academic medical center. A total of 16 (6.7%) concurrent hernia repairs were identified. Patients were deemed suitable candidates for concurrent repair after screening urinalysis indicated no active infection. Medical records were reviewed for patient demographics, intraoperative findings, and postoperative outcomes including length of hospital stay, infectious and other complications, recurrence and chronic pain.

Results: 16 concurrent RALP and inguinal hernia repairs were performed between February of 2009 to August of 2013. Mean age was 63 years (range 47–79) and BMI 27 kg/m² (range 22.9 to 35.9). All patients had a diagnosis of prostate cancer with a Gleason Score of 6.75 (range 6 to 8) and a PSA of 7.13 (range 2.8 to 28). All patients received prophylactic antibiotics preoperatively. 10 repairs were unilateral and 6 were bilateral, 3 of which were detected intra operatively and were not evident preoperatively. Ten repairs were performed by a General Surgeon and 6 by an Urologist. All cases were consisted of a modified TAPP approach using a permanent mesh coated with anti-adhesion barrier with at least partial re-peritonealization to cover the posterior aspect of the mesh. Mesh size was 12 cm by 15 cm and mesh was fixated using titanium helical fasteners. All cases were completed robotically or laparoscopically and there were no intraoperative complications. Average hospital stay was 2.8 days (range 1–15). One (6.25%) patient had a postoperative ileus which resolved with conservative treatment (15 day stay). Mean follow-up by clinical exam was 24 months (range 19 days–54 months). There were no mesh or skin infections (0/16). There was one (6.25%) hernia recurrence showed a 2 cm fat-containing inguinal hernia that was asymptomatic and managed conservatively. One (6.25%) patient had right groin pain which resolved after 6 months of treatment with non-steroidal anti-inflammatory drugs.

Conclusion: Although our series is limited in numbers, our experience over a 4.5 year period supports the safety and efficacy of concurrent inguinal hernia repair during RALP. Importantly there were no mesh infections and no significant complications.

P174

Totally Extraperitoneal Repair For Incisional Hernia

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Introduction: surgical repair of incisional hernia was challenging with high recurrence and complication rate. Laparoscopic onlay mesh repair has been used successfully to reduce the postoperative recovery and associated wound complications. However, tissue ingrowth to the raw surface of the onlay mesh might not be as good as that after retromuscular polypropylene mesh repair. Extraperitoneal mesh herniorrhaphy has been proved to be beneficial in surgical result and was widely used in inguinal hernia repair. Therefore, totally extraperitoneal (TEP) mesh repair was attempted for incisional hernia repair.

Methods and Procedures: Incisional hernia with abdominal wall defect less than 10 cm in diameter was included. Retromuscular space was created by manual telescope dissection and hernia sac was pulled back or transected, a polypropylene mesh was implanted over the intact peritoneum. Peritoneal tear was always closed. Midline fascial defect was closed whenever possible. Patient demographic profile and perioperative results were analyzed from a prospectively collected data base.

Results: From September 2008 to June 2013, fourteen patients with incisional hernia underwent totally extraperitoneal herniorrhaphy were enrolled. Mean diameter of hernia sac was 7.3 cm. All procedures were completed endoscopically without open conversion. Mean operation time was 132 minutes. Mean blood loss was 12 cc. Mean hospital stay length was 1.9 days. Post operation morbidity included subcutaneous seroma and hematoma but no wound or mesh infection, which was treated conservatively. After mean following up for 30 months, one obese patient developed recurrence.

Conclusion: From this preliminary experience, totally extraperitoneal dissection of retromuscular space and mesh placement is a safe and effective technique for incisional hernia repair. The advantages of TEP repair could be expected. However, large randomized control study is needed to demonstrated the true benefits.

P175

Prospective Comparison Between Reduced Port Laparoscopic Hiatal Hernia Repair and Usual 5 Port One

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Background: Since 2009 we had performed Single Incision Laparoscopic Cholecystectomy in 200 cases. We recognize this procedure for patients to prefer to. So in a few cases we tried to perform Hiatal Hernia Repair with the procedures of Single Incision Laparoscopic Surgery. But these procedures have several problems for example difficult handling without keeping of triangular formation and high cost. We should consider to design the well-balanced methods between patients satisfaction and procedures difficulties and cost. Then we had constructed the new procedures with the concept of Reduced Port Surgery and some ideas. So we compared those procedures of Reduced Port Laparoscopic Hiatal Hernia Repair (RPLHHR) with ones of Usual 5 Ports Laparoscopic Hiatal Hernia Repair (5PLHHR) in the prospective study. Furthermore, some comparisons were made with those in several cases of Single Incision Laparoscopic Hiatal Hernia Repair (SILHHR: n = 2).

Methods: The study enrolled 10 patients who were diagnosed Hiatal hernia and were operated from April 2011 to June 2013 in our hospital. They randomly assigned them to one of two groups (RPLHHR: n = 5 or 5PLHHR: n = 5). Data measures were operative time, estimated blood loss, length of hospital stay, adverse events, conversions to 5PLHHR or laparotomy, pain and patient satisfaction.

Operative Procedure RPLHHR: We make a 15 mm vertical incision in the navel. Through the incision we insert two 5 mm ports, for the left hand forceps and the scope. And we make a left abdominal incision for a 12 mm port using the right hand forceps. We mainly use a oblique-viewing endoscope and straight forceps. So we can prevent the scope and the left hand forceps from interfering in each other. Because the right hand forceps is inserted at the separated position from the navel incision, without using bent forceps we are able to work under keeping the triangular formation. One or two needle devices usually are required to revolve the organs.

Results: No cases in the both groups had adverse events and were converted to other laparoscopic approaches or laparotomy. The two study groups did not differ in terms of patient demographics. The RPLHHR group had a statistically significant longer operative time than the 5PLHHR group (240 vs 162 min), by the way SILHHR group (288 min) had a longest time than both groups, but no difference in operative blood loss and hospital stay. And there was no difference in the pain score. After 3 months later from operation, only left abdominal scar of all patients in the RPLHHR group were recognized and these patients had grate satisfactions with their surprises. Both groups were almost same cost to use disposable goods.

Conclusion/Perspective: Compared with 5PLHHR, RPLHHR is a feasible approach with comparable operative outcomes. We think that longer operative time of RPLHHR group is acceptable and RPLHHR is well-balanced procedures.

P176

An Umbrella Approach To Large Or Massive Incisional Hernias With Open Components Separation And Biologic Mesh Reinforcement

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Background: Large (> 10 cm diameter) or massive (> 20 cm diameter) or complex hernias remain a challenge with frequent complications. Ideal patient selection for techniques including open or endoscopic components separation, reinforcement with porous prosthetics or biologic tissue matrixes, or a combination of these remain subject to investigation. This study reviews an umbrella approach to large or massive ventral hernias, regardless of patient characteristics, with open components separation and wide biologic mesh reinforcement.

Methods: Thirty-four patients underwent open ventral (including incisional) hernia repair between September 2009 and August 2013 and were retrospectively reviewed for primary outcomes of recurrence and infection. Secondary analyses assessed associations with patient characteristics, risk factors, and operative variables with a student's t-test for continuous variables and two-tailed Fischer's exact test for categorical variables.

Results: Follow-up ranged from 1 to 25 months. Mean hernia size was 356 + 280 cm². Recurrences and wound infections occurred in 9% and 38% of patients. Postoperative soft tissue infections were associated with age > 55 years (p = <0.01), prior history of wound infection (p = 0.02), and presence of infected prosthetic mesh at operation (p = 0.03). No biologic mesh explants were required for infection.

Conclusion: An umbrella approach to large or massive ventral hernias with open components separation to achieve primary closure without tension and biologic mesh reinforcement to reduce need to explant in the face of infection, regardless of patient factors, may be a reasonable technique in the absence of ideal patient selection criteria for components separation and reinforcement materials. Soft tissue infections remain consistent with published series, but need for major secondary operations were absent and short- to medium-term recurrences are low.

P177

Patient Reported Outcomes Following Laparoscopic Ventral Hernia Repair

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Introduction: Approximately 90,000 ventral hernia repairs are performed in the US each year. Patients expect fast recovery after laparoscopic ventral hernia repair (LVHR) and undisturbed postoperative quality of life. Some patients however experience prolonged recovery. We explore the use of a brief, validated 10 point Linear Analogue Self-Assessment (LASA) to discern risk factors for decreased postoperative quality of life.

Methods: Between January 2011 and May 2013, we prospectively assessed patient reported outcomes for patients who underwent LVHR. VAS pain scale and LASA items were recorded: preoperatively, and at 4 hours, 1 day and 7 days postoperatively. Within the LASA scores, specific attention was paid to overall quality of life (QOL), physical well-being (PWB), and level of fatigue (LOF). We assessed the impact of patient age and gender on these outcomes.

Results: 18 patients were included, 11 were female (61%) and 8 >60 years old (44%). Patient reported fatigue increased clinically and statistically from baseline over time (p = 0.0069) as did pain (p < 0.001). The mean overall QOL and PWB scores did not reveal significant changes from baseline over time (see table). There was a statistically significant difference in QOL scores over time by gender with women reporting lower scores than men (p = 0.001). The mean PWB scores were significantly decreased from baseline over time for women compared to men (p < 0.001) and for patients less than 60 years old compared to patients older than 60 (p = 0.014) There was no significant difference between LOF and VAS scores by age or gender.

Conclusion: Our study detects significant changes from baseline in both fatigue and pain over the 7 days following LVHR. These findings can help surgeons set realistic expectations for postoperative recovery. Further studies should elucidate if individualized targeted interventions can assist with recovery.

	Baseline/Pre-surgical	PO 4 h	POD1	POD7	p value
QOL (N)	18	15	15	14	0.39
Mean (SD)	7.3 (1.9)	7.3 (2.6)	6.2 (2.7)	7.6 (2.3)	
Difference		-0.1	-1.1	0.3	
P value		0.67	0.26	0.47	
PWB (N)	18	14	14	14	0.59
Mean (SD)	7.1 (2.1)	6.9 (2.7)	5.9 (2.6)	6.7 (2.2)	
Difference		-0.3	-1.2	-0.4	
P value		1.00	0.21	0.64	
LOF (N)	18	15	15	14	0.009
Mean (SD)	3.2 (2.5)	5.3 (2.3)	6.2 (2.0)	5.6 (2.5)	
Difference		2.0	3.0	2.4	
P value		0.026	0.002	0.014	
VAS (N)	17	16	16	15	0.001
Mean (SD)	2.3 (2.3)	5.2 (2.5)	6.8 (2.6)	4.1 (2.6)	
Difference		2.8	4.5	1.8	
P value		0.001	0.0001	0.031	

P178

Laparoscopic Parastomal Hernia Repair With Defect Closure: Techniques And Preliminary Results

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Background: Parastomal hernia is common after stoma formation. Laparoscopic parastomal hernia repair provides an acceptable short-term result but incidence of seroma and recurrence is still high. Defect closure in ventral hernia repair has been reported to reduce seroma and may reduce recurrence. We have been applying defect closure in laparoscopic parastomal hernia repair. Our techniques and results of parastomal hernia were reviewed.

Methods: Patients underwent laparoscopic parastomal hernia repair between 2009 and 2013 were collected. Techniques, intraoperative and postoperative data, pain score and complications were analyzed.

Results: Twelve parastomal hernia repairs were performed in 10 patients. They were 7 rectal cancers (6 APR and 1 pelvic exenteration) and 3 uterine corpus cancers (2 pelvic exenteration and 1 hysterectomy with post radiation colitis required permanent colostomy). Median time to develop parastomal hernia was 1.5 years (0.2–10). There were 5 laparoscopic Sugarbaker repairs with defect closure, 5 laparoscopic Sugarbaker repairs, 1 laparoscopic keyhole repair and 1 laparoscopic-assisted-stomal-relocation. Mean operative time was 2.62 hours. Average pain score at 24 hour was 2.5 (1–4). Three cases in laparoscopic Sugarbaker repairs without defect closure developed seroma, two of them required aspiration. Mean follow up was 8 months (1–42). One recurrence found 10 months after keyhole repair required laparoscopic sandwich technique and laparoscopic-assisted-stomal relocation performed 14 months later for another recurrence. There was no recurrence in laparoscopic Sugarbaker repair.

Conclusions: Laparoscopic parastomal hernia repair with defect closure is feasible and safe. It reduces incidence of seroma. Long-term follow up needed to address recurrence.

P179

Mesh Infection Salvage with Locally Bee-Honey Application

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Mesh infection is a catastrophic complication after hernia repair. Honey has bactericidal activity reported since 1892.

Present 4 cases of salvage of infected mesh after abdominal hernia repairs with bee-honey. Presentation.

Case 1: 34 years old man with incisional ventral hernia repair, presented with infection and mesh exposure. Antibiotics and daily lavage for three weeks improved the wound environment and skin grafts were placed. However, the skin grafts were lost secondary to re infection and the mesh was exposed again. Topical honey application successfully controlled the infection and the patient was discharged. By the 4th week the wound healed completely.

Case 2: 56 years old female with ventral hernia with loss of domain repaired with mesh after pre-operative progressive pneumoperitoneum. Ten days after surgery presented with dehiscent wound and mesh infection. The wound was open and drained and bee-honey application was started. The patient was discharged at the third day and by the 5th week the wound was healed.

Case 3: 69 years old woman presented with mesh infection one month after ventral hernia repair. high white blood cell count... Antibiotic therapy and wound irrigation plus application of bee-honey was started. Sepsis control was achieved by 72 hours and the patient discharged on the 5th day. By the end of the 6th week the wound was completely healed.

Case 4: 45 years old woman with colostomy for sigmoidectomy secondary to perforated diverticulum and abdominal sepsis 5 years before admission. Several attempts of unsuccessful intestinal reconnections had been performed previously. She presented with huge incisional hernia which was repaired with mesh using pre-operative progressive pneumoperitoneum. The mesh became infected and wound irrigation plus application of bee-honey was started. The wound was completely healed by the 6th week.

Discussion: It is estimated that the frequency of any type of mesh infection is 1.3%. Honey has direct and indirect actions in the control of local wound infection and healing. There are a variety of bee-honey but honeys of all geographic areas have effective antimicrobial activity.

P180

Underlay Versus Retrorectus Mesh Placement in Complex Ventral Hernia Repair Utilizing Endoscopic Component Separation

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Introduction: Abdominal wall reconstruction for complex abdominal wall defects remains a challenge. Although open component separation with medialization of the rectus muscles restores integrity and function of the abdominal wall, it is fraught with wound complications. Multiple studies demonstrate a decreased incidence of wound complications with endoscopic component separation as perforating vessels remain intact. The ideal mesh and its placement, however, remain elusive. We aim to investigate outcomes after endoscopic component separation with open ventral hernia repair and underlay versus retrorectus mesh placement.

Results: Forty-eight patients underwent bilateral endoscopic component separation with open ventral hernia repair and either underlay or retrorectus mesh placement by a single surgeon at our institution between February 2010 and July 2013. Mesh was placed as an underlay in 27 patients and retrorectus in 21. The demographics of the underlay and retrorectus groups were similar in that there was no significant difference in ASA $p=0.53$, ethnicity $p=0.50$, mean age (59.8 vs 55.1 yrs, $p=0.18$), BMI (32.2 vs 35.8 $p=0.48$), size of fascial defect (10.8 vs 10.7 cm, $p=0.88$) and hernia grade $p=0.66$. There were more female patients in the retrorectus group, however this was not statistically significant (67% vs 41%, $p=0.067$). There were no significant differences in overall incidence of complications (29.6% vs 42.9%, $p=0.15$), hospital length of stay (6.8 vs 6.6 days, $p=0.78$), surgical site infections (15% vs 14%, $p=0.64$), and recurrence (11% vs 0%, $p=0.17$). There were more patients with seromas requiring drainage in the retrorectus group (15% vs 0%, $p=0.031$).

Discussion: With the exception of increased rates of seroma requiring drainage, retrorectus placement of mesh in our open ventral hernia repairs with endoscopic component separation yields outcomes comparable to underlay mesh placement. The incidence of both procedure-related and nonprocedure-related complications, recurrence and hospital length of stay are equivalent. The majority of seromas requiring drainage have been lateral, in the field of the component separation, thus it is difficult to attribute this to retrorectus mesh placement. Our drain placement has not been consistent throughout this period and this should be investigated for potential association with seroma development. One limitation of this study is a shorter average follow up in the retrorectus group (8.7, range 2–15 months) compared to the underlay group (31.6, range 19–43 months) owing to a later date of service. Although retrorectus mesh placement has not increased perioperative morbidity, at least two years of follow up is sought to better assess recurrence rates. Placing mesh outside of the peritoneal cavity has the potential benefit of utilizing a synthetic mesh above the posterior rectus sheath, thus avoiding the complications feared with intraperitoneal placement of synthetic meshes and significant cost of biologic prostheses.

P181

The Influence Of Hiatal Hernia Size On Recurrence Rate Following Laparoscopic Hiatal Hernia Repair

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Introduction: The crano-caudal height of a hiatal hernia has been demonstrated to be associated with the rate of recurrence following laparoscopic repair without the utilization of mesh. The adjunct of mesh utilized to reinforce the hiatal closure at the time of hiatal hernia has not clearly impacted long-term hernia recurrence rates in long-term studies. This study aims to evaluate the impact of hiatal hernia size upon recurrence rate amongst laparoscopic repairs utilizing a mesh reinforcement.

Methods and Procedures: An IRB approved retrospective review of all cases of hiatal hernia repair from 2005 to 2012 at a single center was performed. Patient demographics, comorbid conditions, preoperative evaluation, operative details and postoperative outcomes were measured. Hiatal hernia size was classified as either small or large based upon preoperative endoscopy or barium swallow. Small hiatal hernias were defined as less than 6 cm in crano-caudal height or 50% intrathoracic stomach, while a large hiatal hernia was defined greater than or equal to 6 cm in height or 50% intrathoracic stomach. Radiologic recurrence was defined by radiologic herniation greater than 2 cm, while clinical recurrence was defined as radiologic recurrence with recurrent symptoms associated with the hiatal hernia.

Results: 154 patients underwent hiatal hernia repair. 75 patients (48.7%) were identified with preoperative and postoperative imaging with a mean follow up of 8.4 months. Radiographic recurrences were seen in 10.6% of patients, of which half of these patients (5.3%) were experiencing symptoms. Amongst the study group, 33 (44%) patients had a small hiatal hernia, while 42 (56%) patients had a large hiatal hernia. Recurrences following large and small hiatal hernia repairs occurred similarly (14.3% vs. 6.1%, $p=0.45$, respectively). Among mesh-reinforced repairs, post-operative recurrence rates were similar between large and small hiatal hernias (14.7 vs. 5.9%, $p=0.65$). Similarly, non-mesh repairs demonstrated no difference in recurrence rates among large hiatal hernias when compared to small hiatal hernias (12.5% vs 5.9%, $p=1.0$).

Conclusions: Laparoscopic hiatal hernia repair is associated with a relatively low short-term recurrence rate with or without the adjunct of mesh. Clinical recurrences occur less commonly than radiographic recurrences. Cranio-caudal extent of a hiatal hernia as measured by preoperative endoscopy or barium studies does not directly impact hernia recurrence rate. Recurrence rates are similar between mesh and non-mesh repairs for both small and large hernias. Appropriate indications for mesh use at the time of hiatal hernia repair are unclear. Future studies should address variables beyond the cranio-caudal extent of the hernia.

P182

Laparoscopic Parastomal Hernia Repair: No Different Than a Laparoscopic Ventral Hernia Repair?

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Introduction: Parastomal hernias are a common complication following stoma creation occurring in up to 50% of stomas. Laparoscopic repair of parastomal hernias (LPH) utilizing a Sugarbaker technique has been demonstrated to have excellent outcomes. Laparoscopic parastomal hernia repair utilizes similar principles as a traditional laparoscopic ventral hernia repair (LVH) although careful attention to the lateral tunnel of intestine to avoid obstruction is paramount. The presence of an existing stoma may potentially increase the risk of infections or complications. This study evaluates the outcomes of laparoscopic parastomal hernia repair compared to conventional laparoscopic ventral hernia repair.

Methods: An IRB approved review of a prospectively collected database of all patients undergoing LPH and LVH between 2009 and 2012 at a single institution was performed. Propensity scores were utilized to match LPH and LVH of close clinical profile (3 to 1 match). Patient demographics, comorbidities, perioperative details, and complications were recorded between the groups.

Results: 20 patients underwent LPH during the study interval and were compared to 60 LVH. Groups were matched from the standpoint of age, BMI, smoking status, ASA, estimated blood loss, defect size and mesh size. Operative time was longer in LPH than LVH (172 +/- 35 vs. 94 +/- 32 min, $p < 0.01$) and hospital length of stay was greater in LPH than LVH (3 days, interquartile range 2–5.5 days vs. 1 day, interquartile range 1–2.8 days, respectively, $p < 0.01$). There was no difference in overall wound complications, superficial skin and soft tissue infections, or seromas between groups. No mesh infections occurred in either group. Hernia recurrence rate was similar between groups occurring in 5% and 1.7% of LPH and LVH respectively, $p < 0.01$.

Conclusions: Laparoscopic repair of parastomal hernias utilizing a Sugarbaker technique may be safely performed with a low incidence of complications and recurrences. Hospital stay and operative duration are significantly longer in patients undergoing LPH than LVH, although this did not impact longer term outcomes. Laparoscopic parastomal hernia repair results in similar long-term outcomes to laparoscopic ventral hernia repair.

P183

Prospective Evaluation Of Self-Gripping Mesh (Parietex Progrid™) Without Additional Fixation During Laparoscopic Total Extraperitoneal (TEP) Inguinal Hernia Repair: One Year Results In 102 Hernias

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Background: The use of self-gripping mesh during laparoscopic TEP inguinal hernia repairs may eliminate the need for any additional fixation without added concern for mesh migration. Long term outcomes are not yet prospectively studied in a controlled fashion.

Methods: Under IRB approval, from July 2011–Sept 2012, 102 hernias were repaired laparoscopically with self-gripping mesh without additional fixation. Patients were followed for at least one year. Demographics and intraoperative data (defect location, size, mesh deployment time) are recorded. Carolinas Comfort Scale™ (CCS), a validated 0–5 pain/quality of life (QoL) score where a mean score of >1.0 means symptomatic pain, is employed in the recovery room (RR), at 2 wks, and at 1 year. Morbidities, narcotic usage, days to full activity and return to work, and CCS scores are reported.

Results: 64 patients with 102 hernias completed a mean 15.1 months follow up. 20 hernias were direct defects (average size 2.8 cm). Mesh deployment time was 198 seconds. RR pain was 1.1/5. Total average oxycodone/acetaminophen (5 mg/325 mg) usage = 5.4 tablets, days to full activity was 1.7, and return to work was 4.5 days. 12 small asymptomatic seromas were palpated without any recurrences or groin numbness. All seromas resolved by the 6 month visit. Transient testis discomfort was reported in 8 patients. Urinary retention was 3%. Mean CCS™ scores for groin pain laying, bending, sitting, walking, and step-climbing were 0.2, 0.6, 0.3, 0.5, and 0.07 respectively. At the first postop visit, 6% had symptomatic pain (CCS >1). At 15.1 months, no patients had symptomatic pain (CCS scores = 0.05, range 0–0.8). There are no recurrences.

Conclusions: Self-gripping mesh can be safely used during laparoscopic TEP inguinal hernia repairs. Recovery was rapid. In this cohort, there were no reports of chronic pain or recurrences.

P184

Single Umbilical Tangential Incision (SUTI) Lap-TEP Inguinal Hernia Repair

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Introduction: Single port laparoscopic inguinal hernia repair has been performed to improve the cosmesis compared to that of conventional multi-port procedures. But the cosmetic result of single port Lap-TEP is not superior to that of TAPP hernia repair. The aim of this study is to introduce and assess the single umbilical tangential incision for Lap-TEP repair.

Methods and Procedures: 12 hernia repairs of 10 patients were performed using Single Umbilical Tangential Incision (SUTI) Lap-TEP method. Single incision was made about 2.5 cm along the inferior lateral skin of the umbilical pit. The incision was tangential inside the umbilicus and less than one centimeter of vertical incision was made on the supra- or infraumbilical skin, if needed. SILS port and conventional instruments were used for the operation procedure.

Results: All the procedures were completed without a need of an additional port or conversion to the conventional TEP procedure. Mean operation time was 50.5 minutes for the unilateral LH and 90.3 minutes for the bilateral LH. There were 2 wound seroma postoperatively, which resolved after conservative treatment. Other significant complications were not noted. No hernia recurred during the follow-up. At 3 month's follow-up, the scar was barely visible.

Conclusion(s): The SUTI-TEP procedure was safe and showed superior cosmesis.

P185

Fibrin Sealants for the Prevention of Postoperative Pancreatic Fistula Following Pancreatic Surgery (A Cochrane Review)

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Background: Postoperative pancreatic fistula is one of the most frequent and potentially life-threatening complications following pancreatic resections. Fibrin sealants are introduced to reduce the incidence of pancreatic fistula by some surgeons.

Methods: The Cochrane Library (Issue 10, 2012), Medline (1946 to October 2012), Embase (1980 to October 2012), Science Citation Index Expanded (1976 to October 2012), and Chinese Biomedical Literature Database (1978 to October 2012) were searched to identify relevant randomized controlled trials. Two review authors identified the trials for inclusion, collected the data, and assessed the risk of bias independently.

Results: Seven randomized controlled trials involving 700 patients were included in the review. None of the trials were of low risk of bias. There were no significant differences in the incidence of overall postoperative pancreatic fistula or the perioperative mortality between the two groups. The proportion of postoperative pancreatic fistula that was clinically significant was not mentioned in most trials. On inclusion of trials that clearly distinguished clinically significant fistulas, there was no significant difference between the two groups. There were no significant differences in the overall postoperative morbidity, reoperation rate, or hospital stay between the groups. Quality of life was not reported in any of the trials.

Conclusions: Fibrin sealants do not seem to prevent postoperative pancreatic fistula following pancreatic resections. Based on the current available evidence, fibrin sealants cannot be recommended for routine use in pancreatic surgery.

P186

Cholangiocarcinoma in Hepatic Hemangioma with Hepatitis B Infection

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The simultaneous occurrence of hepatic hemangioma and cholangiocarcinoma is very rare. The development of cholangiocarcinoma in the location of hepatic hemangioma is even more rarely seen. A 59-year-old woman presented to our hospital for evaluation of recently enlarged hepatic hemangioma. Her past history was significant for a diagnosis of 3 cm × 3 cm liver hemangioma 5 years ago. The patient did not have common high risk factors of cholangiocarcinoma, such as liver fluke infection, hepatolithiasis, and primary sclerosing cholangitis. Her physical examination did not reveal any significant abnormalities. Her hepatitis B markers (HBsAg, HBeAb, HBcAb) were positive. Other laboratory results such as routine analysis of blood and tumor markers were all within normal limits except for elevated CA 19-9 of 50 U/ml (<22 U/ml). Abdominal magnetic resonance imaging T2WI scan showed a large mass in the segments 4, 5, and 8 (Fig. 1). Hepatic hemangioma was considered preoperatively. However, a gray solid mass, measuring 7 × 3.5 cm × 2.5 cm, was observed in the right edge of a red cavernous mass measuring 11 cm × 8.5 cm × 4 cm after hepatectomy (Fig. 1; arrow). The postoperative course was uneventful and she was discharged 7 days after surgery. Histological studies revealed both moderately differentiated cholangiocarcinoma (Fig. 2; left) and cavernous hemangioma (Fig. 2; right). The results of immunohistochemical markers were as follows: CK 7 (+) (Fig. 3), CK 19 (+) (Fig. 4), CK 8 (+), CK 18 (+), Glypican-3 (–) (Fig. 5), Hepa (–) (Fig. 6), AFP (–), Arginase (±), CD 10 (–), CK 20 (–), TTF-1 (–), and CDX-2 (–). The patient was followed-up over the ensuing 18 months without cholangiocarcinoma recurrence.

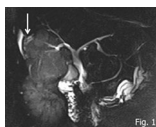


Fig. 1

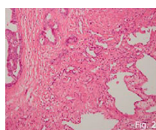


Fig. 2

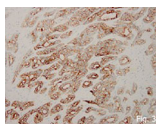


Fig. 3

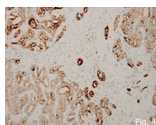


Fig. 4

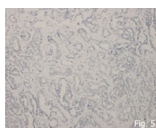


Fig. 5

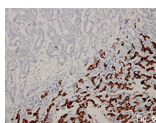


Fig. 6

P187

Transumbilical Multi-Mini Port Clipless Cholecystectomy Without Using Triport

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Transumbilical multi-mini port clipless laparoscopic cholecystectomy is a novel laparoscopic surgical technique for cholecystectomy utilizing only a transumbilical incision, which eliminates any visible abdominal scars and improves cosmesis. This pilot study was conducted to assess the safety, feasibility, and short-term outcomes of transumbilical multimini port clipless laparoscopic cholecystectomy using conventional laparoscopic equipment. Transumbilical multi-mini port clipless cholecystectomy without using the triport technique takes about 55 minutes less time. After the initial expense of buying a Harmonic scalpel, it is economical for patients in poor countries that cannot afford the expensive triport. Fifteen patients (14 females average age 40 years and 1 male age 45 years) underwent laparoscopic cholecystectomy. To reduce the cost, an innovative technique was used in which 3 small incisions were made along the edge of the umbilicus in a “J” fashion. The duration of surgery was 55 ± 20 minutes. Blood loss, patient recovery, and outcomes were comparable to those of using the triport technique, so this single-port technique is feasible for performing routine laparoscopic procedures.

P188

Laparoscopic Cholecystectomy (SILC) with Conventional Three Port Laparoscopic Cholecystectomy

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To report our experience with Single Incision Laparoscopic Cholecystectomy (SILC) and its retrospective comparison with conventional 3-port laparoscopic cholecystectomy. Data was collected for all patients undergoing Single Incision Laparoscopic Cholecystectomy (SILC) (Group A n = 45) and data for those who had undergone conventional 3-ports laparoscopic cholecystectomy (Group B n = 45) between April 01, 2011, to November 30, 2011. Operative time was longer with Single Incision Laparoscopic Cholecystectomy (SILC) compared with conventional 3—ports laparoscopic cholecystectomy. A correlation was seen between reducing SILC operative time and increasing experience. Three patients in the SILC group A required the addition of extra laparoscopic port. No patients in the SILC (group A) required conversion to open surgery. Patients stayed an average of 20 hours following SILC and 30 hours following conventional laparoscopic cholecystectomy. No patient in each group had a postoperative biliary leakage. Single-incision laparoscopic cholecystectomy (SILC) may be equal to conventional laparoscopic cholecystectomy in terms of safety and efficacy.

P189

Experience With The Treatment Of Laparoscopic Common Bile Duct Exploration For Common Bile Duct Stones With Nonsevere Acute Cholangitis

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Objective: To evaluate the outcomes of laparoscopic common bile duct exploration (CBDE) for common bile duct stones (CBDS) with nonsevere acute cholangitis.

Methods: A retrospective clinical study was performed from January 2009 to December 2012. A total of 37 patients underwent laparoscopic CBDE with T-tube drainage and laparoscopic cholecystectomy (LC) for CBDS with nonsevere acute cholangitis and gallbladder stones. Patients with severe cardiopulmonary co-morbidities were excluded. During laparoscopic CBDE, the relationship of the cystic duct to the CBD and common hepatic duct was clearly identified. Cholelithiasis and stones retrieved weren't necessary in order to shorten a period of operation time and to lower danger of the surgical procedure during laparoscopic CBDE. A drain was left at foramen of Winslow. Postoperative cholangiograms and/or choledochoscopy were accomplished in all the patients before T-tube removed, and retained stones was removed.

Results: 37 laparoscopic CBDE and LC were performed successfully. Duration of the procedure was 105.54 ± 6.30 min. The diameter of common bile duct was 12.86 ± 0.58 mm. There were solitary or multiplied CBDS, acute or chronic cholecystitis was 14 (37.8%) and 23 (62.2%), 9 (24.32%) and 28 (75.68%) respectively. Postoperative hospital stay and whole hospital stay was 11.27 ± 0.82 day and 16.41 ± 1.03 day respectively. Control of septic symptoms and improvement of laboratory data were postoperatively achieved in all patients. There was no conversion to open common bile duct exploration, no major bile duct injuries and no mortality in this study. Overall, 4 cases with biliary leak and retained stones were discovered respectively. The biliary leak was postoperatively cured by conservative therapy with a drain left. The retained stone was retrieved postoperatively by choledochoscope.

Conclusion: Laparoscopic CBDE with T-tube drainage and LC for the treatment of CBDS with nonsevere acute cholangitis appears to be safe and effective.

Key words: choledocholithiasis; laparoscopic common bile duct exploration; acute cholangitis

P190

The Study Of The Thrombophilic Risk Factors In The Patients With Hypercoagulable State Underwent Laparoscopic Cholecystectomy

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Background: Laparoscopic Cholecystectomy (LC) is the worldwide gold standard operation for gallstone disease. The use of LC in the patients with hypercoagulable state who suffered from gall stones may pose problems because of the comorbid conditions that are concomitant with hypercoagulable state and may increase the postoperative LC thrombophilic complications.

Objective: The aim of this study was to evaluate the possible risk factors related to hypercoagulable state in the patients undertook LC.

Methods: This was a prospective control study. The total 50 patients suffering from gallstone undertook LC and were enrolled at Beijing Shijitan Hospital, Capital Medical University between November 2011 and February 2013. Based on the coagulation function, they were divided into two groups: hypercoagulable state group (group1) and non-hypercoagulable state group (group2). The following data were collected: gender, age, BMI, medical history, preoperative blood pressure, the time and pressure of intraoperative pneumoperitoneum, the operating bleeding and the time of operation. The serum levels of preoperative fast glucose, total cholesterol, high-density lipoprotein (HDL-C) and low-density lipoprotein (LDL-C) of them were evaluated. Before and at the end of pneumoperitoneum (i.e., 0 h after surgery) and at 8 hours after surgery, the coagulation function including the prothrombin time (PT), activated partial thromboplastin time (APTT), fibrinogen (Fib), thrombin time (TT) and D-dimer (DD) of each patient were measured. The results of two groups were compared statistically.

Results: Of the 50 patients, 22 were male and 28 were female. The mean age of the patients was 56.7 ± 11.5 years (ranged from 29 to 78). All patients were successfully underwent LC and had no major complications. There were 25 patients in group 1 and 25 patients in group 2. The serum levels of preoperative total cholesterol, HDL-C and LDL-C were different significantly in two groups ($P < 0.05$). Univariate analysis showed that age, preoperative blood pressure, HDL-C less than 1.25 mmol/L and LDL-C more than 2.84 mmol/L were risk factors ($P < 0.05$). The patients of group 1 all had comorbidities such as hypertension or diabetes mellitus or hyperlipidemia. The patients had history of hyperlipidemia after laparoscopic cholecystectomy were prone to suffer from hypercoagulable state ($P < 0.05$). Multivariate logistic regression analysis showed that preoperative blood pressure, history of hyperlipidemia and the serum level of LDL-C were the independent risk factors for the patients of group 1.

Conclusion: This study demonstrates that preoperative blood pressure, history of hyperlipidemia and the serum level of low-density lipoprotein are the thromboembolism risk factors in the patients with hypercoagulable state underwent laparoscopic cholecystectomy and these risk factors should be paid more attention to.

Keywords: Laparoscopic cholecystectomy; Hypercoagulable state; Risk factors; Logistic regression analysis

P191

Laparoscopic Splenic Preserving Distal Pancreatectomy For Retrieval Of A Proximally Migrated Pancreatic Stent

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Background and Objectives: Pancreatic stents placed by ERCP are common in the treatment of benign and malignant pancreatic and biliary disease. Proximal migration of the stent into the duct occurs in 2% to 5% of cases, often resulting in pancreatitis. Although technically challenging, proximally migrated pancreatic stents can usually be removed endoscopically. Little has been written about surgical management of irretrievable stents.

Methods: A 61 year old female with a history of chronic pancreatitis underwent an ERCP with pancreatic stent placement. Soon after stent placement, it was noticed the stent had migrated into the mid-portion of the pancreas. The patient underwent four ERCP procedures attempting to remove the migrated stent with no success. Due to the patient's ongoing abdominal pain and weight loss, the decision was made to perform a laparoscopic distal pancreatectomy with intraoperative ultrasound for removal of the pancreatic stent.

Results: Using laparoscopy, we exposed the pancreas and used the ultrasound to locate the distal end of the stent. We incised the pancreas at that point, removed the stent, and completed the laparoscopic splenic preserving distal pancreatectomy. The procedure took 240 minutes, blood loss was minimal. The patient was discharged home on postoperative day 5.

Conclusion: Although ERCP is often successful and sometimes requires several attempts, we recommend surgical consultation after the first or second failed ERCP.

P192

Minimal Invasive Treatment for Patient with Situs Inversus Totalis with Diagnosis Biliary Pancreatitis

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Purpose: Report and describe a safe approach to laparoscopic cholecystectomy and Intraoperative Cholangiography in patients with situs inversus totalis and biliary pancreatitis.

Case: 50-years old female with 1 year with history of abdominal pain who was diagnosed with biliary pancreatitis and situs inversus totalis during work-up for epigastric pain. Physical exam present with tenderness in left upper quadrant. Laboratory tests showed: high lipase levels, Chest X-ray showed dextrocardia (Fig. 1). Ultrasound showed location of gallbladder on the left side of the body with gallstones. An abdominal computed tomography confirmed the situs inversus and showed inflammation of the pancreas with peripancreatic fluid (Fig. 2). Once the pancreatitis resolved, the patient was program for laparoscopic cholecystectomy, in which the patient was placed in the supine position with both the surgeon and camera-man on his right side and the assistant on the left side. Monitor placed near the head of the patient at the left side. Trocars were introduced in the left side of the patient's abdomen. We also identified the cystic artery (Fig. 3). The clip was placed distally on the cystic duct. A small enterotomy was made in the cystic duct. There was good bile flow back. We placed the Cholangioath without any difficulty and there was good flow without any leak. We then placed the patient back in supine position, shot a series of cholangiograms with the possibility of distal common bile duct stones noted, but good flow into the duodenum. The rest of the ductal system was intact without any defects (Fig. 4).

The duration of the operation was 53 minutes, which is slightly longer than our standard laparoscopic cholecystectomy. Nonetheless, the patient was discharged on the morning following surgery, which is comparable to other patients undergoing laparoscopic cholecystectomy.

Discussion: Situs inversus is a congenital condition. It can either be partial or total. This entity is considered to have a genetic predisposition that is autosomal recessive with the defect being localised on the long arm of chromosome 14.

There is no evidence that situs inversus predisposes to cholelithiasis, but it may be a cause of diagnostic confusion. Delay in the diagnosis was due to the left upper abdominal pain and unknown situs inversus. Internet search has revealed 37 reported cases of cholecystectomy in situs inversus including our case, but we don't found biliary pancreatitis case.

We concluded that there is technical difficulty performing laparoscopic cholecystectomy in such patients. The dissection was quite safe and confirms the previous reports of safe laparoscopic cholecystectomy in situs inversus totalis despite the reversed anatomic relationships and other arterial anomaly. At least two thirds of surgeons are right handed. It is necessary for these surgeons, and their assistants, to modify their usual surgical technique to comfortably and safely carry out the procedure. Rather than the clumsy crossing of hands to retract on Hartmann's pouch for dissection of Calot's triangle, we suggest that retraction on Hartmann's pouch may be carried out by the assistant, thus allowing the surgeon to operate in a more ergonomic fashion.



Fig. 1



Fig. 2



Fig. 3



Fig. 4

P193

Laparoscopic Hepatectomy For Dorsal Region Of The Right Lobe With A Transthoracic Port

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Introduction: At present, laparoscopic hepatectomy is being commonly used for tumor resection, but the resection of tumors from dorsal region of the right lobe is difficult because of insufficient operative view. We attempted to reach liver tumors in dorsal region via the conventional laparoscopic approach with the addition of a transthoracic approach using a transthoracic port (TTP). In this report, we describe this modified procedure and evaluate its usefulness.

Materials and Methods: The present study included 10 patients: 4 with hepatocellular carcinoma, 4 with metastatic liver cancer, 1 with an intrahepatic bile duct tumor, and 1 with an intrahepatic cholangiocellular carcinoma. As the tumors were located in the head side of the liver at S7/8, and resection was believed to be the difficult by only laparoscopic approach, an adaptation of the method using a TTP was considered. The operations were performed with the patient placed in the left lateral decubitus position with separation lung ventilation. The first port for the camera was inserted in the umbilical region or left side of the umbilical region, and 3–4 additional ports were added in the abdominal cavity. After the collapse of the right lung, the chest was opened at the ninth or tenth intercostals at the axillary line and a 12-mm balloon trocar (blunt tip trocar, Auto Suture) was inserted into the abdominal cavity through the diaphragm. The balloon port can prevent pneumothorax from occurring due to pneumoperitoneum.

Results: The operation time was 308 (153–477) minutes, and blood loss was 164 (0–500) mL. There were no postoperative complications, including respiratory problems. The patients were discharged from the hospital approximately 9 days after the operation.

Conclusions: By using a TTP, we identified the margins of the tumors, which are not easily detected via a laparoscopic approach, and safely performed the operation. Thus, the TTP is useful for the resection of a tumor located in S7 or S8 of the liver.

P194

Laparoscopic Cholecystectomy In Situs Inversus Totalis: Feasibility And Review Of Literature

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Introduction: Situs inversus totalis is a rare anomaly characterized by transposition of organs to the opposite site of the body. Laparoscopic cholecystectomy in those patients is technically more demanding and needs reorientation of visumotor skills to left upper quadrant.

Presentation of Case: Herein, we report a 10 years old boy presented with left hypochondrium and epigastric pain 2 months duration. The patient had not been diagnosed as situs inversus totalis before. The patient exhibit a left sided “Murphy's sign”. Diagnosis of situs inversus totalis was confirmed with ultrasound, Computerized tomography (CT) and Magnetic Resonant Image (MRI) with presence of multiple gall bladder stones with no intra or extrabiliary duct dilatation. The patient underwent laparoscopic cholecystectomy for cholelithiasis.

Discussion: Feasibility and technical difficulty in diagnosis and treatment of such case pose challenge problem Due to the contra lateral disposition of the viscera. Difficulty is encountered in skeletonizing the structures in Calot's triangle, which consume extra time than normally located gall bladder. A summary of additional 50 similar cases reported up to date in the medical literature is also presented.

Conclusion: laparoscopic cholecystectomy is feasible and should be done in situs inversus totalis by experienced laparoscopic surgeon, as changes in anatomical disposition of organ not only influence the localization of symptoms and signs arising from a diseased organ but also imposes special demands on the diagnosis and surgical skills of the surgeon Key Words: Situs inversus totalis-cholelithiasis- laparoscopic cholecystectomy.

P195

Lap Distal Pancreatectomy In Benign Pancreatic Cyst/Tumor (Insulinoma)

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Insulinomas are benign neuroendocrine tumors which is the most common of the pancreatic islet cell tumors, yet they remain a rarity. The incidence are 1–4 cases in one million patients a year. 60% are woman with a median age at presentation of 47 years. 90% are solitary and 10% multiple. More than 90% are benign adenomas and about 5%–6% of cases are malignant, and 5%–8% are associated with multiple endocrine neoplasm (MEN type I). Most insulinoma are 1–3 cm in size. Hyperinsulinism causes severe hypoglycemia and leads convulsion, depression and coma. Initial operation is curative in 88%, and long-term survival is normal. Recurrence rates of 7% (sporadic) and 21% (MEN type I) have been reported at 20 years.

Clinical manifestation related with endogenous hyperinsulinism : autonomic (less specific) like sweat, worried, tremble, nausea, hungry palpitation and tingling. The more specific neuroglycopenic are confusion, changes of behavior, dizzy, headache, and weakness. The classic diagnostic criteria (Whipple's triad) : hypoglycemic symptoms, fasting hypoglycemic (< 45 mg/dL) and reversal of changes with glucose.

The treatment is surgical, except in advanced metastatic disease, where streptozotocin is helpful. Enuclation is performed for solitary insulinoma, and pancreas resection is performed for multiple insulinomas. Sometimes ultrasonography intra operative is useful to determine the insulinoma location.

The surgical can be done by laparotomy or laparoscopic surgery. The benefit of laparoscopic surgery are small incisions, less pain, faster mobilization, short hospitalization and better cosmetic. In the other side, laparoscopic pancreatectomy should be done by experience surgeon with availability of supporting instruments.

We report a case insulinoma in 39 years old woman. The locations were in body and tail pancreas. Laparoscopic distal pancreatectomy with spleen preservation is done successfully. The operation time were 4.5 hours. Post operative care in ICU for one day. We start enteral nutrition in the third day post operative and the patient may leave hospital in the fifth day post operative.

Key words: insulinoma—laparoscopic distal pancreatectomy

P196

Telaprevir with Adjusted Dose of Ribavirin in Naive CHC-G1: Efficacy And Treatment in CHC in Hemodialysis Population.

TARGET C Trial- A Placebo Randomized Control Clinical Trial

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Objective: The prevalence of Chronic hepatitis C (CHC) in Hemodialysis population is 3%. Standard of care (SOC) offers reduced dose of Peg IFN Alfa (p-IFN α) and reduced Ribavirin (RBV) doses eliciting sub optimal SVR of 27%. Morbidity and mortality of CHC has impact on liver kidney transplant and graft failure. Triple therapy is SOC in CHC patients. Telaprevir is not cleared renally and hence is safe in the hemo-dialysis population. This study evaluated the efficacy of triple therapy with Telaprevir, adjusted dose of RBV and p-IFN α in naive CHC-G1 (CHC Genotype 1) individuals on hemodialysis as a Respond Guided Therapy (RGT)

Methods: Total of thirty five (n = 35) naive CHC-G1 were recruited and subdivided into two sub-groups. Group A—(n = 18): Received p-IFN α 135 mcg once weekly, Telaprevir 750 mg two tablets – TID for four days and three tablets BID post dialysis for three days along with RBV 400 mg daily for 12 weeks followed by p-IFN α 135 mcg plus RBV 400 mg till 24 weeks of duration

Group B—(n = 17): Received p-IFN α 135 mcg once weekly with Telaprevir 750 mg two tablets – TID for four days and three tablets BID post dialysis for three days (same as Group A) with RBV 200 mg for 12 weeks followed by p-IFN α 135 mcg with RBV 400 mg till 48 weeks. The IL28B was evaluated for all individuals. Hematological, Liver and renal parameters were followed regularly during the trial. Viral load was followed to evaluate for response guided therapy (RGT) in all individuals.

Results: See Table (VRVR—Very Rapid Virological Response, ETVR—End to treatment virological response)

Conclusion:

- Triple therapy : In special hemodialysis patients with CHC has SVR of 63% in 24 weeks
- Traditional SOC: For 48 weeks- SVR was 25%
- Dual therapy with Placebo overlapped with reduced dose of RBV- yield SVR of 50%
- 24 weeks of triple therapy in ESRD on hemodialysis have substantial efficacy over 63%
- This study postulates truncated triple therapy with optimal retention, efficacy with cost show a definite benefit in treating this special population

RGT	Group A (24 weeks)	Group B (36 Weeks)	Group C (48 Weeks)
AVR (1 st week)	4/12 (33%)	4/12 (33%)	3/12 (25%)
VRVR (2 nd week)	5/12 (41%)	4/12 (33%)	3/12 (25%)
RVR (4 th week)	6/12 (50%)	5/12 (42%)	3/12 (25%)
EVR (12 th week)	7/12 (63%)	6/12 (50%)	4/12 (33%)
ETVR (24 th week)	8/12 (67%)	12 th week RBV added	MTVR 3/12 (25%)
ETVR (36 th week)		6/12 (50%)	
ETVR (48 th week)			3/12 (25%)
SVR (48 weeks)	7/12 (63%)		
SVR (60th week)		6/12 (50%)	
SVR (72 weeks)			3/12 (25%)
Comments	1 relapser (8.5%)- Gl _a , AA, TT	No relapse	1 breakthrough (8.5 %)- Gl _a , AA, TT

P197

Romiplostim's Effect to Optimize SVR with Telaprevir, Ribavirin, And Peg Interferon-alfa 2a in Thrombocytopenic Cirrhotics with Chronic Hepatitis C. A Placebo Controlled Prospective Clinical Trial: RESTRAINT C Trial

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Objectives: Treating CHC (Chronic hepatitis C) cirrhotic patients with thrombocytopenia is often challenging; requiring dose reduction or even discontinuation of treatment to avoid complications. Significant dose reduction affects the response guided therapy (RGT); adversely affecting outcomes. Thrombopoietin (TPO) agonists are used to avoid disruption or therapeutic failure to optimize SVR (Sustained Virological response). This study evaluated the use of TPO agonist in thrombocytopenia in cirrhotics with treatment experienced CHC-GT1 (CHC-Genotype 1) on treatment with Telaprevir, Ribavirin (RBV) and Peg Interferon-alfa 2a (p-IFN α -2a).

Methods: Total of Forty five (n = 45) cirrhotic treatment experienced CHC-GT1 patients with a mean MELD of 16 and mean platelet count 95 thousand were recruited and subdivided into three groups. Group A- (n = 15) Received placebo plus reduced dose of p-IFN α -2a with RBV and Telaprevir. Group B (n = 15) Received Romiplostim 500 mcg lead in 1 month prior to initiation of therapy and SOC with Telaprevir. Group C (n = 15) Received Elthrombopag 50 mg orally daily lead in prior 15 days and SOC with Telaprevir for 12 weeks. RGT was analyzed with serial platelet counts, hemoglobin/hematocrit, absolute neutrophils count and platelet antibodies. HCV RNA quantitative count was measured at 1st, 2nd, 4th, 12th 24th, 36th and 60th weeks for SVR.

Results: See Table (VRVR—Very Rapid Virological Response, ETVR—End to treatment Virological Response, R—Relapser, PR—Partial Responder, BT—Break through).

	Group A	Platelet count(K)	Group B	Platelet count	Group C	Platelet count
Initial PC (K)		90		68		128
AVR 1 week	5/15 (33%)		7/15 (47%)		6/15 (40%)	
VRVR 2 weeks	7/15 (49%)		7/15 (47%)		6/15 (40%)	
RVR 4 weeks	9/15 (60%)	86	8/15 (53%)	210	7/15 (47%)	101
EVR 12 weeks	10/15 (67%)	76	10/15 (67%)	90	8/15 (53%)	102
MTVR 24 weeks	10/15 (67%)	84	ETVR 10/15 (67%)	96		90
ETVR 36 weeks		98 BT-1/15 (7%)	10/15 (67%)	220	9/15 (60%)	80
ETVR 48 weeks	9/15 (60%)	96		180		108
SVR 60 weeks		R-1/15 (7%)	SVR-10/15 (67%)		9/15 (60%)	
SVR 72 weeks	8/15 (53%)	88		58		131

Conclusion:

- TPO agonist in moderate to severe Thrombocytopenia is approved in the treatment of CHC
- This study demonstrates the efficacy of TPO agonist (Romiplostim 250 mcg IM) in Thrombocytopenic Cirrhotics (prior experienced) with triple therapy
- Romiplostim demonstrated higher retention rate without therapeutic disruption and higher SVR compared to placebo
- Both the TPO agonist has comparable SVR, yet the cost index and pill burden is higher in Elthrombopag group
- Cirrhotics with minimal Hepatic encephalopathy can be challenging with high pill burden that affect negatively with SVR due to compromised compliance
- Span of Platelet survival with optimal quantity remains longer in Romiplostim group. Also is required at a lesser frequency
- This pilot needs a larger controlled trial to validate

P198

Role of Intravenous N-Acetyl Cysteine (NAC) with Steroid in Acute Alcoholic Hepatitis (AAH) with High Morbidity Score: A Randomized Open Label Prospective Clinical Pilot Trial

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Objective: Acute alcoholic hepatitis is a severe clinical state with significant morbidity and impending mortality in 28 days of about 49% with systemic involvement and acute liver failure. Recent meta-analysis provokes therapeutic controversies of use of corticosteroid or even liver transplantation (in some countries) based on the severity score. Established standard of care (SOC) is absolute abstinence, proper nutrition with multivitamins. AAH is a condition of immune induced massive liver injury due to recruitment of liver designated CD3, CD4 and CD8; resulting in intra hepatic oxidative insult, depleting mEOS system altering Redox and depleting the salvage precursor Glutathione—thus activating the Th2 pathway up regulating the entire cascade of cytokines (IL1, IL2, IL6, IL8, IL10, TNF α) causing massive inflammation; mainly intra hepatic oxidative insult with preexisting nutritionally depleted liver.

Method: Forty five (n = 45) patients with AAH were randomized. Age 32–58 (mean 46), race Hispanic 21, (Male 18, Female 3), Caucasian 18 (male 9, Female 9), African American 6 (Male 5, female 1), mean BMI 24%. Mean Alcohol daily consumption 80 grams/day. Total years of Alcohol consumption mean 14 years, DF 56%, Lites score > 0.67, ABCI (Albumin, Total Direct Bilirubin, creatinine and INR) > 9, mean MELD 24 and mean HOMA 0.9
Group A (n = 15): 1V Methyl Prednisolone, 1v. Vitamin C 500 mg + Pentoxifylline 400 mg orally for 4 days followed by Prednisone 60 g orally for 30 days

Group B (n = 15): 1V NAC + IV Vitamin C 500 mg + Pentoxifylline 400 mg for 4 days followed by Prednisone 60 g orally for 30 days

Group C (n = 15): IV Methyl Prednisolone + IV NAC + Pentoxifylline 400 mg for 4 days followed by Prednisone 60 g orally for 30 days

All received 2 grams of salt/day, 3000 cal/day and 120 grams of vegetable protein with BCCA orally.

Labs [Quest Lab at NJ]: Day 0, 4, 7, 14, 21, 30 – TB, AST, ALT, creatinine, CBC, BMP, LFT, Ammonia, Day 0, 14 and 21- Insulin, IL6, IL8, IL12, TNF α , MELD score

Sonogram: Day 0 and Day 30

Body weight: day 0 and 21

Exclusion criteria: GI bleed, HE, Sepsis, Cirrhosis, HIV, HCV, HBV, HCC, shock, Platelet count < 50 k

Results: See Table

Conclusion: This clinical pilot study postulates adding IV NAC to the SOC in AAH with DF > 32% having a better efficacy with accelerated bilirubin response that enabled to continue steroid therapy with faster recovery time. Larger trial warrants validation.

	Group A					Group B					Group C							
	Day 0	Day 4	Day 14	Day 21	Day 30	Day 0	Day 4	Day 14	Day 21	Day 30	Day 0	Day 4	Day 14	Day 21	Day 30			
TB	15	13	11	7	5	66.7	14	10	10	7	3	78.6	15	10	9	6	6	60
Albumin	2.3				3.1	34.7	2.1				3.2	52.3	1.9				3.3	73.7
Creatinine	1.8	1.3	1.4	0.9	1.0	44.4	2.4	1.6	1.3	1.5	1.3	45.8	2.4	1.9	1.8	1.6	1.5	37.5
AST	321	167	120	72	55	82.0	439	211	182	61	58	86.8	481	244	94	42	46	90.4
ALT	129	69	52	48	31	76	281	114	59	43	46	83.6	219	97	48	39	21	81.3
TNF	4.6				0.6	87	4.9				2.8	42.9	5.2				1.8	68.4
IL6	3.4				1.2	64.7	3.7				1.2	67.9	4.4				1.2	72.7
IL8	2.9				1.1	62.1	2.9				1.1	62.1	3.4				1.7	50
MELD	33				16	51.5	36				30	50	38				22	42.1

P199

Management of an Unusual Case Of Lower Gastro-Intestinal Bleeding: Ulcerated Choledochocoele

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Background: Choledochal cyst is an uncommon condition of the extrahepatic tract with or without involvement of the intrahepatic biliary duct. The dilation of the distal extrahepatic tract in the region of the ampulla of Vater forms a choledochocoele. Massive bleeding gastro-intestinal haemorrhage from a choledochal cyst presenting as haematochezia is rare.

Case report: A 13 year-old obese boy with sudden onset of passage of bright red blood with a fainting episode of one day duration. There was no anal protrusion, jaundice, recurrent upper abdominal pain nor bleeding from any other orifice. An emergency OGD showed profuse bleeding in the region of a sub-mucosal mass in the medial aspect of the 2nd part of the duodenum narrowing the lumen (Figs. 1, 2). An emergency exploratory laparotomy revealed a cystic mass in the second part of the duodenum containing bilious fluid with ulcerated mucosa at the dome. The cyst was excised and marsupialized. Post-operative recovery was complicated by adhesive small bowel obstruction on the 9th day post operation (DPO) after discharge on 7DPO. Laparoscopy was done which revealed multiple adhesions of small bowel and omentum to the posterior aspect of the anterior abdominal wall along the midline laparotomy incision. Laparoscopic adhesiolysis was successfully performed (Fig 3, 4). He was discharged home in good clinical state on the 3rd day post laparoscopic surgery.

Conclusion: The management of massive bleeding per rectum involves an oesophagoduodenoscopy. Sequel to an endoscopic impression a prompt surgical intervention is indicated for haemorrhage from a choledochal cyst. Key words: Choledochal cyst, Haemorrhage.

P200

Positive Lymph Node to Recovered Lymph Node Ratio As a Predictor of Survival in Patients with Pancreatic Ductal Adenocarcinoma

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Introduction: Surgical resection of pancreatic adenocarcinoma is associated with low survival rates, even with curative resections. Our study investigated the impact of positive to recovered lymph node ratio (LNR) as a predictor of survival following pancreatic resection at an independent academic center.

Materials and Methods: Following Institutional Review Board (IRB) approval, retrospective analysis of a prospective pancreatic cancer database was conducted. The study population underwent surgical resection of pancreatic ductal adenocarcinoma between 2001 and 2011. The interval between the dates of pancreatic resection until death was considered as the duration of disease-specific survival. Metastatic lymph node ratio (LNR) was calculated as the ratio of the number of lymph nodes harboring metastatic cancer to the total number of nodes examined. Demographics and patient characteristics were analyzed with descriptive statistics. Chi-square test and t-test assessed nominal and continuous variables. Univariate survival statistics were analyzed by Kaplan-Meier method with log-rank test. P-value < 0.05 was considered significant.

Results: 44 patients (mean age 65.7yrs) who underwent resection for pancreatic ductal adenocarcinoma were included in the study. The patient population comprised of 24 females. The mean tumor size was 3.47 ± 1.82 cms. The average number of nodes examined and nodes involved with cancer were 11.11 ± 6.8 and 1.7 ± 3.5 respectively. Subjects were divided into 3 subgroups based on their LNR status: Group 1—0, Group 2—> 0 to 0.2, and Group 3—>0.2. 21 of 44 patients did not demonstrate any lymph node involvement in final pathology. The mean survival in patients with $LNR \leq 0.2$ was 694 ± 123 days while that in those with $LNR > 0.2$ was 311 ± 118 days ($p = 0.094$)

Conclusions: The LN ratio may be an independent predictor of survival after pancreatic cancer resection. The routine estimation of the LN ratio may help formulation of appropriate adjuvant therapy regimens to improve the long-term outcome and survival in this population.

P201

Usage of a Soft-Coagulation Device for Safe Performance of Total Laparoscopic Hepatectomy: Detachment and Transection of Blood Vessels Using A Monopolar Soft-Coagulation Device

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Among intraoperative complications of total laparoscopic hepatectomy (TLH), venous hemorrhage is the most frequent and difficult-to-treat complication. We use a monopolar soft-coagulation device for not only hemostasis, but also detachment of blood vessels. The aim of this prospective, nonrandomized study was to investigate the potential contribution of a monopolar soft-coagulation device to the limitation of intraoperative blood loss in patients undergoing TLH.

Methods: From January 2008 to May 2013 at our department, TLH was performed in 85 cases, including 80 cases of partial hepatectomy and 5 cases of lateral sectionectomy of the left hepatic lobe. We keep the following points in mind for the procedure of partial hepatectomy using a monopolar soft-coagulation device for hepatocellular carcinoma. 1) Even in case of a small amount of bleeding, hemostasis is immediately performed before moving to the next site of transection. 2) For detachment of the vein, a monopolar soft-coagulation device is pressed on the resection surface of the liver to destroy hepatocytes. 3) Regarding the area around the hepatic vein, holes from which the branches of the hepatic vein fall out are identified with a monopolar soft-coagulation device (while dripping water) and closed.

Results: The blood loss was 62.4 (0–500) ml. The operative time was 207 (127–468) minutes. The duration of hospital stay after surgery was 7.6 (3–21) days. Postoperative complications occurred in 5 cases (intraabdominal abscess, wound infection, intraabdominal hemorrhage, bile duct stricture [stricture of B2 and B3 after resection of a tumor in S4], and umbilical hernia in one case each). The peak aspartate aminotransferase (AST) level was 320 (57–1,964) IU/L. Although there were cases showing high AST levels, no sign of hepatic failure was observed during the perioperative period in any case.

Conclusion and Discussion: The use of a monopolar soft-coagulation device improves surgical results with minimal blood loss and low rate morbidity.

P202

Learning Curve of Single Incision Laparoscopic Cholecystectomy: A Preliminary Study in a Teaching Hospital

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Background: Single incision laparoscopic cholecystectomy (SILC) has been projected to be a feasible and equally efficient technique compared with conventional laparoscopic cholecystectomy (CLC). However, little is known about the issues associated with the learning curve of this technique, which includes operating time and safety in hands of surgeons with little experience of SILC.

Method: The study reviewed a series of 438 laparoscopic cholecystectomies attempted in the single incision technique from 2011 to 2012 at Shengjing Hospital of China Medical University. All the procedures were performed using the standard trocars and rigid laparoscopic instruments by four laparoscopic surgeons with little experience of SILC. Patient characteristics (gender, age, and indication), intraoperative outcomes (operating time, conversions, and estimated blood loss) and postoperative outcomes (complications within the first month of surgery, days to oral food intake) were recorded and analyzed.

Results: 424 (96.8%) cases with an overall average age 49.3 ± 13.2 years were accomplished successfully in the single incision technique. The overall average operating time (from skin to skin) was 57.3 ± 19.3 min. Complications were observed in 4 (0.9%) cases: hepatic bile duct injury ($n = 1$), bleeding from the liver bed ($n = 1$), and surgical site hematoma ($n = 2$). Outcomes of patients operated by a single surgeon were compared, and no statistically differences were noted in terms of operating time ($p = 0.105$), conversion rate ($p = 0.392$) and complications ($p = 0.392$). In particular, the data of all surgeons showed significant decreases in operating time after approximately 12–15 cases.

Conclusion: SILC can be implemented safely in teaching hospitals, and it has a short learning curve for laparoscopic surgeons who are proficient in CLC but less experienced in SILC. SILC procedure may be offered as an alternative for cholecystectomy in carefully selected patients.

P203

Laparoscopic Treatment Of Liver Hydatid Disease In Cases Of Cyst Rupture

Serik Tokpanov, Sagidulla Dosmagambetov, Vladimir Kotlovskiy, Aim: Evaluation of efficiency of laparoscopic treatment of liver hydatid disease in cases of cyst rupture.

Materials: Since 1993 till September 2013 436 patients ranging from 4 to 68 years of age with hydatid disease underwent surgery. In 264 (60.5%) cases hydatid located in liver, 93 (21.3%) cases – in lung, 41 (9.4%) cases – in kidney, 9 (2%) cases – in omentum, 6 (1.4%) cases – in uterine tubes, 5 (1.1%) cases – in spleen, 5 (1.1%) cases – in brain, 5 (1.1%) cases – in retroperitoneal space, 3 (0.7%) cases in mussels, 3 (0.7%) cases in pancreas. There were 15 (5.7%) urgent cases of acute peritonitis because of liver cysts rupture. In 9 (62.5%) cases cyst rupture was associated with trauma. In 6 (37.5%) cases it happened spontaneously. We used abdominal ultrasonography, CT, MRT scan as a diagnostic procedures before surgery. In 10 (66%) patients we performed laparoscopic approach for treatment of the cyst complicated, in 5 (33.3%) – open surgery. Fore trocars approach was performed (10, 6, 6, 22 mm). Free hydatid fluid was identified and aspirated from abdomen cavity. In 6 (60%) cases ruptured echinococcus cyst were localized in a right lobe, in 4 (40%) – in a left. We used 22 mm trocar for vacuum extraction of endocyst. Abdomen cavity was irrigated by saline solution. We performed betadine solution for the processing of fibrous capsule. One tube used for draining of every residual cavity, one, or two—for draining of the abdominal cavity. All patients accepted 10 mg/kg of albendazole during 6 weeks postoperatively. Operation time, conversion rate, complications rate, length of hospital stay were analyzed.

Results: It was no mortality. Duration of operation time was 67.1 ± 14.2 min. It was 1 (10%) case of biliary peritonitis, associated with biliary fistula. Laparoscopic suturing of biliary fistula was performed on a third day after primary procedure. Duration of the hospital stay was 10.6 ± 1.3 days. It was one (10%) case of recurrence with dissemination of the process in an abdomen cavity.

Conclusions: Laparoscopic approach could be successfully performed for treatment of liver hydatid disease in cases of cyst rupture. It demonstrates good post-operative results, low rate of complications and recurrence, short duration of operation and hospital stay.

P204

The Application Of Single-Incision Laparoscopic Surgery On The Resection Of Hepatic Hemangioma: Initial Experience And Current Update

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Objectives: Single-incision laparoscopic surgery (SILS) is a recently developing minimally invasive surgery, associated much better cosmetic appearance, and may represent an improvement over conventional laparoscopic surgery. It has been applied in many surgical procedures. However, for the liver surgery, the experience was rather limited, including for benign liver tumor. Now, we will introduce our initial experience for the application of SILS on the resection of hepatic hemangioma.

Method: The clinical records of 10 consecutive cases in which SILS was performed for the hepatic hemangioma at Shengjing hospital of China Medical University since June 2010 were retrospectively analyzed, and all the concerning literatures were retrospectively reviewed.

Results: Among the 10 patients, 6 were female, and the other 4 patients were male. The age ranged from 31 to 60 years old, with the average of 49.4 years old, and the average of body mass index (BMI) is 22.66 (18.9–25.2). In the 10 cases, the SILS were all successfully operated, including left lateral hepatectomy in 6 cases, S2 segmentectomy in 3 cases, and irregular hepatectomy in the inferior segments of the right lobe in the other 1 case. The mean operation time was (123.0 ± 43.0) min (range, 50–180 min), and the mean intraoperative blood loss was (282.0 ± 222.4) ml (range, 20–800 ml). The patients surgical wound healed well, with good cosmetic wound healing, and were discharged from hospital in a mean of (7.4 ± 1.84) d (range, 3–10 days), with no complications. The parameters were comparable with that in the English literature.

Conclusions: Our experiences suggest that the application of SILS on the resection of hepatic hemangioma is feasible, and might be a safe option for patients, especially for the lesions in the left lateral segment or inferior segments of the right lobe.

P205

Laparoscopy and IOC in Gallbladder Remnant

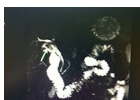
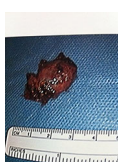
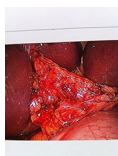
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Introduction: Advances in laparoscopy have expanded its use from cholelithiasis to acute cholecystitis. Partial or subtotal cholecystectomy is acceptable in the presence of dense inflammation in the calot's triangle. It has been reported as safe and without consequences. With increasing volume it has been noted that gallbladder remnant can cause ongoing pain and jaundice and there are case reports of successful laparoscopic removal. I report a case of symptomatic gallbladder remnant treated with laparoscopic cholecystectomy and cholangiogram.

Case report: 35 yr old obese female presented with biliary colic, epigastric and girdle like pain worse with eating, had lap chole about 7 yrs earlier. Multiple ER visits for this pain. MRI suggestive of GB remnant with stones and an earlier CT with calcification in GB fossa with elevated AST/ALT of 234/498. Operative findings include a 3 cm GB remnant with normal IOC. There was a caterpillar hump of right hepatic artery, suggesting that the gallbladder remnant may have been left behind due to the proximity to the right hepatic artery.

Conclusions: Biliary cause of pain should be considered when patients present with post cholecystectomy pain. Gallbladder remnant can be identified by radiologic tests. Cholangiogram may obviate the need for a second invasive procedure such as diagnostic ERCP when liver enzymes are elevated. Gallbladder remnant is a real entity and can be safely removed with laparoscopy.

1. Cholangiogram 2. GB fossa with porta 3. Remnant adjacent to Right hepatic artery 4. Gallbladder specimen 5. Pre op MRI/MRCP showing the remnant in GB fossa 6. Pre op CT scan with calcs in the GB fossa



P206

Single Port Cholecystectomy: Standard Technique in 100 cases

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Introduction: Single Port Surgery has demonstrated good surgical outcomes and a very good cosmetic results in patients submitted to cholecystectomy. For the past three years we have been trying different access ports, using flexible instruments available in our country, with help of the optics designed for this type of surgery. According to our experience, we selected the best access port, the most effective instruments and optics for our practice and we report our technique and results.

Materials and Methods: 100 patients were selected for Single Port Cholecystectomy (SPC) from 2010 to 2013. Including criteria were: Chronic calculous cholecystitis or gallbladder polyps, BMI: 18.5 to 29, not previous upper abdominal surgery, ASA I-II, normal liver function test. Our standard technique was performed using a 15 mm vertical incision at the patient navel, the access port was the GelPOINT, Endocamaleon Laparoscope was used in all procedures as well as rigid instrumentation. We performed safe dissection of the cystic duct and artery, placing double clips in each, and retrograde cholecystectomy. Extraction of the gallbladder was done directly trough the port wich protected the wound from spillage. Closure of the wound with non-absorbable separate sutures at the fascia and absorbable subcuticular was performed in all cases

Results: 85 females/15 males, age: 22–75 y/o. 95% were completed as SPC, 5% had a 2 mm extra port to complete the safe dissection placed at the right upper abdominal quadrant. Operating time: 35–90 min. Conversions to open surgery: 0. Morbidity: 5%, wound infections 0%, incisional hernia 0%, pain score during hospitalization : 3–5 (VAS), hospital stay: 24 hrs. Time to return to normal activities: 7 days. Patient. satisfaction with cosmesis at 1 month : 100 %.

Conclusion: SPC is a safe technique with good surgical outcomes. Using the standard technique can be accomplished in the majority of patients. Combining the Gelpoint with Endocamaleon Laparoscope and the rigid curved instruments results in great tools for the single port surgery. We strongly recomend this tool box to avoid increasing the procedure cost.

P207

SILS Hepatectomy For Hepatic Hydatid Disease: A Case Report

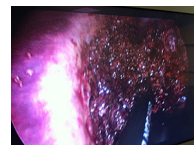
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Single-incision laparoscopic surgery (SILS) is being used with increasing frequency in the treatment of many conditions requiring surgery. Experience with SILS in hepatic surgery is limited. The literature includes a few case reports of SILS hepatectomy for malignant and benign diseases. To our knowledge, however, there is a few report of SILS hepatectomy in the treatment of hepatic hydatid disease. In this article, we report the treatment of a hydatid cyst located in the left hepatic lobe using a SILS hepatectomy.

A 17-year-old female was admitted with abdominal pain persisting for several months. The physical examination was unremarkable. Abdominal ultrasonography showed an 89 × 59-mm cystic mass in the left lobe of the liver. Abdominal magnetic resonance imaging (MRI) conducted the same day showed a multiloculated, multiseptated mass that was hypointense on T1-weighted images, with no contrast uptake in T2 hyperintense secants. The serological investigation was positive for hydatid disease and surgical intervention was planned. Preoperatively, albendazole 10 mg/kg p.o. was given for 3 weeks.

The SILS technique can be used to perform nephrectomy, splenectomy, bariatric surgery, and colonic surgery. Although laparoscopic procedures are used widely in hepatic surgery, use of SILS is still limited in practice. The complexity of the liver structure and the technical difficulties of SILS restrict its applications in hepatic surgery. Bleeding is the main complication and the most common reason for conversion to open abdominal surgery. The instruments are in very close proximity in SILS, which makes this intervention challenging. If the instruments and techniques can be improved and more experience is gained, the use of SILS will increase. The literature contains few reports of the use of SILS in liver surgery; these indicate that SILS hepatectomy is a safe method for the surgical treatment of liver tumors, metastatic cancers, and hemangiomas. Ours is rare case of a hepatic hydatid cyst treated using SILS in literature.

Although complexity of the liver structure and the technical difficulties of SILS restrict its applications in hepatic surgery, the treatment of liver hydatid disease with SILS in selected patients is safe and efficient. Moreover, it allows a better cosmetic result and rapid recovery.



P208

Three Port Laparoscopic Cholecystectomy

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Introduction: Most commonly performed laparoscopic surgery is laparoscopic cholecystectomy. Although cholecystectomy with three ports is not commonly preferred, researches have shown that it is a safe and feasible way of surgery.

Materials and Methods: We evaluate 100 patients that have undergone elective laparoscopic cholecystectomy with three ports (group one). These patients were compared with 50 patients that have undergone laparoscopic cholecystectomy with four ports (group two). Complications, length of stay in hospital, operation time, conversion to open surgery rate were compared in two groups.

Results: In group one, fourth port was required for nine (9%) patients. Duration of operation was in average 31 min in group one and 31,3 min in group two. Operation time, length of stay in hospital, complication rate, conversion to open surgery rate were similar in both groups.

Conclusions: Three port laparoscopic cholecystectomy is a safer method when performed by experienced surgeons. Laparoscopic cholecystectomy can be tried with three ports firstly and can be continued with addition of fourth port if necessary

P209

Adenocarcinoma of the duodenum: usefulness of intraoperative endoscopy

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It is well known that the adenocarcinoma of the duodenum is a quite rare lesion in fact represents 40% of cancer of the small bowel and 30% of these are localized in the peri-ampullary area: 7% affect the sub-papillary tract and only 3% the supra-papillary segment of the duodenum.

Our presentation concerns a 58 old lady, obese 107 kg with jatal hernia and GERD, lithiasis of gall bladder and an adenocarcinoma ex sessile adenoma (4 × 4.5 cm) localized endoscopically in the anterior-lateral external wall of the supra-papillary tract of the duodenum.

The patient was previously treated for cancer of the right breast twice followed by chemotherapy. Normally these patients should be treated surgically performing a Wipple procedure in order to insure a radical operation. A pre-operative PET-TAC examination demonstrated the lesion of the duodenum without lymphatic involvement and no infiltration of the head of the pancreas. Intra-operatively it was clear that the duodenal lesion was localized in the supra-papillary area extending from the sub-pyloric tract to the proximal part of the second segment of the intestine. The dissection started with mobilizing the duodenum (Cocker maneuver) and cholecystectomy; no evidence of infiltration of the peripheral tissue, in particular the dissection of the upper duodenum from the head of the pancreas was very easy.

An intraoperative duodenoscopy showed no involvement of the papilla and under direct endoscopic vision the duodenum was transected using a linear stapler. Part of big omentum resected and the left gastric artery divided. The stomach was resected and the exploration of the retroperitoneum didn't show any lymphnode involvement. The operation was concluded performing a jejunojuno anastomosis 30 cm below the residual duodenum and a gastro-jejuno reconstruction performed, according to Roux-Y procedure made with a long (50 cm) defunctionalized small intestine. So doing we avoided performing a Wipple procedure and the large gastro-duodenal resection will be beneficial for a obese patient with more than 40 BMI.

The post-operative period was very good and the patient was discharged 6 days after the operation. In this case, according to our experience of 476 Wipple procedures of which 102 for duodenal cancer, the operation we choosed was objectively right and the intraoperative endoscopy very useful. The surgical procedure was performed in July 2013, now a long follow up is needed.

P210

Primary Carcinosarcoma and Sarcomatoid Carcinoma of the Liver: Clinical features, Surgical Treatment, and Prognosis
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Background and Aim: Primary carcinosarcoma (CS) and sarcomatoid carcinoma (SC) of the liver are extremely rare malignancies composed of both carcinomatous and sarcomatous components. The aim of this study is to clarify the clinical features, surgical treatment, and prognosis of patients with primary hepatic CS and SC.

Methods: Between January 1996 and August 2012, 7 and 32 patients were histologically diagnosed as primary hepatic CS and SC, respectively. Their demographic, clinicopathological, and survival data were retrospectively reviewed.

Results: The incidence of primary hepatic CS and SC was 0.8%. There were 30 men (76.9%) and 9 women (23.1%), with a median age of 53 years (range, 29–73 years). Twenty-eight patients (71.8%) were positive for serum HBsAg, and liver cirrhosis was found in 27 patients (69.2%). Nineteen patients (48.7%) underwent radical liver resection, and 15 patients (38.5%) received palliative resection to remove the tumors. The 1-, 2-, and 3-year overall survival (OS) rates were 43.6%, 15.4%, 7.7%, respectively. There were no significant differences in the median survival time between the SC and CS group (9.6 vs. 8.2 months, $P = 0.641$). The patients who received radical resection had obviously better survival compared with those underwent palliative resection or nonsurgical treatment (14.1 vs. 7.1 months, $P = 0.001$). Univariate analysis revealed that local invasion ($P = 0.018$), vascular invasion ($P = 0.032$), Child–Pugh class ($P = 0.009$), TNM stage ($P < 0.001$), and radical resection ($P = 0.001$) were prognostic factors for OS. However, on multivariate analysis, only TNM stage [HR 4.556, 95% CI 1.058–19.620, $P = 0.042$] was identified as independent risk factor of OS.

Conclusion: Both primary hepatic CS and SC are highly aggressive malignancies with extremely poor prognosis. Surgical resection remains the first-choice treatment of these uncommon malignancies, and radical resection at an early stage may contribute to a relatively favorable prognosis. Key words: carcinosarcoma; sarcomatoid carcinoma; liver

P211

Ten Reasons To Use Fluorescent Cholangiography In Laparoscopic Cholecystectomy

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Background: Intra-operative fluorescent cholangiography (FC) has been described as a novel tool to identify the extrahepatic biliary anatomy during laparoscopic cholecystectomy (LC). We investigated the reasons why FC should be used routinely in LC.

Methods: We analyzed feasibility, cost, time, usefulness, teaching tool, safety, learning curve, x-ray exposure, complexity, and real time surgery of FC in 45 patients who underwent LC.

A single dose of 0.05 mg/kg of Indocyanin Green (ICG) (Akorn, Florida, USA) was administered intravenously one hour prior to the surgery. During the procedure, a xenon/infrared light source with charge-coupled device camera was used.

Results: FC could be performed satisfactorily in all 45 patients (100% of the cases). Individual mean cost was 14.1 ± 4.43 US dollars per patient (0.16 US dollars ICG/kg). The mean operative time was 64.95 min \pm 17.43. FC took a mean time of 0.71 \pm 0.26 min. The cystic duct was identified with FC in 44 out of 45 patients (97.7%). The common hepatic duct was seen clearly in 27 of 45 patients (60%), and the common bile duct in 36 of 45 (80%) patients. No allergic reactions were reported related to the use of ICG. No learning curve was necessary to use FC. X-ray was used only while performing IOC. The dissection could be performed during infrared mode of FC. Surgeons reported FC to be an effective teaching tool in 100% of the cases.

Conclusion: Fluorescent cholangiography seems to be feasible, inexpensive, expeditious, useful, and an effective teaching tool. It is safe, no learning curve is necessary, does not require x-ray, and it is easy to perform. It can be used for real time surgery to delineate the extrahepatic biliary structures. FC seems to be a tool which can be used routinely in LC.

P212

Role and Limitations of Indocyanine Green Near Infrared Fluorescent Cholangiography: Experience in 100 Patients

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Background: Intra-operative cholangiography (IOC) has been demonstrated to allow earlier recognition of biliary injuries, but it does not decrease their incidence, increases operative time and costs, and expose the patient and the surgical staff to radiation. Fluorescent cholangiography (FC) seems to be a promising technique for the intraoperative identification of the biliary tree anatomy. The aim of this study is to analyze the role and limitations of this novel technique.

Materials and Methods: All the patients undergoing LC between June 2012 and July 2013 were asked to participate in this institutional review board (IRB) approved study. Fluoroscopic and fluorescent cholangiographies were performed to delineate the extrahepatic biliary ducts. For the FC a single dose of 0.05 mg/kg of indocyanine green (ICG) was administered intravenously one hour prior to surgery. During the procedure, alternate exposure from xenon to infrared lights was used to identify the biliary structures before and after dissection. A questionnaire to assess the surgeon's visibility of extrahepatic bile ducts was administered.

Results: One hundred patients were enrolled in the study, 51 with cholelithiasis, 37 with acute cholecystitis, and 12 with chronic cholecystitis. At least one biliary structure was identified with fluorescence cholangiography in all patients before dissection. The cystic duct was fluorescently visible before dissection in 69% of the cases, and in 96% with some dissection. CBD was identified in 73% of the cases prior to dissection, and in 90% of the cases after some dissection. No pre- or postoperative complications were observed.

Conclusion: Near infrared fluorescent cholangiography allows the delineation of at least one extrahepatic biliary duct in 73% of cases prior dissection. Partial dissection increases the identification to 100%.

P213

The Efficacy and Safety of Laparoscopic Common Bile Duct Exploration (LCBDE) for Patients who Have Had Previous Operations

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Introduction: In Japan, common bile duct stones (CBDS) were first treated with endoscopic sphincterotomy (EST), and then with laparoscopic cholecystectomy. Recently however, the advent of laparoscopic procedures has led to an increasingly important role for laparoscopic common bile duct exploration in the treatment of CBDS. At this meeting in 2011, we reported on the safety of LCBDE using C-tube. The aim of the current study was to evaluate the efficacy and safety of LCBDE for patients who have had previous operations.

Methods: Between 2004 and 2012, 303 patients underwent LCBDE in our hospital. Postoperative bile drainage was carried out via C-tube, endoscopic nasobiliary drainage (ENBD), or endoscopic retrograde biliary drainage (ERBD). 70 patients with previous operations (group A) were retrospectively reviewed. The points evaluated were: operation time, blood loss, post operative day of C-tube removal, length of hospital stays, CBD stone clearance rate, morbidity and mortality. These were statistically compared with another 233 patients (group B).

Results: There were 45 male patients and 25 female patients in group A, and 114 males and 119 females in group B. Their mean age was 70 ± 12 years in group A, and 69 ± 13 in group B. Previous operations included open gastrectomy (17), appendectomy (17), gynecologic surgery (16), cholecystectomy (10), colorectal surgery (7), inguinal hernia (2), and others (8). CBD stones were cleared with choledochotomy (88%) or transcystic exploration (12%). Mean operation times, blood loss, postoperative C-tube removal times and hospital stays in groups A and B were 201 ± 61 min and 197 ± 59 min, 15 ± 29 and 19 ± 43 ml, 4.8 ± 2.2 days and 5.0 ± 2.7 days, 8.5 ± 8.6 days and 10.0 ± 8.8 days, respectively. There were no significant statistical differences between the two groups. The CBD clearance rate was 99% in group A and 98% in group B. Morbidities included pancreatitis (1.4%) in group A, and bile leakage (0.4%) in group B. There was no mortality in group A, but two patients (0.8%) in group B died, one of acute myocardial infarction and another of hematemesis.

Conclusion: Experience in our institute has shown LCBDE to be a safe and feasible procedure for patients who have had previous operations.

P214

An Unusual Case Presented with Coincidence of Primary Hepatic Neuroendocrine Tumors And Gallbladder Adenocarcinoma

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We present a case of coincidence of primary hepatic neuroendocrine tumors and gallbladder adenocarcinoma in a 67-year-old woman. She had a 1-month history of intermittent epigastric pain. Her past history was not significant and physical examination was unremarkable. Routine laboratory tests such as complete blood count, liver function tests and tumor markers were within reference range except for the CA 19-9 (55.36 U/ml). Computed tomography revealed irregular thickening of gallbladder wall and several low-density hepatic tumors with ring-enhancement after contrast-enhanced scan located in segment IV, V of the liver close to the gallbladder. Extended radical resection for gallbladder and middle lobe of the liver combined with skeletonized lymph node dissection of the hepatoduodenal ligament were performed. Histopathologic examination disclosed poorly differentiated primary hepatic neuroendocrine tumors G3 (PHNETs, neuroendocrine carcinoma) accompanied with moderately differentiated gallbladder adenocarcinoma invading the serosa layer. Immunohistochemical analysis confirmed the diagnosis. PHNETs were extremely rare with less than 150 cases having been reported in the English literature till now. To our knowledge, this patient may be the first case diagnosed as combined PHNETs and gallbladder adenocarcinoma. The diagnosis of PHNETs is difficult before resection or biopsy of the tumors. Syn, CgA and CD56 were specific and sensitive immunohistochemical markers for PHNETs. Although PHNETs have a relatively benign process compared with hepatocellular carcinoma, liver resection remains the most effective treatment for localized PHNETs.

Key words: primary hepatic neuroendocrine tumors; gallbladder adenocarcinoma

P215

Effect Of Rowachol On Prevention Of Postcholecystectomy Syndrome After Laparoscopic Colectomy

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Introduction: The postcholecystectomy syndrome (PCS) is characterized by abdominal pain following gallbladder removal. The purpose of this trial is to determine whether Rowachol will be useful in the prevention of postcholecystectomy syndrome and in symptoms improvement after laparoscopic cholecystectomy (LC).

Methods and Procedures: from 2012 to 2013, this prospective, randomized, single blind, placebo-controlled study had balanced random assignment Rowachol and placebo in Dongguk University Ilsan Hospital, and Chung-Ang University Hospital. A total of 128 patients, with various gallbladder diseases after LC, were enrolled and randomized. Rowachol or placebo 1000 mg three times daily was given to each group of patients for 3 months. Outcomes were assessed in visit over 3 months after surgery. The primary endpoint was the mean change from baseline in right upper quadrant (RUQ) pain on European Organization for Research and Treatment of Cancer QLQ-C30.

Results: There is no difference in aspects of demographics, preoperative clinical findings, and surgical findings between each group. Incidence of postoperative CBD stone in placebo group (n = 3, 4.8%) was higher than that in Rowachol group (n = 1, 1.5%) with statistically marginal significance (p = 0.089). Rowachol group showed significantly higher improvement of postoperative RUQ pain, digestive symptom compared to placebo group (40.0 ± 25.8 vs. 28.6 ± 10.7, p = 0.002; 45.7 ± 25.1 vs. 30.0 ± 17.4, p = 0.042). Rowachol group showed lower postoperative fatigue, hepatic symptom compared to placebo group with statistically marginal significance (34.5 ± 20.0 vs. 28.0 ± 16.0, p = 0.067; 38.2 ± 19.5 vs. 24.0 ± 15.2, p = 0.082).

Conclusion: Rowachol can be beneficial for prevention of postcholecystectomy syndrome and symptoms improvement after LC.

P216

“Adult Pancreatic Hemangioma” Case Report And Literature Review

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Introduction: Pancreatic hemangioma is very rare and hardly suspected clinically due to their nonspecific symptoms and diagnostic characteristics. We report an adult pancreatic hemangioma diagnosed on pathological specimen review following laparoscopic distal pancreatectomy with splenectomy for a two cystic mass in the body of the pancreas.

Case report: A 49-years-old woman was admitted to our institution because of bowel distention, constipation, and fatigue. Pancreatic cystic lesions were incidentally found on ultrasound when she visited a gynecologist for evaluation of suspected uterus myoma. A computed tomography (CT) scan demonstrated two lesions, first lesion was 2.7 × 2.3 cm sized unilocular cystic tumor and second lesion was 2.4 × 2.3 cm sized multilocular cystic tumor with septation and intramural nodules in the pancreatic body. The suspicious intramural nodule and wall enhancement could not exclude a malignancy, and then we decided a surgical removal. She underwent in laparoscopic distal pancreatectomy. Her perioperative course was uneventful. The histological result is pancreatic cavernous hemangioma. **Method:** We used three trocars of 5 mm and two trocars of 12 mm. After the insertion of trocars, the entire gastro colic ligament from distal antrum up to the fundus of stomach, including the short gastric vessels, are divided by Ligasure. The splenic artery is identified at the upper border of the body of pancreas, double clipped and divided. The splenorenal, splenophrenic ligaments, superior pole of the spleen and retrogastric vessels are divided. The splenic vein and the body of pancreas are divided by Endo-GIA stapler. The resected specimen of pancreas and spleen is placed into a bag then retrieved by Pfannenstiel incision. The surgery was successfully finished by laparoscopy without a perioperative complication.

Result: Gross examination of the tumor revealed a two mass; first lesion composed of well-defined wall, containing a dark green fluid, and second lesion is composed of cystic spaces containing gelatinous material and hemorrhages. The tumor did not involve the surgical margin. On microscopic examination shows pancreatic acinar tissue consisted of blood vessel with dilated cystic lumen filled with red blood cell (Figures 4). Immunohistochemistry (IHC) examination revealed that this lining was positive for CD34 (Figures 5). And CD68 stain shows macrophage cells in cystic lumen filled with red blood cell. The histological results demonstrate that tumor was pancreatic cavernous hemangioma.

Conclusion: This case of an adult pancreatic hemangioma is the sixteenth reported in literature since 1939. The histological examinations are very important role for pancreatic hemangioma diagnosis. In pediatric cases, they often regress, no surgical removal is advocated other than follow-up. But in adult cases, the risk of sudden hemorrhage, abdominal pain, and possible differential diagnosis with malignant tumors, surgical resection is recommended.

P217

Role of Routine Intraoperative Cholangiography During Laparoscopic Cholecystectomy

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Introduction: The study was undertaken to assess the utility, safety and cost effectiveness of routine intraoperative cholangiography (IOC) during laparoscopic cholecystectomy (LC) which can represent a systemic approach for avoiding common bile duct (CBD) injury.

Materials and Methods: This was a prospective study, conducted in the Department of General Surgery, Government Medical College/ Rajindra Hospital, Patiala. 100 consecutive patients suffering from symptomatic gall stones undergoing laparoscopic cholecystectomy were included in the study.

The intra-operative cholangiograms was obtained after the laparoscopic trocars were inserted, the gall-bladder grasped and retracted cephalad and the cystic duct was dissected, a large metallic clip was positioned between the gallbladder neck and the cystic duct to prevent migration of stones or flow of contrast material during cholangiography. A pediatric feeding tube (Argyle 5-French) was used for injection of contrast material. 20 cc of dilute contrast (50% Hypaque mixed 50/50 with saline) was slowly injected. Two films were taken in addition to a pre-operative scout film. The films were immediately interpreted. The catheter was taken out and the gall bladder was removed as usual, and ports were taken out after putting drain in the abdominal cavity.

Results: A total of 100 patients were included in the study with average age was 43.7 years and majority of them were females (80%). 60% of patient presented with Pain abdomen while 40% presented with dyspepsia along with pain abdomen. Out of the 100, successful cannulation of the cystic duct was achieved in 92 patients. Eighty cholangiograms showed normal biliary tree anatomy while 12 showed dilated CBD with free flow of the contrast into the duodenum but with no evidence of filling defects. There was significant additional operating time ranging from 17 to 42 minutes with mean time of 24.82 minutes. There was no intraoperative complication. Total additional cost of IOC was in range of Rs 2200 to 2500. No patient re-presented to us with biliary symptoms within 18 months of surgery.

Conclusion: In our study, we concludes that routine IOC was successful and safe, yields information that was clinically useful for operative management. However, the operating time was significantly longer but there was no significant difference in the hospital stay and further decreases the admission rate with post cholecystectomy syndrome, which occurs in 10%–40% of the post cholecystectomy patients.

P218

A Method For Measuring Copper Absorption Using A Short-Lived Isotope (⁶⁴Cu)

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Introduction: Clinical studies were carried out to validate the measurement of ⁶⁴Cu absorption by a computer-assisted deconvolution.

Method: After an oral dose of ⁶⁴Cu (250 μCi), a plasma appearance curve was derived over 10 h from sequential blood samples. On a separate occasion after an injected dose of ⁶⁴Cu (125 μCi), a plasma disappearance curve was similarly constructed. To remove the caeruloplasmin component in each curve, serum samples after counting were mixed in solution with sodium diethyldithiocarbamate and passed through activated charcoal columns; this separated non-caeruloplasmin-⁶⁴Cu from ⁶⁴Cu-caeruloplasmin contained in the eluate. Serum activity not bound to caeruloplasmin was determined by subtraction of the weight-corrected activities of ⁶⁴Cu-caeruloplasmin and the complete sample. Both curves of non-caeruloplasmin data were matched by relating the data to the same dose level by the process of normalisation. Deconvolution of this data determined cumulative ⁶⁴Cu absorption.

Results: Column validation tests consisted of quantitative elution of caeruloplasmin, full adsorption of non-caeruloplasmin bound ⁶⁴Cu, and protein spectrum in the eluate, which was unaltered. At the levels of serum ⁶⁴Cu reached in all the studies “in vivo” there was a minimal leak of ⁶⁴Cu in the eluate (< 1 %). Unless ⁶⁴Cu-caeruloplasmin was present practically no activity would appear in the eluate using either plastic (containing more than 130 mg charcoal) or the glass columns (containing more than > 200 mg charcoal).

The procedure is discussed in one subject (investigator data) with three sets of data.

IV-1 IV-2 IV-3 Mean ± SD

Oral-1 VT (1,1) = 51.17 VT (1,2) = 52.44 VT (1,3) = 46.41 50.0 3.2

Oral-2 VT (2,1) = 50.30 VT (2,2) = 51.71 VT (2,3) = 45.75 49.3 3.1

Oral-3 VT (3,1) = 34.39 VT (3,2) = 35.21 VT (3,3) = 31.22 33.6 2.0

Conclusion: Against three I.V. tests, the percentage absorption is the same for the first two oral tests. A late meal was taken on the third test producing a lower absorption for the third test. The validation studies for the method is presented. There was a uniformity and reproducibility in the values of copper absorbed provided the protocol was rigidly adhered to and the subject remained on the habitual diet for three days before the test.

P219

Copper Absorption In Chronic Pancreatitis

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Introduction: Patients with chronic pancreatitis (CP) not on pancreatic extract increased copper excretion in bile in response to intravenous secretin. Serum copper oxidase (caeruloplasmin, ferroxidase I) rose in proportion to the severity of pancreatic insufficiency (PI). Treatment with extract led to low levels of post-secretin biliary copper and serum copper oxidase. The purpose of the study was to determine the influence of exocrine pancreatic insufficiency (EPI) on copper absorption in man.

Method: ⁶⁴Cu absorption was measured by a computerised deconvolution program after separating ⁶⁴Cu in serial blood samples from that bound to caeruloplasmin by elution through charcoal columns. The method was previously designed, validated, and tested for reproducibility using healthy volunteers.

Results: 10-h absorption from 350-ml water for twelve healthy volunteers was 43.7 (±10.2) % (Mean ± SD) [1.94 ± 0.49% (10 h absorption/BMI)]. Excluding three on oral contraceptives (OC+), ⁶⁴Cu absorption was 42.3 (± 9.7) % (n = 9) [or 1.84 ± 0.43 %/BMI]; 6 male, 3 female, and serum copper, caeruloplasmin, and ⁶⁴Cu-caeruloplasmin and urinary ⁶⁴Cu were all similar suggesting equivalent copper status on their habitual diet. In nine patients with CP, 10-h absorption was 35.9 (±12.8) % [1.71 ± 0.52]; 6 male and three female. Variation increased due to the inclusion of clinical pancreatic insufficiency (CPI) patients, who had pancreatic steatorrhea. Lower absorption 26.9 (±7.5) % (n = 5) [1.33 (± 0.33)] associated more with CPI (t = 4.078, P2 P < 0.01) than with vaginal transection (VT+) (n = 3) (t = 3.588, P2 < 0.01). Non-CPI patients absorbed 47.2 (±7.3) % (n = 4) [2.17 ± 0.18]. Without patients with achlorhydria (DM, DH), the CPI group 10h absorption was still low at 32.1 (± 3.1) % (n = 3) [1.57 (± 0.11)]. In the CPI group, the three patients (DH, DM, and NK) had been on long-term supplements (LT+), VT+ (DH, DM, BJ) had lowest absorption; two (DH, DM) with achlorhydria absorbed least. When Nutrizym was combined with oral ⁶⁴Cu dosein two, DM (total pancreaticoduodenectomy patient) increased his per cent absorption from 18.2 to 40.9% reversing the CPI trend, whereas a non-CPI patient, absorption remained unaltered (42.8 to 40.8%). In this patient cimetidine alone with the dose raised 10h-absorption to 60%. Two patients with primary biliary cirrhosis had 20% 10h absorption irrespective of the type of meal taken. With a protein meal (350 ml 7.14 % casein) ⁶⁴Cu absorption decreased to 15.8 (±5.6) % in 5 patients with CP compared to 31.4% and 32.1% in controls.

Conclusion: The greater decrease in ⁶⁴Cu absorption in CP with casein was due to both increased Cu status and reduced release of Cu from casein binding. Whereas ⁶⁴Cu absorption from 350 ml water reflected inversely only copper status. There was no evidence of direct inhibition of copper absorption by normal pancreatic secretion in man, but severe EPI appeared to result in decreased ⁶⁴Cu absorption. On limited data, pancreatic extract appears to normalise absorption not increase it. Further work is needed to confirm this observation. Markers of CPI, such as this test, may be helpful in deciding those patients with EPI, who should be offered pancreatic supplement.

P220

The Influence of pH in Proximal Small Bowel Perfusion on ⁶⁴Cu Absorption in Anaesthetised Rats

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Introduction: In the closed duodenal-jejunal loop, single shot doses of standard pH solutions had a very transitory effect on duodenal luminal pH.

Method: To produce a more persistent change in luminal pH at different levels, the duodenal-jejunal loop with the common duct still ligated was opened and two methods of fixing pH in the gut perfusion were investigated.

Results: The first method was a pH-stat re-circulation technique using single rats. As an index of ⁶⁴Cu absorption, ⁶⁴Cu retention in liver, as a percentage of the input concentration, from unbuffered pH stat perfusion was 36.61 (±5.61)% (n = 6) (% body count per g perfusate count) at pH 6 and 22.98 (±3.09)% (n = 4) at pH 8 (Mean ± SD). The second method was a triple rat buffered single pass system providing perfusion in a steady state. Four levels of pH were studied, and the same trend was observed. From a MOPS, MES and HEPES (MMH) buffer with glucose liver ⁶⁴Cu retention was 33.95 (±7.84)% (n = 7) at pH5, 28.02 (±5.02)% (n = 3) at pH 6, 20.54 (±3.65)% (n = 5) at pH7, and 16.43 (±3.60) (n = 7) at pH8. Carcass and total body absorption was also measured. Then using MMH buffer without glucose, ⁶⁴Cu retention in the liver only was assessed: 22.58 (± 4.53)% (n = 4) at pH 5, 19.08 (±4.03)% (n = 5), at pH 6, 13.84 (±3.89)% (n = 4) at pH 7, and 10.73 (±2.95)% (n = 6) at pH 8.

As gut length varies considerably even after taking a set length (17 cm), the stretched length and mucosal weight of gut was assessed at autopsy. As independent variables their sum was divided into the percentage absorption to give gut-related absorption. For method one total ⁶⁴Cu absorption was 4.21 (±0.42) (% body count per g perfusate count per g (mucosa) plus cm (length of gut loop) (n = 5) at pH6 and 2.75 (±0.32) (n = 4) at pH 8 (P2 <0.001). 5.5% of the gut uptake at pH 6 and 4.1% at pH 8 absorbed leaving 95% in the gut mucosa. For method two total ⁶⁴Cu absorption was 4.58 (±1.72) (n = 6) at pH5, 4.15 (±0.16) (n = 2) at pH6, 2.33 (±0.45) (n = 4) at pH 7 and 2.32 (± 0.43) (n = 7) at pH8 (P2<0.001). With total absorption a jump between pH 6 and pH7 was observed which might relate to the properties of the Cu(II). 3% of ⁶⁴Cu uptake absorbed leaving 97% in the gut mucosa. Net effective absorption (mucosa to body transfer) was thus a rate-limiting process.

In the pH stat recirculation study, the ratio of mucosa over the initial perfusate specific activities (counts/g) was 6.5 at pH 6 and 5.5 at pH 8. In the single pass study, the ratio was 15.8 (±5.4), at pH 5, 11.5 (± 1.1), at pH 6, 6.1 (±2.2), at pH 7 and 8.8 (±8.3), at pH 8. The specific activity ratio was greater than five to 16 times the perfusate concentration depending on pH and gut preparation.

Conclusion: The pH effect had its main influence at the brush-border membrane or adjacent protein binding sites. The more acid the pH the more copper was absorbed.

P221

Influence of pH, Dose Volume, Human Pancreatic Juice and Bile on ⁶⁴Cu Absorption From the Rat Closed Duojejunal Loop

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Introduction: In the rat closed duodenal-jejunal loop, rat pancreatic juice (PJ) inhibited ⁶⁴Cu absorption. Pancreatic insufficiency in man was found not to increase ⁶⁴Cu absorption in man, so the rat closed duodenal-jejunal loop was re-examined testing for pH influences and repeating the ⁶⁴Cu 2h instillation with test solutions.

Method: Using Antimony electrodes, the resting pH values in the loop lumen were measured and the influence of both alkaline and acid single-shot buffers examined. The loop management was modified to examine the influence of dose volume. Human pancreatic juice and bile were used as test solutions.

Results: In the rat duodenal-jejunal loop, single-shot test solutions had only transitory effects on pH. The volume of dose influenced the amount ⁶⁴Cu absorbed from the loop. The procedure was therefore modified. Although diluted human bile decreased ⁶⁴Cu absorption by 62% as before, human pancreatic juice injected into the loop did not influence absorption either in the original loop or the modified loop.

Test solution	Dose Volume ml	Liver Mean ± SD % of dose	Total Mean ± SD	Liver Mean ± SD % of gut cpm/G/cm	Total Mean ± SD
Original loop using flush-on volume:					
0.9% saline (n = 4)	0.5+ ml	3.02 ± 0.22	7.40 ± 0.66	37.1 ± 11.3	90.0 ± 22.7
Human PJ (n = 8)	0.5+ ml	2.48 ± 0.91	6.18 ± 1.78	38.2 ± 9.2	99.1 ± 23.52
Modified loop with exact volume placement					
0.9% saline (n = 3)	0.5 ml	1.16 ± 0.25	3.31 ± 0.71	11.4 ± 0.9	32.5 ± 2.7
Human PJ (n = 3)	0.5 ml	1.18 ± 0.10	3.55 ± 0.46	13.3 ± 2.3	39.6 ± 3.5
0.9% saline (n = 3)	1.0 ml	2.37 ± 0.55	6.67 ± 1.60	27.2 ± 7.8	76.7 ± 23.5
Human PJ (n = 2)	1.0 ml	2.48 ± 0.38	7.42 ± 0.33	38.2 ± 4.7	108.1 ± 3.3
			Liver	Carcass	Total
0.9% saline (n = 3)	1.0 ml	2.06 ± 0.49	4.56 ± 0.56	6.62 ± 0.92	
Bile solution (n = 3)	1.0 ml	0.66 ± 0.17	1.83 ± 0.25	3.49 ± 0.40	
Modified loop with exact volume placement					
0.9% saline (n = 12)	0.5+, 1.0	2.53 ± 0.58		6.84 ± 0.97	
Human PJ (n = 3)	0.5+, 1.0	2.48 ± 0.81		6.46 ± 1.64 (n = 9)	

Conclusion: The closed loop had a pH in the alkaline pH range, and neither acid nor alkaline buffers had more than a slight or transient effect on the resulting pH. Using a modified loop, ⁶⁴Cu absorption at one ml was twice that at 0.5 ml. Higher dose volumes showed no further increment. The effect was due to increased gut surface contact. The results with 0.5-ml plus the flush-on volume and one ml were very similar. Human pancreatic juice did not produce the inhibition in ⁶⁴Cu absorption, which was seen with rat pancreatic juice, either in the original or modified protocol. This may relate to reduction in protein content of the juice (e.g. metallothionein). Human gall bladder bile however, even with a one in four dilution, with saline, inhibited ⁶⁴Cu absorption to approximately one third of the control value.

P222

Raised ^{64}Cu -Caeruloplasmin and Urinary ^{64}Cu Excretion; Indicators Of Altered Copper Status In Chronic Pancreatitis

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Introduction: In the rat, high liver copper in pancreatic insufficiency (PI) reduced with pancreatic extract, and, in duodenal-jejunal loops, rat pancreatic juice (PJ) inhibited ^{64}Cu absorption compared to isotonic saline. The inhibition of ^{64}Cu absorption with rat PJ in the rat closed loop represented normal copper absorption. The raised liver plus carcass value of the saline control was due to lack of pancreatic juice, supporting the elevation of liver copper in PI. In previous studies, in man pancreatic supplements reduced caeruloplasmin levels and the copper excreted in bile. The aim was to confirm the increased copper status with pancreatic insufficiency in man, and to determine the influence of pancreatic extract.

Methods: These results from venous and urinary sampling were taken as the part of the study on absorption in chronic pancreatitis using computerised deconvolution, which provided a direct measure of copper absorption.

Results: In CP ^{64}Cu transfer to caeruloplasmin increased relative to the dose absorbed. Although mean copper absorption in patients with chronic pancreatitis, after a water-based test, was similar to normal subjects, serum ^{64}Cu -caeruloplasmin by 3 hours and ^{64}Cu excretion in urine by 4 hours showed a significant rise in patients with CP compared to controls after both oral and intravenous ^{64}Cu . Furthermore, in keeping with dose dependency after oral dose, the difference in the rise of ^{64}Cu -caeruloplasmin in CP and controls was enhanced by expressing the counts as a proportion of the 10-h percentage absorption derived by deconvolution (P2 P < 0.001). Dividing ^{64}Cu -caeruloplasmin by the 10 h absorption percentage reversed the relationship between CPI and non-CPI groups in oral tests. ^{64}Cu -caeruloplasmin became more elevated in CPI subjects with greater divergence from controls but dose-related ^{64}Cu -caeruloplasmin in the non-CPI group was still above controls. A similar trend was seen after injected ^{64}Cu . In two CPI IV tests in the presence of oral supplements ^{64}Cu -caeruloplasmin showed a nearly quadruple increase.

Conclusion: Because these changes were enhanced by division with time-related and 10 h absorption, block in rate of tissue utilisation of ^{64}Cu -caeruloplasmin was not proposed. Serum ^{64}Cu -caeruloplasmin was recently absorbed copper; any increase compared to controls may reflect increased absorption. Patients with chronic pancreatitis absorb more ^{64}Cu . Those with clinical pancreatic insufficiency absorb even more copper relative to the oral dose of ^{64}Cu applied. This was apparent even though ^{64}Cu absorption was reduced. Previous rat studies emphasised increased liver copper retention in the presence of PI, so the implication of raised copper status in chronic pancreatitis may be attributable to reduced exocrine secretion. Pancreatic extracts on limited data appears to return ^{64}Cu absorption to normal but enhance ^{64}Cu -caeruloplasmin synthesis. Pancreatic supplements thus may prevent the excess absorption of copper. The most likely factor in pancreatic juice is to be found in the proteins (such as metallothionein) when PJ is actively secreted, as the influence of Zn and alkalinity is small.

P223

Gallstone Ileus in the Setting of Situs Inversus

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We present the case of a 42 year old male who presented to the emergency room with 2 days of nausea, vomiting and abdominal pain. He complained of sharp, epigastric pain that radiated to the umbilicus and was associated with distention and watery diarrhea. The patient described previous episodes of LUQ pain associated with spicy food but no similar previous episodes. Past history was reported as hyperlipidemia and an episode of inflammation of the appendix. There was no past surgical history. On exam the patient was tachycardic and hypertensive, in no distress with a soft, distended and tympanic abdomen. Laboratory values were unremarkable except for a mild leukocytosis and elevated creatinine. He had CT scan showing Situs Inversus Totalis and pneumobilia with an impacted gallstone causing a distal small bowel obstruction. He was resuscitated and taken to for exploratory laparotomy with enterolithotomy. A $4 \times 2 \times 2.5$ cm stone was removed from the distal ileum and the enterotomy was closed with a stapled side-to-side closure. An appendectomy was also completed given the patient's abnormal location to avoid any further diagnostic confusion. The patient progressed normally postoperatively and was discharged home with outpatient follow up for possible cholecystectomy at a later time.

Gallstone ileus is a rare cause of mechanical small bowel obstruction, usually presenting in elderly women. It occurs in 0.5% of cases of cholelithiasis due to stones greater than 2.5 cm in diameter that pass through a cholecystoenteric fistula. Situs Inversus Totalis is the complete reversal of thoracoabdominal organs that can be associated with biliary anomalies. There are many case reports of successful open and laparoscopic cholecystectomy for acute cholecystitis and symptomatic cholelithiasis in patients with Situs Inversus. However gallstone ileus in a patient with situs inversus has never before been reported.

P224

Haemobilia Secondary to a Non Traumatic Cystic Artery Pseudoaneurysm Presenting as Massive Upper Gi Bleed Managed By Minimally Invasive Surgery: Case Report

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Aim: Pseudoaneurysm of the cystic artery is rare, two third of the cases are iatrogenic, the remaining third includes trauma, malignancies, inflammation and A-V malformations either congenital or acquired.

In this study we are presenting a case of non traumatic cystic artery pseudoaneurysm secondary to acute calcular cholecystitis presenting as upper GI bleed managed by minimally invasive. To our knowledge there are only twelve cases reported in English written literature of haemobilia secondary to acute or chronic cholecystitis.

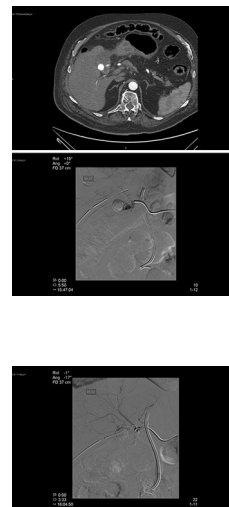
Method: We presented a case of 71 year old gentleman who is known to have gallstones recently discharged from the hospital with a diagnosis of acute cholecystitis, he had a past medical history of myocardial infarction and pulmonary embolism and his list of medications include warfarin. He presented as emergency with melaena, dizziness, haemodynamic instability. Haemobilia confirmed radiological and endoscopic examination.

Results: Initially a gastroscopy revealed no source of an upper GI haemorrhage but the stomach wall was noted to have indentation suggestive of external compression. Subsequently contrast CT demonstrated a fluid filled defect most likely spontaneous intrahepatic haematoma and that it was indeed pressing on the stomach. Haematoma had shown an increase on size compared to a previous CT he had one month previously. Again there were gallstones noted to be present.

Patient continued to have massive melaena and hemodynamic instability, urgent CT angiography demonstrated cystic artery pseudoaneurysm and active bleeding into the gallbladder, but was reported not suitable for angiographic embolisation.

ERCP confirmed the diagnosis of haemobilia and a stent was inserted. Subsequently a laparoscopic cholecystectomy was attempted by laparoscopic biliary surgeon but the procedure was abandoned due to dense adhesions and it was impossible to proceed. The patient successfully had radiological transcatheter arterial embolisation of the cystic artery using a coil. Melaena subsided, haemodynamic status improved and he was discharged home.

Conclusion: Haemobilia associated with pseudoaneurysm of the cystic artery is a rare complication of calcular cholecystitis that was successfully managed by ERCP stenting of the common bile duct and radiological transarterial embolisation. More cases required to be reported to help in establishing the guidelines for management of haemobilia however due to rarity of this condition, case reporting will continue to be the main guidance.



P225

An Interesting Case of MEN Type 1 Diagnosed On Workup For Cholecystitis

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Multiple Endocrine Neoplasia-1 (MEN-1) is a rare hereditary endocrine disorder predisposing to tumors of pituitary gland, pancreas, parathyroid and gastrointestinal tract. A practical definition of MEN1 is a case with 2 of the 3 main MEN1-related endocrine tumors (parathyroid adenomas, entero-pancreatic endocrine tumors, and pituitary tumor). The mode of inheritance is autosomal dominant and has high penetrance. The MEN1 gene (MEN1) is located on chromosome 11q13 and is composed of ten exons that encode a 610 amino acid protein called menin that is important in regulation of cell growth, cell cycle and genome stability. 80% clinical and 98% laboratory manifestation is observed by the fifth decade. Hyperparathyroidism is the most common feature of MEN1 (90%) with pancreatic islet/neuroendocrine tumors (40–70%) and pituitary tumors (30–40%) also commonly observed in MEN1 patients. Untreated patients have a decreased life expectancy, with a 50% mortality rate by the fifth decade mostly directly related to the syndrome and commonly from malignant pancreatic tumor and thymic carcinoids.

We report a case of MEN-1 diagnosed during preoperative workup for cholecystectomy for cholelithiasis found on ultrasound. Elevated calcium and CT findings of para duodenal mass prompted the workup for this rare endocrine syndrome and patient was found to have significantly elevated gastrin and prolactin levels. Patient underwent total parathyroidectomy and enucleation of para-duodenal mass along with antrectomy, duodenectomy, cholecystectomy and gastrojejunostomy reconstruction. We did an extensive literature review for MEN syndrome.

P226

Does Ultrasound Predict Intraoperative Findings At Cholecystectomy? An Institutional Review

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Introduction: Acute cholecystitis (AC) is one of the most common reasons for emergency admission to general surgical services. Ultrasound (US) is the mainstay of biliary tract imaging, but there have been few recent studies that test its ability to diagnose AC. The objective of this study was to determine how well an US diagnosis of AC correlates with intraoperative diagnosis. It is hypothesized that US under calls the frequency and severity of AC in the emergency setting leading to unexpected findings in the operating room.

Methods & Procedures: This retrospective review included all patients admitted to the acute care surgical service of a tertiary hospital in 2011 with suspected biliary pathology who underwent a diagnostic US and subsequent cholecystectomy. Major US indicators used to diagnose AC included cholelithiasis, wall thickening (>3 mm), and a positive sonographic Murphy's sign. Minor indicators included pericholecystic fluid and distension. The sensitivity (sen), specificity (spec), positive predictive value (PPV), and negative predictive value (NPV) of US were determined using the intraoperative diagnosis as the gold standard. Further analysis identified which US indicators were most predictive of an intraoperative diagnosis of AC. A logistic regression model was used to analyze the effect of age, gender, BMI, and diabetes on US reliability.

Results: Of the 288 patients receiving an US for biliary symptoms, 152 were definitively diagnosed with AC and 143 (94%) of these patients underwent emergency surgery (median time to OR = 23.03 hours). The ability of US to predict intraoperative findings is summarized in Table 1. The individual US indicators most predictive of AC are summarized in Table 2.

Table 1. Agreement Between US and Intraoperative Diagnosis of AC

	N	Sen (%)	Spec (%)	PPV (%)	NPV (%)
AC	143	73.22	85.48	93.71	51.96

Table 2. Sonographic Indicators. Most Predictive of Intraoperative Diagnosis of AC

	N	Sen (%)	Spec (%)	PPV (%)	NPV (%)
Cholelithiasis	245	90.00	4.62	75.30	12.50
Thick wall	172	71.43	72.31	89.29	43.93
Murphy's	137	59.52	86.15	93.28	39.72

For the 102 patients with other biliary pathology who underwent cholecystectomy, there were 49 with intraoperative findings suggestive of AC (false negative rate of 48.04%). The logistic regression model showed that selected patient demographics had no significant effect on the accuracy of ultrasound diagnosis (BMI: $p = 0.2403$, age: $p = 0.4149$, gender: $p = 0.6702$, diabetes: $p = 0.9407$).

Conclusions: US is highly sensitive and specific for diagnosing AC. The poor NPV, however, confirms our hypothesis that US can under call AC. If an US impression of AC is not given, the presence of cholelithiasis, wall thickening and a sonographic Murphy's sign are most predictive of AC. BMI, age, gender, and diabetes had no effect on the ability of US to correctly diagnose AC.

P227

Conversion Rate In Laparoscopic Cholecystectomy: A 21-Year Experience In A Single Centre

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Background: Laparoscopic cholecystectomy has become the standard method for the elective treatment of patients with biliary colic and complications of gallstone disease, such as acute cholecystitis, gallstone pancreatitis and bile duct stones. Conversion to an open procedure should not be considered a complication it is a rational decision of a surgeon when important anatomical structures cannot be clearly identified. Reported rates range from 0.18%–30%.^{1,2}

Objectives: This is a retrospective analysis of a large series of cholecystectomy performed at a tertiary care center between January 1998 and July 2013 by trained surgeons and surgical residents. The data from all patients operated for gallstone disease in this period was collected and compared with those in the literature.

Results: Between January 1998 and July 2013 6765 patients underwent a gallstone disease surgery. We performed 36.9% (2498) conventional cholecystectomies and 63.1% (4267) laparoscopic operations. There was 2.7% (186 cases) conversion rate. The most common reason was inability to define anatomy in patients with adhesions in severe inflamed gallbladder 61.3% (114 cases). Bile duct injury and uncontrolled bleeding was reported in 5.4% (10 cases), 2.7% (5 cases), respectively. Intrahepatal gallbladder or abscess, porcelain gallbladder, large stones, gangrene of the gallbladder and obesity were the reason for conversion in 16.6% (31 cases). The rare causes were diaphragm perforation, suspected malignancy, acute appendicitis, injury of mesenteries and severe liver cirrhosis.

Conclusion: Conversion occurred in 2.7% in all laparoscopic cholecystectomies and was similar to that found in the reports.^{1,2}

Intense inflammation with adhesions and inability to identified the main anatomical structures was the main reason (61.3%). Preoperative patients assessment for a risk for conversion from laparoscopic to open cholecystectomy³ can decrease the problems in training cases, and management of difficult cases may be left to experienced surgeons therefore lowering complications and conversion rate.

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P228

A Novel Approach For Total Laparoscopic Pancreaticoduodenectomy

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Objective: A novel approach for total laparoscopic pancreaticoduodenectomy (TLPD) based on “Five Trocars” is developed.

Methods: The “Five trocars” fit for the Eastern body habitus (slim) are as follow: a 10 mm laparoscope trocar in the midline below the umbilical scar; a 12 mm trocar along the right midclavicular line, and a 5 cm trocar along the right anterior axillary line for the primary surgeon; another two 5 cm trocars placed along the left midclavicular line and anterior axillary line for the assistant. Thus, the visual field is “below-up” around the axis of the mesenteric-portal vein. Under the vision, the flow of resection is designed from caudad to cephalad, from anterior to posterior, from left to right. After the retropancreatic window is created to make sure it resectable, the resections are performed with transaction in order of the jejunum, stomach, pancreatic neck, gallbladder, pancreatic uncinata, common bile duct. Each procedural step helps to set up the next, thus facilitating the flow and increasing efficiency of the operation. The reconstructions with pancreaticojejunostomy (duct to mucosa), hepaticojejunostomy, gastrojejunostomy are performed.

Results: 11 TLDP with this novel approach were done between March 2013 and September 2013. The mean operating time was less than the one with traditional steps through laparoscopic approach, while there were no obviously differences about the outcomes of these procedures, but the cost was decreased by reducing the number of trocars. What's more, the primary surgeon and assistant felt smoother with this novel approach.

Conclusion: This novel approach based on “Five trocars” is suitable for the Eastern body habitus. It not only simplifies the technique, but also is more economic.

P229

Totally Laparoscopic Right Hepatectomy with Modified Liver Hanging Technique

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Background: Challenges of liver manipulation, parenchymal transection and hemostasis were hurdles in the progress of laparoscopic hepatectomy. Major hepatic resections demand a high level of surgical skill. Herein we report a 57 year old male patient who is a follow up case of adenocarcinoma of rectum status post abdominoperineal resection, post chemoradiotherapy who underwent total laparoscopic right hepatectomy for metastasis in the right lobe of liver.

Case Report: 57 year old man known diabetic who underwent abdominoperineal resection for adenocarcinoma rectum (T3N0M0), received adjuvant chemoradiotherapy two years back presented with pain in the upper abdomen since two months. On evaluation, CECT abdomen and PET scan showed metastatic lesions in segment V and VIII of the liver. Serum CEA levels were raised. He underwent 5 port total laparoscopic right hepatectomy. After ligating the right hepatic artery the line of demarcation was defined, aided by intraoperative ultrasound. Parenchymal transection was achieved by harmonic shears and CUSA. He was started on oral liquids on 2nd post operative day, abdominal drain was removed on 6th day. The patient was discharged on the 7th postoperative day.

Conclusions: Laparoscopic right hepatectomy is feasible and safe. Careful pre operative planning and endosuturing skills are prerequisites in achieving this advanced laparoscopic procedure.

P230

Laparoscopic Choledochal Cyst Excision Following Previous Bilio-Enteric Bypass

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Background: Complete excision of the extrahepatic biliary apparatus with bilio-enteric reconstruction is the procedure of choice for a choledochal cyst. Few centers have reported the feasibility of using the laparoscopic approach for excision and reconstruction. Using the laparoscopic procedure in a patient who has undergone an earlier biliary drainage procedure can be technically challenging.

Case Report: A 58 year old gentleman presented to us with history of repeated episodes of cholangitis. He had undergone an open cholecystectomy, common bile duct (CBD) exploration and choledochoduodenostomy 8 months ago following a failed attempt of endoscopic CBD clearance for choledocholithiasis. On evaluation magnetic resonance cholangio-pancreatography showed features of Type I Choledochal cyst. He underwent 5 port laparoscopic excision of the Choledochal cyst in the following steps. Step 1 – Adhesiolysis, delimitation and dismantling of previous choledochoduodenostomy; Step 2 -Excision -of Choledochal cyst; Step 3 Roux -en -Y hepatico jejunostomy. The duration of surgery was 4 hours and intra-operative blood loss was 100 ml. The patient enjoyed a uneventful post operative stay and was discharged on the 4th post operative day. On follow up LFT, HIDA scan and USG abdomen were normal.

Conclusion: Laparoscopic excision of choledochal cyst in the presence of prior biliary drainage procedure is feasible but requires the advanced endo-suturing skills.

P231

Laparoscopic Pancreas-Sparing Subtotal Duodenectomy In Gastrointestinal Stromal Tumor Of The Duodenum: Comparison With Open Surgery

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Introduction: Although organ-preserving operation for benign and borderline duodenal tumors has been regarded as reasonable strategy, laparoscopic pancreas-sparing subtotal duodenectomy (LapPSSD) was rarely reported. The aim of this study was to compare the perioperative surgical outcomes laparoscopic approach with open surgery.

Method: Between March 2010 and June 2013, 7 consecutive LapPSSD for duodenal gastrointestinal stromal tumor (GIST) were performed. The demographics and surgical outcomes of LapPSSD were compared with the database of 7 patients who underwent open PSSD during same period. Subtotal duodenectomy was defined as distal duodenal resection of ampulla of Vater to first portion of jejunum. All patients underwent side-to-side duodenojejunostomy after subtotal duodenectomy, and jejunal limb was placed to retrocolic pattern.

Results: One of patients underwent LapPSSD converted to laparotomy because of mesocolonic involvement by the tumor. The mean operative time was significantly longer (281.4 vs. 210.0 minutes), but lesser estimated blood loss (88.6 vs. 364.3 ml) and shorter length of postoperative hospital stay (7.4 vs. 22.6 days) were observed in LapPSSD group compared with OpenPSSD group. The tumor size was similar (3.6 vs. 4.8 cm) and tumor-free surgical resection margins were achieved in all study patients. The most frequent postoperative complication was delayed gastric emptying in both group (3 vs. 5 patients). Three patients of LapPSSD readmitted after early discharge, and two of them underwent re-operation for obstruction of jejunal limb. There was one recurrence in OpenPSSD group among all patients at a mean follow-up of 11.9 months.

Conclusions: Laparoscopic pancreas-preserving subtotal duodenectomy is technically feasible and attractive strategy in well-selected benign or borderline duodenal tumors. However, delayed gastric emptying is a major concern of postoperative complication, and it is needed to be study further for its cause and solution.

P232

Single Incision Laparoscopy Cholecystectomy In Patients With Empyema Of The Gallbladder

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Background: Laparoscopic cholecystectomy is considered to be the gold standard in treatment of gallstones. Single incision laparoscopic cholecystectomy is gaining in popularity because of the appealing cosmetic results.

Method: We retrospectively reviewed 274 cases that presented with acute cholecystitis and were treated laparoscopically using a single umbilical incision. All operations were performed by the same surgical team and the umbilicus was the only point of entry for all patients. All data and demographics on these patients were gathered and analyzed.

Results: Of the 274 cases which were treated with single incision laparoscopic cholecystectomy, 16 were found to have empyema of the gallbladder with extensive gallbladder wall thickening. 5 cases from the 16 were converted to either open cholecystectomy or the classic 4 port technique. Of the remaining 11 cases, 9 completed the laparoscopic procedure using the initial single umbilical incision. Two cases had their gallbladders partially removed because of the extensive gallbladder wall thickening, leaving intact the posterior gallbladder wall which was thoroughly cauterized. The average procedure time was 140 minutes in these 9 cases. There were no post operative complications and the average hospital stay was 3.4 days.

Conclusion: Single incision laparoscopic cholecystectomy can be performed on patients who present with empyema of the gallbladder. Although the procedure may be demanding and time consuming as compared to the classic 4 port laparoscopic technique, the procedure is safe in surgeons with advanced laparoscopic training.

P233

Natural Course of Intra-abdominal Fluid Collections Following Minimally Invasive Left Sided Pancreatectomy

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Introduction: Intra-abdominal fluid collections (IFC) at operative bed were frequently founded after minimally invasive left sided pancreatectomy. However, natural course of IFC following minimally invasive left sided pancreatectomy have not been evaluated thoroughly yet.

Method: From July 2006 to May 2011, seventy-four patients underwent minimally invasive left sided pancreatectomy for benign or malignant pancreatic lesions by single surgeon. All patients were performed abdominal CT scan routinely after operation for identification of complications. If IFC were detected, the patient was followed up by CT scan regularly to complete resolution. We measured the size of IFC in axial and coronal view of abdominal CT scan each time.

Results: Among 74 patients underwent minimally invasive left sided pancreatectomy, IFC were developed in 70 patients (94.6%). IFC have resolved gradually in all cases except 5 cases lost of follow-up before complete resolution (median time: 27 weeks, range: 8–204 weeks). 67 patients were asymptomatic and 3 patients presenting symptom consistent with local peritonitis were performed intervention procedure (percutaneous catheter insertion, gastrocystostomy by endoscopy). In resolution analysis using Kaplan-Meier survival analysis, 50% of IFC were resolved within 27 weeks after operation. Malignant pancreatic lesion showed significantly shorter resolution time than benign in sub-group analysis ($p = 0.005$).

Conclusions: IFC at operative bed were developed in most of cases following minimally invasive left sided pancreatectomy. Most of IFC were asymptomatic and disappeared spontaneously without intervention.

P234

Laparoscopic Liver Resection: An Early Experience In A Resource Limited Country

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Introduction: Mongolia has the highest mortality rate of liver cancer in the world (six times the global average). While open liver resections are currently being performed safely in Mongolia, many patients seeking access to minimally invasive approaches to hepatic resection are traveling abroad to receive laparoscopic surgical care. Recognizing the economic burden of traveling abroad for surgical care, Mongolia has been building advanced laparoscopic surgical capability to address hepatobiliary disease through a multinational cooperative capacity building initiative. A single institutional experience of the implementation of laparoscopic hepatic resection in a resource poor country is reviewed.

Methods/Procedure: A retrospective chart review was conducted of 39 patients who underwent laparoscopic liver resections by the Hepato-Pancreatic-Biliary Surgical Department at the National Cancer Center of Mongolia between October 2010 and August 2013. Prior to the initiation of laparoscopic hepatic resection the Mongolian hepatobiliary surgeons, underwent multiple basic and advanced laparoscopic training courses ranging from two days to six months over a ten-year period, including courses in Japan, the United States, Switzerland, Taiwan, and South Korea. These courses included experiences with didactic lectures and animal labs including laparoscopic liver resections and nephrectomies. A harmonic scalpel generator donated by a private non-governmental organization along with important disposables provided key equipment facilitating laparoscopic liver resection.

Results: There were 39 laparoscopic hepatic resections performed. Male/female ratio: 14/25. Twenty-two cases were left lateral sectionectomy, and 17 cases of small isolated tumor resection. Pathology included: Hepatocellular carcinoma- 28; cholangiocarcinoma-1; hepatic adenoma-3; Hydatid cyst and cystadenoma-1; hemangioma-3; high grade dysplastic nodule, and CRLM-1. The mean duration of surgery was 134.75 min (60–240 minutes). Mean blood loss was 91.41 mL (30–300 mL). There were 2 intraoperative complications, which were bleeding, and a left diaphragm injury, and one conversion from a laparoscopic to an open procedure because of bleeding. Postoperative complications: bile leak-1; re-operation-1; wound infections-7; liver failure and ascites-2; postoperative bleeding-1, with no documented cases of perioperative mortality. The mean hospital length of stay was 7.97 days (4–29 days), with two patients requiring re-admission.

Conclusion: Laparoscopic hepatic resection is now available to address the large burden of hepatic disease in Mongolia. The implementation of an advanced laparoscopic procedure requires a significant amount of training and resource assistance. As developing economies grow, so does the demand for advanced surgical techniques. To address this demand, and to continue to further strengthen surgical capacity, Mongolian surgeons are working to give their patients the highest standard of quality surgical care through modern surgical techniques locally. Laparoscopic hepatic resection for left lateral resection and small right-sided liver neoplasms can be performed safely and effectively in a resource-poor country.

P235

Laparoscopic Right Posterior Sectionectomy In Patients With Hepatocellular Carcinoma In The Era Of Laparoscopic Surgery

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Background: Although there are only few reports on laparoscopic right posterior sectionectomy (RPS), it will become attractive operative method when the lesion is confined to right posterior section of the liver.

Method: Between September 2003 and June 2012, laparoscopic liver resection was performed in 408 patients in Seoul National University Bundang Hospital. We retrospectively evaluated clinical data for 24 patients who underwent laparoscopic RPS for hepatocellular carcinoma. For inflow control of portal triad, glissonian approach was common method for patients with HCC.

Results: The mean operation time was 567 min and the mean postoperative hospital stay was 10.6 ± 4.8 days. Mean tumor-free margin for HCC was 3.0 ± 5.8 cm. There were no deaths or major complications. Two complications occurred and were managed by percutaneous drainage. Three conversion to laparotomy occurred due to insufficient tumor margin in the early era of our experiences. Extended RPS ($n = 6$), which is composed of RPS and resection of RHV, was performed to obtain enough margin, when tumor was very close to RHV. 5-year overall and disease-free survival rate of patients with HCC was 66.5% and 37.8%, respectively.

Conclusion: Laparoscopic RPS is feasible in the hands of experienced surgeons, but more refinement of surgical technique is required to reduce operation time.

P236

Laparoscopic Median Pancreatectomy for Select Mid Body Tumors Our Indications, Technique and Results

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Introduction: Conventional pancreatic resections may be unnecessary for mid body tumors of the pancreas that are benign or of low malignant potential. Median pancreatectomy is an option that has been investigated in the management of such tumors. Our objective of this study is to evaluate the feasibility and safety of laparoscopic median pancreatectomy.

Method: 14 patients including 8 females and 6 males, age group ranging from 13 to 79 years underwent laparoscopic median pancreatectomy during the period of October 2003 to October 2012. All patients underwent CT scan of the abdomen. Tumours located in the body of pancreas were chosen, tumours more than 3 cm or with suspicion of malignancy were excluded.

Results: Tumours included 10 mucinous cystadenomas, 4 serous cystadenomas. The proximal pancreatic remnant was suture ligated. The distal pancreatic end was anastomosed to a Roux-en-Y jejunal loop. The mean operative time was 240 minutes. Mean blood loss was around 160 ml (range 30–320 ml). Mean Post op Icu stay was one day and overall hospital stay was around 4.5 days. There were no mortalities, no major post op complications, however 2 patients had a pancreatic fistula ISGPF Grade A and were managed conservatively. Margins were negative in all cases and with a mean follow up of 2 years no recurrence has been reported till date.

Conclusion: Laparoscopic central pancreatectomy is a feasible and safe procedure which preserves the parenchymal function. The minimally invasive approach ensures an adequate treatment despite requiring the expertise of highly skilled laparoscopic surgeons

P237

Laparoscopic Cholelithotomy

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Although it is known for years that laparoscopic approach to common bile stones is feasible, few centers with experience in advanced laparoscopic surgery approach this pathology. In our country common bile lithiasis is commonly treated by the gastroenterologist by ERCP, only in complicated cases that do not resolve by ERCP does the surgeon have a role.

We have an experience of 13 cholelithotomy's with the extraction of common bile stones using the Dormia or Fogarty probes. In our technique we use a flexible one working channel cholelithotomy that is introduced in the abdomen through a 10 mm trocar placed under the right costal margin. In 4 cases we used Kehr tube choledochal drainage for 2 weeks postoperatively, and in the remaining cases we used primary closure of the choledochotomy with resorbable sutures. All cases had favorable outcomes with a mean hospital stay of 5 days, and mean operation duration 90 minutes.

Our results are in line with other published data concerning one stage treatment of common bile stones and gall bladder stones by laparoscopic approach.

P238

Single-Port Laparoscopic Liver Surgeries

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Introduction: Single-port laparoscopic liver surgery has been performed sporadically. The aim of this study is to assess our experience of single-port laparoscopic liver surgery as one of the treatment modality for various kinds of hepatic diseases.

Methods and Procedures: We retrospectively review the medical records of 213 patients who performed single-port laparoscopic liver surgeries between Dec 2008 and Aug 2013 at the Catholic University Seoul St. Mary's hospital.

Results: 213 patients underwent single-port laparoscopic liver surgeries for variety of hepatic lesions. Of these, 107 were single-port laparoscopy assisted right hepatectomy in living-donor liver transplantation. In the other 106 patients, various kinds of single-port laparoscopic liver resection were performed for hepatocellular carcinoma (n = 50), metastatic liver tumor (n = 23), intrahepatic duct stone disease (n = 9), cholangiocarcinoma (n = 6) and others. For these patients, partial liver resections were carried out in 76 cases, 14 were left hepatectomy, 11 were left lateral sectionectomy and 5 were right hepatectomy. Four procedures were converted multiport laparoscopy and seventeen were converted to open liver resection. There was no major perioperative complication in this study.

Conclusion: Single-port laparoscopic liver surgery seems to be a feasible approach for various kinds of liver diseases.

P239

Effect of PPI Use on the Diagnosis of Biliary Dyskinesia with CCK HIDA Scintigraphy

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Background: A previous small study on healthy subjects demonstrated that proton pump inhibitors (PPIs) were associated with a significant reduction in gall bladder ejection fraction (GBEF). It has been a widely accepted belief in medical circles that PPI therapy interferes with hepatobiliary scintigraphy (HIDA) scan results, presumably due to the similar structure of cholecystokinin (CCK) and gastrin, given the known increase in gastrin levels amongst patients taking PPIs. We sought to determine if the use of PPI medications was associated with a reduction in gallbladder ejection fraction in patients undergoing CCK-stimulated HIDA scan for evaluation of biliary dyskinesia.

Methods: At a tertiary care center 366 patients underwent HIDA exams from 2008 to 2012; 93 patients had CCK given at the time of HIDA in order to measure GBEF for the purpose of identifying biliary dyskinesia. Demographic and clinical data of patients on PPI (N = 31) were compared to those not on PPI (n = 62). These two groups were well matched demographically [female (77% vs 71%, NS), age (53 vs. 53, NS), BMI (27.2 vs 26.5, NS)] and had similar clinical presentation [abdominal pain (87% vs. 81%, NS), nausea (19% vs. 31%, NS), bloating (13% vs. 7%, NS), vomiting (10% vs. 15%, NS), meal related symptoms (26% vs. 18%, NS)]. CCK HIDA exam findings were compared between groups in terms of mean GBEF and frequency of abnormal exam (GBEF < 35%). Continuous variables were assessed for significance by t test and categorical variables were assessed by a Fisher's exact test.

Results: The PPI and non PPI groups had similar mean GBEF (57.7% vs. 64.7% respectively, p = 0.14). The groups also had a similar frequency of abnormal CCK HIDA exams (29.0% vs. 16.1% respectively, p = 0.12).

Conclusions: This study demonstrates that use of PPI medications has no significant or clinically relevant effect on the outcome of a CCK-stimulated HIDA scan in the diagnosis of biliary dyskinesia.

P240

Laparoendoscopic Rendezvous: An Effective Treatment For Patients With Cholelithiasis And Choledocholithiasis

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Introduction: There is no consensus on the optimal method of management of concomitant gallstones and common bile duct stones. However, intra operative ERCP by the 'laparoendoscopic rendezvous' (RV) technique is emerging as a preferred treatment option. The aim of this study is to evaluate technical feasibility and benefits of RV technique in patients with cholelithiasis and proven or strongly suspected choledocholithiasis.

Methods and Procedures: This study was carried out on 61 patients with cholelithiasis and suspected or confirmed choledocholithiasis in the Surgical Gastroenterology unit of Regency Hospital and Gastro Liver Hospital, Kanpur, India during the period 2006–2013. Laparoscopic cholecystectomy with Intraoperative ERCP by RV technique was performed in each case. The parameters assessed included antegrade papilla cannulation rate, total operative time, a timing of the postoperative return of peristaltic activity and food intake, incidence of postoperative complications especially pancreatitis and the prevalence of retained CBD stones.

Results: The technique was successful in 95.8% patients. The mean operating time was 75 minutes. There was no mortality and no postoperative complications e.g. pancreatitis, bleeding or perforation. Six patients complained of postoperative abdominal bloating and pain over tip of the right shoulder. Return of intestinal peristaltic activity was noted in all patients within 24 hours. The mean duration of hospitalization was 2 days. There were no retained stones in this series with a CBD clearance rate of 100%.

Conclusion: The rendezvous procedure is a safe and effective treatment option for the management of concomitant cholelithiasis and choledocholithiasis, especially in cases with failed ERCP.

P241

Laparoscopic Pancreatotomy Of Acinar Pancreatic Cancer

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Introduction: The purpose of this Case Report Video is present a case of an acinar cell pancreatic cancer with laparoscopic resection technique, and to discuss the clinical presentation, surgical feasibility and technical tips of this approach.

We present the case of a caucasian 52 year-old male patient with Acinar Cell Pancreatic Cancer resected by laparoscopy. The neoplasm was found incidentally in an abdominal CT scan for the evaluation of hematuria. After the mass was found, we performed a contrast enhanced MRI scan for staging the neoplasm. The surgery was performed by laparoscopy with a complete resection of the pancreas tail including the spleen 'on block'. The pathology analysis reported an acinar cell pancreatic cancer of the pancreas, lymphovascular invasion with non positive nodes nor metastatic disease. The patient was discharged on good conditions at the fifth postoperative day and has been followed in the outpatient clinic.

Methods and Procedures: A video case report of the laparoscopic resection of pancreatic tail due to an acinar pancreatic cancer is shown.

Results: The video demonstrate that laparoscopic technique is feasible and secure and the oncologic surgical criteria can be fulfill with this surgical approach.

Conclusion(s): The laparoscopic resection of a pancreatic neoplasm involving the pancreatic tail is a secure and feasible technique and that can be performed fulfilling the oncologic criteria for complete resection.

P242

Management Of A Recurrent Pancreatic Pseudocyst

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Introduction: Pancreatic pseudocyst is a well-defined fluid collection, but without solid components, which occurs 4 weeks after an interstitial or edematous pancreatitis episode. The natural history is to resolve spontaneously in a period of 4–6 weeks in more than 85% of the time. Persistent pseudocyst should be treated surgically, including the percutaneous, endoscopic and laparoscopic techniques, based on the size, localization and symptoms of it.

Case report: We present a 47 years old male, with history of hypertension and one episode of acute edematous pancreatitis 3 years ago, complicated with a pancreatic pseudocyst, treated with a laparoscopic transgastric cystogastrostomy. Was admitted to the department of surgery under the clinical diagnosis of acute pancreatitis. The laboratory analysis of blood and CT confirmed an acute edematous pancreatitis, requiring medical management, with a good response, and a hospital care for 6 days.

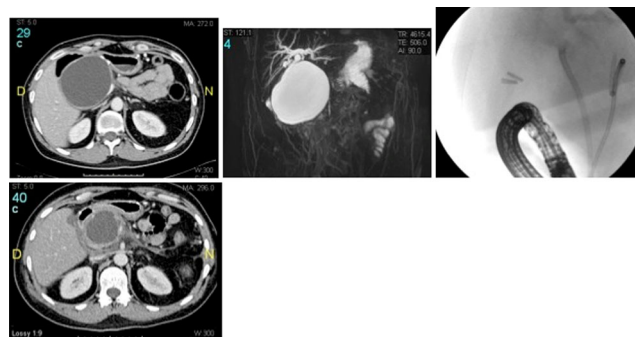
The patient was readmitted 72 hours after, with a new episode of epigastric pain accompanied by nausea and plenitude; the CT confirmed the presence of a pancreatic pseudocyst which was located behind the head of the pancreas, with a $8.5 \times 6.9 \times 4.8$ cm dimensions, with an image of a septum and a volume of 330 mL.

A new surgical treatment was the choice, with a laparoscopic technique; patient in French lap position, using 4 laparoscopic ports, transgastric approach with a gastrotomy of 5 cm, followed by a puncture on the posterior wall of the stomach to confirm the correct site for the cystogastrostomy, which was made with an endoscopic stapler, we created a 5 cm anastomosis. The gastrotomy was closed with a hand sewn absorbable suture; the procedure time was 75 minutes. The patient had a good recovery, with a 3-day hospital care, with an outpatient follow-up at 2 weeks and 2 months. However, the patient presents 11 weeks after the surgical procedure, icteric, with a 72 hours episode of mesogastric pain, with nausea and emesis. Laboratory blood test showed an obstructive biliary pattern. The CT and MR confirmed a pseudocyst in the same location with an $11.5 \times 10.4 \times 9$ cm size, and a volume of 686 mL (MR).

The endoscopic approach was used, the anastomosis was occluded with gastric debris, we used a double pigtail stent to communicate the cyst and stomach; also deployed a 10 mm \times 10 cm stent in the biliary duct. The obstruction was solved, confirmed with the blood test and symptoms solution. Reducing the volume to 188 mL 2 days after the procedure.

Discussion: Generally, the spontaneous regression in the acute pancreatitis scenario occurs in 85%; but those related to a chronic pancreatitis only have a regression in 9–31%. One etiology that must be considered is the disconnected pancreatic duct syndrome, which is related to a necrotizing acute pancreatitis, with the lost of communication between the pancreatic duct and the gastrointestinal tract; reporting a mayor chance of recurrence.

The anatomic study of the pancreas is imperative for the full comprehension of this pathology, and for the surgical solution of this case.



P243

Outcome Following Laparoscopic Treatment For Liver Hydatid Cyst: Single-Institution Experience

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Introduction: The most appropriate treatment to obtain the best result with the lowest rate of recurrence and minimal morbidity and mortality is mandatory for treatment of liver hydatid cyst (LHC). In addition to, obtain to optimal aesthetic satisfaction.

Methods: Between January 2011 and July 2013, 28 patients (28.5% male) with LHC underwent surgery. Only the following aspects were considered as not eligible for laparoscopic surgery: cyst over the lack of access due to adhesion. Of the 28 patients who underwent laparoscopic treatment, 1 required conversion to open surgery.

Results: The median age was 39.29 years. Median cyst size was 8.23 cm.(range, 3–16 cm). The most common location of the cyst was the right lobe (%67.8). The median number trocars used was 4. Protective scolioside-soaked swabs were used in all patients. We performed all cyst partial pericystectomy and discharge. Four cases was observed bile leakage, leakage was repaired laparoscopically, but, continued to leak in one case. The median operating time was 78 min(range, 35–120 min) and the mean blood loss 124 mL. The length of hospital stay was 4.13 days (range, 1–16 day). No cyst recurrence was observed after a follow-up 15.6 months(range, 3–36 months)

Conclusion: Laparoscopic surgery provides a safe and efficacious for almost all types of LHC. Large prospective, randomized trials are required to confirm its superiority.

P245

Experiences of Laparoscopic Liver Resection for Liver Tumors in Pediatric Patients: Initial 11 cases

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Purpose: The value of laparoscopic hepatectomy in children is not established. The aim of this study was to evaluate the outcome of laparoscopic hepatectomy in children with liver tumors.

Methods: This was a retrospective clinical study of 11 patients under the age of 18 years old who underwent laparoscopic hepatectomy for liver tumors between January 2008 and December 2012. The laparoscopic procedure was performed using three to five ports via laparoscopic via Cavitron Ultrasonic Surgical Aspirator (CUSA EXcelTM; Valleylab, Boulder, Colorado, USA) and ultrasonic shears (Harmonic scalpelTM; Ethicon Endosurgery, Cincinnati, USA). Because of the narrow abdominal cavity of pediatric patients, There were some points of difference in the location of trocars, the CO₂ pneumoperitoneum and the manipulation of laparoscopic CUSA comparing with laparoscopic hepatectomy in adult.

Results: The patient group comprised 6 females and 5 males, with a mean age of 49.2 ± 60.4 months (range 0.3–180 months) and a mean body weight of 16.0 ± 13.8 kg (range 3.8–50.0 kg). The diseases of patients were hepatoblastoma (n = 6), focal nodular hyperplasia (n = 3), recurrent neuroblastoma (n = 1), and liver abscess (n = 1). Two patients underwent a major anatomical hepatic resection (right lobectomy); the others underwent minor hepatic resections (left lateral segmentectomy, IVb & V subsegmentectomies, segmentectomy, and right-sided non-anatomical resections). One patient required conversion to open procedure because of inadequate free surgical margins for focal nodular hyperplasia. Mean duration of operation was 195 ± 75 minutes and mean duration of hospitalization was 7.0 ± 2.0 days. There was no postoperative complication and perioperative mortality.

Conclusion: Laparoscopic hepatectomy requires extensive experiences in hepatobiliary and laparoscopic surgery, and a limited number of cases provide insufficient opportunities for pediatric surgeons to master the surgical procedure in pediatric population. Laparoscopic hepatectomy, nevertheless, offers many advantages, as widely published. The authors performed laparoscopic hepatectomies for benign and malignant liver tumors with respectability. Laparoscopic hepatectomy, therefore, would be a safe and feasible option for liver tumors in children. Randomized studies will be required in the future to establish laparoscopic hepatectomy as the standard procedure for liver tumor in pediatric patients. Key words: Laparoscopic hepatectomy, laparoscopic liver resection, pediatric patient, children, hepatoblastoma.

P244

Laparoscopic Pancreas Surgery for Solid Pseudopapillary Tumor in Children

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Purpose: Solid pseudopapillary tumor (SPT) of the pancreas is rare primary neoplasm of the pancreas with malignant potential, but an excellent prognosis. The aim of this study was to evaluate the outcome of laparoscopic pancreas surgery for SPT in children.

Methods: A retrospective review was conducted for patients under the age of 18 years old who had undergone laparoscopic pancreas surgery for pathologically confirmed SPT between January 2006 and December 2012.

Results: 20 patients underwent laparoscopic pancreas surgery for SPT. The patient group comprised 17 females and 3 males, with a mean age of 14.7 ± 2.8 months. They underwent laparoscopic distal pancreatectomy [LDP (n = 14)], laparoscopic pancreaticoduodenectomy [LPPPD (n = 2)], laparoscopic central pancreatectomy [LCP (n = 1)] and laparoscopic enucleation of pancreas [LEP (n = 3)]. 71.4% of the LDP performed were spleen-sparing LDP (SSLDP) included 2 cases of splenic vessel sacrificing SSLDP (Warshaw technique) and Single port SSLDP. Mean duration of surgery was 229.8 ± 145.5 minutes and one patient was performed transfusion. There was one conversion to open procedure in the patients group. Perioperative mortality was not developed, but 9 patients were involved postoperative complications included pancreatic fistula (n = 7), fluid collection (n = 3), splenic infarct (n = 3) and wound seroma (n = 1). There was no grade C pancreatic fistula. Recurrence of tumor was shown in one patient who underwent LEP due to incomplete resection.

Conclusion: Lately, laparoscopic surgery is being used more and more extensively in pediatric population, and its scope of usage has widened to include pancreas surgery. The prognosis of laparoscopic surgical treatment for SPT was good in pediatric patients. Because SPT is the rare, but most common pancreas tumor in children and malignancy of pancreas is extremely rare in children. Laparoscopic pancreas surgery, therefore, would be a safe and feasible option for STP in children.

Keywords: Solid pseudopapillary tumor, Laparoscopic pancreas surgery, Laparoscopic pancreatectomy, Laparoscopic distal pancreatectomy

P246

Importance of the Node of Calot in Gall Bladder Neck Dissection: A Novel Standardized Approach to the Laparoscopic Cholecystectomy

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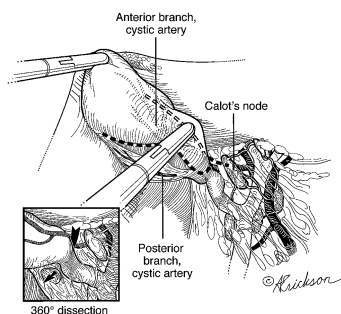
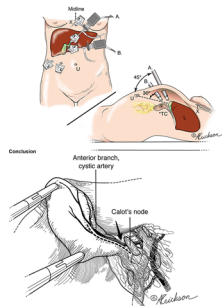
Introduction: Bile duct injury (BDI) during laparoscopic cholecystectomy is one of the most feared complications in General Surgery. Iatrogenic BDI can result in the need for major reconstructive surgery, poor quality of life and increased mortality for the patient. For the operating surgeon, it is associated with significant medico-legal repercussions as well as negative professional and psychological consequences. BDI also results in dramatically increased financial cost. Once the injury occurs, the negative consequences are predetermined, therefore, the mainstay of management of BDI is prevention.

In this study, we introduce a novel landmark, the node of Calot, that, when used appropriately, greatly reduces the occurrence of BDI in laparoscopic cholecystectomy. Furthermore, we present our standardized approach to the laparoscopic cholecystectomy which greatly aids in visualization of the critical anatomy of the operation and which systematically approaches the dissection in a safe manner allowing us to accomplish our low BDI rate.

Methods: We retrospectively reviewed our experience utilizing our standardized approach to port placement, operative steps and the use of the lymph node of Calot as a landmark to avoid BDI. Our standard technique involves insufflation of the abdomen with a Veress needle allowing optimal placement of the optical port at a variable point between the umbilicus and the Xyphoid process (determined by the patients body habitus). The gall bladder (GB) is retracted in the usual fashion. Calot's node is identified and is used as a landmark to avoid injury to the bile duct. Reliably, the node rests superior to the cystic duct (CD), lateral to the common hepatic duct (CHD), and anterior to the cystic artery (CA). After identifying Calot's node, we begin the dissection always caudad and lateral to the node. In that area one stays safely away from the CHD, common bile duct (CBD) and right hepatic artery (RHA), which are, by definition, on the other side of the node. The tubular structure that remains must be either the CD or the infundibulum which is fully revealed after developing the critical view of safety. The CA is also exposed at this point far from its origin at the RHA. Clipping and transection of the CA and CD as well as dissection of the GB off of the liver proceed in the usual fashion.

Results: In the period of January 2009 to September 25, 2013 we have undertaken 873 laparoscopic cholecystectomies utilizing the standard steps described above with emphasis on recognition of the Node of Calot as a landmark to avoid BDI. To date we have had no bile duct injury and no cystic duct leak.

Conclusion: The main cause of BDI is due to misidentification of the hepatobiliary structures. Numerous operative and imaging techniques have been described to avoid BDI with varying degrees of acceptance and success. We propose the important addition of recognizing Calot's node as the critical anatomical landmark to guide GB dissection and to enhance the safety and effectiveness of laparoscopic cholecystectomy from straight-forward to difficult cases.



P247

Treatment And Removal Of A Double Gallbladder With Two Distinct Stone Compositions: A Case Report

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Introduction: Duplication of the biliary system is rare and the incidence of a double gallbladder has been reported at one per 4,000–5,000 people. It is important for surgeons to be knowledgeable of the different anatomic classifications of a double gallbladder and also understand the treatment rationale for such a patient as it could complicate surgery. We present the rare case of a double gallbladder identified intraoperatively, despite preoperative imaging, with two separate and distinct acute pathologies.

Case Report: A 65 year old woman presented to the emergency department with acute onset right upper quadrant and epigastric pain. Physical exam was consistent with patient history and labs were significant for a mild elevation in liver function tests but normal bilirubin levels. Ultrasound examination was limited by bowel gas but identified cholelithiasis and dilatation of the common hepatic duct. Follow up imaging with CT scan demonstrated a serpiginous gallbladder with variable stones and a dilated CBD, but did not identify a redundant biliary system. Intraoperatively, a double gallbladder was identified and completely excised, and the remaining operation proceeded normally. A duplicated gallbladder with two discrete cystic ducts opening into two attached by separate gallbladders (Boyden type Y) was confirmed with pathology. Both demonstrated chronic cholecystitis with cholelithiasis, however with different stone compositions – large brown stone (cholesterol) and many small yellow-black stones (mixed stones). The patient was discharged home the following day with no complications.

Conclusions: Although a double gallbladder is a rare finding, it is not uncommon to discover biliary anomalies intraoperatively, and an awareness is needed to prevent complications and harm to the patient. Ultrasound and CT scan are highly specific imaging modalities for biliary pathology, but as demonstrated through our case report, they still have limitations and risk a missed diagnosis preoperatively. Management of a double gallbladder can be undertaken safely with laparoscopic removal of both gallbladders at the initial operation as this avoids morbidity related to recurrent biliary disease and repeat surgery.

P248

4-Channel Single Incision Laparoscopic Cholecystectomy Using A Snake Retractor

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Introduction: Single incision laparoscopic cholecystectomy (SILC) is rapidly popular. Common technique in SILC is a 3-channel method. However, there is a certain limitation for exposure of Calot's triangle. Therefore, we report an adequacy and feasibility of 4-channel SILC using a snake retractor.

Material and methods: 480 SILC were performed between April 2010 and June 2013. 326 3-channel SILC had been performed from April 2010 to September 2012. After October 2012, we have added a snake retractor for liver retraction and modified to 4-channel SILC. 125 4-channel SILC have been performed.

Results: Previous upper GI operation history was higher in 4-channel SILC (2.1% vs. 8.0%, $p = 0.021$), a mean BMI in either group was similar (25.7 kg/m² vs. 24.9 kg/m², $p = 0.592$), a mean operating time was similar (53.0 minutes vs. 52.6 minutes, $p = 0.879$), a rate of preoperative PTGBD treatment due to acute inflammation was higher in 4-channel SILC (9.2% vs. 20.1%, $p < 0.001$), and a mean hospital stay was shorter in 4-channel SILC (3.0 d vs. 2.4 d, $p = 0.003$). Ports addition were at 6 cases (1.8%) vs. 4 cases (2.6%) ($p = 0.733$), because of cystic artery bleeding, or bile leakage from GB bed, but there were no open conversions, 6 complications (3 wound infections, 1 bile duct injury, 1 duodenal perforation, and 1 incisional hernia) were observed at 3-channel SILC, whereas 1 wound infection was observed at 4-channel SILC without significant difference. ($p = 0.773$)

Conclusion: 4-channel SILC using the snake retractor is safe and feasible. Therefore, almost all benign diseases of gallbladder could be treated with 4-channel SILC.

P249

Simultaneous Laparoscopic S8 Segmentectomy of Liver and LADG in Patient with Synchronous HCC and EGC

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Introduction: As we encounter patients diagnosed with double primary cancer, we think over a proper way of treatment. Nowadays, preferable treatment on both early gastric cancer (EGC) and hepatocellular carcinoma (HCC) is laparoscopic surgery. Various literatures have reported there are no differences with oncologic safety and feasibility between open and laparoscopic surgery for each cancer. Hereby, we report simultaneous laparoscopic S8 segmentectomy and laparoscopic-assisted distal gastrectomy (LADG) in patient with synchronous HCC and EGC.

Method: 58 year-old male patient was diagnosed with EGC and HCC (S8) during cancer screening test. He presented with a 3.9 × 4 cm sized HCC confirmed by ultrasound (US)-guided biopsy in segment 8 of the liver and 1 cm sized EGC (signet ring cell carcinoma) that is located at great curvature of antrum, and localized at mucosa without lymphovascular invasion confirmed by Endoscopic US (EUS). Laparoscopic S8 monosegmentectomy was firstly performed with 4 ports method (umbilicus and epigastrium: 11 mm, Rt. mid-abdomen and Lt. upper abdomen: 5 mm), and LADG with D2 lymph node dissection was performed later with additional 2 ports (Rt. lower abdomen: 11 mm, Lt. lower abdomen: 5 mm).

Results: An operating time was 215 minutes, and estimated blood loss was 100cc. Diet was started at postoperative day 3 and discharged at postoperative day 8 without another complications.

Conclusion: We suggest that simultaneous laparoscopic treatment for synchronous HCC and EGC would be safe and feasible method.

P250

Laparoscopic Approach for Large Polypoid Lesions and Cancer of the Gallbladder

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Introduction: An open cholecystectomy and partial liver resection has classically been advocated for gallbladder cancer that extends beyond the lamina propria, due to the potential of port site seeding and likelihood of liver involvement. We have previously reported that polypoid lesions of the gallbladder (PLG) greater than 9 mm, in patients older than 52 years of age are risk factors of existing cancer extending into the liver interface. We report our outcomes following laparoscopic cholecystectomy and partial segment 4b and segment 5 liver resections to analyze the safety and efficacy of the minimally invasive approach.

Method: Six patients (median age 69 years, 4 females) underwent laparoscopic cholecystectomy and partial segment 4b and segment 5 liver resection with periportal lymph node dissection, for either gallbladder cancer (n = 2) or large (>9 mm) PLG (n = 4). One of the patients with gallbladder cancer presented following laparoscopic cholecystectomy at an outside hospital with gallbladder cancer diagnosed on pathology, and we performed a laparoscopic partial liver resection. The second patient had CT findings suggestive of gallbladder cancer. The patients with PLG presented with lesions >9 mm on preoperative imaging including ultrasound, CT or MRI.

Results: Pathology of the specimens from the 2 patients with gallbladder cancer revealed T3N1 adenocarcinoma with > 10 mm resection margins. Of the 4 patients with PLG, one patient presented with T2N0 adenocarcinoma, one with adenomyomatous hyperplasia forming a nodule, one with cholesterosis polyp and one with cholelithiasis without an identified polyp. The one patient undergoing liver resection following prior cholecystectomy had a significantly higher estimated blood loss (1700 mL), length of hospital stay (12 days), and was the only patient in this group that required blood transfusion and an ICU admission for monitoring. The median operative time was 155 minutes, median estimated blood loss of 150 mL and median length of hospital stay of 3 days. Median follow up was 19 months for patients diagnosed with gallbladder cancer, and 1 of these 3 patients had recurrence within 16 months following resection. There was no mortality, morbidity, or port site metastasis to report.

Conclusion: Our data suggests that a minimally invasive approach is a safe and effective approach for patients with gallbladder cancer and PLG. This may benefit patients as there were no operative morbidity or mortality while providing an adequate oncologic resection with negative margins. The operative time, estimated blood loss and low length of hospital stay are encouraging for wider application of this approach.

P251

Utility Of Vessel Sealing System In Laparoscopic Hepatectomy

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Introduction: The number of laparoscopic hepatectomy (LH) has been increasing, but its technical aspect is still difficult and remains to be solved.

Purpose: We examined initial results of LH special reference to the usefulness of Vessel sealing system.

Object, Method: 31 hepatocellular carcinoma (HCC), 21 metastasis liver cancer and others 5 cases are enrolled. 5 Re-hepatectomy cases are 2 HCC recurrence and metastasis of one gastric cancer and 2 colon cancer. As for liver dysfunction cases with high ICG (>30%), one HCC explosion in 2 cases. 45 pure laparoscopic hepatectomy and 12 hybrid hepatectomy were carried out. A procedure of pure laparoscopic hepatectomy is as following; VSS (Ligasure vessel sealing system) is mainly adapted for dissection of hepatic parenchyma, and partially CUSA for deep layer with Pringle maneuver and precoagulation. Hybrid hepatectomy: We took cholecystectomy / liver mobilization in laparoscopy and performed hepatectomy by CUSA in laparotomy. ?

Result: 1 left hepatectomy, 7 lateral segmentectomy, 4 subsegmentectomy, and 45 partial hepatectomy cases. For median tumor diameter 2.0 cm, operation time 285 minutes, bleeding 100 ml, postoperative hospitalization 13 days. There is no postoperative complication including bile leakage and SSI. There were definite differences between the two procedures among those parameters.

Conclusion:

1. VSS is an effective device for transecting liver parenchyma during pure laparoscopic hepatectomy.
2. Pure laparoscopic hepatectomy could be standardization from our initial results.

P252

Agenesis of Gallbladder

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Introduction: Agenesis of gallbladder is a very rare congenital abnormality that usually has no characteristic symptomatology and maybe associated to other anatomical malformations. Many of these patients develop a typical symptomatology of biliary colic leading the patient and the surgeon to the operating room. When surgical decision is taken it is better to remain at the level of a diagnostic laparoscopy because further surgical investigation may lead to detrimental biliary tract injuries.

Methods: A 46-year-old man presented with a 1 month history of right upper quadrant pain radiating to the right scapula. Ultrasonography revealed cholelithiasis, gallbladder wall thickening, and a dilated common bile duct.

Results: The patient went to the operating room for a laparoscopic cholecystectomy, but during the laparoscopy the identification of the gallbladder was unsuccessful. The common bile duct (CBD) was identified and found dilated; the gallbladder and cystic duct were inexistent.

The CBD was drained and a T-tube was placed during the same procedure. An intraoperative cholangiogram through the T-tube was done with no filling defects and free flow of contrast into the duodenum.

Conclusion: The incidence of agenesis of the gallbladder is between 0.01% and 0.04%, or 1 in 6,000 live births. Encountering gallbladder agenesis during an operation represents a dilemma since there is no consensus for an adequate treatment when the patient is symptomatic; this prompts the conversion to an open procedure for many surgeons since some physicians have emphasized the need for a thorough surgical exploration.

Key words: Gallbladder; Agenesis of; Congenital abnormalities; Cholecystectomy.

P253

Laparoscopic Hand Sewn Repair of a Cholecystoduodenal Fistula As a Trans Operative Finding. A Case Report

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Introduction: Cholecystoenteric fistula is a rare complication of cholelithiasis, it's a spontaneous track with bile flow between an inflamed gallbladder and one or more adjacent structures (3). It's associated with chronic cholelithiasis, peptic ulcer, and neoplasia (5). Cholecystoduodenal fistula accounts for 80% of cholecystoenteric fistulas, and for 0.5–1.9% of biliary diseases (2). Incidence of 3–5% in patients with cholelithiasis (4). More common in geriatric female population (3).

Clinical manifestations nausea, fever, vomiting, backache, flatulence, intolerance to fatty meals, right superior quadrant pain, and jaundice (4). It's an occasional intraoperative finding during laparoscopic cholecystectomy (3)

US findings include gallbladder with thickened wall, calculi, adhesions to the duodenum and intra and extra hepatic pneumatosis (2).

During laparoscopy a thick-walled contracted gallbladder stuck firmly to adjoining viscera in a patient with long history of gallstone disease should alert the surgeon of the presence of a fistula (4).

The treatment of choice is by laparoscopy. The most commonly used technique is the endoscopic stapling (1); another option is the visceral hand-sewn repair after detaching the fistula (4).

Case report: 59-year-old female, with surgical history of hysterectomy and oophorectomy 13 years ago. With a 10 month right upper quadrant colicky pain.

Physical examination: Abdomen soft, depressible, normal peristaltic movements, pain at palpation of right hipocondrium, and positive Murphy's sign.

Laboratory tests: Hb: 14.1 g/dL, WC 6.340 K/uL, N: 57%, AST: 18 U/L, ALT: 137 U/L, AP: 420 U/L, GGT: 430 U/L, LDH: 174 U/L.

External ultrasound: presence of vesicular lithiasis.

Laparoscopic cholecystectomy

We observed multiple adherences to duodenum, a scleroatrophic gallbladder, with a cholecystoduodenal fistula.

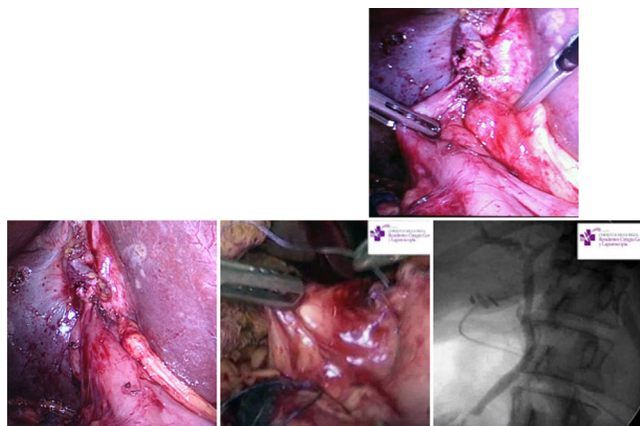
Posteriorly we liberated and resected the fistula, repaired the defect on the duodenum with inverted 3-0 polyglactin 910 sutures and Lembert stitches with silk.

Pneumatic, methylene blue test, and cholangiography without evidence of leaks.

Cholecystectomy was realized and a # 19 Blake drain was introduced. Operative time of the procedure was of 127 min without complications.

Patient was admitted to surgical ward, with NPO and 5 days of TPN, started oral liquids at the sixth day, and discharged at the seventh day. The drain presented a daily average of 90 cc of serous discharge and was removed at the tenth day.

Conclusions: The ability of a surgeon to identify intraoperatively fistulas is very important for it's correct management. Even tough the endoscopic stapling is the standard of care; the laparoscopic hand-sewn technique is feasible and secure, like it was demonstrated in this case.



P254

Effect of Pre-Operative Bilirubin Levels on Post-Operative Mortality and Morbidity After Pancreatico-Duodenectomy For Pancreatic Cancer. An Analysis of 4850 Patients from NSQIP Database

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Introduction: Malignancy in the head of the pancreas can cause obstructive jaundice. There have been multiple studies in the past to evaluate the effect of high bilirubin levels on the post-operative mortality and morbidity however, the large database studies are lacking. In this study we used ACS NSQIP database to find whether high bilirubin levels in patients undergoing pancreatico-duodenectomy [PD] for pancreatic cancer have any effect on their intra-operative or 30 day post operative complications.

Method: Patients who underwent PD for pancreatic cancer were selected from NQIP database for year 2005 to 2011. Patients who were ventilator dependent, having current pneumonia or SIRS/sepsis as well as who had undergone previous chemotherapy or radiotherapy were then excluded. They were then analysed for intra-operative and 30 day post-operative complications after standardizing them for various pre-operative variables such as sex, race, BMI, ASA classification, pre-operative creatinine, hematocrit and serum albumin levels. Primary outcome variable was 30-day mortality. Secondary outcomes included intra and post-operative transfusion, operative time, surgical site infections, sepsis, various pulmonary and cardiac complications, renal failure, return to OR, hospital stay and DVT. Analysis was done using SASS software. For the numeric variables we ran an analysis of covariance (general linear model) with both categorical and numeric explanatory variables. For the dichotomous response variables, the same model was run, but we assumed a binary response and hence a generalized linear model was conducted with the same explanatory variables.

Results: Total of 4580 patients were included in the analysis. There was no increase in 30 day mortality with increase Bilirubin levels. However, post operative morbidity with high bilirubin levels was statistically significant for increases in post-operative bleeding (2.68 vs 3.37; $p < 0.001$), incidences of deep venous thromboses (2.23 vs 2.76, $p < 0.001$) total operative time ($p < 0.05$) and intra operative complications (2.74 vs 6.25; $p < 0.05$) including unplanned intubation and myocardial infarctions. Further, no association with surgical site infections or overall length of stay was seen with increased bilirubin.

Conclusion: Higher Bilirubin levels are associated with increased post-operative complications, however with no increase in mortality. These data suggest that biliary drainage procedures should be considered for patient undergoing PD for pancreatic cancer.

P255

Usefulness And Limitations Of The One Step Approach To Managing Biliary Pancreatitis

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Introduction: A safe and accepted approach to managing biliary pancreatitis is to allow the pancreatitis to "cool off" before performing a cholecystectomy with intra-operative cholangiogram (IOC). Another approach is to perform a cholecystectomy within the first 36 hours of admission, unless other medical issues contraindicate surgical intervention. An endoscopic retrograde cholangio-pancreaticogram (ERCP) is performed synchronously or metachronously to ascertain the status of the bile duct. With the UNSOM/UMC Las Vegas experience and success of performing ERCP in the supine position during laparotomies, it became possible to study the usefulness and limitations of intra-operative ERCP in the management of biliary pancreatitis.

Methods and procedures: During a four year period, over 200 patients have successfully undergone intra-operative ERCPS [INOPERC] at the time of cholecystectomy. For this study, 20 patients diagnosed with biliary pancreatitis were selected and consented for: Laparoscopic, possible open, cholecystectomy with IOC; ERCP [INOPERC] with papillotomy and stone extraction, and possible insertion of biliary stent. All consented patients were operated on and an IOC obtained. If the IOC was omitted for technical reasons, an ERCP was still performed as long as the pre-op diagnosis was certain for biliary pancreatitis. If the IOC was negative for bile duct pathology, ERCP was omitted. All ERCPS were performed exclusively by the surgical team.

Results: The One Step approach to biliary pancreatitis has several limitations, including its limited utility when multiple or large (>2 cm) bile duct stones are present as this often requires multiple ERCPS to clear the common bile duct. Also, performance of ERCP is technically more challenging in the supine position. Additionally, equipment and staffing required to perform the laparoscopic cholecystectomy with IOC and ERCP in one anesthesia are potential challenges, but can be easily resolved with properly trained radiology and endoscopy crews and with tolerant anesthesiologists and operating room staff. Overall, the procedure has proven its usefulness because ERCP is better tolerated with general anesthesia than with sedation, and successful completion of the One Step eliminates the need for subsequent ERCP in most cases of biliary pancreatitis. The One Step Lap Chole has been shown in a previous study at UNSOM/UMC to reduce hospital costs and length of stay.

Conclusions: The One Step Laparoscopic Cholecystectomy offers a rational approach to the management of patients with biliary pancreatitis. It has already been shown to reduce hospital costs and can be adapted to the surgical treatment of other obstructing diseases of the biliary tree.

P256

Microbiology and Antibiotic Prophylaxis in Laparoscopic Cholecystectomy

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Background: The use of antibiotics in laparoscopic cholecystectomy (LC) is well established. Type of antibiotics, prophylaxis purpose, and period after surgery varies significantly among surgeons. The purpose of this study was to determine the microorganism in bile of patients who underwent LC related to symptom of gallstones.

Materials and Methods: Twenty-six patients with symptomatic gallstones undergoing elective LC in our institution were prospectively reviewed. The characteristic of patient included demographic data, microorganism, and length of stay, type of operation, indication for surgery, pathological finding, antibiotic type and reason of antibiotic use. We sent bile from gallbladder for culture in all cases. Patients were divided by indication for surgery into 2 groups; group 1: symptomatic gallstones without previous biliary tract infection and group 2: gallstone with history of previous biliary tract infection.

Results: From May 2013 to September 2013, 26 patients (19 F, 7 M) had mean age 60+13.97 years (28–80). Overall rate of uneventful LC was 76.92%. We had 5 cases accidental ruptured gallbladder during surgery and one case converted to open surgery. Between group 1 (17 patients) and group 2 (9 patients), rate of positive bile culture was not statistically different (29% and 44%, $p=0.44$). The common organisms of bile culture were *Escherichia coli* (55.26%) and *Klebsiella pneumoniae* (22.22%). An antibiotic that has been used in this study was third generation cephalosporin (65.38%) with prophylaxis reason was 53.86% and the other for treatment. No wound complication occurred in this study. Mean length of stay was 3 days after surgery.

Conclusions: Based on our study, there was no significant difference in the rate of positive bile culture between the two groups. The third generation cephalosporin was the common antibiotic for the prevention and treatment of wound infection following elective LC. *Escherichia coli* was the most common organism that was found in bile culture among these patients.

P257

A Diary of a Laparoscopic Surgeon in Africa

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Background: EGYPT feels the importance of giving support and building partnership with Nile basin Countries in their development path especially the medical field

Activities: the author was a team member 10 health convoys 6 surgeons of different specialties. These convoys went to Nile Basin Countries All the convoys were on volunteering basis they had educational, surgical and social activities from July 2011 to October 2012 more than 300 different operations were performed 2 basic laparoscopic courses were made we used to send all the needed equipment to our African destination: in Sudan "University of Khartoum" and in Kampala "Malago Hospital" 26 doctors were trained.

Conclusion: Nile Basin countries are in bad need of medical educational and health care support this support should be structured, sustainable and effective -EGYPT can be a hub for tri-partnership between western countries, Egypt and Africa.

P258

Laparoscopic Peritoneal Entry After Abdominoplasty; A New Technique

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Introduction: Vertical midline fascial plication is a procedure commonly used during standard abdominoplasty in order to correct diastasis of the rectus abdominus muscles. This permanently distorts the fascial anatomy of the anterior abdominal wall, creating a double midline fascial layer, which can interfere with a standard open periumbilical abdominal entry technique if the patient requires laparoscopic surgery.

Methods and Procedures: A small horizontal skin incision is made along the pre-existing circumumbilical scar from the previous abdominoplasty, and is deepened to expose the layer of rectus abdominus muscles. The fascia is grasped on each side of the midline with Kocher clamps and elevated, then a vertical incision is made in the plication scar with a scalpel. Any remaining suture material from the abdominoplasty is removed. Stay sutures are placed in both sides of the plicated tissue and then the muscles are retracted laterally with "S" retractors in order to expose the true anatomical midline linea alba. This fascial layer is then grasped with Kocher clamps, elevated, and incised vertically with a scalpel. The anatomical fascia is retracted laterally in order to expose the peritoneum, which is grasped and incised, allowing introduction of the Hasson cannula into the abdominal cavity. The stay sutures are secured to the cleats of the Hasson trocar and pneumoperitoneum may be achieved. Once the intra-abdominal portion of the procedure is complete, the Hasson is removed and the plicated muscles are re-closed using the stay sutures placed in the beginning of the procedure.

Results: Twenty-four consecutive patients with a previous history of abdominoplasty with midline fascial plication, all women, underwent elective laparoscopic cholecystectomy. Peritoneal entry was successfully achieved in all patients by a surgical trainee under the supervision of the authors using the technique described above. All patients were evaluated in the office setting four weeks postoperatively. No intraoperative or postoperative complications or incisional hernias occurred.

Conclusions: Midline peritoneal entry under direct vision can be safely and expeditiously achieved with a modified open technique after previous abdominoplasty with vertical midline plication. Using the existing scar and closing the plicated fascial layer maintain the cosmetic result of the previous abdominoplasty.

P259

Motion Sickness in the Operating Rooms – Effect of Minimally Invasive Techniques

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Introduction: The incidence of visually induced motion sickness in health care providers in the era of minimal invasive interventions has not been previously studied. Anecdotal reports suggest that motion sickness symptoms are more prevalent in laparoscopic and endoscopic procedures due to high visual demand during such procedures. The purpose of this study is to assess symptoms of motion sickness among health care providers during open and minimally invasive operations.

Methods: There were 80 subjects, consisting of 31 surgeons, 16 scrub nurses, 18 circulators, and 15 anesthetists. All subjects were surveyed within 30 minutes of completing a daytime scheduled surgical procedure. Half of the subjects were involved in an open traditional operation (open = 40), while the other half were involved in a minimally invasive procedure (endoscopic or laparoscopic, MIS=40). The widely used Simulator Sickness Questionnaires (SSQ, Kennedy et al., 1993) was administered to subjects in the operating room or the recovery area. Nausea, oculomotor problems, and disorientation were assessed with the SSQ's 16 symptoms on a 4-point scale survey and a total SSQ score was calculated. Subjects' demographics and procedure details were also collected. Averages \pm standard deviations are reported. Mann-Whitney and chi-square tests were used to compare the two groups. Multiple regression analysis was performed to identify variables associated with motion sickness symptoms.

Results: There were no significant differences among study groups in terms of age, height, weight, procedure duration, OR room temperature, subjects' years of experience, or incidence of previous experience with motion sickness symptoms during past operations [25% (10/40) for Open, and 27.5% (11/40) for MIS ($p=0.8$)]. There was no difference in the number of symptoms reported just prior to the case [7.5% in either group (3/40 MIS and 3/40 in open)]. Total SSQ scores were 10 ± 17 and 14 ± 19 ($p=0.5$) for Open and MIS groups respectively, while the subscores for nausea, oculomotor and, disorientation were 7 ± 12 and 8 ± 12 ($p=0.6$), 11 ± 17 and 13 ± 18 ($p=0.7$), and 7 ± 22 and 14 ± 26 ($p=0.3$) for the Open and MIS groups respectively. While scores trended higher for MIS cases, none of the differences were significant. The best predictors of post-surgery symptoms were pre-surgery symptoms and weight (kg).

Discussion: OR personnel may be at slightly higher risk for motion sickness symptoms during MIS procedures, and especially those susceptible to motion sickness. Previous research on body weight supports a "postural control" theory of motion sickness causation. Further investigation geared towards identifying procedures more likely to induce motions sickness is warranted. As visually demanding newer stereotactic interventions emerge, motion sickness for OR health care providers might become a more prevalent problem (Fig. 1).

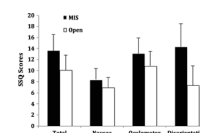


Fig. 1 Average total Simulator Sickness Questionnaire (SSQ) scores, SSQ subscores for nausea, oculomotor, and disorientation. The error bars represent standard error

P260

Operating in the Comfort Zone: Interns Perform Better with Straight over Articulating Instruments

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Introduction: Laparoendoscopic Single-Site surgery (LESS) is a surgical technique performed using a single, small incision typically within the patient's umbilicus. LESS presents several technical challenges for the surgeon compared to conventional laparoscopy: a single incision causes intra- and extra-corporeal collisions, limits the ability to triangulate instruments, and the view of instruments is inline and transposed (i.e., the surgeon's right instrument operates on the left side). As an emerging technique surgeons have relied upon conventional laparoscopic instrumentation, which were not designed specifically for LESS. To enable surgeons to perform LESS more efficiently, effectively and most importantly safely, research must identify and eventually enhance the performance abilities of such instruments for surgeons. As an initial step toward technique and instrumentation optimization, the aim of this study was to objectively compare the technical performance and usability of three different instruments (one straight and two articulating) within a LESS training simulator.

Methods and Procedures: Twelve surgical interns volunteered to perform the Fundamentals of Laparoscopic Surgery (FLS) peg transfer task in a specially designed single-port trainer (Brown-Clerk et al., 2011). Each participant donned surgical gloves, completed a 5 minute hands-on familiarization period and then performed the peg transfer within the validated LESS box trainer (Brown-Clerk et al., 2011), using pairs of ENDOPATH Dissectors (Ethicon Endo-Surgery, Inc., Cincinnati, Ohio), SILS Dissectors (Covidien, Mansfield, Massachusetts) and Autonomy Laparo-Angle Maryland Dissectors (CambridgeEndo, Framingham, Massachusetts) in a random order.

Results: The mean time to complete the FLS peg transfer task was significantly less using the pair of straight tools (ANOVA, $p = 0.005$). Participants performed comparably using all instruments with respect to errors. Although there were more total recoverable errors (i.e., dropped pegs that were picked up and successfully transferred) than non-recoverable, the total number of errors did not differ across instruments.

FLS Time and Errors by Laparoscopic Instrument Type

INSTRUMENT	TIME (sec)		Errors (counts)		
	Mean	Std Dev	Recoverable	Non-recoverable	Total
Cambridge	239	67.3	8	0	8
Covidien	223	46.3	6	3	9
Straight	163	22.7	6	2	8

Discussion: Even with a similar number of total errors, trainees performed significantly faster when using standard straight laparoscopic instruments in the LESS environment. This study suggests that articulating tools may not be intuitively understood by surgical interns. Given the inherent complexity of articulating instrumentation, further work to characterize the learning curves of surgical trainees for LESS is needed to better understand the true potential of the instrumentation and understand the training needed in order to attain and maintain proficiency.

P261

Surgeon Stress Performing Single-Port Vs Traditional Laparoscopic Cholecystectomies

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Introduction: There is an increasing preference for and documentation of benefits to patients undergoing laparoscopy, these benefits come at the expense of the surgeon in terms of posture as well as increased fatigue- with a higher load for single incision surgery over traditional laparoscopy, as shown in trainees. More than 750,000 patients per year undergo a laparoscopic cholecystectomy in the United States. With this large volume of procedures, there is a clear advantage in achieving patient and provider health, safety, and satisfaction. Therefore the goal of this study is to measure surgeon stress during single incision (SILC) versus traditional 4-port laparoscopic cholecystectomy using the Surg-TLX and other metrics after each surgery.

The stressors for the surgeon come mainly from the tools in the operative environment. The instrumentation for SILC is inserted through a single incision, creating technical challenges including hand collisions, in-line and transposed view of the instruments, and the surgeon's close proximity to assistants which may increase the duration of surgeries, as well as the cognitive and physical stress on the surgeon, in turn leading to preventable errors that impact patient outcomes.

Methods: The surgeon completed a survey including Surg-TLX (Wilson, 2011) and added questions (Beurskens et al., 2000; Trejo et al. 2006; Vassiliou, 2005) after they performed operative cases within a double-blind randomized controlled trial for single port versus four port cholecystectomy (NCT0148943). Thirty surgeries were studied, two converted from SILC to 4-port and were eliminated from the analysis. Kruskal-Wallis non-parametric ANOVAs on the dependent variables of the surgeon rating values by the variable of access (single-port vs 4-port) were performed with $\alpha=0.05$ from 13 SILC and 15 4-port surgeries.

Results: Significant dependent variables were the Surg-TLX question on physical demand ($p = 0.033$), answers to the questions of the surgeon feeling the instruments were awkward to manipulate ($p < 0.001$) and s/he were not able to perform fine or precision motions ($p = 0.018$), with SILC significantly worse than traditional 4-port. Non-significant differences were found for length of surgery (median times for SILC = 71 min and 4-port=72 min), the Surg-TLX combined score, mental demand, complexity, degree of difficulty, difficult dissection, situational awareness, temporal demand and tiredness after the operation.

Conclusions: The survey worked well as a rating tool. Differences between the access were primarily physical. The stress of SILC vs. 4-port surgeries was demonstrated with the question about the physical demand (how physically demanding was the procedure?) with the median score of 9.5 out of 20 for SILC and 5.5 for 4-port. The post-surgery surgeon rating of their ability to perform fine or precision motions and the feeling that the instruments were awkward to manipulate was also significantly worse for SILC than 4-port. More interesting results were those that were non-significant, most notably the length of surgery. Other metrics that were expected to differ significantly were mental demand ($p = 0.392$), degree of difficulty ($p = 0.531$) – they were not even close. This may be due to the surgeon's familiarity with SILC. The mental demand and situational awareness might be an issue for a less-experienced SILC surgeon.

P262

Fatigue Quantification In Laparoscopic Surgery: A Recurrence-Analysis Based Approach

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Introduction: Muscle fatigue is an important consideration for minimally invasive surgeons with expanding case volumes. However, few objective methods have been used to quantitatively evaluate surgeon muscle fatigue. Recurrence analysis of surface electromyography (sEMG) data assesses the level of determinism in muscle activation patterns (%DET), and has been used to evaluate fatigue in other disciplines. Highly deterministic patterns of muscle activation indicate well-practiced, fatigue-free actions. We hypothesized that the %DET of sEMG data collected from the upper extremity and upper back muscles of a surgeon during laparoscopic surgery performance would decrease over the duration of the surgical cases, indicating muscle fatigue.

Methods: One right-hand dominant surgeon performed 11 laparoscopic surgical procedures while sEMG data was collected from the bilateral biceps, triceps, deltoid, and trapezius muscle groups. Recurrence analysis was performed on the sEMG data to determine %DET. We pooled %DET data from the first ten minutes (F10) and the last ten minutes (L10) of the operative procedures, and compared mean %DET from each muscle group using unpaired t-tests. Differences with a p-value < 0.05 were considered to be statistically significant.

Results: The mean duration of analyzed operative cases was 52.0 ± 21.0 minutes. Mean %DET data are shown in the table below. Significantly greater levels of %DET were noted in the right biceps and right deltoid muscles during the first ten minutes compared to the last ten minutes of surgical procedures.

Recurrence-based analysis of sEMG data collected from a surgeon performing laparoscopic procedures can be used to highlight differences in muscle fatigue during surgical cases. Our data suggest that muscle fatigue occurred primarily in the dominant upper extremity when the first and the last ten minutes of procedures were compared. Data from multiple surgeons are necessary to verify these findings.

	Mean %DET	
	First 10 minutes	Last 10 minutes
Left Biceps	52%	44%
Left Triceps	54%	45%
Left Deltoid	50%	45%
Left Trapezius	35%	29%
Right Biceps*	46%	33%
Right Triceps	45%	37%
Right Deltoid*	52%	34%
Right Trapezius	44%	40%

* $p < 0.05$

P263

Ergonomic Analysis Of Basic And Advanced Laparoscopic Procedures

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Introduction: A majority of laparoscopic surgeons report chronic musculoskeletal complaints. These complaints are associated with high laparoscopic case volume. We seek to quantify the ergonomic challenges of laparoscopic surgery using surface EMG (sEMG). We compare the ergonomic stress associated with performing basic and advanced laparoscopic procedures, as defined by the ACGME. We hypothesize that a significantly higher degree of ergonomic stress, as quantified by sEMG data, will be associated with advanced laparoscopic cases when compared to basic laparoscopic cases.

Methods: One right-hand-dominant surgeon performed 13 laparoscopic procedures (9 advanced, 4 basic) while sEMG data was collected from bilateral bicep, tricep, deltoid, and trapezius muscles for the duration of each case. Data was analyzed in 1-minute segments. Average muscle activation (%MVC) was calculated for each muscle group during each procedure. We compared mean %MVC values between basic and advanced laparoscopic cases using unpaired t-tests.

Results: Mean activation of left bicep, tricep, and deltoid muscles, and right tricep and trapezius muscles are significantly elevated during advanced compared to basic laparoscopic procedures (see table).

Conclusions: sEMG quantified ergonomic differences between basic and advanced laparoscopic procedures. Statistically significant differences were noted in five of eight muscle groups during advanced laparoscopy. These findings suggest that advanced laparoscopic procedures are more ergonomically challenging. Surgeons who specialize in advanced laparoscopy may therefore face heightened ergonomic risks.

Muscle Group	%MVC basic	%MVC advanced
Left Biceps*	2.5	3.3
Left Triceps*	2.3	4.4
Left Deltoid*	2.6	4.3
Left Trapezius	5.8	5.1
Right Biceps	4.8	4.3
Right Triceps*	4.2	6.4
Right Deltoid	2.8	2.6
Right Trapezius*	5.8	7.1

* p < 0.05

P264

Evaluation Of Vessel Sealing Performance Of Ultrasonic Devices In A Porcine Model

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Introduction: As new technologies emerge, it is imperative to define which new devices are most likely to provide a reproducible, effective result for the patient and surgeon, while remaining cost effective. The purpose of our study was to analyze the three most commercially available ultrasonic energy devices; the Sonicision™ (SC) (Covidien, USA), the Harmonic ACE™ (HA) (Ethicon Endo-Surgery, USA), and the THUNDERBEAT™ (TB) (Olympus, Japan).

Methods: Intra-abdominal vessels (artery and vein) from eight female Yorkshire pigs (30–35 kg) were harvested. Three devices were evaluated and compared to each other with respect to seal failure and cutting speed in vivo. After harvest, one vessel end was sent for histological evaluation, and the other used for blinded burst pressure measurement. Coagulation and cut levels of all generators were set up similarly and consistently throughout the study.

Results: Eighty-four vessels (47 arteries and 37 veins) were tested. Mean vessel diameter was equal among groups: SC (n = 29) 4.3 ± 1.3 mm, HA (n = 29) 4.0 ± 1.7 mm, and TB (n = 26) 4.0 ± 2.1 mm. There were equal numbers of arteries and veins in each group. Cutting speed was significantly faster with TB (3.4 ± 0.7 seconds versus SC 5.8 ± 2.4 and HA and 6.1 ± 3.1) (p < 0.0001). Burst pressure after ligation with TB (505.4 ± 349.4 mmHg) was higher than that of the SC and HA (435.8 ± 403.0 and 437.6 ± 291.3, respectively), though not statistically significant. There were no seal failures in the TB group, and two in each the SC and HA groups (vessel diameter 3.1–7.0 mm).

Conclusion: TB provides the most rapid and reliable seal in a porcine model and may result in decreased operative time and less blood loss.

P265

ETrack: An Affordable Ergonomic Assessment Tool for Surgical Settings

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Introduction: Ergonomic assessment for surgeons and evidence based medical simulation are increasingly recognized as enablers for more productive and safer clinical operations. These can be performed by gathering in-depth information about practitioner's interactions within their working environment. However observation techniques that can be performed by non specialists are crude, requiring pen and paper notation. The ideal solution, advanced motion tracking platforms such as those used in the film industry, can only be afforded by large institutions, require an expert to run and require the practitioner to be covered in precisely placed reflective markers or electronic sensors, which can interfere or prove hazardous with the aseptic environment. We present here the ETrack, a motion tracking solution that requires no markers, uses low cost hardware, is simple to set up and compact to transport.

Methods and procedures: The ETrack (www.aehrc.com/eTrack) posture capture tool uses Microsoft's Kinect Infra Red tracking hardware for posture capture. This technology was designed primarily for computer games and is a low cost (RRP \$249 USD) markerless tracking solution. ETrack (Fig. 1), a Microsoft Windows 7 program enables the researcher to visualize the surgeon being tracked, in real-time, as an animated two-dimensional distance map. Prior to recording posture data, the researcher can select points of interest on the tracked skeleton to be recorded. During recording, the xml data file is populated with position data and a time stamp at a rate of 30 times per second. The software tool provides pre-programmed flag buttons and a free text option to highlight or note positions of interest in real-time for post analysis. In addition to real time posture and position capture, retrospective analysis of scenes captured using the Kinect Studio recording platform (a free Microsoft tool) can be performed.

Results and Conclusions: ETrack has been successfully used in a published bronchoscopy posture analysis study. The software is free and a simple interface makes the tool simple to use for those without advanced computer programming skills. The exchangeable xml data format can be simply loaded into most analysis software. An xml loading package for R is provided.

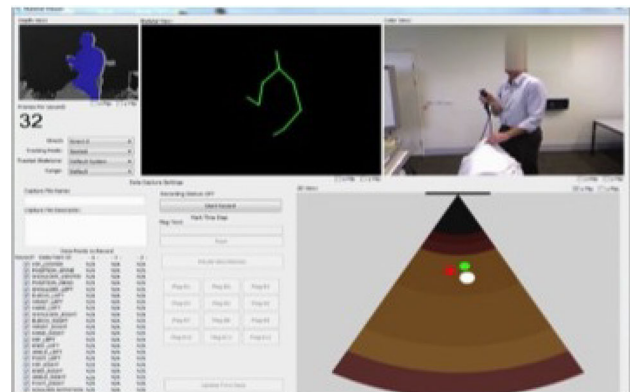


Fig. 1 ETrack. Posture and position capture software. (top left) Visualisation of captured depth map. (top middle) A 3D skeletal view of a practitioner's movements. Shown visualising upper limbs only. (top right) A camera view of the practitioners interactions. (bottom right) A 2D distance view of the practitioners head (white) right hand (green) and left hand (red) from the motion sensor (top black bar). (bottom centre) A set of buttons to flag particular poses during a procedure. (bottom left) Users can select points of the tracked skeleton they wish to record

P266

Evaluation of Eye & Hand Fatigue in 3D vs. 2D Display Systems for Surgical Novices During Laparoscopic Suturing; A Randomised Control Trial

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Background: The available data reports the efficacy of the 3D vision system and its superiority to 2D. However the physiological effect of 3D on surgeons remains unaddressed.

Aims: We aimed to objectively investigate the effect of 3D on ocular and hand muscles fatigue in comparison to 2D and its impact on surgical performance in novices.

Methods: We conducted a stratified randomised comparative study with cross-over of 13 novices. Eye fatigue assessed using Visual Stress Test (VST), Visual Acuity (VA) and post-study display questionnaire. Hand fatigue was assessed using grip dynamometer (GD). Surgical performance was evaluated using a validate curriculum with proficiency criteria; the Fundamentals of Laparoscopic Surgery curriculum.

Results: The VST showed a higher mean score in the 3D group of 3.92 in comparison to the 2D group with mean of 3.15, (P-value = 0.23). It is apparent from VA test that the 3D group had a better VA on both eyes compared to the 2D group after performing the suturing task (right eye; P-value = 0.29, left eye P-value = 0.47). There was no statistical difference in handgrip strength between both display groups (right hand; P-value = 0.55, left hand P-value = 0.70). The 3D group demonstrated statistically evident superior performance in terms of less slippage errors (P-value = 0.003) and gap errors (P-value = 0.015), number of repetitions and accuracy were similar in both groups (P-value = 0.81 and P-value = 0.20 respectively).

Conclusion: 3D offers superior visual feedback that positively reflects on the VA and accuracy which in turn favourably impact training and patient safety.

P267

The Impact of Helicobacter Pylori on the Complications of Laparoscopic Sleeve Gastrectomy

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Background: Helicobacter Pylori (H. Pylori) is a very common bacterium present in the gastric tissue of up to 50% of people and the mucosal damage it causes can predispose to multiple co-morbid conditions. This study aims to observe the prevalence of H. Pylori infection in patients undergoing laparoscopic sleeve gastrectomy (LSG) and its correlation with post-operative complications.

Methods: A retrospective study was done of the gastric pathology specimen results of 682 patients who underwent LSG at Amiri Hospital from 2008 to 2012. Symptomatic patients had pre-operative upper gastro-intestinal endoscopies (UGIE) based on the decision of the treating surgeon, along with campylobacter-like organism test (CLO-test) for H. Pylori detection. The intra-operative excised gastric specimen was sent for histopathological assessment of H. Pylori and the patients were followed up for complications.

Results: Of the 682 patients, 629 (92.2%) were found to be H. Pylori negative intra-operatively, while 53 (7.8%) were positive. A total of 32 (4.7%) patients were found to have post-operative complications, of which 2 (6.3%) had H. Pylori intra-operatively. No statistical significance (p = 0.71), however, was seen between the overall complication rate and H. Pylori. Specifically, there were five (0.7%) cases of leak and eight (1.2%) cases of neuropathy, both of which were not significantly associated with H. Pylori (p = 0.33 and p = 0.12 respectively). All the other complications had no evidence of H. Pylori.

Conclusions: There appears to be no association between H. Pylori infection and post-LSG complications. Further studies with larger sample sizes are warranted, however, to fully address this issue.

P268

Roux-en-Y gastric bypass for super obese patients: what approach?

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Background: Super obese (SO) patients with a Body Mass Index (BMI) ≥ 50 kg/m² still represent a real anesthesiological and surgical challenge. While the best procedure to perform in this population remains unclear, robotic technology has been proposed to accomplish Roux-en-Y gastric bypass (RYGB). The study aim is to report our experience of robotic RYGB for SO and to compare it to open and laparoscopic surgery.

Methods: From July 1997 to March 2013, all the consecutive RYGB for SO have been prospectively collected in a dedicated database and reviewed retrospectively. One hundred and ninety-nine SO patients were operated on: 51 by a robotic approach (25.6%), 53 by a laparoscopic approach (26.6%), and 95 using an open approach (47.7%). Peri- and post-operative data has been compared between the three approaches.

Results: There were more male patients in the robotic group, but with a slightly lower BMI. The operative time was longer for the robotic (+28 minutes) and laparoscopic (+22 minutes) groups in comparison to the open group (p < 0.05). Overall, there were less conversions (p = 0.16), less postoperative complications (p > 0.05), less reoperations (p < 0.05), and a shorter hospital stay (p < 0.05) in the robotic group, in comparison to other groups.

Conclusions: Robotic RYGB can be performed safely in super obese patients, with results that compare favorably to laparoscopic and open surgery. However, the robotic approach has a longer operative time. The exact role of robotics for super obese population needs to be clarified in larger and randomized trials before drawing definitive conclusions.

P269

Laparoscopic Revision of Vertical Banded Gastroplasty to Sleeve Gastrectomy for Gastric Outlet Obstruction: Early Experience in 18 patients

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Introduction: The long-term effectiveness of Vertical Banded Gastroplasty (VBG) is limited due to development of complications related to gastric outlet obstruction at the band site. Surgical reversal or conversion to Roux-en-Y gastric bypass has been the mainstay of treatment for complications. The purpose of this study was to assess outcomes of revising VBG to laparoscopic sleeve gastrectomy (LSG) in patients presenting with gastric outlet obstruction.

Methods: We retrospectively reviewed 18 consecutive patients that underwent revision of VBG to LSG for gastric outlet obstruction, from 2008 to 2012, in an academic institution.

Results: The mean age of the patients was 47 ± 11 years (89% females), with mean preoperative BMI of 36 ± 8 kg/m². Comorbidities included diabetes (n = 1) and hypertension (n = 5). The mean length of time from the original VBG was 10 ± 7 years. Gastric outlet obstruction, diagnosed by EGD and UGI, was present in 100% (n = 18). Intolerance to solid food was present in 40%, while 45% had reflux symptoms. The mean operative time was 187 ± 50 min. There was one conversion to open sleeve gastrectomy secondary to dense adhesions. There were two staple-line leaks (11%) requiring reoperation. There were no perioperative bleeds and no deaths. Symptom resolution was observed in 95% of patients. Postoperative BMI was 33 ± 6 kg/m² at 15-month follow-up.

Conclusion: Revision of VBG to LSG is a safe and feasible option for patients presenting with gastric outlet obstruction with low BMI. This procedure alleviates gastric outlet obstruction, while maintaining gastric restriction.

P270

Laparoscopic Sleeve Gastrectomy After Previous Pyloromyotomy For Infantile Hypertrophic Pyloric Stenosis. Case Report And Discussion of LSG-Mediated Weight Loss Mechanism

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Introduction: The mechanism of the laparoscopic sleeve gastrectomy (LSG)-mediated weight loss remains a topic of active investigation. Considered a restrictive procedure, LSG is thought to limit the amount of food that can be consumed and induce weight loss. This requires preserved gastric emptying. Foregut pathology and surgery, in particular infantile hypertrophic pyloric stenosis (IHPS) and pyloromyotomy, have a significant impact on gastric motility. However, the impact of previous pyloric drainage procedures on restrictive bariatric surgery has not been investigated. We report a case of a LSG performed in a patient who underwent a previous pyloromyotomy for IHPS as an infant and offer insight into the LSG-mediated weight loss mechanism.

Methods: The patient is a 32-year-old female, 5 feet 6 inches tall with a weight of 343 pounds and a body mass index (BMI) of 55.4 kg/m². Relevant past medical history included asthma, sleep apnea, gastroesophageal reflux disease, hypertension, hypercholesterolemia and polycystic ovarian syndrome. Abdominal past surgical history included laparoscopic cholecystectomy and pyloromyotomy as an infant for IHPS. She denied smoking and reported occasional alcohol ingestion. A LSG over a 34-French Bougie was performed. On postoperative day number one a routine esophagram was performed, which was unremarkable and the patient was discharge home.

Results: Postoperatively, weight loss was excellent following the procedure. Her weight at nine-month follow up visit after her surgery was 235 pounds (net weight loss: 108 pounds, excess weight loss: 50.7%). At her latest follow up visit she was tolerating solid foods without difficulty with no adverse symptoms following the surgery.

Conclusion: The pylorus plays an important role in the regulation of gastric emptying by acting as a brake to the passage of food. The potential impact that the gastric resection in LSG might have on pyloric function and gastric emptying in patients who underwent pyloromyotomy in infancy is unknown. The patient presented had excellent weight loss comparable to patients without pyloromyotomy and no adverse symptoms following surgery. We review the literature and discuss the mechanistic explanation of the successful LSG-mediated weight loss in this setting. The present is the first report suggesting that pyloromyotomy is clinically insignificant when considering LSG.

P271

Does the Surgeon Experience Interfere with the Leak Rate After Laparoscopic Sleeve Gastrectomy?

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Introduction: Laparoscopic Sleeve Gastrectomy (LSG) is becoming a very common bariatric procedure, based on several advantages it carries over more complex bariatric procedures. LSG is generally considered a straightforward procedure, but the surgical technique is one of the major determinants of the most feared complication- staple line leak.

Methods: The purpose of this study was to analyze the correlation between the surgeon's experience and the leak rate and to assess different risk factors for developing gastric leak after LSG. We reviewed a single surgeon's experience since the introduction of LSG (1500 procedures), we compared yearly the leak rate and analyzed for possible risk factors.

Results: A total of 1500 LSG was performed in La Casamance Private Hospital between september 2005 and july 2013. Eighteen cases (1.2%) of gastric fistula were recorded. Of these, 17 patients were women (94.4%) with a mean age of 39.4 years (range 22–61) and mean BMI of 41.2 kg/m² (range 34.8–57.1). On an yearly basis, the leak rate was 2.63% (2006), 5.66% (2007), 0% (2008), 2.55% (2009), 1.63% (2010), 0.81% (2011), 0.3% (2012), 0.37% (2013). In group A (the first 750 cases) there were recorded 16 cases of gastric leak and in group B (the last 750 cases) ???. Using Fisher's Exact Test between the 2 groups, the recorded p- value was 0.0012. Only one leak was recorded in the superobese patients (5.5%) with no statistical difference versus general population with super-obesity (182 cases—12.1%).

Conclusions: The LSG can be performed safely with a low complication rate. Even if LSG is considered a technically simple bariatric procedure, still, the most feared complication remains the gastric fistula. This review of a large series of a single surgeon's experience demonstrated that the leak rate after LSG could be significantly reduced by surgeon's experience.

P272

Comparison Of Laparoscopic And Open Revision Roux-en-Y Gastric Bypass

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Introduction: Revision Roux-en-Y gastric bypass (RRYGB) is performed in patients who have undergone bariatric surgery, but experienced recidivism or complications which have failed medical management. Traditionally, revisions have been approached in an open fashion given the high risk of anastomotic leak (as high as 20%) and other morbidities. The purpose of this study is to compare outcomes of patients who have undergone laparoscopic and open RRYGB.

Methods: A retrospective review of clinical data from all patients who had undergone RRYGB at a single institution was performed. The data on pre-operative co-morbidities, operative variables, and post-operative outcomes were collected and analyzed using t-test and chi square with Yates' correction.

Results: Ninety-six RRYGB were performed of which 17 were laparoscopic. There was no significant difference in preoperative comorbidities of gender, age, BMI, diabetes, hypertension, or sleep apnea. Average follow up was 20.3 months. Laparoscopic RRYGB was performed with a significantly lower blood loss and a trend towards a shorter operative time, and higher % excess weight loss (%EWL) when compared to open RRYGB. There was no significant difference in surgical morbidity, mortality, ICU days or length of stay between laparoscopic and open RRYGB (Table 1). The anastomotic leak rate for open revisions was 2.5%. There were no leaks in the laparoscopic revision group.

Conclusion: Revision RYGB can be performed safely with an anastomotic leak rate that approximates de novo RYGB. A laparoscopic approach can be performed safely with significantly less blood loss and a trend towards a shorter operative time and greater excess weight loss when compared to open revisions. Long term comparable weight loss was achieved without an effect on morbidity or mortality. Future larger studies may be able to demonstrate a significantly shorter operative times and superior excess weight loss of laparoscopic RRYGB.

Table 1 Outcomes

	OPEN (n = 79)	LAPAROSCOPIC (n = 17)	p
OR Time (minutes)	206.0 +/- 61.67 n = 69	170.8 +/- 60.23 n = 10	0.095
Estimated Blood Loss	171.49 +/- 148.52 n = 78	56.82 +/- 100.35 n = 17	0.004
ICU Stay	0.81 +/- 1.16 n = 78	0.93 +/- 1.49 n = 15	0.884
Length of Stay	5.56 +/- 3.1 n = 78	4.69 +/- 1.92 n = 16	0.284
% EWL (12 months)	45.05 +/- 17.36 n = 27	62.39 +/- 10.23 n = 2	0.179
Mortality	0	0	0
Bleeding	1	0	0.641
MI	1	0	0.641
Leak	2	0	0.507
Wound Infection	3	1	.696
DVT	1	0	0.641
Pneumonia	0	0	0

P273

Delayed Presentation of Congenital Malrotation with Midgut Volvulus presenting After a Laparoscopic Gastric Bypass

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Introduction: Malrotation in morbidly obese patients is rare, but has been reported. Most of these are discovered incidentally during laparoscopic gastric bypass. Controversy exists whether the discovery of malrotation during laparoscopic gastric bypass necessitates performing the LADDs procedure at the time of surgery or not at all. The literature reports that though technically more difficult, performing the LADDs procedure may be done safely during laparoscopic gastric bypass. Without performing the LADDs procedure, the risk of midgut volvulus and other complications associated with malrotation is still present.

Case Report: A 35 year old female with history of laparoscopic gastric bypass 8 years ago presented to an outside hospital with 4 days of cramping abdominal pain, nausea and vomiting. She reports to have a history of malrotation found incidentally during her gastric bypass. Imaging at that time demonstrated an ovarian cyst and free fluid on US and CT. She represented to the ER the following day with worsening abdominal pain and nausea and repeat CT demonstrates a whirl-sign and concern for small bowel obstruction. The concern for midgut volvulus was high. She was therefore transferred to our facility as the tertiary referral center in the area.

Upon presentation she continued to report cramping lower abdominal pain. She was taken urgently to the operating room due to concern for mid gut volvulus. Diagnostic laparoscopy was performed with attempted reduction of the volvulus. Midgut volvulus was confirmed and after brief attempt to reduce the volvulus laparoscopically, the procedure was converted to open. The midgut volvulus was reduced and LADDs procedure performed. The entire small bowel, which initially appeared dusky and congested, became pink and healthy after the reduction of the volvulus. A gastrostomy tube was placed in her excluded stomach for decompression. Postoperative recovery was slow but uneventful. She eventually had return of bowel function and was tolerating a regular diet. She was discharged home on post-operative day 13.

Discussion: In this case the patient presented 8 years after her laparoscopic gastric bypass. Her presentation and imaging were consistent with midgut volvulus. Opinions on the decision to proceed with LADDs procedure during the gastric bypass versus proceeding with the gastric bypass alone differ amongst surgeons. We also believe that the patient be informed of the diagnosis and after maximal weight loss has occurred that an attempt be made to perform a laparoscopic LADD procedure. We believe that obesity might be protective in these patients and rapid weight loss from a gastric bypass makes the small bowel mesentery thinner and more likely to cause volvulus. As was demonstrated in the case above once a midgut volvulus has occurred it becomes very difficult to laparoscopically correct it and in some cases due to delayed diagnosis patients have lost their entire small bowel.

P274

Effectiveness Of Bariatric Surgery In Super-Super Obese Patients

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Introduction: This study aims to add to our understanding of perioperative experience & postoperative outcomes with the super-super obese (BMI \geq 60). These patients are regarded as high risk for bariatric surgery, but there is limited published data regarding the safety & effectiveness in this population.

Methods and Procedures: This retrospective chart review at a single high volume academic center looks at GBP, SG & adjustable gastric banding (GBa) done from 2008–2012 in super-super obese patients. Experiences and outcomes associated with the different operations were compared. Patient demographics, preoperative risk factors, & intra-operative procedures were noted & compared.

Endpoints of procedure length, postoperative complications, LOS & EWL at 6 months were compared between patients undergoing GBP & SG. Modified Reinhold criteria for success was applied to the results & then adapted for this study. Success was defined as EWL \geq 30% at 6 months. This data was analyzed using χ^2 analysis. Analysis with Fisher's exact test was used to compare complication rates between the two groups.

Results: One hundred thirteen patients with BMI \geq 60 underwent GBa, SG or GBP from 2008–2012. Overall, 76 patients underwent GBP, while 28 underwent SG. Limited GBa group size (n = 8) precluded meaningful comparison & analysis of efficacy of GBa with the super-super obese. At 6 months, 37% RGB patients & 64% SG patients followed up. Of these patients, 78.57% patients achieved greater than 30% EWL at 6 months after RGB. The average operative duration was 2 h 06 min +/-55 min. Median length of stay was 2 days (range 2–21 days). After SG, 50.00% patients that followed up achieved greater than 30% EWL at 6 months. The average operative duration was 1 h 52 min +/-46 min. Median length of stay was 3 days (range 2–13 days). This difference in EWL was statistically significant (p = 0.0437). Complications included small bowel obstruction, wound infection, anastomotic leak or stricture, pulmonary embolism or upper gastrointestinal bleed. No intraoperative complications were reported. No postoperative pneumonia was reported. For all patients undergoing RGB, 15.79% patients experienced postoperative complications. Reported complications included SBO, (5.26%), wound infection (3.95%), leak (2.63%), stricture (2.63%), UGIB (1.32%) & PE (1.32%). One death was recorded from postoperative cardiac failure after lysis of adhesions for SBO. Postoperative complications were reported in 7.14% of all patients undergoing SG (3.57% SBO, 3.57% PE). No wound infections, leaks, strictures, PE or UGIB were noted.

Conclusions: Bariatric surgery appears to be safe for use in the super-super obese. The overall complication rate of 7–15.79% was comparable to reported rates of 3.2–16% for patients of all BMIs undergoing laparoscopic gastric bypass.

Super-super obese patients undergoing GBP lost more excess body weight at 6 months, but experienced more postoperative complications compared with those undergoing SG.

P275

Morbid Obesity Management Insights: Pre-Operative Clinical Variability By Insurance Carrier In 8,966 Sleeve Gastrectomy Patients

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Introduction: Every pre-surgery clinical insight contributes to positive outcomes in the often perilous peri-operative management of medically fragile sleeve gastrectomy patients. While obesity co-morbidities are clear, differences in their prevalence by health insurance carrier are unknown. The objective of this study was to identify variation in the clinical characteristics of sleeve gastrectomy patients according to insurance type.

Methods and Procedures: Pre-operative data on 8,966 patients from the Surgical Review Corporation's BOLD database who were about to undergo sleeve gastrectomy was studied in four health insurance groups: Medicaid, Medicare, Private, and Self-Pay. Analysis of variance tested continuous variables. Dichotomous parameter distribution was assessed by the Chi-squared equation.

Results	Medicaid	Medicare	Private	Selfpay	P value
DEMOGRAPHICS AND BMI					
Age	39+10	56+13	45+11	44+12	<0.0001
BMI	51+11	53+13	47+9	46+9	<0.0001
Sex (F/M %)	83/17	64/36	74/26	75/25	<0.0001
CARDIOPULMONARY CO MORBIDITIES					
Hypertension	50.27	75	56.57	48.84	<0.0001
Angina	3.23	7.24	2.39	2.05	<0.0001
CHF	2.96	11.51	1.69	1.05	<0.0001
DVT/PE	2.15	12.17	2.44	1.44	<0.0001
Ischemic Heart Disease	3.49	14.47	3.79	2.66	<0.0001
Pulmonary Hypertension	2.96	9.54	4.33	2.21	<0.0001
OSA	47.85	61.18	45.44	32.89	<0.0001
Asthma	28.76	27.63	15.55	10.8	<0.0001
ABDOMINAL AND HEPATOBILIARY CO-MORBIDITIES					
Abdominal Hernia	8.6	18.09	8.12	6.87	<0.0001
Cholelithiasis	20.97	30.92	18.69	14.73	<0.0001
GERD	39.25	51.32	44.59	40.14	<0.0001
Liver Disease	15.32	8.55	4.53	4.04	<0.0001
METABOLIC AND HORMONAL CO MORBIDITIES					
Diabetes	36.29	59.87	31.16	24.03	<0.0001
Gout	5.11	10.53	3.65	2.71	<0.0001
Hyperlipidemia	35.22	54.93	40.48	32.89	<0.0001
MUSCULOSKELETAL CO-MORBIDITIES					
Back Pain	56.72	58.88	46.54	37.87	<0.0001
Musculoskeletal Pain	41.61	61.84	40.82	32	<0.0001
MENTAL HEALTH CO-MORBIDITIES					
Disabled Functional Status	4.84	19.41	2.62	2.21	<0.0001
Depression	36.02	40.13	33.14	32.23	<0.05
SOCIAL CO-MORBIDITIES					
Alcohol Use	16.67	19.41	36.36	38.21	<0.0001
Tobacco Use	9.95	3.95	6.56	8.91	<0.0001
Unemployed	40.59	67.76	10.32	11.35	<0.0001

Conclusions: In sleeve gastrectomy patients, medical conditions vary widely by insurance status. Medicare patients are the oldest, heaviest, and manifest the highest rates of cardiopulmonary, hepatobiliary, metabolic, musculoskeletal, and mental health problems, in addition to having the highest unemployment rate. Medicaid patients, though youngest, have the highest F/M ratio, asthma, liver disease, and tobacco abuse. Private and Self-Pay drink and smoke but have the fewest co-morbidities. Awareness of increased surgical risks for obese Medicare and Medicaid patients should benefit both patients and surgeons in improving peri-operative outcomes.

P276

Safety Of Laparoscopic Adjustable Gastric Banding With Concurrent Cholecystectomy For Symptomatic Cholelithiasis

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Introduction: The prevalence of cholelithiasis has been shown to correlate with obesity and BMI. Not infrequently, patients will present for bariatric surgery with symptomatic cholelithiasis. For patients electing laparoscopic adjustable gastric banding (LAGB), there is a theoretical concern that performing a concurrent cholecystectomy could cross-contaminate the implanted foreign body. The primary goal of this study is to address the safety and feasibility of this practice.

Methods: A retrospective cohort study was designed from a prospectively-collected database at a single institution. All operations were performed by any one of four surgeons (GF, CR, MK, BS). All patients undergoing LAGB between July 2005 and April 2013 were considered for the study. LAGB was performed with or without a hiatal hernia repair (HHR) per standard practice. Inclusion criteria consisted of age \geq 18 and BMI \geq 35. Exclusion criteria included patients with any other procedure performed at the time of LAGB or revisional bariatric surgery. Patients undergoing LAGB with concurrent cholecystectomy (for documented symptomatic cholelithiasis) were included in the study group (LAGB/chole). The control group (LAGB) consisted of patients undergoing LAGB without cholecystectomy, and was selected using a 3:1 (control-study) case-match based on demographic and comorbidity data. The primary outcome was overall complication rate, with secondary outcomes including operating room (OR) time, length of stay (LOS), 30-day readmission and reoperation, band erosion, port/wound/intra-abdominal infections, and bandport revisional surgery. Statistical analyses were performed using two-sample t-test for continuous data and Chi-square or Fisher's Exact tests for categorical data.

Results: There were 4,982 patients who met the study criteria. Of these, 28 patients had a LAGB with concurrent cholecystectomy and comprised the LAGB/chole (study) group. The remaining 4,954 patients were eligible controls, of which 84 were selected for the LAGB (control) group (Fig. 1). Demographic and comorbidity data were similar between the two groups (Table 1). Mean follow-up time for the LAGB/chole group was 3.0 years vs. 3.6 years for the LAGB group (p = 0.179). OR time was longer in the LAGB/chole group (68.7 min vs. 46.0 min, p = <0.0001), but LOS was the same (1-day admission: LAGB/chole 79% vs LAGB 85%, p = 0.380). The complication rates are summarized in Table 2. The number of patients with any complication in the LAGB/chole group was 6 (21%) vs. 17 (20%) in the LAGB group (p = 0.893). Thirty-day readmission and reoperation were similar. There was also no difference in port site, wound, and intra-abdominal infections. The rate of band or port revisional surgery was 14% in the LAGB/chole group vs. 18% in the LAGB group (p = 0.778). There were no band erosions in either group.

Conclusions: Our study suggests that performing a concurrent cholecystectomy at the time of LAGB does not result in increased immediate or delayed morbidity. While the operation may take longer to perform, it can be done safely and would avoid a second surgery for a patient already diagnosed with symptomatic cholelithiasis.

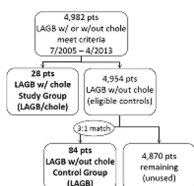


Fig. 1 Selection of study and control groups

Table 1 Comparison of demographic and comorbidity data between patients undergoing LAGB with Cholecystectomy vs. LAGB alone

		LAGB/chole (N = 28)	LAGB (N = 84)	p-value
Age (years)	Mean (SD)	46.6 (12.4)	46.4 (12.5)	0.944 [†]
Gender	Male, % (n)	18% (n = 5)	18% (n = 15)	0.999 [‡]
	Female, % (n)	82% (n = 23)	82% (n = 69)	
Race	Caucasian, % (n)	36% (n = 24)	83% (n = 70)	0.869 [‡]
	African American, % (n)	4% (n = 1)	7% (n = 6)	
	Hispanic, % (n)	7% (n = 2)	5% (n = 4)	
	Other/unknown, % (n)	4% (n = 1)	5% (n = 4)	
BMI (kg/m ²)	Mean (ST)	44.1 (5.0)	43.6 (4.7)	0.684 [†]
Hypertension	Yes, % (n)	57% (n = 16)	54% (n = 45)	0.742 [‡]
	No, % (n)	43% (n = 12)	46% (n = 39)	
Hyperlipidemia	Yes, % (n)	57% (n = 16)	57% (n = 48)	0.999 [‡]
	No, % (n)	43% (n = 12)	43% (n = 36)	
Diabetes	Yes, % (n)	36% (n = 10)	31% (n = 26)	0.640 [‡]
	No, % (n)	64% (n = 18)	69% (n = 58)	
Sleep Apnea	Yes, % (n)	25% (n = 7)	26% (n = 22)	0.901 [‡]
	No, % (n)	75% (n = 21)	74% (n = 62)	
HHR	Yes, % (n)	29% (n = 8)	30% (n = 25)	0.905 [‡]
	No, % (n)	71% (n = 20)	70% (n = 59)	

[†]Two-sample t-test; [‡]Fisher's exact test; [§]Chi-square test HHR = hiatal hernia repair performed at the time of LAGB

Table 2 Comparison of the number of patients in each group with any complication, as well as comparison based on specific complications

	LAGB/chole (N = 28)	LAGB (N = 84)	p-value
Any Complication	21% (n = 6)	20% (n = 17) [*]	0.893 [†]
30-Day Readmission	4% (n = 1)	0% (n = 0)	0.250 [‡]
30-Day reoperation	0% (n = 0)	1% (n = 1)	0.999 [‡]
Port Site Infection	0% (n = 0)	1% (n = 1)	0.999 [‡]
Surgical Site Infection	4% (n = 1)	0% (n = 0)	0.250 [‡]
Intra-Abdominal infection	0% (n = 0)	1% (n = 1)	0.999 [‡]
Band Erosion	0% (n = 0)	0% (n = 0)	NA
Revisional Surgery	14% (n = 4)	18% (n = 15) ^{**}	0.778 [‡]
Band Revision	4% (n = 1)	12% (n = 10)	0.286 [‡]
Band Replacement	4% (n = 1)	4% (n = 3)	0.999 [‡]
Band Removal	0% (n = 0)	1% (n = 1)	0.999 [‡]
Port Revision	0% (n = 0)	1% (n = 1)	0.999 [‡]
Port Replacement	7% (n = 2)	4% (n = 3)	0.597 [‡]
Port Removal	0% (n = 0)	1% (n = 1)	0.999 [‡]

[†] Chi-square test; [‡] Fisher's exact test

^{*} Note: in the LAGB group, one patient required a revisional surgery within 30 days (the total number of patients with subtype complications is greater than the number of patients with any complication)

^{**} Note: in the LAGB group, there were 4 patients that had two revisional surgery each (the total)

Number of patients with subtype with subtype revisional surgeries is greater than the number of patients with any revisional surgery

P277

The Effect of Laparoscopic Sleeve Gastrectomy with Concomitant Hiatal Hernia Repair on Gastroesophageal Reflux Disease in the Morbidly Obese

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Background: The effect of laparoscopic sleeve gastrectomy (LSG) on gastroesophageal reflux disease (GERD) is controversial. Although concomitant hiatal hernia repair (HHR) at the time of LSG is common, there is little data on the outcomes of GERD symptoms in these patients. The aim of this study was to evaluate the effect of concomitant HHR on GERD symptoms in morbidly obese patients undergoing LSG.

Methods: A single institution prospectively maintained database was examined to identify patients who underwent LSG and concomitant HHR from December 2010 to April 2013. Patient characteristics, operative details, and postoperative outcomes were analyzed. Standardized patient questionnaires administered both pre- and postoperatively were utilized. Primary endpoints included the presence of subjective GERD and the need for antireflux therapy.

Results: Forty patients were identified meeting inclusion criteria, with a mean follow-up of 17 months (range 6-35 months). The mean age of the cohort was 47.4 years, with 82% being female. Mean preoperative body mass index was 44.4 kg/m². All patients were evaluated preoperatively with upper gastrointestinal contrast series (UGI). Hiatal hernia was diagnosed on UGI in 25% of cases, with the remainder being diagnosed intra-operatively. Gastroesophageal reflux was demonstrated in 23% of symptomatic patients by UGI. Preoperatively, 75% of patients reported subjective symptoms of GERD and/or required daily antireflux therapy. After surgery, previously symptomatic patients remained symptomatic and/or continued to require daily antireflux therapy in 67% of cases. New onset of GERD requiring daily antireflux therapy was seen in 30% of patients who were previously asymptomatic.

Conclusion: Based on our data, LSG with concomitant HHR may not improve GERD symptoms or the need for daily antireflux therapy in symptomatic patients. Furthermore, LSG with HHR may induce de-novo GERD in a subset of previously asymptomatic patients. The role of HHR with LSG remains controversial.

P278

Neural Activation in Response to Food Cues in Bariatric Surgery Candidates

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Purpose: Candidates for bariatric surgery often experience a lifelong battle with weight loss that may be correlated with intensity of food cravings in these patients. The current study explores the hypothesis that failure to achieve target BMI may be related to neural signatures of "food addiction". Through a long-term collaboration with Hartford Hospital Surgical Weight Loss Clinic and Olin Neuropsychiatric Research Center, our overall strategy is to identify endophenotypes of bariatric surgery success BMI and % excess weight loss. In addition to this task, the grant encompasses several important measures (fMRI activity, psychiatric assessment, genetic analysis, impulsivity measures), which will help us to address this research question.

Methods: The Food Cue Reactivity Task is adapted from an fMRI (functional magnetic resonance imaging) task in which cue-induced neural activation is associated with subsequent drinking patterns in college students (Alcohol Cue Reactivity Task—Pulido et al., 2010; Dager et al., 2013). The task asks whether participants like (left button) Dislike (middle button) or feel Neutral about (right button) particular food pictures while in an fMRI scanner. Each participant gives responses during two rounds. During the second round, participants are told that they are being observed by a weight loss professional (nutritionist). This experimental condition will also be useful to understand how weight loss coaches function to encourage or discourage choices on a neural level. 13 consenting adults from the Surgical Weight Loss Clinic at Hartford Hospital (under the care of Drs. Darren Tishler and Pavlos Papasavas) are included in this abstract.

Results: We observe the greatest neural activation in response to unhealthy food when compared to baseline of the three groups of stimuli (unhealthy food, healthy food, scrambled pictures). This includes BOLD (blood oxygen level dependent) signal activity in the right caudate – the brain's reward center. There is also activation in the anterior cingulate, a region frequently engaged when evaluating choices and making decisions. This region shows more significant activation when subjects are told that a nutrition professional is evaluating their choices than when the observer is not present. We hope to continue recruiting patients and follow them through their first year after surgery to see if food cue reactivity may be a predictor of long-term weight loss.

Conclusions: Food images incite neural activation in regions of the brain that are traditionally associated with reward, and even more so in response to high fat foods. Preliminary data suggest that there is greater neural activation in the ACC in the presence of a weight loss professional. We will continue to explore how this activation relates to a) self report of food liking and b) observation by a nutritionist during food viewing.

P279

Bariatric Surgery in Adolescents, Our Experience

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Background: Adolescent obesity has become a health care problem of great magnitude. There is no reliable long term medical remedy available. Diet and exercise fail in great majority of the adolescents suffering from morbid obesity. Many of the adolescents suffering from morbid obesity are super obese or even super-super obese. The surgical intervention has been proven to be safe and effective although acceptance is still at a lower level. Laparoscopic Gastric Band(LGBs), Laparoscopic Gastric Bypass(LGBP) and recently increasingly Laparoscopic Sleeve gastrectomy(LSG) are being offered as surgical options. We, at Montefiore Medical Center, run a high volume Bariatric surgery program and have been offering these interventions to the adolescent population for last few years. At our institution Adolescent population is defined as age 21 years and under. More than 60 patients have undergone bariatric surgical procedures at our institution in last 4 years.

Objectives: To review the outcomes of bariatric surgical interventions performed at our institution in morbidly obese adolescent patients. To verify the effectiveness of different interventions and compare the data with reported literature.

Methods: Adolescent 21 and under were selected through the registry of bariatric cases performed in last 4 years. A retrospective analysis of medical records through chart review was performed. Relative clinical information was obtained through chart review of surgical or medical provider's notes and phone call interview were performed where necessary in patients who had not followed up regularly in clinic.

Results: 61 patients underwent the interventions. 5 patients who underwent lap Band placement were excluded; follow up was not available for two of these patients. Follow up was not available for two additional patients who underwent Lap GBP. Remaining 54 patients were included in the review. 14 (26%) were male and 40 (74%) were females. 37 (68.52%) patients underwent Laparoscopic Gastric bypass and 17 (31.48%) patients underwent Laparoscopic Sleeve Gastrectomy. Average preop weight was 309.14±59.66 Lbs., average pre-op BMI was 51.50±9.55. Average Excess Body Weight was 160.78±54.34. Follow Up ranged 1–48 months with average 13.61 months. Average weight loss was 76.20±39.81 Lbs. Average Excess Body Weight Loss was 50.70% ±27.65. Average EBWL was 32% at 3 months, 57.09% at 6 months, 59% at one year, 67.97% at 2 years, 78% at 3 years. There were no leaks, no re-operations, no deaths, no DVT and No PE's reported. One patient developed stricture at G-J-anastomosis and required endoscopic dilatation. One patient developed neuropathy secondary to vitamin deficiency. Pre-Existing Co-morbidities included HL (4%), DM (5.56%), PCOS (10% Female patients), HTN (19%), OSA (22.22%), Asthma (31.48%). Significant resolution or symptomatic improvement of the comorbid conditions was reported.

Conclusions: Bariatric surgery is most viable option for the morbidly obese adolescents and benefits are not limited to weight loss only but improvement of multiple aspects of patients overall health. Our results are comparable to reported results in other published series in US and worldwide. Long term effects of these surgical interventions although remain to be analyzed in coming decades and will need further investigations.

P280

Role Of Intraoperative IV Fluids On Hospital Length Of Stay In Laparoscopic Bariatric Surgery: A Retrospective Study In 170 Consecutive Patients

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Introduction: Studies are unclear regarding optimal intraoperative fluid management in laparoscopic bariatric surgery. The purpose of this study was to determine if the amount of intraoperative intravenous fluids affected hospital length of stay (hLOS).

Methods and Procedures: Data collected and analyzed with ChiSquare tests or logistic regression included reported patient demographics, comorbidities, intraoperative fluid administration, hLOS, and postoperative complications. Associated P values < 0.05 were taken to signify statistical significance. The data mining technique of partitioning was utilized to discover a cutting value of intraoperative fluid administration when plotted against hLOS.

Results: Preliminary logistic regression analysis of demographic and comorbidity variables revealed that in patients with a history of anemia (P = 0.01), obstructive sleep apnea (P = 0.01), and BMI (P = 0.01) were significantly related to increased hLOS (C statistic, 0.73). Lower rates of intraoperative IV fluid administration were significantly associated with increased hLOS (P = 0.001) (Fig. 1). Statistical analysis with the partition platform indicated a cutoff value of ≥ 1800 ml of intravenous fluid administration during anesthetic care resulted in lower hLOS when compared to bariatric patients receiving <1800 ml (LogWorth 1.6). All patients staying greater than 2 days were within the <1800 ml group (Fig. 2). Lower rates of intraoperative IV fluid administration significantly correlated with delayed wound healing (P = 0.008) (Fig. 3).

Conclusions: These data suggest the amount of intravenous fluids administered during laparoscopic surgery plays a significant role in hLOS, wound healing, and healthcare costs.

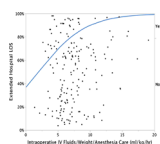


Fig. 1

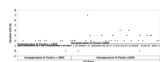


Fig. 2

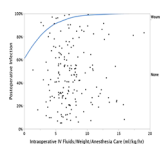


Fig. 3

P281

Methylene Blue Or Upper GI, Which is More Effective For Detecting Leak In Gastric Bypass Patients?

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Background: Postoperative leak from an anastomosis is a serious complication following gastric bypass that results in morbidity and could even lead to mortality. The bariatric surgeon has several tools to evaluate this adversity. There has been debate as to which method is more superior and furthermore whether these methods should be routinely or selectively used.

Purpose: The aim of our study is to evaluate and compare whether methylene blue or upper gastrointestinal(UGI) study is more effective in detecting an anastomotic leak following gastric bypass.

Setting: Academic Practice, United States

Material and Methods: Between May 2013 and August 2013, 40 patients underwent laparoscopic Roux-en-Y gastric bypass(LRYGB). Linear staplers were used to create the gastrojejunostomy and the jejunojunctionostomy. All staple lines were over sewn for reinforcement. All patients underwent routine UGI studies and methylene blue challenge on postoperative day 1. A retrospective review of a prospectively collected database was performed for all patients.

Results: Of the 40 patients in this study there were 33 females(82.5%) and 7 males(17.5%). Mean age was 49.7 ± 10.1 years (range, 21–66), and mean preoperative body mass index was 46.2 ± 7.0 kg/m² (range, 35.8–63.8) at the time of procedure. Mean length of hospital stay was 3.8 ± 8.5 days (range, 1–53). There was no detection of leak in any of the initial routine UGI studies or methylene blue challenges. One patient had fever and tachycardia which prompted a repeat UGI series which confirmed a leak and fluid collection. Regarding her second UGI positive and methylene blue negative, there was no statistical difference in detecting the leak between UGI and methylene blue (p>0.32). This patient was treated with percutaneous drainage and conservative measures. A second patient who developed a leak also had a negative initial routine UGI studies and methylene blue challenges. This patient required reoperation for staple line disruption.

Conclusions: Delay in diagnosis of anastomotic leak can have a significant impact on morbidity and mortality in postoperative LRYGB patients. Both UGI studies and methylene blue challenge are commonly used to assess this awful complication. Based on this data UGI studies and methylene blue challenge had little or no significant difference in detecting a postoperative leak. Furthermore, these tests may have limited utility and may warrant adjuncts to aid in leak detection.

P282

Post-operative Intravenous (IV) Acetaminophen Reduces Narcotic Requirement after Laparoscopic Roux-en-Y Gastric Bypass (LRYGB)

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Introduction: IV acetaminophen potentially reduces postoperative narcotic requirement but has not been tested after LRYGB. Lower narcotic requirements could reduce commonly associated unwanted effects such as nausea, vomiting, itching, dizziness and headache.

Method: A retrospective review of a prospectively maintained database was performed over a 2-year period 2011–2013. 183 patients were identified that received scheduled IV acetaminophen in addition to morphine sulfate (MSO4) patient-controlled analgesia (PCA). A cohort of 229 patients from the preceding two years who were treated with only narcotics was used as a historical control. Patient demographics and narcotic use were recorded. Statistical significance was defined as p < 0.05.

Results: There was no significant difference in age or gender distribution between groups (Table 1). In the postoperative 24 hr period, narcotic analgesic demand (total PCA button pushes including non-delivery of narcotic due to lock-out) was reduced significantly by 25% with the addition of IV acetaminophen (40.5 Vs. 30.9 average pushes; p = 0.0017). During the same period, narcotic analgesic requirement was cut down significantly by 20% with the concomitant use of IV acetaminophen (average of 29.9 Vs. 24.1 mg of MSO4; p = 0.004). The mean body mass index was similar in the two groups (46 and 48 kg/m² in control and study group, respectively).

Conclusion: IV acetaminophen reduces the demand for and the requirement of narcotic analgesia after LRYGB. We recommend use of multimodal analgesia with IV acetaminophen and MSO4 PCA in the initial 24 hour period after LRYGB.

Table 1 Comparison of narcotic demand and requirement using morphine PCA with or without IV acetaminophen after laparoscopic Roux-en-Y gastric bypass. Results are mean + SEM (range)

	Morphine PCA Only (n 229)	Morphine PCA and IV Acetaminophen (n = 189)	P value (t-test)
Age (years)	43±0.75 (18–68)	44±0.57 (23–68)	0.73
Gender—Male, Female	23%	16%	0.08
	77%	84%	
Narcotic demand (pushes/1st 24 h)	40.5±3.08 (=2–206)	30.9±0.78 (0–174)	0.0017
Narcotic requirement (mg/1st 24 h)	29.9±1.31 (0–111)	24.1± 0.1 (0–117)	0.004
Total IV acetaminophen in 1st 24 h	0 mg	3617 mg	

P283

21st Century Weight Loss: Banding Versus Bypass

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Introduction: The two most commonly performed procedures for bariatric surgery include Roux-en-Y gastric bypass (RYGB) and adjustable gastric banding (AGB). While many studies have commented on short-term, postoperative outcomes of these procedures, few studies have reported long-term data. The purpose of this study was to compare long-term, postoperative outcomes between RYGB and AGB.

Methods: This was a retrospective, cohort study comparing all patients undergoing either RYGB or AGB at our institution, from January 1998–August 2012. Patients were followed at 1-, 3-, and 5-year intervals. Categorical and continuous data were analyzed. Multivariable, linear regression was performed.

Results: A total of 2,453 bariatric surgeries were performed at our institution from January 1998–August 2012. Two thousand four hundred twenty patients (380 AGB, 2040 RYGB) were identified by CPT code. Median (range) follow-up for patients was 3 (1–5) years. Preoperatively, RYGB patients were significantly younger, more obese, had higher hemoglobin A1c, and less often suffered from hypertension, dyslipidemia, and asthma as compared to AGB patients. Postoperatively, RYGB patients experienced significantly longer operating room times, higher incidences of intensive care unit admissions, longer hospital lengths of stay, and increased incidence of small bowel obstruction as compared to AGB patients. At 1-, 3-, and 5-year follow-up, RYGB patients weighed significantly less and experienced a significantly greater percentage of total body weight loss, lesser rate of gastroesophageal reflux disease, lesser rate of diabetes, and lesser rate of apnea as compared to AGB patients. After adjusting for statistically significant and clinically relevant factors (e.g., age, gender, body mass index, degenerative joint disease, diabetes, hypertension, dyslipidemia, heart disease, apnea, and asthma), RYGB was independently associated with a significantly greater percentage of total body weight loss as compared to AGB at 1-year ($P < 0.0001$), 3-year ($P < 0.0001$), and 5-year ($P < 0.0001$) follow-up.

Conclusion: Our results support previous studies that have observed a greater weight-loss associated with RYGB as compared to AGB and provide further evidence towards the long-term sustainability of this weight-loss. Additionally, RYGB appears to result in a greater reduction of medical comorbidity.

P284

The Protocol Of A Randomized, Double-Blinded, Placebo Controlled Trial To Investigate The Role Of Intra-Peritoneal Ropivacaine In Gastric Bypass Surgery

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Introduction: Postoperative pain control remains a major challenge, even in laparoscopic surgery such as gastric bypass. Effective pain control reduces the risk of postoperative complication such as deep vein thrombosis and pulmonary emboli, pulmonary morbidity (eg. atelectasis and pneumonia), and tachycardia. Pain management is especially important in obese patients who may have a number of cardiovascular and pulmonary comorbidities that increase perioperative risk. These include a high prevalence of obstructive sleep apnea, hypoxia and respiratory depression. The objective of this study is to evaluate the efficacy of intraperitoneal local anesthetic (IPLA), in this case Ropivacaine, to reduce post-operative pain in patients undergoing laparoscopic Roux-en-Y gastric bypass surgery (LRYGB). We hypothesize that the use of IPLA will lead to a decrease in early postoperative pain and improvements in other clinically important postoperative outcomes and quality of life (QoL) in the period shortly after the surgery.

Methods and procedures: A single-centre, double blinded, randomised controlled trial will be conducted to compare intraperitoneal ropivacaine (intervention) versus normal saline (placebo) in 120 adult patients undergoing LRYGB. After pneumoperitoneum establishment, 200 mg of Ropivacaine (0.2% Ropivacaine in 100 mL Normal Saline) will be instilled in the abdomen at the start of the case before surgical dissection. Under direct visualization, 50 mL will be infused over the esophageal hiatus. The remaining 50 mL will be infused throughout the abdomen. Patients in the control group will undergo the same treatment with normal saline. Standardized doses of local anesthesia will be used at the incision sites for all patients. All patients will be cared for by our standard bariatric post-operative protocol and discharged when criteria are met. Patients will be followed until their first follow-up clinic within 10 days of discharge. Primary endpoint will be post-operative pain measured by the visual analogue scale (VAS). VAS pain score will be measured at baseline preoperatively, in recovery room, at 1, 2, and 4 hours post-operatively. Pain measurement will continue every 4 hours for a period of 24 hours and every 8 hours for up to 48 hours if the patients remain in hospital that long. Secondary endpoints will include opioid use, peak expiratory flow score, 6-minute walk distance, and quality of life assessed by the Quality of Recovery instrument (QR40) in the immediate post-operative period.

Conclusion: The study, regardless of its findings, will have an impact on use of (IPLA) in laparoscopic gastric bypass surgery. A positive finding would confirm the effectiveness of IPLA in laparoscopic gastric bypass surgery. Negative results may lead to changes to the current postoperative management practices and prompt further research to improve pain management following laparoscopic gastric bypass.

P285

Sleeve Gastrectomy Or Gastric Bypass As Primary Bariatric Procedure: Retrospective Evaluation Of Outcomes

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Roux-en-Y gastric bypass (RYGB) is a gold standard bariatric procedure and sleeve gastrectomy (SG) is innovative procedure that is increasingly applied as a stand-alone procedure. Our objective was to determine whether significant differences exist in outcomes between primary RYGB and SG

Methods and Procedures: Patients who underwent laparoscopic SG and RYGB were retrospectively compared and analyzed. Data included demographics, operative time, hospital stay, conversion rate, percentage excess weight loss (%EWL), morbidity and mortality.

Results: Fifty SG and 50 RYGB were performed. The median preoperative weight (117.2, 112.2 Kg, $p = 0.3$) and BMI (40.0 versus 42.4 kg/m², $p = 0.7$) were not significantly different respectively. The mean operative time was significantly shorter in SG (92.4 versus 110.5 minutes, $p < 0.005$) and the median hospital (2 versus 2 days, $p = 0.2$) was not significantly different respectively. There was no conversion in neither group. The reoperation rate in RYGB was 2%, however, it was not statistically different (0.0% versus 2%, $p = 0.2$). The overall complication rates were not statistically different (4.0% versus 4.0%, $P = 0.6$). The mean follow up was (20.1 versus 17.8 months, $P = 0.3$) respectively. The mean postoperative BMI at 1 year was (32.2 versus 29.2 kg/m², $p = 0.09$) and the mean %EWL was (55.7% versus 65.7%, $p = 0.1$) respectively.

Conclusion(s): Both SG and RYGB are safe procedures with similar outcomes in terms of %EWL. Due to the complexity of RYGB, SG may be a better option in this group of patients. Further confirmation and longer follow up is needed.

P286

Acute Appendicitis In The Setting Of Laparoscopic Adjustable Gastric Banding: A Case Report And Literature Review

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Background: Laparoscopic adjustable gastric band (LAGB) remains an established modality for the surgical treatment of morbid obesity. Acute appendicitis remains the most common cause of acute abdomen. Since the lifetime prevalence of acute appendicitis reaches 8–10%, the risk of developing this clinical condition among the LAGB patients is considerable. This clinical situation remains remarkably under reported in the literature; therefore the actual incidences as well as guidelines for treatment are not available.

Case Report: A 25-year old, 116 kg female, with a BMI of 40 kg/m², underwent an uneventful laparoscopic band placement. Post-operative contrast radiogram demonstrated the band in satisfactory position. The patient's subsequent recovery was uneventful. Nine months after the operation, with an 18 kg weight loss, the patient presented with a 24-hour history of abdominal pain. Her clinical signs and symptoms were consistent with acute appendicitis. Computed tomography (CT) scan of the abdomen confirmed the clinical diagnosis of acute appendicitis. The patient was started on intravenous piperacillin-tazobactam, and underwent an uneventful laparoscopic appendectomy for phlegmonous appendicitis with no diffuse peritonitis. At laparoscopy, the band was observed to be in good position with no gross contamination and without any evidence of slippage and was left in situ. The patient had an uneventful and routine post-operative course. At a 1-year follow up post appendectomy, a CT scan of the abdomen and pelvis demonstrated a well-positioned band without any radiological evidence of intra-abdominal infection. The patient remains with no clinical signs of infection or erosion, however was diagnosed with systemic sclerosis, likely unrelated to LAGB or appendicitis.

Discussion: LAGB placement represents a clean procedure with a low risk of infection. However, very little data is available on the incidence and risk of lap band infection in face of intra-abdominal infection, such as acute appendicitis. The incidence of appendicitis in the setting of LAGB is not well reported and there is no data to support either the explanation or retention of the lap band system at the time of appendectomy. Review of the literature reveals only a few case reports of intra-abdominal and thoracic infections in this clinical scenario. The ensuing management of lap band system varied. Here, we report a case of acute appendicitis in a patient with a lap band system. The patient was treated with a laparoscopic appendectomy leaving the lap band intact.

Conclusion: Laparoscopic appendectomy can be performed without simultaneous band explanation. However, close follow up should be continued in search for subacute infection, port infection or erosion of the LAGB. More data and evidence based recommendations should become available in order to facilitate management of LAGB in face of intraabdominal infection or contamination.

P287

Validity Of Laparoscopic Sleeve Gastrectomy Following Gastric Band Failure

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Background: Laparoscopic adjustable gastric banding (LAGB) is an effective bariatric procedure with low morbidity and mortality. Unfortunately, high failure rates in long-term follow-up were seen. Laparoscopic adjustable gastric banding (LAGB) has a failure rate in the US approaching 40–50%. Laparoscopic sleeve gastrectomy (LSG) is an emerging procedure initially described by Gagner's group as the first stage of the laparoscopic duodenal switch in super-obese patient, recently and quickly gaining position in the field of bariatric practice either as a first step toward gastric bypass/ biliopancreatic diversion or as a stand-alone operation. It has been described as a revision option for previous bariatric surgery failures. We report our experience with LSG as a revision stand alone procedure for failed LAGB.

Methods: From June 2009 to September 2011, 60 patients who had undergone LAGB followed by LSG. As result of gastric band failure were studied. Demographics, reason for band removal, interval between removal and LSG, operative times, estimated blood loss, complications, length of hospital stay, and percent of excess weight loss were collected.

Results: Of the 60 patients, 10 (17%) had their bands removed before LSG median time interval 36 months (range, 4 months to 10 years); the rest 50 (83%) patient had concomitant band removal and LSG.

Twenty patients were men (33.3%). Mean age and BMI were 30Y (range, 18–44) years and 38.8kg/m² (range, 33.47–57), respectively. Forty women (66.7%) were operated. Mean age and BMI were 32y (range, 17–58) and 43.11 (range, 34–63). All done as laparoscopic procedure. Median operative time 100 minute (range, 70–180) minutes, estimated blood loss average 50 ml (range, 10–500) ml. And length of hospital stay were 2 days (range, 2.5 d–14 d) days respectively.

Conclusions: Our results suggest that LSG is safe, feasible, and effective and valid procedure for failed LAGB and can be considered as revisional option in these cases. Larger series and longer follow-up are needed to confirm this.

Keywords: Bariatric · Obesity · Clinical papers/trials/

P288

What is The Normal Drain Amylase Range For Laparoscopic Sleeve Gastrectomy?

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Staple line and anastomotic leaks from the foregut extravasate salivary amylase. Elevated drain amylase (DA) levels have been associated with leaks in bariatric surgery. The ability to detect elevations in DA may improve early detection of leaks. However, interpretation of DA drain amylase (DA) levels is complicated by an ill defined normal range. This study describes our experience with routine drain placement in laparoscopic sleeve gastrectomy (LSG) with an emphasis on defining the distribution of DA levels.

Study Design: Retrospective review of prospectively collected database of a single surgeon's consecutive series of LSG from 2008 to 2013. Patients routinely had a 10 mm flat JP placed along the vertical staple line. Staple line reinforcement was used and a "leak test" was performed with intra-operative gastroscopy. DA was measured on the morning of POD #2. Drains were typically removed just prior to discharge. If the DA was >100 IU/L, it was repeated 6 hours later to insure stability. Primary outcome was the distribution of DA levels. Age, BMI, LOS, gender, ASA, staple line complications (leak and bleeding), and drain complications were also recorded. Postoperative bleeding was defined as acute anemia requiring transfusion. The "normal" DA range was defined as one standard deviation from the mean.

Results: The study group consisted of 248 patients. Results are summarized in Table 1. There were no leaks or drain complications. The mean drain amylase was 85 IU/L; 77% were <100 IU/L and only 6.8% were beyond 1 standard deviation (greater than 182 IU/L), 77% were <100 IU/L. Six patients (2.4%) had a postoperative bleeding event, none were intraluminal. There was no correlation between drain amylase level and LOS. There were no perioperative re-operations.

The vast majority of drain amylase levels in our LSG series were less than 100IU/L. Although we did not have any leaks in this study, DA levels above 182 IU/L were statistical outliers (above one standard deviation). Morbidity from the drain was nil. Drain placement in LSG enables monitoring of amylase levels adjacent to the staple line. Further studies are required to determine the role and cost effectiveness of DA in the bariatric population.

Table 1

Drain Amylase (IU/L)	mean 85 ± 97 (range 9–785)
LOS (days)	mean 2.2 ± 0.6 (range 2–7)
BMI	mean 43.7 ± 5.7 (range 33–58)
Age	45 (range 20–68)
Gender	77% female
ASA	mean 2.7 (range 2–4)
Drain Complications	0
post-op hemorrhage	6 (2.4)
Staple line leak	0

P289

Gastric Banding vs. Gastric Bypass: Clinical Outcomes at 5+ Years Follow Up

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Introduction: We compared medium to long-term clinical outcomes (>5 years) among the first 100 patients undergoing laparoscopic adjustable gastric banding (LAGB) and the first 100 patients undergoing laparoscopic gastric bypass (LGB) for a single fellowship trained surgeon in a private bariatric surgery practice.

Methods and Procedures: Data were collected prospectively and reviewed retrospectively. LAGB was performed with the pars flaccida technique using the Allergan Lap-Band (r) system. LGB was performed with a retrocolic, antegastric technique with a handsewn gastrojejunostomy over a 36 Fr bougie. Band patients were seen with weight loss and complications recorded at monthly intervals for the first six months, then bi-monthly for six months, then every 6 months thereafter. Bypass patients were seen with weight loss and complications recorded at 1 month, 2 months, 4 months, 8 months, and 1 year, and then annually thereafter. Chi-squared test or Fisher exact test were used for categorical variables and Student's t test for continuous variables.

Results: LAGB patients were slightly older (41 vs. 39 years, $p < 0.05$) and less heavy than gastric bypass (BMI 44.2 vs. 46.1, $p < 0.05$). At a mean of 5.4 years of follow up, LAGB patients experienced an average of 49% excess weight loss (EWL) (SD 29%, mean BMI reduction 44.2 to 35.2); and LGB patients had 74% EWL (SD 21%, mean BMI reduction 46.1 to 30.7), $p < 0.0001$ at a mean follow up of 6.2 years. The complication rate among band patients was 10% at 2 years and 23% after 5 years, with 10 patients undergoing band removal, 4 of whom had revisions to other bariatric procedures. The complication rate among bypass patients was 24% at three years and 28% at 6 years of follow up.

Conclusions: LGB induces superior weight loss to LAGB at follow up of at least 5 years. LAGB is associated with fewer complications at both 3 and 6 year intervals but has a higher rate of increasing complications with time, including band removal for complications or insufficient weight loss.

P290

Insufficient Weight Loss and Weight Regain After Bariatric Operation. Does Laparoscopic Biliopancreatic Diversion with Duodenal Switch Stand the Test of Time?

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Introduction: Roux-en-Y gastric bypass (RYGB) has been challenged by insufficient weight loss and weight regain, especially in superobese patients (BMI >50 kg/m²). These unsatisfactory outcomes frequently lead to revisional procedures, in order to maintain the benefit of initial weight loss. Although biliopancreatic diversion with duodenal switch (BPD-DS) is not the most commonly performed procedure in the United States, it is considered the more effective bariatric procedure than RYGB. Only limited mid-/long-term data can be found in the literature in regards to weight loss outcome and weight regain after laparoscopic BPD-DS. This study is designed to evaluate weight loss outcome and weight regain up to 5 years after laparoscopic BPD-DS.

Methods: A review of a prospectively maintained database of 425 patients who underwent laparoscopic BPD-DS from 2006 to 2013 was conducted. The patients were seen in follow-up at 1,3,6,9,12,18 months for the first 2 years postoperatively, and continued yearly thereafter. Weight loss outcome was measured as a percentage of excess weight loss (%EWL).

Results: A total of 425 patients (F:M=309:116) with average age of 44.6 years (range : 20–72), BMI of 50.4 kg/m² (range : 34.2–78.8) were included in this study. Median length of hospital stay was 4.2 days (range: 1–33). Up to date, 107 of 425 (25.2%) patients have reached 5-year post-operative follow-up interval. Postoperative weight loss data was able to be collected in 71% of patients at 1 year, 45% of patients at 2 years, and 15% of patients at 5 years. Percentages of postoperative excess weight loss at 1, 3, 6, 9, 12, 18 months were 20%, 36.7%, 55.1%, 68.5%, 76.6%, 81.8%, respectively. On longer follow-up interval at 2,3,4, and 5 years after the laparoscopic BPD-DS, the patients continued to show excellent results with maintained excess weight loss of 82.2%, 81.9%, 81%, and 83%, respectively.

Conclusions: In our experience, issues of insufficient weight loss and weight regain seen after RYGB do not appear to be a major concern in patients who underwent laparoscopic BPD-DS, despite their high preoperative mean BMI. Laparoscopic BPD-DS maintains its efficacy even after 5 years postoperatively.

Keywords: Biliopancreatic diversion, Duodenal switch, Weight Loss, Weight Regain

P291

Outcomes of Bariatric Surgical Interventions in Patients Older Than 60

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Background: The number of obese older persons has markedly increased. Obesity has important functional implications in older men and women because it exacerbates the age-related decline in physical function and causes frailty or sarcopenic obesity. The current data show that weight-loss therapy improves physical function, quality of life, and the medical complications associated with obesity in older persons. Lifestyle intervention is just as effective in older as in younger subjects. Bariatric surgery is the most effective weight-loss therapy for obesity. The indications for bariatric surgery were established at a National Institutes of Health Consensus Conference held in 1999.

Objectives: To evaluate the safety and efficacy of bariatric surgery performed at our institution, in patients older than 60 years of age. To determine the weight loss, rate of operation related complications and impacts of surgery on comorbid conditions.

Methods: Departmental databases were queried to identify patients older than 60 years age who underwent bariatric surgery procedures. Only patients who underwent laparoscopic interventions were included in the analysis. Lap. Gastric band (LGBa), lap. Gastric Bypass (LGBP) and lap Sleeve Gastrectomy (LSG) were the procedures performed. Data evaluated at different pre and post-operative interval included age, sex, height, pre-op weight and BMI, presence of Co-morbid conditions DM, HTN, HL, asthma, OSA, procedures performed, mortality, immediate or delayed complications, length of follow up, weight/BMI points lost, % excess weight loss (%EWL), and effects on obesity related comorbid conditions.

Results: 98 patients were identified. 7 patients did not have any follow-up information available. 8 patients had LGBa, 30 had LSG and 53 underwent LGBP. Average age was 63.26 years, 70 (78.2%) women, and 20 (21.8%) patients were men. Average pre-op weight was 269.33 +/-54.21 Lbs. Average Pre-O BMI 46.26kg/m², Average Excess Body Weight was 88 ± 45.30 Lbs. Pre-existing comorbid conditions included DM in 55%, HTN in 78%, HL in 44%, OSA in 31% and asthma in 30% patients respectively. There were no operative deaths, there was 1 anastomotic leak, 1 patient had respiratory failure, 1 bleeding from G-J anastomosis requiring endoscopic intervention. Complications within one year of surgery included 4 episodes of SBO requiring abdominal exploration and LOA, one of them was secondary to internal hernia, 4 G-J anastomotic strictures requiring endoscopic dilatation. Average 5 Excess Weight Loss(%EWL) at 3 months was 29.80+/- 9, at 6 months 59.18+/-30.65, at one year 62.70+/-26.25 and 66.22+/-30.42 at 2 years intervals. 30.91 patients suffering from DM reported resolution, 61.82% reported improvement and 7.27% reported no difference. 78.21% patients with HTN reported resolution, 14.10% reported improvement and 7.69% no change. 18.18% reported resolution of HL, 72.73% improved and 13.64% reported no change. 6.45% patients with OSA reported resolution, 87.10% reported improvement and 6.45% no change.

Conclusions: In our experience bariatric surgery is effective for patients older than 60 years of age with a low morbidity and mortality. The weight loss and improvement in comorbidities in older patients were clinically significant.

P292

Does Maximum Pre-Operative Weight Loss Predict Weight Loss Surgery Outcomes?

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Introduction: Is 'maximum pre-operative weight loss' (MPWL), defined as the maximum amount of weight lost prior to surgery, a predictor for post-operative weight loss for patients undergoing weight loss surgery (WLS)? WLS has become a widely accepted and pursued surgical option following medical management for morbidly obese patients. Various pre-operative variables have been investigated, including weight loss, body mass index (BMI), pre-existing comorbidities and socioeconomic status. 'Maximum pre-operative weight loss' (MPWL), however, has not been evaluated as a predictor for weight-loss outcomes.

Methods and Procedures: a single institution, retrospective review of 506 patients who underwent WLS, including laparoscopic band, Roux-en-Y gastric bypass, and laparoscopic sleeve gastrectomy from 2004–2012. Patients undergoing WLS who had a recorded MPWL in their pre-operative intake were included in this study; patients whose intake did not include this data were excluded. Follow-up interval was at approximately 3 month, 6 month and 1 year intervals, which respectively are designated 'short', 'intermediate', and 'long-term.' Age, gender, pre-operative body-mass index (BMI) and MPWL were collected for all patients. Post-operative data included: total post-operative weight loss, percent total weight lost, and corresponding BMI at 3 month, 6 month and 1 year intervals. Statistical analysis was performed using STATA (r) ensuring removal of patient identifiers. Tests including t-test, logistic regression, paired correlation and ANOVA.

Results: MPWL was positively correlated with total weight loss and pre-operative BMI across all intervals. Pre-operative BMI was found to be a significant predictor for short-term weight loss ($p = 0.004$, 95% CI), while MPWL was a significant predictor for intermediate weight loss ($p = 0.035$, 95% CI). Both pre-operative BMI and MPWL were positive predictors for post-operative weight loss at one year ($p = 0.003$ and $p = 0.008$ respectively, 95% CI). No specific amount of MPWL was found to be of predictive value of post-operative weight loss or post-operative BMI.

Conclusion: No other studies to our knowledge have explored maximum pre-operative weight loss (MPWL) as a predictor for weight-loss outcomes. This single-institution review of patients undergoing weight-loss surgery demonstrates that maximum pre-operative weight loss is a significant predictor for short-term and long-term weight loss. However, no specific amount of MPWL could be significantly predictive of post-operative weight loss or BMI. These findings emphasize the need for further investigations of weight loss history and tailoring realistic goals and interventions for these patients considering surgery.

P293

Is Heparin Prophylaxis With Aggressive Ambulation Enough To Prevent Thrombo-Embolic Complications Even In Higher Risk Patients Undergoing Bariatric Surgery?

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Introduction: Patients undergoing bariatric surgery have been believed to be at a high risk for thrombo-embolic complications in the peri-operative period. There remains a wide variation in practice for Deep Vein Thrombosis (DVT) prophylaxis in the bariatric surgery patients. These range from aggressive measures such as a routine inferior vena cava (IVC) filter placement in patients with a higher risk of thrombo-embolism, to simply early ambulation with compression stockings without any pharmacologic prophylaxis. We hypothesized that by following a protocol of immediate pre-operative heparin 5000 mg subcutaneous (sc) administration followed by eight hourly Heparin 5000 mg sc administration along with sequential compression stockings and early ambulation starting the evening of surgery, and combining it with a venous surveillance ultrasound on the first post-operative day we could minimize thrombo-embolic complications in all our bariatric patients.

Methods and Procedures: We carried out a retrospective analytical study of all patients who were managed per the protocol after the protocol was first adopted; from October 2012 to June 2013 obtaining a minimum three month post-operative follow up. Demographic data, patient risk factors for DVT, venous duplex study results and clinical follow up records were analyzed and data was collected using a Microsoft excel spreadsheet. Data are reported as mean ± standard deviation (SD).

Results: Fifty-seven patients (46 females and 11 males) were managed per our protocol during the eight-month period of our study. Laparoscopic roux-en-y gastric bypass surgery was performed in 29 patients and Laparoscopic sleeve gastrectomy in 28 patients. The mean age was 44.6 years (SD = 9.9). The mean Basal Metabolic Index (BMI) was 47.3 (SD = 8.0), with 12 patients (21%) with BMI > 55.

Apart from patients with a high BMI, three patients were at a higher risk of thrombo-embolic complications based on their previous history of DVT (one of whom also had Factor 5 Leiden mutation, and one had previous pulmonary embolism also). Two of them were on Coumadin before surgery and had Coumadin resumed the day after surgery.

On venous duplex scanning of the lower extremities none of the patients were found to have an occult DVT, except for 1 patient with a previous history of DVT who was found to have a partial non-occlusive chronic DVT. Clinic follow-up visit records were reviewed for all the patients, and none of the patients developed a DVT or any other thrombo-embolic complication with a mean 6.7 months and minimum 3 months post-operative follow up.

Conclusion: Our study suggests that the incidence of occult DVT is likely low in Bariatric surgery patients and using a standardized protocol combining pre and post-operative heparin prophylaxis with sequential compression stockings and early ambulation the incidence of post-operative thrombo-embolic complications can be minimized, and routine placement of IVC filters in higher risk patients maybe unnecessary. Serial venous duplex scanning could be selectively utilized in high risk patients. Further prospective high powered studies in this regard are required to support our findings.

P294

Racial Variation In The Distribution Of Demographics, Body Mass, And Weight-Related Medical Co-Morbidities Among The Morbidly Obese: Analysis Of 5,389 Bold Database Patients

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Objective/Background: The purpose of this study was to identify variations in weight, BMI, and obesity co-morbidities among the most severely overweight patients. As the obesity epidemic grows, morbidly obese patients with the highest BMI carry the greatest risk of severe weight-related medical problems. However, the effect of race on the distribution of these conditions in the morbidly obese is unknown.

Methods: Data from the Surgical Review Corporation's BOLD database on 5,389 patients who were about to undergo open roux-en-Y was analyzed retrospectively in four groups: African-American (n = 503), Caucasian (n = 3,769), Hispanic (n = 460), and Other (Pacific Islands, Native American, or >1 race recorded; n = 652). Five Asian patients were too few to analyze. Age, weight and Body Mass Index (BMI) were compared by analysis of variance. Dichotomous variable distribution was assessed by the Chi-squared equation.

Results:	African-American	Caucasian	Hispanic	Others	p-value
Age	42+11	47+12	39+10	47+13	<0.05
Weight	151+38	142+33	139+36	131+31	<0.05
BMI	53+11	50+10	51+11	48+9	<0.05
Hypertension	63.42%	62.51%	48.91%	65.34%	<0.0001
Sleep Apnea	52.09%	54.47%	42.83%	27.61%	<0.0001
CHF	4.77%	3.50%	0.43%	1.07%	<0.0001
Hyperlipidemia	31.41%	45.34%	15.87%	27.15%	<0.0001
Diabetes	38.77%	41.07%	29.35%	34.05%	<0.0001
GERD	43.74%	46.38%	21.74%	31.75%	<0.0001
Back Pain	57.85%	53.91%	30.43%	40.95%	<0.0001

Conclusions: Among the morbidly obese patients, severe co-morbidities are common, and vary widely by racial classification. Weight and BMI are greatest in African-American. Sleep apnea is highest among Caucasians and African-Americans while Hypertension in Others. Diabetes and hyperlipidemia are most frequent among African Americans and Caucasians. The oldest patients are Caucasians and Others, and the rate of depression is greater amongst Caucasians. It is no coincidence back pain appears to be high across all racial groups as it is most likely affected by high weight and BMI across all racial groups, in addition to other associated co-morbidities. Clinical suspicion for these race-related clinical factors should be heightened in managing morbidly obese patients. It is important to take into consideration these findings and co-morbidities when considering medical and/or surgical treatment plans for the morbidly obese population as they can have significant impact in the final outcome of how patients respond to an open roux-en-Y surgical intervention. Attention to these findings may facilitate pre-surgical preparation, and could help optimize obesity outcomes.

P295

Study Of The Effect Of Laparoscopic Gastric Plication On Ghrelin Hormone In Morbidly Obese Patients

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Background: The prevalence of obesity continues to rise worldwide at an alarming rate. This trend was met with an evolution of new bariatric procedures to address the needs of obese patients. Gastric plication is among the new procedures that can effectively manage obesity. Ghrelin is a hormone that is secreted from the gastric lining cells, it increases before meals and decrease after meals. Restrictive bariatric surgery has been proven to affect Ghrelin levels. We here in study the effect of laparoscopic gastric plication on Ghrelin hormone level.

Patients and Methods: After approval of Alexandria University Hospitals ethical committee, we prospectively studied 20 consecutive patients undergoing laparoscopic gastric plication for the management of obesity from February 2012 to September 2012. Follow up was done at 6 and 12 months. Patient demographics, preoperative and post operative fasting Ghrelin levels were analyzed.

Results: Twenty patients underwent laparoscopic gastric plication including 17 females (85%) and 3 males (15%). The mean age was 27.70 ± 7.54 years (range 20–50 years) and the mean BMI was 41.33 ± 4.76 (range 35.2–52.1). On follow up patients had a mean %EWL (percentage excess weight loss) of 15.75 ± 4.91 and 22.45 ± 4.697, at 6 and 12 months respectively. Preoperative Ghrelin levels ranged between 258.3–993.0 pg/mL, with a mean of 675.48 ± 187.27 pg/ml. Postoperatively, the mean Ghrelin levels were 554.6 ± 206.57 pg/ml (range 114.3–916.7 pg/ml) and 487.38 ± 145.14 pg/ml (range 129.1–770.0 pg/ml), at 3 and 6 months respectively. The difference between preoperative and postoperative Ghrelin level was statistically significant (p < 0.001).

Conclusion: Ghrelin hormones level changes significantly after laparoscopic gastric plication for treatment of morbid obesity.

P296

Laparoscopic Roux en Y Gastric Bypass as a Revisional Strategy for LAGB Failure

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Introduction: The UAE has the second highest rate of type 2 DM and obesity in the world. Bariatric surgery is the most effective long term solution for morbid obesity. However, many patients fail to lose weight, regain their lost weight or develop complications necessitating revisional bariatric surgeries. Outcomes of bariatric surgery from the UAE are not known.

Methods: We reviewed our prospectively maintained database for revisional bariatric surgeries at Bariatric and Metabolic Institute (BMI) Abu Dhabi from June 2009 to June 2013. Patient demographics, types of operation and perioperative outcomes were evaluated. EWL% for LAGB conversion patients are calculated based on the weight prior to LAGB conversion.

Results: A total of 444 bariatric surgeries were done at BMI Abu Dhabi, of these 83/444 (18.7%) patients were for LAGB failure. Forty six patients (56%) had LAGB reversal, and 37 patients (44%) had LAGB removal and conversion to RYGB. The conversion was done in one stage in 31/37 (84%) of patients. Average age for the LAGB reversal and conversion patients was 36 (20–51) and 33 (16–44) years. Females represented 71% and 76% of the LAGB reversal and conversion patients. Average BMI for the LAGB reversal and conversion was 37 (23–54) and 47 (32–71) Kg/m². Length of stay for the LAGB reversal and conversion was 1 and 2 days. Our leak rate for LAGB reversal and conversion was 0% and 2.7%, stenosis 0%, pneumonia 0% and 2.9%, conversion to open 0%, re admission 0% and 6%, bleeding requiring blood transfusion 0%, line sepsis 0% and 2.7%, gall stones requiring cholecystectomy 0% and 2.4% and Mortality 0%. EWL% at 12 months 61% (45%FU) which is lower than our primary RYGB series 76% at 12 months.

Conclusion: LAGB failure was the commonest reason for revisional bariatric surgery at BMI Abu Dhabi. Conversion to RYGB in one stage is our preferred strategy. EWL% of revisional RYGB is inferior to primary RYGB at one year.

P297

Bariatric Surgery improves metabolic syndrome by increasing HDL and decreasing triglycerides

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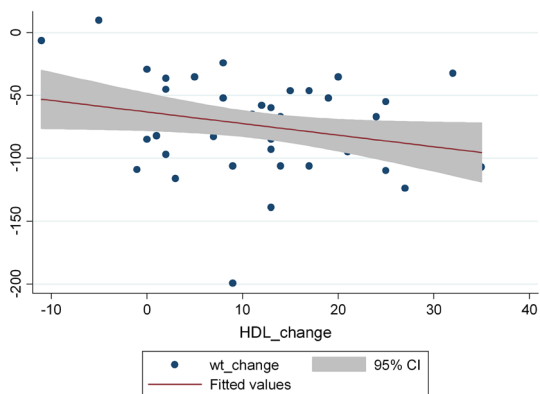
Background: It has been well established that hyperlipidemia has a high resolution rate after bariatric surgery. However, hyperlipidemia is a catch all phrase for 4 specific indices, specifically cholesterol, HDL (high density lipoprotein), LDL (low density lipoprotein), and triglycerides. These markers have varying significance in quantifying patient risk. We know from the metabolic syndrome that HDL and triglyceride are key indicators of risk from heart disease and stroke. Therefore, lowering these particular agents is crucial when looking at the lipidemic profile of the post bariatric surgery patient. We sought to quantify which of the 4 components of hyperlipidemia resolved following bariatric surgery and specifically looked at HDL and triglyceride.

Methods: A retrospective review of all consecutive patients undergoing bariatric procedures at a tertiary facility over a 6 month time frame was done. Patients underwent one of three procedures: laparoscopic band, laparoscopic bypass or laparoscopic sleeve gastrectomy. Lipid profiles were examined at various times points including two months preoperatively, and various post-op time points including 2 weeks, 3 months, 6 months, 9 months and 12 months. Lipid profiles included HDL, LDL, triglyceride and cholesterol. Statistical analysis was done using SPSS software and Pearson correlation.

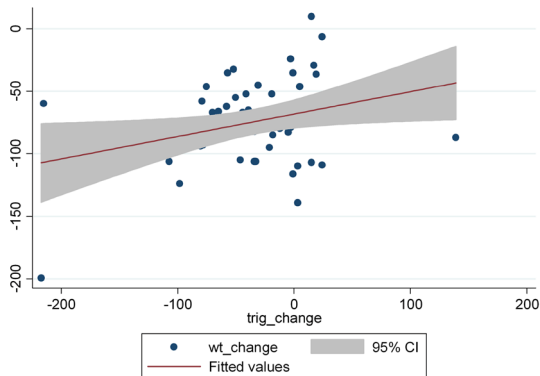
Results: Included in the study time frame were 105 patients with a 35% incidence of hyperlipidemia on cholesterol lowering medications. 80% were female and 20% were male. Ages ranged from 19–65. Patients lost on average 70 lbs. Lap band accounted for 8% of all procedures, lap sleeve gastrectomies accounted for 30% and the remaining 62% were roux-en-y gastric bypass.

Over the 12 month period all lipid indices measured decreased. However, the change in LDL and cholesterol was not statistically significant. The change in HDL and triglycerides were statistically significant at 12 months. In addition, when comparing degree of weightloss to change in HDL ($P < .05$ and a $R = -0.28$) and triglyceride ($P < 0.5$ and $R = 0.31$), there was a statistically significant correlation. This suggests that the greater the weightloss the more significant the rise in HDL and the greater the weightloss the greater the drop in triglycerides. An additional phenomena was seen in the data, at two weeks a deleterious change was seen in all lipid indices prior to improvement (Graphs 1, 2).

Conclusion: Bariatric surgery shows a significant decrease in triglyceride and increase in HDL, both of which are correlated to the degree of weightloss. This is especially important for patients with metabolic syndrome.



GRAPH 1 Increasing HDL with Increasing Weightloss



GRAPH 2 Decreasing Triglycerides with Increasing Weightloss

P298

Retrospective Study Of The AirSeal™ System For Laparoscopic Bariatric Surgery

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Introduction: The AirSeal™ (SurgiQuest, Milford, CT) system consists of a surgical trocar, tubing/filter set, and recirculation and filtration control unit used to create and maintain a port of entry during laparoscopic surgery. The device enables peritoneal access with a novel mechanism to maintain pneumoperitoneum. Specifically, it creates a pressure barrier, which acts as an invisible seal to maintain pneumoperitoneum during the course of surgery.

Aim: This project is a meta-analysis that compares the impact of PBD and Surgery (DS=S, pancreatectomy and/or hepatobiliary resection) on morbidity and mortality after PBD+S in comparison with Surgery alone. This is a post-market study of the AirSeal™ system to further establish the safety, efficacy, and utility of the AirSeal™ trocar in laparoscopic bariatric surgery.

Methods: We randomly selected 100 patients who underwent a Roux-en-Y gastric bypass (RNY) with a 12 mm AirSeal trocar and 100 patients who underwent a RNY with a 10 mm standard VersaStep (co, city, state) from October 1, 2005 through February 1, 2013, 100. A retrospective chart review was then performed to collect operative times, blood loss, hemodynamic values, and end tidal CO₂, which were compared between the two groups.

Results: In both groups, a similar surgical technique was used. In the AirSeal group, patients had a mean BMI of 50.0 (range 40.4–84.5) and mean age of 45.4 (range 18–69). Mean operative time was 83.6 min (range 46–130) with mean estimated blood loss of 35.1 cc. In the VersaStep group, patients had a mean BMI of 56.6 (range 36.4–81.4) and mean age of 46.9 (range 21–67). Mean operative time was 95.9 min (range 57–200) with mean estimated blood loss of 47.5 cc. Both groups had similar hemodynamic profiles (BP, HR), ventilator settings, and end tidal CO₂. The AirSeal™ system group saved 12.3 min in the operating room on average. This saves about \$345.00 per case on operating room time.

Conclusion: The AirSeal™ system in laparoscopic bariatric surgery is safe and leads to decreased operative times. This can potentially decrease the overall cost of surgery by decreasing operating room costs.

P299

Laparoscopic Gastric Restrictive Procedures in the Super Super Obese (BMI > 60 kg/m²) Without the Use of Prophylactic Inferior Vena Cava Filters: Our Experience at a Bariatric Center of Excellence

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Introduction: Patients undergoing bariatric surgery are at an increased risk for venous thromboembolism (VTE). The incidence of symptomatic deep venous thrombosis (DVT) and pulmonary embolism (PE) in patients following bariatric surgery ranges from 0%–5.4% and 0%–6.4%. Prophylaxis against VTE is comprised of three options: mechanical (sequential compression devices), chemoprophylaxis (unfractionated heparin and low-molecular weight heparin), and inferior vena cava filters. IVC filters have been recommended for use in high risk bariatric patients – high risk being defined as BMI > 55 kg/m², immobility, venous stasis, pulmonary hypertension, hypercoagulable state and a history of VTE. Studies by Obeid et al and Triglio-Black et al suggest a decreased rate of PE and death in patients receiving prophylactic IVC filters. Deployment outside the target area, access complications, recurrent PE, IVC occlusion, filter migration, and filter fracture have been documented.¹² This study seeks to evaluate super super obese patients undergoing laparoscopic bariatric surgery without the prophylactic insertion of IVC filters.

Methods: Records between 2006–2012 at a community hospital and bariatric center of excellence were reviewed. Fifty-eight patients with a BMI > 60 kg/m² and no placement of a prophylactic IVC filter who underwent laparoscopic weight loss surgery were included. Parameters such as the type of surgery, demographics, length of stay, change in weight/BMI, reduction of co-morbidities and complications were determined. Specific attention to the development of DVT or VTE was documented.

Results: Thirty-six (62.0%) women and 22 (38.0%) men, 39.75 (20–62) average years of age. Forty-eight (85.7%) underwent laparoscopic roux-en-y (LRY), 6 (10.7%) underwent a gastric banding (LGB) procedures, and 2 (3.5%) had a sleeve gastrectomy (LSG) procedure. The average operation time for the LRY was 60–190 minutes and 50–160 minutes for the LGB. The pre-surgical BMI's were 65 for the LRY, 65 for the LSG, and 61 for the LGB. The post-surgical BMI at the approximately two year period was 44 for the LRY, 57 for the LSG, and 51 for the LGB. No patient underwent prophylactic preoperative insertion of IVC filters. Subcutaneous heparin and sequential compression devices were ordered postoperatively. No significant DVT's or VTE's were noted during the patients hospital stay.

Discussion: Inferior vena cava filters have been advocated in the high risk bariatric patients. The purpose of this study is to present our experience with super super obese patients (BMI > 60 kg/m²) undergoing laparoscopic gastric restrictive surgery who did not receive prophylactic IVC filters. Our facility is a community based bariatric center of excellence. Patients receive intraoperative and postoperative subcutaneous heparin and also sequential compression devices as DVT prophylaxis. Of the 58 patients undergoing laparoscopic gastric restrictive procedures, each had a BMI > 60 kg/m² and none received an IVC filter prophylactically. No complications such as DVT, VTE, or PE were noted intraoperatively or postoperatively. These findings are significant as they demonstrate BMI may not be a good indication of a high risk bariatric patient. Thus, patients with BMI > 60 kg/m² can safely undergo laparoscopic gastric restrictive procedures without the insertion of prophylactic IVC filters.

P300

Sleeve Gastrectomy And Gastroesophageal Reflux Disease: Systematic Review And Meta-Analysis

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Introduction: The aim of this meta-analysis is to assess the post-operative prevalence of GERD in adult patients who underwent sleeve gastrectomy (SG) compared to baseline, as well as to other types of bariatric surgeries. Gastroesophageal reflux disease (GERD) is a known obesity-related comorbidity. With bariatric surgery currently proven to be the most effective therapy for morbid obesity, many different types of bariatric surgeries have been performed, including SG. Controversy exists regarding the best surgery for bariatric patients with GERD, as some studies have suggested that SG does not improve, and may worsen GERD post-operatively.

Methods and Procedures: An extensive search of electronic databases including PubMed, EM-BASE, and the Cochrane Library and Scopus was performed, as well as searches of the grey literature and hand searches of select journals. The primary outcome measure was the prevalence of GERD at 12 months post-operatively. The post-operative GERD prevalence after SG was compared to pre-operative baseline, as well as to the prevalence of GERD after Roux-en-Y gastric bypass (RYGB) and adjustable gastric banding (AGB). The secondary outcome was the resolution of diabetes post-SG. Pooled odds ratios were calculated using random-effects models for meta-analysis.

Results: Nine studies were included in the analysis. There was a statistically significant increase in the prevalence of GERD at 12 months after SG compared to pre-operative baseline. There were non-significant trends toward higher prevalence of post-op GERD in SG compared to RYGB and AGB. The prevalence of diabetes after SG was significantly lower compared to pre-operative baseline. The included studies evaluated were all rated to have a high risk of bias leading to low quality evidence.

Conclusion: This meta-analysis has shown that in morbidly obese patients having SG, there is a higher prevalence of GERD post-op compared to baseline. There may be a higher prevalence of GERD after SG compared to RYGB and AGB. However, the quality of evidence is low, and further studies are needed to better evaluate these outcomes.

P301

Does Helicobacter Pylori Increase The Risk Of Adverse Outcome After Laparoscopic Sleeve Gastrectomy

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Introduction: Helicobacter pylori is a common gastrointestinal pathogen that was found to affect outcomes of many foregut operations. In bariatric surgery, H. pylori was thought by many to negatively affect outcome. Our study aims to evaluate the impact of H pylori on short term outcomes after laparoscopic sleeve gastrectomy (LSG).

Methods and Procedures: We analyzed 280 consecutive patients who underwent LSG by a single surgeon over 48 months. All gastric specimens were tested for the presence of H. pylori, and patients with negative pathology were compared to those with positive testing. Routine preoperative testing was not performed. A subset of 252 consecutive sleeves was analyzed after implementation of a one day discharge protocol to investigate whether H pylori status impacted length of stay (LOS). We compared LOS, 30 day complications, readmissions and emergency room visits (up to 1 year), as well as excess weight loss at 1 year (EWL1). Independent t-test and Fisher exact probability tests were done to identify significant outcomes.

Results: Twenty one (7.5%) of the 280 patients tested positive for H. pylori on post-operative pathology. There were three major complications potentially related to H. pylori requiring intervention (1 leak, and 2 strictures), all in the H. Pylori negative group. The average length of stay was longer for the H. pylori positive group compared to the negative group (1.85 vs 1.45, $p = 0.02$). The most common reason for prolonged stay was severe nausea. Those in the H. pylori positive group (23%) were more likely to require an ER visit or hospital admission related to their procedure when compared to the H. pylori negative group (6.42%) (OR = 3.93, 95% CI = 1.28–12.04, $p < 0.05$). EWL1 was equivalent for both groups, 71% in the H. pylori negative group and 72% in the H. pylori positive group ($p = 0.44$).

Conclusion: The presence of H. pylori does not increase the risk of major complications after sleeve gastrectomy and does not affect weight loss. However, it may be related to longer hospitalization and higher readmission rates.

P302

Short-Term Morbidity Of 1,597 Laparoscopic Roux-En-Y Gastric Bypasses: A Single Institution Experience

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Introduction: The purpose of this study was to ascertain the 30 and 90-day procedure-related morbidity and mortality of laparoscopic Roux-en-Y gastric bypass (LRYGB) at a single university hospital to facilitate consistent patient counseling and informed consent.

Methods: Retrospective review of a prospectively maintained database was conducted on all patients who underwent primary LRYGB at an American College of Surgeons Bariatric Surgery Center of Excellence from 1998–2012. LRYGB technique and postoperative management algorithms were standardized and consistent throughout the study period. LRYGB was performed in a retrocolic, retrogastric fashion with linear stapled anastomoses. Data assessed were patient demographics and postoperative outcomes at 30 and 90 days including rates and severity of wound infection, leak, marginal ulcer, stomal stenosis, bowel obstruction, internal hernia, incisional hernia, venous thromboembolism, readmission, and overall morbidity and mortality. Additional outcomes included primary procedure-related reoperation rate and the type of intervention required.

Results: In total, 1,597 patients underwent LRYGB. Most were available for follow-up at 30 (96.7%) and 90 days (98.7%). Mean patient age and body mass index (BMI) were 42.1 ± 11 years and 48.9 ± 7.8 kg/m², respectively. Most patients were female (84.6%) and Caucasian (76.6%). Overall 30 and 90-day morbidity were low (10% and 15%). The higher 90-day morbidity was due, in large part, to the increased incidence of marginal ulcer and stomal stenosis diagnosed between 31 and 90 days (Table 1). In all, 70 patients (4.4%) required reoperation for gastrointestinal leak ($n = 48$) and small bowel obstruction ($n = 22$). The majority of reoperations were required within the first 30 days postoperatively. No invasive treatments were required for other assessed complications. Of 91 patients readmitted within 90 days, principal admission diagnoses were abdominal pain (38%), nausea/vomiting (35%), bowel obstruction (3%), infection (8%), venous thromboembolism (6%), gastrointestinal bleeding (4%), and other (4%). The 30-day mortality rate was low (0.6%) with no death occurring between 31 and 90 days.

Conclusions: In a large single-institution series of LRYGB, short-term outcomes demonstrated low rates of overall morbidity and mortality. The most common complication and indication for reoperation was gastrointestinal leak. The increased incidence of marginal ulcer and stomal stenosis from 30 to 90 days contributed to higher rates of readmission and overall morbidity. Patient counseling about the potential complications of LRYGB should include a risk frequency profile compiled from local outcomes data whenever possible.

Table 1 Short-term morbidity of 1,597 primary gastric bypasses

Complication (%)	30 days (n = 1,545)	90 days (n = 1,576)
Minor infection	8 (0.5)	9 (0.6)
Major infection	7 (0.5)	7 (0.4)
Gastrointestinal leak	68 (4.4)	68 (4.3)
Marginal ulcer	15 (1)	53 (3.4)
Stomal stenosis	13 (0.8)	42 (2.7)
Bowel obstruction	23 (1.5)	30 (1.9)
Internal hernia	1 (0.1)	4 (0.3)
Incisional hernia	11 (0.7)	15 (1)
Venous thromboembolism	13 (0.8)	14 (0.9)
Readmission	62 (4)	91 (5.8)
Reoperation	62 (4)	70 (4.4)

Complication rates reported at 90 days are cumulative

P303

To Open Or Not To Open: Operative Choices For Approach To Gastric Pouch Revision

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Introduction: Gastro-gastric fistula (GGF) complicates 11–40% of undivided Roux-en-Y gastric bypasses (RYGB) and 1–2% of patients with divided gastric staple lines. Repair of GGF represents a technical challenge even to the experienced bariatric surgeon and historically has been performed via open surgical approach. Experienced bariatric centers have increasingly reported series of laparoscopic revision of GGF. We reviewed our clinical series of pouch revisions for GGF with the aim of comparing perioperative outcomes of patients undergoing this technically challenging revision via laparoscopic versus open approach.

Methods and Procedures: We reviewed our IRB-approved prospectively maintained institutional bariatric database of patients who underwent any bariatric operation between 05/2001 and 01/2013. Eighty-five patients with GGF were identified and their electronic medical records were reviewed for preoperative demographics, BMI, indications for surgical revision, surgical approach (open or laparoscopic), perioperative complications, and long term morbidity. Data was analyzed using standard statistical methods with Wilcoxon rank sum test.

Results: Of the 4237 patients in our database, 85 underwent revision for gastrogastroic fistula. Sixty-two cases were done open and 23 cases were approached laparoscopically. There were no conversions. Patients did not differ significantly in terms of preoperative comorbidities. The open group had a significantly higher mean BMI prior to revision (43.8 kg/m² open vs. 34.9 kg/m² lap, $p = 0.0004$). Mean operative time was 195 minutes for open revision and 205 minutes for laparoscopic revision ($p = 0.25$). There was no significant difference between groups in terms of bleeding requiring transfusion (8.7% lap vs. 8.1% open, $p = 0.93$), leak (8.7% lap vs. 9.7% open, $p = 0.89$), stricture (0 lap vs. 1.6% open, $p = 0.54$), pulmonary complications (4.3% lap vs. 14.5% open, $p = 0.2$), requirement for ICU admission (4.3% lap vs. 12.9% open, $p = 0.26$), intrabdominal abscess (4.3% lap vs. 4.8% open, $p = 0.92$), requirement for reoperation (13.0% lap vs. 9.7% open, $p = 0.66$) or mortality (0 for each group). The open group experienced a 40.3% incidence of wound complications compared to 12.5% in the laparoscopic group ($p = 0.056$). Average length of stay was 4.9 days in the open group and 3.2 days in the laparoscopic group ($p = 0.0002$). Thirty day readmission rates were 20.1% for the open group and 17.4% for the laparoscopic group ($p = 0.72$).

Conclusions: Revision of the gastric pouch is technically challenging. Patients undergoing revision of GGF had increased LOS as well as higher reoperation and readmission rates than those reported from COE data and also compared to our own patients undergoing primary RYGB. Comparable short term morbidity and mortality rates to those of open revision suggest that laparoscopic revision of GGF is feasible. LOS for patients undergoing laparoscopic revision of GGF was significantly shorter with a trend toward fewer wound complications. Larger series should clarify whether trends toward better outcomes for laparoscopic revision of GGF are significant.

P304

Repair Of Large Paraesophageal Hernias With Combined Partial Longitudinal Gastrectomy In Obese And Morbidly Obese

Patients: Intermediate Follow-Up

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Background: Treatment of gastroesophageal reflux disease (GERD) with hiatal hernia in obese patients has proven difficult, as studies demonstrate poor symptom control and high failure rates in this patient population following standard repair with fundoplication. Recent data has shown that incorporating weight loss procedures into the treatment of reflux may improve overall outcomes.

Methods: This study retrospectively identified 28 obese (body mass index [BMI], >30 kg/m²) and morbidly obese (BMI, >40 kg/m²) patients who presented between December 2007 and July 2013 for management of hiatal hernia with large or recurrent Type 3 or Type 4 paraesophageal hernias. All of the patients underwent a combined paraesophageal hernia repair and partial longitudinal gastrectomy. Charts were retrospectively reviewed to collect preoperative, operative, and intermediate-term postoperative results. Additionally, patients were contacted to determine symptomatic relief. Quantitative data were analyzed using Student's *t* test and qualitative data with χ^2 testing.

Results: Laparoscopy was successful for all 28 patients. The mean preoperative BMI was 38.1 ± 4.9 kg/m² (range, 30–48 kg/m²) and the mean operative time was 227 ± 75 min (range 102–373 min). Preoperative endoscopy revealed anatomic failure of prior fundoplication in 7 patients (25%). The remaining 21 patients had primary paraesophageal hernias, 3 of which were Type 4 hernias. Mesh was used to reinforce the hiatus in 19 of the 28 cases (67.9%). The postoperative complications included pulmonary embolism ($n = 1$), pulmonary decompensation due to underlying chronic obstructive pulmonary disease ($n = 2$) and wound infection ($n = 1$). The mean hospital stay was 5 ± 3 days (range 2–15 days). Upper gastrointestinal esophagogram was performed for 21 patients on post-operative day 1 or 2, with no immediate recurrence of paraesophageal hernia or staple-line dehiscence. At a mean follow-up period of 27 months, 21 patients were interviewed by telephone. Weight loss was seen for 20 of the 21 patients contacted, with a mean excess weight loss of $44\% \pm 25\%$ (range 1–115%). All of the patients surveyed experienced near to total resolution of their preoperative symptoms within the first month. At one year, symptom scores were found to significantly decrease toward asymptomatic from pre-operative levels. After intermediate follow-up at 27 months, however, there was a mild increase in mean symptom scores from those obtained at one year. Severe return of symptoms at or near pre-operative level occurred in 2 patients, both of whom will require conversion to Roux-en-Y gastric bypass.

Conclusion: Combined laparoscopic paraesophageal hernia repair and longitudinal partial gastrectomy offers a safe and feasible approach for the management of large or recurrent paraesophageal hernias in well-selected obese and morbidly obese patients. Though short-term results were promising, intermediate results show increasing rates of reflux symptoms that require medical therapy or conversion to gastric bypass.

P305

The Covidien TriStaple System vs. the Duet Tissue Buttress in Laparoscopic Sleeve Gastrectomy: a Comparative Study

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Background and Objectives: The laparoscopic sleeve gastrectomy (LSG) is growing increasingly popular as a first line bariatric procedure due to its ability to both restrict oral intake and modulate gut hormone regulation. The most significant challenge for surgeons associated with LSG is postoperative hemorrhage and gastric staple line leakage. To mitigate the risk of these complications, bariatric surgeons have promoted numerous preventative techniques. These techniques include over-sewing the staple line, adding buttress material and, most recently, adding additional staples lines. Our objective was to assess and compare two of these techniques: staple line reinforcement via the Duet tissue buttress reinforcement stapler system and the Covidien TriStaple design. We performed a qualitative institutional review of complications in postoperative LSG patients.

Methods: We performed a retrospective review of 213 consecutive patients that underwent LSG at a single institution between January 2008 and October 2012. There were 97 operations completed with Duet staple line buttress reinforcement, and 116 operations that used the Covidien TriStaple system. Our primary outcomes were staple line bleed or leakage. Secondary outcomes included wound infection, hematoma, upper GI bleeds, cardiopulmonary complications, and operative time.

Results: Both patient cohorts had similar baseline demographics. The mean patient age was 44.4 (+/-9.2) and 44.3 (+/-9.5) years ($p = 0.938$), and preoperative BMI was 44.9 (+/-9.3) and 44.3 (+/-6.9) kg/m² ($p = 0.78$) for the tri-staple and buttress group respectively. Our primary outcome of gastric leak was not met in either group, and the rate of gastric bleeding was not significantly different between the TriStaple and buttress group (0 vs. 1; $p = 1.00$). We found no significant difference between the TriStaple and buttress groups in regards to wound infection (1 vs. 4; $p = 0.379$), hematoma (1 vs. 0; $p = 0.455$), upper GI bleeds (0 vs. 1; $p = 1.00$), or cardiopulmonary complications (0 vs. 1; $p = 1.00$). Interestingly, we found that the OR time was significantly shorter in the TriStaple group (80 +/-22 min) than in the buttress group (96 +/-25 min) ($p < 0.001$).

Conclusion: Both the TriStaple and the Duet Tissue Buttress system are safe and efficacious options for managing the staple line in a laparoscopic sleeve gastrectomy, as both show low rates of postoperative complication. We found no significant differences in gastric bleeds or leaks between the two systems. Due to the low incidence of these complications, further studies with larger patient populations and randomization are needed to detect differences between the two systems.

P306

Revisional Surgery In Bariatrics: A Surgical Dilemma

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Introduction: Bariatric procedures are prone to failure. As the number of procedures performed increases, more reoperations/revisions will likely be needed. Current incidence of reoperation ranges between 5 and 56%. The aim of this study is to show our experience with laparoscopic bariatric reoperative surgery.

Methods: From 2004 to 2011, 96 patients have been reoperated for failure of a primary bariatric procedure. Procedures were performed at a single private institution in Monterrey, Mexico. Indications for reoperation or revisional surgery were unsatisfactory weight loss, weight regain, metabolic/nutritional complications, intolerable adverse effects or mechanical complications.

Results: A total of 96 patients with a mean age of 42 years (range 19–71) had laparoscopic revisional surgery. Sex distribution was 70% females and 30% males. Revisional procedures performed were as follows: 62 patients had an adjustable gastric band (AGB) converted to a Roux-en-Y gastric bypass (RYGB), 14 patients had an AGB converted to sleeve gastrectomy (SG), 11 patients had an AGB removed or replaced, and 4 patients had an AGB on a RYGB. Other less common revisional procedures performed were surgical reduction of large gastric pouch ($n = 3$) and conversion of SG to RYGB ($n = 2$).

Conclusions: Bariatric surgery is prone to failure due to patient and technical factors. Surgeons should be prepared to reoperate on these technically demanding cases. Although morbidity is higher, laparoscopic revisions can be performed satisfactorily with acceptable results.

P307

Gastric Band: Still an Effective and Safe Procedure? Analysis of Failures and Revisional Surgery in a Series of 111 Consecutive Patients

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Introduction: Increasing experience with laparoscopic adjustable gastric banding (LAGB) demonstrated a high rate of complications and inadequate weight loss. Revisional laparoscopic Roux-en-Y gastric bypass (RYGB) and laparoscopic sleeve gastrectomy (LSG) have been reported to be safe and effective in selected patients after LAGB removal. This study aims at evaluating the outcomes of revisional weight loss surgery (RWLS) after LAGB removal at our bariatric tertiary center.

Methods and Procedure: We retrospectively evaluated the feasibility and efficacy of performing concomitant single-stage or delayed two stages laparoscopic band removal and LSG or RYGB on all-comers who had a failed laparoscopic adjustable gastric band (LAGB) and analyzed the impact of the reason for revision surgery on outcomes. From January 2009 to September 2013, all patients who underwent LAGB removal were retrospectively analyzed. All procedures were performed by surgeons with extensive experience in bariatric surgery. Patient demographics, reason for band removal, interval between removal and RWLS, type of RWLS, complications, length of hospital stay, and percent of excess weight loss (%EWL) were collected.

Results: During the study period, 111 (100 women, age = 41 ± 8 years, 11 men, age 42 ± 4.7 years) patients underwent LAGB removal. Sixty-eight patients (61.3 %), presented with weight regain or inadequate weight loss. In the remaining 43 patients (38.7 %) indications for removal included: dysphagia (14 patients, 12.6%), GERD (10 patients, 9 %), gastric erosion (4 patients, 3.6 %), problems related to the access port (4 patient, 3.6%), epigastric pain and vomiting (9 patients 8.1%), diagnosis of gastric ectopic pancreas (1 patient 0.9%) and 1 removal upon patient's request (0.9%). A total of 56 patients (50.4 %) with a BMI of 42.5 ± 4.7 kg/m² successfully underwent RWLS (31 RYGB, 25 LSG). Five patients underwent simultaneous band removal and LSG. In the remaining patients RWLS was undertaken approximately 4 months (2 weeks–13 months) after LAGB. No conversion to an open approach was required. Median hospital stay was 5.7 (3–15) days. There was no major morbidity and no mortality. Early complications occurred in 4 patients after two-stage (7.14 %) revisional LSG, including 1 gastric fistula successfully treated by endoscopic stenting, one peri-gastric hematoma requiring surgical drainage, 1 urinary infection; Six (10.7 %) late complications occurred: 4 incisional hernias, 1 laparoscopic exploration for internal hernia after RYGB, 1 dysphagia after SLG. Mean follow-up time was 17.4 (range, 6–60 \pm 10.8) months. Overall mean EWL at 3, 6, and 12, months was 22.9 ± 7.4 , 46.6 ± 15.9 , and 58.2 ± 18.2 respectively. At a mean follow-up of 12 months, %EWL was 76.8 ± 15.3 %, for RYGB and 56.7 ± 16.3 for LSG. At 12 months 57.7% of patients achieved a BMI < 33.

Conclusions: Over 1/3 of patients who underwent LAGB removal were likely to present with mechanical/symptomatic/functional complications other than unsuccessful weight loss. Bariatric revisional surgery can be performed safely in experienced hands in selected patients even as a single-stage procedure with good surgical outcomes and satisfactory short-term weight loss results.

P308

Bariatric Surgery Improves Sexual Function In Obese Patients

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Introduction: Research suggests that obesity is linked to specific sexual problems including lack of sexual desire, poor performance and avoidance of sexual encounters. The aim of our study was to systematically evaluate the effect of bariatric surgery on patient's sexual function in comparison to their preoperative status.

Materials and Methods: The bariatric service of the Chaim Sheba Medical Center maintains a prospective database of all bariatric surgery patients. 80 patients were polled with a questionnaire on the day before surgery, and again one year post surgery on their sexual function. Females were polled with the Female Sexual Function Index (FSFI) and males with the Brief Sexual Function Inventory (BSFI). Full compliance with the questionnaire was achieved in 48 patients who represent the cohort of the study.

Results: The 48 patients include 34 females and 14 males, with a mean age of 40.2 (+/- 10.2). Mean preoperative BMI was 43.4 (+/- 5.3) and post-operative BMI was 31.4 (+/- 4.9). 36 patients underwent sleeve gastrectomy and 12 underwent gastric bypass. 9 patients were diabetic prior to surgery. For females, the FSFI index rose significantly from 24 to 30 ($p = 0.006$), indicating increased sexual performance and satisfaction. For males there was also an increase in the BSFI from 40.2 to 43.9, although it did not reach statistical significance ($p = 0.084$). However the general satisfaction index within the BSFI for males was significantly increased ($p = 0.0006$).

Conclusions: Our small study shows that in addition to the well documented metabolic benefits of weight loss following bariatric surgery, there is also clear improvement in patient's sexual function, both physical and psychosexual. There is not a lot of data in the literature regarding the effect of bariatric surgery, especially sleeve gastrectomy, on sexual function. However, this study shows that improved sexual function, can be verified, and this gives further credence to the idea that bariatric surgery has benefits over a wide range of physical, psychological and social parameters.

WOMEN FSFI SCORE

Domain	Pre-op	P	Post-op
Desire	3.6 \pm 1.2	0.18	4.2 \pm 1.1
Arousal	3.8 \pm 1.8	0.025	4.9 \pm 1.2
Lubrication	4.4 \pm 2	0.011	5.5 \pm 0.7
Orgasm	4.2 \pm 2	0.046	5.2 \pm 0.9
Satisfaction	4 \pm 1.9	0.001	5.4 \pm 1
Pain	3.8 \pm 2.5	0.027	5.1 \pm 1.4
Total	24 \pm 9.6	0.006	30 \pm 4.5

MEN BSFI SCORE

Domain	Pre-op	P	Post-op
Desire	6.1+1.6	0.018	7.8+2.7
Erection	4.5+0.8	0.053	12+3.6
Ejaculation	9+1.3	0.315	8.3+2.6
Perception	11.3+3.7	0.42	11.8+4
General satisfaction	2.8+0.8	0.0006	4.1+1.1
Total	40.2+9.2	0.084	43.9+12

P309

Band Over Sleeve: A Safe Alternative to Achieve Further Weight Loss and Reduction of Co-Morbidities

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Introduction: The vertical sleeve gastrectomy was traditionally performed as part one of a staged bypass procedure in the super obese patient population. The weight loss achieved from this surgery alone is often substantial and frequently patients do not require or desire the second stage mal-absorptive procedure. The vertical sleeve gastrectomy is one of the most common weight loss surgeries performed today. Over time, however, weight gain often occurs and we present a new technique of using a laparoscopic placed adjustable gastric band (LAGB) over a vertical sleeve gastrectomy (VSG) to aid in further weight loss and reduction of co-morbidities.

Methods: A retrospective review was performed of five patients who underwent LAGB placement following a VSG. BMI, weight loss from VSG alone and weight loss from LAGB plus VSG were reviewed. Percent excess body weight loss (%EWL) for LAGB alone and for LAGB plus VSG was calculated. Co-morbidities and their resolution as well as any postoperative complications were evaluated.

Results: All five patients achieved further weight loss after placement of the adjustable gastric band over the vertical sleeve gastrectomy with an average of 40.4 lb (range 31–64 lb) and an added %EWL of 32.2% (range 12.7%–44.1%). Total %EWL following VSG plus LAGB placement was 57% (range 43%–67.5%). The average BMI decreased from 56.6 pre-operatively to 43.9 post VSG and down to 37.6 after VSG plus LAGB. No major complications occurred during the 31-month average follow up (range 15–46 mo). An average of 3.6 adjustments to the gastric band were needed post operatively. Several co-morbidities resolved after VSG, and there was even further resolution of co-morbidities after LAGB plus VSG. One patient was intolerant of the band and required eventual removal.

Conclusion: This case series introduces a novel approach to add to the repertoire of bariatric procedures following a vertical sleeve gastrectomy. There are advantages to placing an adjustable gastric band over a sleeve gastrectomy in lieu of converting patients to a malabsorptive procedure such as Roux-en-Y gastric bypass or a biliopancreatic diversion with duodenal switch. We demonstrate that certain patients can achieve further weight loss from laparoscopic placement of a gastric band over a vertical sleeve gastrectomy without complications. Further studies still need to be done to determine the efficacy of this procedure to provide long-term weight loss in this patient population.

P310

Compare Of Diabetic Remission Rate After 3 Months After Laparoscopic Sleeve Gastrectomy Vs Roux-en-Y Gastric Bypass: Single Institute in Thailand

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Background: Bariatric surgery has been an acceptable treatment in morbid obese patient which demonstrated efficacy on weight loss and comorbidity resolution especially diabetes. The effect on diabetes control obviously occur within 3 months after surgery. Gastric bypass (LRYGB) is still the standard procedure and thought to have the major role in glucose homeostasis and diabetes control. Sleeve gastrectomy (LSG) is gaining the popularity as an option procedure in morbid obese patient with comparable outcome to gastric bypass in previous study. However there is still lack of data in Asia-pacific.

Objective: To compare the remission rate of diabetes within 3 months after LSG and LRYGB surgery including the data of anti-hyperglycemic drug use, excess weight loss, and complication rate of both operations.

Method: A cohort study in morbid obese patients with type 2 diabetes (T2DM) who undergo LRYGB and LSG in King Chulalongkorn Memorial Hospital. We recruited all Thai patient with age between 15–60 years, BMI 32.5–60, history of T2DM at less 6 months but not more than 10 years. At 3 months after surgery, the remission rate, excessive weight loss, the reduction of anti-hyperglycemic drugs use, change of HbA1c and complication rate were collected.

Result: 237 bariatric surgeries were performed in our hospital since 2003. 66 patients diagnosed of diabetes and compatible with inclusion criteria were identified. There were 38 patients in LRYGB group and 28 patients in LSG group. Overall average BMI was 50.7 (34.10–76.5). The age, gender and BMI were comparable in both groups (BMI 49.38 ± 8.73 and 52.49 ± 10.77, age 37.39 ± 9.82 and 52.49 ± 12.68 in LRYGB and LSG respectively). At 3 months after surgery, mean percentage of excessive weight loss was 43.9 ± 15.84 in LRYGB group and 28.57 ± 10.89 in LSG group with significant difference (P = 0.004). The major complication was found 2.6% in LRYGB and 3.5% in LSG group (1 leakage in LRYGB and 1 bleeding in LSG), both were controlled by laparoscopic procedure without any mortality. There was no significant differences in reduction of mean HbA1c level from 8.01 to 5.72 in LSG group and from 8.73 to 5.56 in LRYGB group (P = 0.343). The remission rate was 47.34% in LRYGB vs 39.28% in LSG with p = 0.513 while 95% of LRYGB and 89% of LSG showed decrease or discontinued of anti-hyperglycemic drugs use after surgery.

Conclusion: The study shows that bypass surgery is significant effective than sleeve gastrectomy in reduce weight but could not demonstrate significant difference in diabetes control in Thai patients. However this report shows that both procedures are feasible and have high success rate in glycemic control.

P311

Assessment Of The Quality Of Internet Information On Sleeve Gastrectomy

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Introduction: The Internet is an important source of information for morbidly obese patients who are potential candidates for bariatric procedures. In the last few years, there is a growing demand for Sleeve Gastrectomy because of perceived technical ease balanced with excellent outcomes. The aim of this study was to assess the quality and content of the internet information available about Sleeve Gastrectomy.

Methods and Procedures: A total of 50 websites were analyzed in September 2013. We used the search term “sleeve gastrectomy” on the most common internet search engines: Google®, Yahoo®, Bing® and Ask®. Based on popularity of use, 20 websites were obtained through the Google® engine and 10 sites by each of the others. Websites were classified as academic, physician, health professional, commercial, social network, and unspecified. Quality of information was evaluated using the DISCERN score and JAMA benchmark criteria. The DISCERN score varies from 0 to 80 points and is based on 16 questions that evaluate publication quality and reliability. The JAMA benchmark criteria range from 0 to 4 points assessing website authorship, attribution, disclosure, and currency. Duplicate and inaccessible websites were excluded from the analysis.

Results: We identified 43 websites from the United States, 6 from Mexico and one from Australia. The average DISCERN and JAMA benchmark scores for all websites was 46.32 ± 14.54 and 1.6 ± 1.1 with a median of 48.5 (range, 16–76) and 2.0 (range, 0–4), respectively. Website classification distribution was 21 physician, 11 academic, 7 commercial, 5 social network, 4 unspecified and 2 health professional. The average DISCERN and JAMA benchmark score reported was 55.36 ± 13.42 and 2.36 ± 1.02 in the academic group, 49.47 ± 9.99 and 1.90 ± 0.88 in the physician, 46.89 ± 14.16 and 0.2 ± 0.4 in social network, 44.00 ± 2.82 and 1.0 ± 0.0 in health professional, 41.28 ± 14.23 and 1.0 ± 1.0 in commercial, and 39.75 ± 19.53 and 1.0 ± 1.1 in the unspecified group. **Conclusion:** The results of this study suggest that the quality and content of information on the internet viewed by potential bariatric patients is poor. The global mean DISCERN and JAMA benchmark scores reported in this study were significantly lower than one would expect. Academic and physician websites offer the best information content whereas the worst was observed in the commercial and unspecified groups.

P312

Small Bowel Obstruction After Laparoscopic Gastric Bypass And Its Surgical Management: Experience In 10 Years

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Background: An internal hernia is the most common cause of small bowel obstruction (SBO) in patients with a Laparoscopic Roux-en-Y Gastric Bypass (LRYGB) with an incidence reported of 2–5%.

Objective: Present our incidence of small bowel obstruction and internal hernias after LRYGB and determine the causes.

Methods and procedures: A retrospective and descriptive study was carried out of 705 patients, reviewing charts between the years 2003 and 2012 that were operated of LRYGB and required hospitalization between those years because of an episode of small bowel obstruction. The tests and procedures used to diagnose the bowel obstruction included: physical examination, CT scan and diagnostic laparoscopy. Causes that lead to the episode of SBO were determined.

Results: 18 patients with previous LRYGB presented with SBO requiring hospitalization. 9 were female and 4 males. Ages 16–79 years (Mean 52.4, DE 17.8). The leading cause for SBO was an Internal Hernia; 13 patients (72.2%) sub-divided in transmesocolic hernia (2, 15%), Petersen's space hernia (3, 23%) and jejunal mesentery space (8, 62%) with a mean time for presenting SBO from surgery of 26 months. 2 patients were pregnant; required surgical intervention and had no complications post-op. Others etiologies for SBO were adhesions (3 patients, 16.6%) and jejunal-jejunal anastomosis obstruction (hemobezoar and torsion). All the patients that required surgical intervention were approached laparoscopically. Conversion to open surgery was not required. The mortality rate was 0%.

Conclusion: SBO occurred with an overall incidence of 2.5% in this series of patients with a previous LRYGB. We must consider the diagnosis of an Internal hernia as the first etiology for SBO because it represents 72.2% of the causes. Our incidence of internal hernias is 1.8%, which is low compared with other series probably because of the change of the technique from retrocolic to anteocolic. When indicated, the laparoscopic approach for SBO can be achieved with minimal mortality risk.

P313

CT Volumetry for Follow up of Sleeve Gastrectomy and Relation to Weight Loss

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Introduction: Sleeve Gastrectomy has gained wide popularity in the past few years; however there has been no accurate method for assessing the changes in remnant gastric pouch volume and impact on weight loss.

Methods: Prospective, single group Cohort study including 50 morbidly obese patients in Cairo University with a mean BMI of 47.4. CT Volumetry was done 1 and 6 months postoperative to assess the gastric pouch volume changes. A plain multi-slice abdominal CT with 5 mm reconstruction software was used to calculate the volume in each section and finally summates them.

Results: The mean 1st month postoperative pouch Volume was 107 cm³ which increased to 155 cm³ after 6 months. The mean Pouch Volume increase after 6 months was 48 cm³ (55% volume increase). Six months postoperative, the mean BMI dropped from 47.4 to 33.8 with 62.7% EBWL. We found that there is a non Significant weak negative correlation ($r = -0.3, P = 0.07$) between the initial pouch volume and EBWL. Also no statistical correlation was found between % 6 m pouch volume increase and EBWL ($r = 0.16, P = 0.35$) and this signifies there is no need to decrease the size of the bougie to establish a better EBWL.

Conclusion: CT Volumetry is a non invasive, feasible and relatively accurate method for the follow up of laparoscopic sleeve gastrectomy, yet more patients and longer periods of follow up are needed for wider use of this new technique. Use of a bigger size bougie (40 Fr or more) can be adopted as it has a lower incidence of leak and at the same time doesn't affect the EBWL. Restrictive factors such as initial pouch volume and rate of pouch volume increase are important but not the only factors determining weight loss following sleeve gastrectomy.

P314

An Altered Ghrelin Response Is Accountable For Reduced Caloric Intake After Endoscopic Plication Of The Stomach

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Introduction: Bariatric surgery is the only long-term effective therapy for weight loss in morbidly obese patients and therefore has an increasing role in surgical practice. With the rising number of procedures, research and development of minimal invasive procedures also increases. Recently, our center started an endoscopic method to reduce the volume of the stomach by creating plications. Excess BMI loss of 30.1% after 3 months was presented in last years abstract. A substudy was performed to assess possible mechanisms that lead to this weight loss.

Methods and Procedures: The procedure starts with placing an endogastric tube to secure a safe entry route to the stomach. Through this tube an Articulating Circular Endoscopic (ACE) stapler device is introduced. With the device, stomach tissue is acquired by vacuum and stapled to create eight to ten permanent plications (Fig. 1). Before and one month after the procedure patients underwent a standardized meal test with blood sampling for gastrointestinal hormones, breath sampling for gastric emptying (13C-octanoic acid breath test) and visual analogue scale (VAS) for hunger and satiety. Samples were obtained at several time points before and after a standardized breakfast. Changes in weight, hormonal changes and gastric emptying were tested with the paired t-test, VAS scores with repeated measures ANOVA. To analyze hormonal response to the breakfast, incremental areas under the curve (iAUC) for ghrelin, GLP-1 and PYY were computed. For each subject we separately calculated regression slopes, R and R² values for the correlation between VAS scores and hormone concentrations.

Results: Ten patients underwent the gastric plication procedure and were tested. Baseline weight was 119.3 ± 3.5 kg, which had decreased to 111.6 ± 3.4 kg ($p < 0.001$) at day of the standardized meal test, one month after the procedure. No changes were found in gastric emptying (GE) compared to baseline (GE half time 141.3 ± 5.9 preoperative vs 138.7 ± 12.3 minutes postoperative, $p > 0.05$). Statistical analysis of Ghrelin concentration in the first hour showed significantly different iAUC after the procedure (6.7 ± 9.1 vs. -33.3 ± 12.0 , $p < 0.05$). Furthermore, iAUC of VAS for desire to eat significantly decreased after the procedure (-21.2 ± 7.1 vs. -41.7 ± 7.4 , $p < 0.05$). After the procedure we found a significant correlation (see Table 1) between ghrelin levels and desire to eat in the first hour of the test day that did not reach statistical significance before the procedure. We did not find any significant changes in the anorexigenic hormones GLP-1 and PYY. One year after plicating the stomach mean weight was 100.3 ± 3.5 kg which is a mean weight loss of 19.0 ± 2.4 kg.

Conclusion: Post-procedural plasma levels of the hunger hormone ghrelin, showed a significant decrease as a response to the meal. This can be related to increased stretch on the plicated fundus. This effect might explain part of the reduced caloric intake as desire to eat changes significantly after the procedure and is positively correlated to plasma levels of Ghrelin. We emphasize that the changed Ghrelin response is part of the explanation to why patients are more likely to reduce caloric intake and lose a significant amount of weight after plicating the stomach.

Table 1

	Slope	95% CI	R	95% CI	R ²	95% CI
Desire to eat vs Ghrelin PRE	-0.4 ± 0.6	-1.8, 0.9	-0.3 ± 0.2	-0.7, 0.2	0.3 ± 0.1	0.1, 0.6
Desire to eat vs Ghrelin POST	$1.6 \pm 0.4^{*5}$	0.6, 2.5	0.6 ± 0.1^5	0.3, 0.8	0.4 ± 0.1	0.2, 0.7

All values are presented as mean \pm SEM * Mean of the regression slopes significantly different from zero, $P < 0.01$ (Student's one sample t-test). ⁵ Significantly different from pre-operative, $P < 0.01$ (paired Student's t-test)

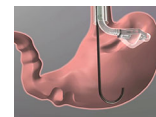
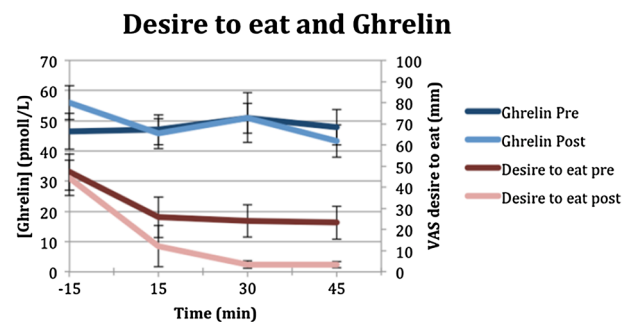


Fig. 1



P315

Intravenous Acetaminophen Does Not Reduce Peri-Operative Acute Pain Or Narcotic Use In Bariatric Surgery Patients

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Introduction: Narcotic pain medications continue to be the mainstay of postoperative pain management. It has been previously shown that use of intravenous acetaminophen in the peri-operative period can reduce acute pain, thus reducing narcotic use and potential narcotic-related side effects and complications. The specific objective of this study was to determine if peri-operative use of intravenous acetaminophen would reduce peri-operative pain and narcotic use in the bariatric surgery population.

Methods: In October 2011, routine administration of 1000 mg of intravenous acetaminophen at the end of bariatric procedures was established. After obtaining IRB approval, the records of consecutive bariatric surgery patients were retrospectively examined. Patients were separated into two groups of fifty patients each: Group A patients who received intravenous acetaminophen; and Group B patients who did not receive intravenous acetaminophen. Pain scores and narcotic usage (morphine equivalents) in the PACU were recorded. Average pain scores and narcotic usage for the two groups were compared using XLSTAT software.

Results: The average PACU pain scores, on a 10-point scale, for group A and group B were 4.94 and 4.34, respectively. The average morphine equivalent use in the PACU for group A and group B were 8.67 mg and 8.81 mg, respectively. There was no statistical difference in either average pain scores ($p = 0.15$) or morphine use ($p = 0.51$) between the two groups.

Conclusion: These data show that use of intravenous acetaminophen in the peri-operative period does not reduce acute pain or narcotic use in the bariatric patient population. Given these findings, IV acetaminophen is not a cost effective measure for pain control in the immediate postoperative period.

P316

Anthropometric Changes May Predict Diabetic Response After Bariatric Surgery

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Background: Type 2 diabetes mellitus (T2DM) is a life-threatening obesity linked condition often treated with bariatric surgery. Predictors of positive surgical response include duration and severity of diabetes, type of operation employed and various patient factors. Central obesity, as measured by waist circumference and waist/hip ratio, is associated with increased cardiometabolic risk. In this study, patient and surgical factors, including anthropometric changes, were analyzed in predicting T2DM response.

Method: 145 consecutive morbidly obese surgical patients at Loyola Health University Chicago were enrolled in this IRB approved cohort study, from Jan 2012 to Sep 2013. Analyzed were 35 patients (22 women; mean age = 44.86 ± 9.81) having T2DM. Demographic data, diabetic type (non-insulin or insulin dependent) and type of surgery were analyzed. Anthropometric factors were measured before and at intervals of 1 week, 1 month and every 3 months post-operatively. Follow up time was 8.09 ± 3.72 (range, 3–15) months. Predictors of diabetic remission (complete remission, improvement and non-response) were analyzed. Definition of complete remission (CR) was considered when there was a return to “normal” glucose metabolism (HbA1C < 6%, fasting glucose < 100 mg/dl). Diabetic improvement (DI) was defined as lower drug dosage with sub-diabetic hyperglycemia (fasting glucose 100–125 mg/dl).

Results: Surgical intervention included 19/35 (54.28%) gastric bypass (LRYGB), 10/35 (28.57%) sleeve gastrectomy (LSG) and 6/35 (17.15%) gastric banding (LAGB). There were no demographic or anthropometric measurement differences between type of surgery and gender ($p = 0.370$), race ($p = 0.503$) or diabetic type ($p = 0.267$). Mean preoperative BMI (kg/m^2) was 45.03 ± 6.31 (LRYGB), 53.25 ± 10.49 (LSG), and 50.41 ± 13.70 (LAGB). When evaluating postoperative factors, only a decrease in waist circumference (WC) at 3 months was associated significantly with gastric bypass ($p = 0.030$; 95% Confidence Interval, CI: 0.56–10.47) but not with either LSG or LAGB. Eighteen (51.42%), eleven (31.42%) and six (17.16%) of the 35 patients had complete remission, improvement and non-response of their diabetes respectively. In univariate analysis, preoperative independent predictors of success (CR and DI) included; white race ($p = 0.018$), LRYGB ($p = 0.015$), non-insulin dependent ($p = 0.025$), pre-BMI ≤ 60 kg/m^2 ($p = 0.019$) and pre-WC ≤ 160 cm ($p = 0.010$). Postoperative parameters of success included; decrease in waist/hip ratio at 1 and 3 months (0.012 and 0.00 respectively) and greater change in BMI. Waist and neck circumference (NC) changes at 1 and 3 months were associated significantly with complete remission and improvement in diabetes. In multivariate logistical regression analysis, type of surgery ($p = 0.019$; CI: 0.106–1.069), greater Δ WC at 1 month and greater Δ NC at 3 months remained independent predictors of success.

Conclusion: Bariatric surgery remains the most effective treatment of diabetes (overall 82% of success) in the morbidly obese patient. Predictors of positive outcome may not only include the type of surgery and duration/ severity of T2DM, but changes in fat distribution. Gastric bypass, in this short-term study, led to a greater degree of change in central obesity. Long-term follow-up may show that gastric bypass is superior in resolving central adiposity and therefore decreasing cardiometabolic risk and improving diabetes.

P317

Omentopexy (OP) in Vertical Sleeve Gastrectomy (VSG) Might Be Associated With Reduced Short And Long Term Morbidity

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Introduction: With increased utilization of VSG, there is clearly a need to minimize associated morbidity: proximal gastric leaks, staple line bleeding, strictures and severe reflux symptoms. Disruption of gastric ligaments associated with VSG, might result in tortuosity, L-shape kinking resulting in “functional” stricture. Role of omentopexy in potential reduction of morbidity was retrospectively analyzed in this study.

Patients and Procedures: In consecutive series of 179 VSG, 91 procedures were done without OP (control) and 88 – with OP (study group). There were no difference in patients characteristic between groups (age, sex, BMI, frequency of cruroplasty or hiatal hernia repair). Analysis included 90 day morbidity, utilization of postoperative endoscopy, balloon dilatation of strictures, %EBWL at 6, 12 months and daily use of antacid medications at 1 year. One year follow-up data were available for 30% of patients in the study group and 80 %—in control group.

Results: There were no mortality in either group. Morbidity, readmission rate, reoperation rate were 8.7%, 5.1%, 1.26% (for ventral hernia) in the study group and 12%, 9.3%, 1.3% (leak, abscess) in control group ($p = 0.5$ for all 3 variables). Single proximal leak was detected in control group 4 weeks after VSG (0% vs. 1.3%, respectively with $p = 0.5$). Postoperative endoscopy with balloon dilatation was required in 6.7% of control group and 0% in the study group ($p = 0.02 < 0.05$). At one year after VSG, daily antacids use was reported by 25% in the control group Vs 11% in the study group ($p = 0.02 < 0.05$). There were no reoperations for stricture in either group. One patient in control group developed recurrent hiatal hernia that required surgery at 2 years after VSG.

Conclusion: With all the limitations of retrospective analysis and length of follow-up in the study group, omentopexy appears to contribute to reduction in short and long-term morbidity. Even tubular VSG and its C-shape fixation provided by OP are associated with decreased clinical reflux symptoms and strictures.

P318

Routine Preoperative Esophagogastroduodenoscopy In Patients Undergoing Bariatric Surgery

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Introduction: Bariatric surgery is now accepted as the most effective treatment for morbid obesity. However, given the various surgical options (ie: RYGB, sleeve gastrectomy, gastric band), and ensuing changes in the GI tract, it is imperative that bariatric surgeons suggest the appropriate procedure for the appropriate patient. Use of selective versus routine esophagogastroduodenoscopy (EGD) in the preoperative workup of bariatric surgery patients remains controversial. We hypothesized that routine preoperative EGD is necessary for complete work-up of a patient in order to perform the appropriate surgery.

Methods and Procedures: Preoperative bariatric surgery patients who had undergone routine EGD between February 2013 and September 2013 were analyzed retrospectively. EGD findings and pathology results were reviewed.

Results: Twenty-five patients with GERD related symptoms and 25 asymptomatic patients were included in the final analysis. Mean age was 42.1 (range: 22–60) and 43.9 (range: 20–59) and mean BMI was 53.0 (range: 38.0–84.9) and 52.6 (range: 37.8–84.4) for asymptomatic and symptomatic patients, respectively. Females accounted for 80% of the patients in the asymptomatic group versus 68% in the symptomatic cohort. The most common findings in the symptomatic group were gastritis ($n = 9$; 36%), hiatal hernia ($n = 5$; 20%), gastric polyps ($n = 5$; 20%), and esophagitis ($n = 5$; 20%). One patient (4%) was positive for *H. pylori* and 1 patient (4%) had non-dysplastic Barrett’s esophagus. One individual (4%) was found to have a grade 1 neuroendocrine tumor of the duodenum. In the asymptomatic cohort, the most common findings were hiatal hernia ($n = 8$; 32%), gastritis ($n = 7$; 28%), gastric polyps ($n = 2$; 8%), gastric ulcers ($n = 2$; 8%), and esophagitis ($n = 2$; 8%). Two patients (8%) were found positive for *H. pylori*. Fifty-percent ($n = 6$) of asymptomatic patients desiring sleeve gastrectomy were found to have hiatal hernia.

Conclusions: Asymptomatic morbidly obese patients have similar GI pathology as symptomatic patients. Given this similarity, and the consequences of untreated (*H. pylori*) or missed pathology (gastric/duodenal polyps) routine EGD should be included as part of the pre-operative work-up of bariatric patients.

P319

Safety and Effectiveness Of Bariatric Surgery In Dialysis Patients

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Introduction: Chronic renal disease is known to affect adversely the results of bariatric surgery. There is paucity of literature on the safety and effectiveness of bariatric surgery on dialysis patients who are at a very advanced stage in their renal disease.

Methods: A retrospective review of a prospectively collected database was conducted for dialysis patients who underwent bariatric surgery between 01/06 and 01/13. Age, gender, BMI, cause of renal failure, associated comorbidities, type of surgery, early and late complications and mortality were collected.

Results: A total of 21 dialysis patients (0.7%) were identified out of 3048 patients undergoing bariatric surgery during the study period. Eighteen underwent laparoscopic Roux-en-Y gastric bypass (LRYGB), two patients underwent laparoscopic sleeve gastrectomy and one patient underwent laparoscopic adjustable gastric banding. Mean preoperative BMI was 48.84 ± 5.53 and BMI decreased to 35.38 ± 8.48 , after a mean follow-up period of 2.3 years (Range = 0.12–6.5). Early complications (<30 days of surgery) occurred in 5 patients (23.8%). Three patients had a minor complication and two patients had a major complication. Four patients (19%) had a late complication including one marginal ulcer with bleeding managed endoscopically, one patient small bowel obstruction requiring laparoscopic lysis of adhesions, one cholecystitis requiring cholecystectomy and one anastomotic stricture requiring dilatation. There was one death in this cohort at 45 days after LRYGB that was unrelated to a surgery.

Conclusions: Chronic renal failure requiring dialysis should not be considered a contraindication to bariatric surgery. Our experience with this patient population demonstrates excellent medium-term weight loss and acceptable early and late complication rates.

P320

Laparoscopic Sleeve Gastrectomy Outcomes (LSG): Experience from Kuwait

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Background: With 80% of its population overweight, 47.5% obese, and having the 8th fattest population worldwide, Kuwait has a serious obesity problem. This has led to a widespread practice of bariatric surgery specially LSG. This study aims to look at clinical outcomes, role of preoperative endoscopy, abdominal ultrasound and gastric histopathologies of patients who have undergone LSG at Al-Amiri Hospital, Kuwait.

Methods: A retrospective study was conducted of the gastric pathology specimen results of 1202 patients who underwent LSG at Al-Amiri Hospital from 2008 to 2012 (5 years).

Results: A total of 1202 patients, the average age were 34 years, and 889 (74%) were female while 313 (26%) were male, 135 (11%) adolescences age (12–21). Median BMI was 45 (30–105). Percentage Excess weight loss was 77% at 4 years. 185 patients (15%) were diabetics with 54% resolution rate. The histopathology results of 656 patients identified 488 (74.4%) cases with chronic gastritis, 63 (9.6%) with follicular gastritis, 12 (1.8%) with atrophic gastritis and 12 (1.8%) cases showed rare significant findings. H. Pylori was discovered in 48 (7.3%) of the patients. No statistical significance ($p = 0.71$) was seen between the overall complication rate and H. Pylori. 747 patients had pre-operative ultrasonography; 240 patients (32.1%) had normal results, 83 (11.1%) were found to have gallstones, 427 (57.2%) had fatty liver, and 55 (7.4%) had other pathologies. There was no statistically significant association between BMI and gallstones ($p = 0.545$) and BMI and fatty liver ($p = 0.418$). Morbidity and mortality was recorded.

Conclusions: Our experience with LSG indicates that this is an effective and safe procedure for the treatment of obesity in Kuwait it resulted in a 53.3% remission of Type 2 DM. In view of gastric histopathology results, routine histological examination of the gastric specimens is highly recommended. No association between H. Pylori infection and post-LSG complications. Trans-abdominal ultrasonography screening does not add significant information to the pre-operative workup and should be reserved for indicated patients.

P321

Pregnancy and the Bariatric Patient

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Introduction: Patients presenting with abdominal pain and/or emesis following Roux-en-Y gastric bypass (RYGB) must be urgently evaluated for internal hernia—a potentially life threatening condition which requires emergent surgical intervention. Evaluation can be challenging as no clinical or radiographic finding is reliably diagnostic. Diagnostic laparoscopy remains the gold standard for diagnosis. As the majority of bariatric surgery is performed in women of childbearing age, pregnancy complicates matters further. Abdominal pain as well as emesis is not uncommon in pregnancy and differentiating this from internal hernia can be difficult. Additionally, use of imaging such as CT scan may be limited secondary to concern for radiation exposure and diagnostic laparoscopy may also pose undo risk. We reviewed our institutional experience and our algorithmic approach to pregnant women with abdominal pain following RYGB.

Methods: Following IRB approval, 5 pregnant patients who presented acutely with abdominal pain or emesis following RYGB were identified from 2010–2013 and a retrospective chart review was performed. Data regarding clinical presentation, physical exam, laboratory values radiographic studies, intraoperative findings and clinical outcomes of both mother and fetus were collected and reviewed.

Results: Patients' age ranged from 22 to 34 years (mean 28.4). Gestational age ranged from 9 to 31 weeks (mean 19.2). Average BMI at time of presentation was 30.27kg/m^2 . Of the 5 patients, 4 presented with abdominal pain and one with intractable emesis. Management of the patient with intractable emesis consisted of plain radiograph, serial abdominal exams and 24-hours of observation. For the 4 patients who presented with abdominal pain, all underwent laparoscopy. 2 underwent CT scans preoperatively, with one concerning for internal hernia which was confirmed in OR. The remaining 2 patients were taken to the OR based on clinical suspicion alone. Intraoperatively, two patients were found to have obstruction from adhesions. The other two patients were found to have an internal hernia. One patient had ischemic bowel, which led to a open conversion and an emergent c-section (28 weeks gestational age). There were no postoperative complications or mortality for either fetus or mother. Average hospital stay was 3.6 days.

Conclusions: Pregnant women with history of Roux-en-Y gastric bypass who present with abdominal pain should be evaluated emergently for an internal hernia or obstruction. Based on our experience we have created an algorithm for pregnant post-bariatric patients (Fig. 1). This algorithm may prevent delay in diagnosis.

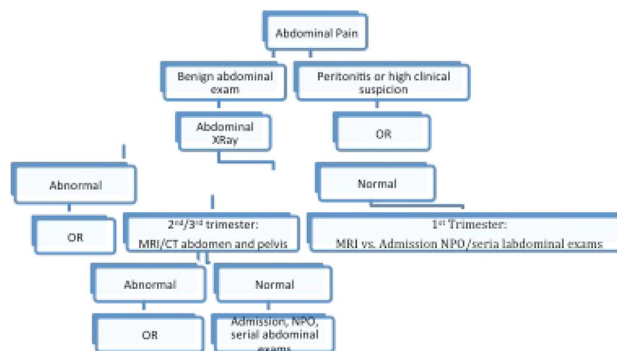


Fig. 1 Algorithm for assessing the pregnant post-bariatric patient

P322

Prevalence of Upper Gastrointestinal Gross and Microscopic Pathology in Patients with Morbid Obesity

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Introduction: Bariatric surgery is regarded as the most effective therapy in the treatment of morbid obesity and associated co-morbid conditions. The diagnosis of upper gastrointestinal pathology in bariatric patients is an essential component of the preoperative work up. Identifying such conditions preoperatively allows for proper preparation and avoidance of intraoperative pitfalls. In addition, the anatomical changes following some bariatric procedures render portions of the gastrointestinal tract inaccessible to surveillance endoscopic exams. A study was undertaken to determine the frequency of gross endoscopic and pathological diagnoses in a large sample of morbidly obese patients undergoing work-up for weight loss surgery as well as the association of such conditions and body mass index (BMI).

Methods: This IRB approved study was conducted at a university-affiliated tertiary care center with a high volume bariatric program. Upper gastrointestinal endoscopy was routinely performed on all patients undergoing a preoperative bariatric work up by fellowship trained surgeons with extensive endoscopic experience. A retrospective chart review of 1,000 consecutive patients was performed, including both the dictated endoscopy report as well as pathology results. Data collected included age, sex, pre-operative BMI, gross descriptive endoscopic diagnoses and microscopic pathological diagnoses. Confidence intervals for proportions were calculated using a modified Wald method. Student's T-test was used to determine associations between endoscopic findings and BMI.

Results: One thousand consecutive patients were reviewed. Patients had a mean BMI of 48 Kg/m² and 79% were female. Of this sample, 99% had at least one diagnostic finding on endoscopy, 90% had at least 2 diagnoses and 64% had 3 or more diagnoses. The most common gross descriptive finding was gastritis found in 63.1% of patients (95% CI 0.600, 0.660), while 52.9% of patients had a pathologic diagnosis of gastritis (95% CI 0.498, 0.560). Other common descriptive and pathologic abnormalities included: 23.3% hiatal hernia (95% CI 0.208, 0.260), 9.5% esophagitis (95% CI 0.078, 0.115), 2.4% peptic ulcer disease (95% CI 0.016–0.036), 3.7% duodenitis (95% CI 0.027, 0.051), 5.7% gastric erosions (95% CI 0.044, 0.073), 3.1% Barrett's esophagus (95% CI 0.022, 0.044), 9.7% gastric polyps (95% CI 0.080, 0.117), 1.2% Schatzki ring (95% CI 0.007, 0.021), 29.5% gastropathy (95% CI 0.268, 0.324), 15% foveolar hyperplasia (95% CI 0.129, 0.174), and 7.1% H. pylori infection (95% CI 0.057, 0.089). There was no significant difference between pre-operative BMI and any of the above endoscopy findings (all p-value >0.05).

Conclusions: This is the largest study to date evaluating the incidence of upper GI pathology in the morbidly obese. Although upper GI pathology is ubiquitous in the morbidly obese population, BMI is not directly associated with abnormalities in this large sample of pre-operative patients. These findings emphasize the value of routine performance of pre-operative EGD on all bariatric surgery candidates.

P323

SPIDER Sleeve - Initial Experience

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Introduction: SPIDER (Single Port Instrument Delivery Extended Reach) surgical system is a revolutionary surgical platform that offers the triangulation during the surgical procedure eliminating the crossover of the instruments, one of the major limitations of the single access surgery. **Methods:** The purpose of this study was to analyze our initial experience with 10 patients who underwent SPIDER sleeve gastrectomy at the Hospital Prive Casamance between November 2012 and April 2013. All patients were reviewed in outpatient clinic for postoperative control at 1, 3 and 6 months. In addition to the clinical examination, the 1-month postoperative consultation also included a satisfaction survey questionnaire, according to the Moorehead – Ardelst scale.

Results: All patients were women and the average age was 41.5 year old (range 27–52). The mean BMI was 40.11 (range 37.2–44.3). The intervention was completed by SPIDER approach in all patients without “conversion” to classical laparoscopy or open surgery. The mean operative time was 61 minutes (+/- standard deviation 15.22 min). The mean BMI at 1 month was 35.5 (+/-SD 3.58) with an average EWL of 32.9% (+/-SD 8.56%). At 3 months the mean BMI was 32.4 (+/-SD 2.78) with an average EWL of 52.7% (+/-SD 8.64%). At 6 months the mean BMI was 29.9 (+/-SD 2.60) with an average EWL of 68.8% (+/-SD 8.38%). Regarding the comorbidities, a complete remission of these was observed in 4 patients, an improvement in 3 others and no change in the last patient. The average hospital stay was 3.1 days. The average follow-up period was 161 days (+/-SD 57.4 days). There was no mortality and no intraoperative complication was recorded.

Conclusions: The SPIDER surgical platform seems feasible and effective as a minimally invasive approach for sleeve gastrectomy allowing easy and efficient operating procedure compared to other systems of single port surgery. Prospective long-term studies are recommended before validating this approach as comparable in terms of efficiency to the conventional laparoscopic surgery.

P324

Single-Incision Sleeve Gastrectomy versus Laparoscopic Sleeve Gastrectomy: A Case-Control Study

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Introduction: Miniaturization of the access into the abdominal cavity is, nowadays, gaining popularity. Theoretical advantages include reduced abdominal wall complications, less postoperative pain, reduced genesis of adhesions, shorter hospital stay, faster return to activity and productivity, and preserved cosmesis. Due to the still unresolved technical hurdles, the so-called “hybrid” NOTES approach and the Single Incision techniques were developed. Obese patients may theoretically benefit most from these techniques due to a would-be lower abdominal wall-related morbidity. We undertook a retrospective case-control study evaluating the Single Incision Sleeve Gastrectomy (SISG) as compared to the conventional laparoscopic Sleeve Gastrectomy (LSG).

Methods and Procedures: Between January 2008 and September 2011, our group performed 921 SG. Of these, 127 were performed using the Single Incision technique. Considering the first 20 SISG as serving to accomplish the learning curve, we decide to compare the next 107 patients who had SISG (Group A) to 107 patients who had LSG (Group B), matched for age, sex, and BMI. The two groups were compared regarding operative parameters, post-operative pain management, rate of fistula, and mid-term outcome at 1 year follow-up.

Results: 107 patients were considered eligible for the study in each group. The conversion rate (i.e., any additional port insertion or laparotomy) was 5.6% in Group A and 0.9% in Group B (p < 0.05). No major operative incident was reported. Mortality was 0%. No patient was transfused. Operative duration was 110 minutes in Group A (60–280 minutes) and 79 minutes in Group B (44–181) (p < 0.05). Oral diet was resumed on POD 1 (1–4) in Group A and on POD 3 (1–4) in Group B (p < 0.05). The postoperative morbidity rate was 4.6% in Group A and 7.4% in Group B (p > 0.05). The amount of pain killers in Group A was rated 3.6 upon a local score we developed as compared to 7.8 in the Group B (p < 0.05). One leak was observed was observed in Group A (0.9%) and 2 leaks in Group B (1.9%) (p > 0.05). The median duration of hospital stay was 2 days (0–7) in Group A and 3 days (2–12) in Group B (p > 0.05). Mean follow-up was 16 months in Group A (11–56) and 19 months in Group B (12–66). Weight loss patterns were comparable in both groups (p > 0.05). Two patients in each group had an incisional hernia.

Conclusions: SISG has longer operative duration as compared to LSG. However, SISG seems to be associated to lower post-operative pain and shorter hospital stay. Leak rate, short-term weight loss and 1-year incisional hernia rate are comparable.

P325

Single-Site Laparoscopic Gastric Band Versus Multiport Laparoscopic Gastric Band: A Matched Retrospective Study

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Introduction: The purpose of this study is to compare the outcomes of laparoscopic single-site gastric band (LSSGB) with a cohort of patients undergoing multiport laparoscopic gastric band (MLGB). Laparoscopic Gastric Band Placement has already proven its efficacy for the treatment of morbid obesity and is one of the most common bariatric procedures performed worldwide. In addition, laparoscopic single-site surgery has been shown to be well-accepted alternative for abdominal procedures, specifically cholecystectomy. However, in bariatric surgery, only small series and a few articles have compared the outcomes of patients undergoing LSSGB compared to its counterpart standard multiport laparoscopic adjustable gastric band.

Methods: A total of 146 patients underwent placement of adjustable gastric band. Of these, 107 underwent LSSGB and were compared with 39 similar MLGB. A single surgeon, in one hospital, performed all the surgeries. LSSGB were performed from November 2008 to November 2012, while MLGB occurred May 2008 to July 2011. Data collection included demographics, comorbidities, surgical time, hospital length of stay, and complication rate.

Results: There were 68 (63.5%) vs 24 (61.5%) females (p = 0.828); age was 42.9 ± 12.2 (range 17–71) vs 41.2 ± 12.4 (range 21–64) (p = 0.179); and BMI was 43.9 ± 6.6 (range 33–57.7) vs 44.2 ± 6.7 (range 35.2–68.1) (p = 0.275) for LSSGB and MLGB respectively. There were 21 (19.7%) vs 9 (23.0%) patients with diabetes mellitus (p = 0.591); 56 (52.3%) vs 18 (46.1%) with hypertension (p = 0.511); sleep apnea 18 (16.8%) vs 6 (15.3%) (p = 0.823); presence of previous abdominal surgery 52 (48.5%) vs 17 (43.5%) (p = 0.586) for LSSGB and MLGB respectively. Total surgical time was recorded in 52.9 ± 21.9 (range 29–112) vs 52.4 ± 23.8 (range 29–113) (p = 0.167) for LSSGB and MLGB. Intraoperative complications were seen in 2 (1.8%) LSSGB vs 1 (2.5%) MLGB (p = 0.327); Reoperations due to complications were seen in 11 (10.2%) vs 4 (10.2%) (p = 0.986); Incisional hernia was 2 (1.8%) vs 0 (p = 0.389) for LSSGB and MLGB respectively; No conversions occurred in the LSSGB group. Follow up was 36.9 ± 11.8 (range 55–7) and 38.3 ± 9.5 (range 61–23) for LSSGB and MLGB respectively (p = 0.231).

Conclusions: LSSG may be an attractive alternative for gastric band placement since it has similar outcomes to MLGB with better aesthetic results.

P326

Is Bariatric Surgery Safe in Patients with Cirrhosis? An Analysis of Short-Term Outcomes

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Introduction: Non-alcoholic fatty liver disease (NAFLD) is an increasingly recognized cause of chronic liver disease. Due to its association with the metabolic syndrome, NAFLD is common in the bariatric population. While the natural history of NAFLD remains variable, morbidly obese individuals with hepatocyte fibrosis may progress to cirrhosis. Given the association of NAFLD and obesity, bariatric surgeons are increasingly being asked to consider cirrhotic patients as potential surgical candidates. The safety of bariatric procedures in patients with cirrhosis remains uncertain. The aim of the current study is to report the short-term outcomes of patients with cirrhosis undergoing elective bariatric procedures.

Methods: The American College of Surgeons National Surgery Quality Improvement Program (ACS-NSQIP) maintains a clinically rich database on outcomes after surgery for quality improvement and benchmarking purposes. We conducted a retrospective cohort study using ACS-NSQIP Participant Use File 2005–2011 to identify patients with cirrhosis undergoing elective bariatric procedures. CPT and ICD-9 codes were used to identify patients undergoing bariatric procedures. Patients with ascites and/or esophageal varices were included and considered as having cirrhosis. We measured 30-day morbidity and mortality captured with the database.

Results: 11 patients were identified as having a bariatric procedure in the setting of cirrhosis. Seven of these patients were female. The average age and BMI of the 11 patients was 52.5 years and 45.3 kg/m² respectively. Five patients underwent laparoscopic Roux-en-Y gastric bypass while five underwent laparoscopic adjustable gastric band and one laparoscopic sleeve gastrectomy. The average operative time was 126.1 minutes. The average length of stay was 2.1 days. Eight of the 11 patients (72.7%) had evidence of ascites while seven of the 11 (63.6%) had evidence of esophageal varices. Variables to calculate MELD score were available for four patients. The average score of these four patients was 10.25. Only one patient had a post-operative urinary tract infection. No other post-operative complications were identified. There were no mortalities in this patient population.

Conclusions: Bariatric surgery was performed with minimal morbidity and no mortality in this small cohort of obese patients with cirrhosis. These findings suggest that bariatric surgery may be a potentially safe option in this high-risk patient population, although, these results should be considered within the context of a retrospective study with its inherent associated risk of bias and limitations. Additional prospective studies are needed to further define both the safety and clinical effectiveness of bariatric procedures with advanced NAFLD.

P327

Defining the Learning Curve: Early Experience of Laparoscopic Roux-En-Y Gastric Bypass from a Bariatric Centre of Excellence

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Introduction: Obesity is a leading public health challenge. The laparoscopic Roux-en-Y gastric bypass (LRYGB) has emerged as an effective and durable treatment option. There is a learning curve associated with this advanced laparoscopic procedure. Previous studies indicate that this learning curve is within the range of 100 cases per surgeon. The aim of the current study is to describe the learning curve of LRYGB at a Bariatric Centre of Excellence by examining operative time and outcomes of three non-bariatric fellowship-trained advanced laparoscopic surgeons.

Methods and Procedures: This retrospective cohort study employed a hospital-generated database that captured both elective and emergent bariatric procedures performed from November 16, 2009 to August 30th, 2013 at a single Ontario Bariatric Centre of Excellence. Patients who underwent an elective LRYGB by three non-bariatric fellowship-trained advanced laparoscopic surgeons were included in the study. Outcomes of interest included operative time and unexpected return to the operating room as captured in the database.

Results: From November 16th, 2009 to August 30th, 2013, 734 elective LRYGB were performed. The first 100 cases per surgeon were analyzed and compared to subsequent cases. Mean operative time for the three surgeons decreased by over 15 minutes as experience with LRYGB increased (146 minutes versus 130.9 minutes; $p < 0.001$). Unexpected return to the operating room decreased following the initial 100 cases, however this did not reach significance (4% unexpected return versus 2.08%; $p < 0.13$). To further describe the institutional learning curve, the first 150 cases performed at our centre were analyzed and compared to the subsequent 584 cases performed. As an institution, the mean operative time decreased by over 20 minutes as experience with LRYGB increased (153.5 minutes versus 132.9 minutes; $p < 0.001$). Similarly, unexpected return to the operating room decreased following the first 150 cases (5.33% unexpected return versus 2.23%; $p < 0.04$).

Conclusion: LRYGB is a technically demanding procedure with an appreciable learning curve. Results from this single-centre retrospective cohort study demonstrate that as experience with this advanced laparoscopic procedure increases, operative time amongst surgeons, as well as within the institution, decreases. While the unexpected return to the operating room of this Bariatric Centre of Excellence decreased following the initial 150 cases, this small cohort study would suggest that there is a trend to decreased return to the operating room amongst individual surgeons following the initial 100 cases. Additional studies are required to further elucidate this learning curve both amongst individual surgeons as well as at the level of the institution itself.

P328

Laparoscopic Gastrojejunal Revision With Selective Gastrectomy For Intractable Marginal Ulcers Following Gastric Bypass

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Background: Marginal ulcers following gastric bypass for morbid obesity is a common complication. The incidence of marginal ulceration varies from 0.6 to 16%. Most marginal ulcers respond to conservative medical therapy. Marginal ulcers unresponsive to medical therapy require surgical intervention. There is very little data on laparoscopic revisional procedures for marginal ulcers. We present a case series of a single institution experience of roux-en-Y gastric bypass revisions for recalcitrant marginal ulcers.

Methods: A retrospective chart review was undertaken of roux-en-Y gastric bypass revisional surgeries for recalcitrant marginal ulcers. 13 patients underwent revisions between March 2012 and June 2013. All cases were performed laparoscopically with no conversions to open. All cases involved resection of the gastrojejunal anastomosis with selective gastrectomy. No vagotomies were performed.

Results: 12 of the 13 patients were female (92%). Presenting symptoms included pain (12 patients), vomiting (6 patients), bleeding (2 patients) and dysphagia (1 patient). All patients except for two were American Society of Anesthesiologists (ASA) class 3. One was ASA class 2 and the other was class 3E. This was due to urgency secondary to bleeding from the ulcer. Median time to revision after the original bypass was 20 months (range 8–43). The median length of stay was 2 days (range 2–7 days). The median BMI was 32 (range 21–45.7). The following comorbidities were present: smoking two patients (15%), diabetes type II one patient (7.6%), hypertension two patients (15%). No patients were taking NSAIDs during their treatment for marginal ulcers. Average time in the operating room was 128.4 minutes. Median blood loss was 25 cc (range 0–300 cc). There were no leaks and no mortality. One patient had a missed enterotomy that was repaired same day. Another patient needed a postoperative transfusion. Two patients needed more revisional surgery.

Conclusion: Laparoscopic revision of the gastrojejunal anastomosis for intractable marginal ulcers is feasible and a safe option for patients with medically unresponsive marginal ulcers. As experience in laparoscopic revisional surgery increases, more data needs to be published to establish the best surgical approaches and algorithms for dealing with difficult marginal ulcers.

P329

Outcome Of Bariatric Surgery In Thailand : Laparoscopic Sleeve Gastrectomy Vs Laparoscopic Roux-En-Y Gastric Bypass

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Introduction: Obesity becomes a public health problem in Asia. Bariatric surgery has been accepted as an effective treatment. Laparoscopic roux-en-y gastric bypass (LRYGB) is one of the most widely used procedures, but laparoscopic sleeve gastrectomy (LSG) is increasing in popularity. However there is no study comparing both procedure in Thailand. Our objective is to evaluate the percentage of excess weight loss (%EWL), postoperative complication and mortality of the procedures.

Methods: A retrospective, group-matched controlled analysis was performed on 222 patients who underwent Bariatric Surgery in King Chulalongkorn Memorial University Hospital between 2003 and 2013. The patients in each procedure were matched for BMI. Outcome measures were percentage of excess weight loss (%EWL), postoperative complication and mortality.

Results: 80 patients performed either LSG or LRYGB with mean age 34.9 (9–60) years and mean BMI 51.9 (35.1–84.5). There were no operative-related mortality, no significant difference in postoperative complication (3.4% in LSG vs 6.4% in LRYGB, $p = 0.59$). %EWL at 6 months of follow-up was analysed. Overall %EWL was significant difference (41.1% in LSG vs 59.5% in LRYGB, $p < 0.01$). Subgroup analysis of BMI was done. %EWL of LRYGB were superior than of LSG only in BMI 35–44.9 group (72.92% in LRYGB vs 47.98% in LSG, $p < 0.01$). In BMI 45–59.9 group and super obese group (BMI >60), weight loss was significant after LRYGB and LSG but there was no statistical difference at 6 months of follow-up.

Conclusion: In Thai population, laparoscopic roux-en-y gastric bypass achieved a significant higher excess weight loss when compared to laparoscopic sleeve gastrectomy only in BMI <45. However both procedures result in success weight loss with comparable complication and no mortality in all BMI group

P330

Impact Of The Treatment With Intragastric Balloon In Abdominal Fat Compartments - Visceral Fat And Subcutaneous Cellular Tissue

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Objective: to demonstrate which of abdominal fat compartments, the subcutaneous cellular tissue (SCCT) or visceral fat (VF), is more reduced in patients after treatment with intragastric balloon (IGB).

Methods: In this study, twenty-two patients were evaluated before and after treatment with IGB through the following variables: weight, height and body mass index (BMI) and the measures of the thickness of the SCCT and of the VF through the abdominal ultrasonography.

Results: The age of the patients in this study ranged from 20 to 61 years, average of 41.50 years, standard deviation of 11.53 years and a median of 42.00 years, and 54.5% between 41–61 years, 45.5% remaining were 20 to 40 years. The majority of patients (68.2%) were composed of women. All variables analyzed (weight, BMI, SCCT and VF) decreased in the mean from that the averages of the absolute variation were all positive; for the margin of error fixed (5.0%), the differences in all variables were significant ($p < 0.05$). The means of the percentage differences ranged from 11.74% to 12.62%; being higher for the SCCT; followed by VF (12.0%); weight and BMI, each one with 11.74%.

Conclusions: The data indicated that patients after treatment with IGB obtained bigger reduction in their SCCT than abdominal VF.

P331

Laparoscopic Nissen Fundoplication With A Lap Band Placement: Two Procedures In A Unique Surgery For Treatment For Obesity And Severe Reflux Disease

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Objective: To demonstrate 2 procedures in association during a unique surgery: Adjustable Laparoscopic Banding and Nissen Fundoplication with the purpose of less aggressive loss weight and antireflux correction at the same patient.

Results: Two patients with body mass index above 40kg/m^2 and with a severe reflux disease was selected for the surgical treatment. A Laparoscopic Nissen Fundoplication is performed classically covering the distal esophagus and proximal stomach. By the same opening retrogastric space, beyond the fundoplication, the adjustable band is pulled through the tunnel, and a sufficient stomach between the fundoplication and the band is left to create a 30 mL reservoir. The discharge from the hospital was after an overnight. The patients had standard weight loss for the adjustable gastric banding and got better of the symptoms of severe reflux disease.

Conclusion: Laparoscopic Gastric Banding with Nissen Fundoplication has showed to be executable and effective in those 2 cases. Although, it is necessary further contribution using more patients to firmly demonstrate those benefits.

P332

Conversion To Gastric Bypass Is Technically Feasible After Endoscopic Gastroplasty

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Introduction: Endoscopic suturing devices have made it possible to perform less invasive procedures for obesity. Currently, it is not known whether an endoscopic sleeve gastroplasty would interfere with conversion to a gastric bypass. The purpose of this study was to assess technical feasibility of gastric pouch creation for a gastric bypass after an endoscopic sleeve gastroplasty.

Methods and Procedures: Endoscopic sleeve gastroplasty was performed on three ex-vivo cadaveric human and one swine stomach. An endoscopic suturing system, Apollo Overstitch™, attached to a GIF TH-180 dual lumen upper endoscope was used to perform the procedures. Plications in a figure-of-eight suturing pattern were performed along the greater curvature with the help of a tissue helix device, permanent prolene sutures, and ceramic anchors. After successful gastroplasty, a gastric pouch was created with laparoscopic linear staplers simulating that performed during a gastric bypass. The resultant gastric pouch was measured, inspected, and tested for stapleline leaks.

Results: Endoscopic sleeve gastroplasty was successfully performed in all four stomachs with an average of seven plications. There were no stapler misfires and all four stomachs were converted to gastric pouches with lengths (from GE valve to stapleline) ranging from 3.8–6.8 cm and pouch widths of 3.5–15.2 cm. Gastric pouch volume ranged from 14–69 ml. Leak pressure ranged from 14.1–16.0 mmHg in the human gastric pouches and 25.7 mmHg in the swine.

Conclusions: Creation of a gastric pouch as in a gastric bypass with linear stapling devices is technically feasible after endoscopic sleeve gastroplasty.

P333

Sleeve Gastrectomy In Patients With BMI Between 30 and 35

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Introduction: The laparoscopic sleeve gastrectomy is a well-recognized bariatric procedure for the obese population. It has been adopted worldwide. There are a large group among obese patients, with grade I obesity (BMI of $30\text{--}35\text{ kg/m}^2$) who are not candidates for bariatric surgery, based on NIH recommendations. However it is well known, that many of these patients have metabolic syndrome and increased cardiovascular risk. The development of this technique in some cases has been extended to patients with BMI under 35 with associated comorbidities that are similar or even worse compared to higher BMI population. There are clinical studies reported elsewhere with good results with the LSG in these patients. In this report, we show our experience performing LSG in patients with BMI between 30 and 35 and show the results in regards to safety, weight loss and resolution of their comorbidities.

Methods and Procedures: Descriptive and retrospective study. We analyzed 347 patients, analyzing gender, age, comorbidities, preoperative BMI, EWL, EWL% and BMI postoperatively at 1, 6, 12 and 24 months, morbidity and mortality.

Results: Mean preoperative BMI 34.1 (30, 9–34, 9), mean weight 90.6 (73–107) kg, Mean postoperative BMI at 24 months 27, surgical time 86.2 (40–120) min. Comorbidities: Insulin resistance 76.2%, Dyslipidemia 66.2%, Fatty liver 57.1%, Hypertension 33.4%, Obstructive sleep apnea 17%, Hyperuricemia 9.5%, Hypothyroidism 14.5%, Type 2 Diabetes mellitus 7.4%. Remission of comorbidities: Insulin resistance 90%, Dyslipidemia 90%, Fatty liver 70%, Hypertension 70%, Obstructive sleep apnea 70%, T2DM 82% and improvement 18%. Morbidity: 7 (2%); Hemoperitoneum = 5, Portal vein thrombosis = 1, Bile peritonitis (Lushka-cholecystectomy) = 1, Leaks = 0, Reoperations = 0, Mortality = 0.

Conclusions: LSG is a safe and reproducible technique in patients with BMI under 35, with low morbidity and mortality. In our series this results are very encouraging with excellent weight loss in the midterm. So we believe that it should be considered as a good surgical alternative in this group of patients.

P334

Portal-Mesenteric Thrombosis Following Laparoscopic Sleeve Gastrectomy A Rare but Potentially Serious Complication

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Introduction: Laparoscopic Sleeve Gastrectomy (LSG) has shown to be an effective surgical technique for obesity control and its associated co-morbidities, with comparable results to gastric bypass. It has risks with associated morbidity and mortality from 0% to 1% according to different series. Obese patients have a relative risk to develop venous thromboembolism (VTE) of 2.5 compared with non obese patients. VTE represents the main cause of mortality in bariatric surgery. Porto-Mesenteric Thrombosis (PMT) in bariatric surgery has an incidence of 0.5–3% and a global mortality of 0.21%. Incidence of PMT in relation to LSG reaches up to 1%. The objective of this study is to evaluate the incidence of PMT in a LSG series of patients and analyze their characteristics, risk factors, thrombosis extension and sequels.

Methods and Procedures: Descriptive & retrospective study based on the analysis of a data base of consecutively LSG operated patients, by the same surgical team between April 2006 and August 2013.

Results: Out of 1370 LSG, 4 patients developed PMT, Incidence 0.29%. Female / Male: 2 / 2, Mean Age 32 years old (22–38), Initial Weight 100.8 kg (87–126), Initial BMI 36 (32–42). Preop known risk factors: Contraceptive users 2, Smoke 3, DVT Family History 1, OR Time: 91 min (80–95), Conversions 0, DVT Prophylaxis all with enoxaparin 40 mg sc/day, Mean Hospital stay 3 days.

Symptoms: Abdominal pain 4, nausea/vomits 1. Post op presentation day: 15 (10–59), Images: Abdominal-pelvic CT Scan/Angio CT. Re-admission mean hospital stay 7.5 days (6–30). CT findings: Portal vein (PV) exclusive 1, PV extended to Splenic Vein(SpV) 1, PV extended to SpV + SMV 1, other findings: Intestinal segmental ischemia 1. Treatment: NPO, Anticoagulant (heparin and/or enoxaparin): Successful 3, Failed in 1 (PVT extended to SMV patient and intestinal ischemia & Intestinal necrosis), Surgery: small bowel resection. Follow Up: 12 months (3–24), all asymptomatic, AngioCT complete permeabilization in 4. Thrombophilia Study: Positive 2, Factor V Deficit in 1, Factor VIII Excess in 1, Negative 2.

Conclusions: Although PMT is a rare complication, it must be considered in the differential diagnosis of abdominal pain in the days or months following LSG. Prompt diagnosis is crucial to properly treat these patients and minimize morbidity. Thrombophilia is frequently identified as an underlying cause in our experience. LSG results are not affected in terms of weight loss in the midterm followup.

P335

Bariatric Surgery Revisions after Unsuccessful Weight Loss: Outcomes and Complications

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Introduction and Objectives: There are increasing numbers of patients who require revisional bariatric surgery either due to unsuccessful weight loss or complications due to their primary procedures. Revisional bariatric surgery has 10% incidence of major complications. The aim of this study was to review our experience with bariatric patients undergoing revisional surgery.

Methods: From April 2009 to May 2013, 142 patients underwent revisional bariatric surgery at our institution. We conducted a retrospective analysis to review revisional bariatric procedures and assess their postoperative outcomes and complications at 1 year after the surgery.

Results: The mean age at revision was 45.1 ± 11.3 years, Mean weight before revision was 280 ± 70 lbs and the mean BMI was 46.1 ± 12.7 kg/m². Mean duration until revision after initial surgery was 6.1 ± 2.3 years. 77 (54.2%) patients underwent band to bypass revision, 10 (7%) patients underwent band to sleeve revision, 40 (28.1%) patients underwent bypass revisions and 15 (10%) patients underwent other forms of revision. Mean hospital stay after surgery was 3.4 ± 1.2 days. Mean weight 1 year after surgery was 218.1 ± 60 lbs 1 year after revision. Mean BMI was 36.7 ± 14.3 kg/m². Only 6 (4.2%) patients required post-operative transfusion and 1 (0.7%) patient was re-admitted with anastomotic leak.

Conclusions: Revisional bariatric surgery effectively treated the undesirable results from primary bariatric surgery with very low complication rates in our experience.

P336

Preliminary Feasibility of an Interdisciplinary Study Identifying Predictors of Success in Bariatric Surgery: Neuroimaging Meets Surgical Weight Loss

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Background: Obesity is a leading public health concern in the US. As the rate of morbid obesity rises, bariatric surgery is becoming an increasingly important treatment modality for individuals who struggle with weight loss. Continued follow-up, regular exercise and healthier diet are common post-surgical predictors of successful weight loss, but currently there are no pre-surgical behaviors that are putative predictors of success after bariatric surgery. This project aims to explore evidence for the hypothesis that failure to lose significant weight by 12 months post-bariatric surgery is related to features of "food addiction". By using fMRI tasks and behavioral measures we hope to prospectively identify characteristics that will predict successful versus unsuccessful surgical outcome.

Methods/Design: The study is collecting neuroimaging data on 100 obese adults (18–60 years) approximately 4 weeks before undergoing laparoscopic adjustable gastric banding (LAGB), RYGB and sleeve gastrectomy surgical procedures and again 12 months post-operatively. Neuroimaging tasks focus on the circuits underlying impulsivity, reward, emotional and cognitive control, previously shown to have a strong influence in other addictive behaviors. Blood work is also collected to investigate hormonal influence regulating hunger and satiety. Routine post-operative follow-up measures and self-report measures on mood, weight and eating behaviors, anxiety, stress and life events are assessed monthly.

Results: To date participants were 29 obese (BMI = 45.9, SD = 8.3) and 4 community control (mean BMI = 23.3, SD = 1.7) adults (23 women; mean age = 41.5 years, SD 11.7). Participants completed 3 hours of fMRI scanning over two sessions. Tasks ranged from 10–30 minutes assessing: impulsivity (Go/No Go, monetary incentive delay), mood regulation (affective pictures task), cognitive control (regulation of craving) and reward function (anticipatory food cues versus receipt/consumption of food). Four participants were unable to tolerate imaging sessions due to claustrophobia.

Discussion: The study will provide critical information about the relation between neurobiological functioning, behavioral assessments, and bariatric surgery outcome. We discuss the initial challenges faced in organizing a large neuroimaging study with bariatric participants: MRI physical limitations, MRI-task considerations, and recruitment feasibility. The results of this study will provide a comprehensive examination of bariatric surgery predictors and will further our understanding of how various factors (individual, hormonal, behavioral, cognitive, emotional) interact to influence weight loss. In addition to identifying predictors of success in the total participant sample, the study aims to compare success across bariatric surgery type (LAGB, RYGB, sleeve gastrectomy).

P337

Insurance Mandated Preoperative Medical Visits Do Not Correlate With Bariatric Surgical Outcomes

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Introduction: Morbidly obese patients seeking surgical weight loss therapy are often required to meet arbitrary months of dietary counseling prior to surgical intervention. Often there is a discrepancy between the amount of insurance required preoperative visits and the amount of visits based on clinical needs. We sought to analyze these differences and their effects on outcomes.

Methods: All individuals seeking obesity treatment undergo education on obesity risks, treatment options as well as thorough medical, psychological and nutritional validated screening questionnaires prior to individual multi-disciplinary visits. Patients are considered high or low risk for intervention based on face-to-face interaction evaluating for presence of eating disorders, significant life-threatening illnesses, super obesity, and revisional bariatric surgery. Payors also require an arbitrary number of preoperative visits with varying duration times prior to surgical intervention. Analyzed are insurance requirements, time in a clinical pathway, demographics, and outcomes of low and high risk patients undergoing bariatric surgery.

Results: In this IRB approved registry, 90 individuals met criteria for analysis. Based on insurance policies, 66 patients required no insurance mandated nutritional visits and 24 patients required 3–6 months of preoperative nutritional (Table 1). Then patients were divided into to four groups for further analysis. Group 1 had no insurance mandated preoperative time constraints and was considered low risk. Group 2 had 3–6 months of insurance mandated visits with low risk. Group 3 had no insurance mandated preoperative time constraints yet was considered high. Group 4 required 3–6 months of mandatory preoperative visits and was considered high risk. The primary outcome was change of BMI at various perioperative time points. There were no demographic or anthropometric measurement differences between the four groups and type of surgery. Group 4, despite having an increased time in the program, had an overall significant increase of BMI (1.21 ± 1.25) prior to surgery (p = 0.02 with Group 1 and p = 0.008 with Group 2). The other groups had a modest decrease in BMI that was not significantly different. Body mass index at initial visit, after insurance mandated time and post-operatively are shown without statistical difference.

Conclusion: Arbitrary insurance mandated preoperative visits did not influence perioperative changes in body mass index. Clinical pathways better predict the need for individualized medical and psychological optimization prior to surgical intervention. This imbalance of mandated healthcare service should be re-evaluated in today's medical environment.

	Insurance requirement		P value	Clinical pathway		P value
	0 month	3–6 months		Low risk	High risk	
	(N = 66)	(N = 24)		(N = 58)	(N = 32)	
LRYGB/LSG/LAGB	25/11/30	6/7/11	0.329	20/12/26	11/6/15	0.971
Time before surgery (Days)	136.21 ± 98.12	180.42 ± 109.11	0.070	140 ± 82	163 ± 131.99	0.315
Starting BMI (kg/m ²)	45.89 ± 8.58	48.54 ± 8.83	0.203	46.27 ± 7.32	47.18 ± 10.82	0.636
BMI at time of surgery	44.83 ± 7.72	47.68 ± 8.49	0.135	44.88 ± 6.41	46.88 ± 10.23	0.259
Decrease in BMI before surgery	1.05 ± 2.61	0.85 ± 2.99	0.755	1.38 ± 2.98	0.30 ± 1.95	0.069
BMI at last FU	37.27 ± 7.67	40.38 ± 8.88	0.107	37.42 ± 7.01	39.34 ± 9.72	0.283
TimeFU (Days)	270.30 ± 109.13	257.25 ± 104.68	0.613	253.38 ± 101.49	291.19 ± 115.36	0.111
Decrease in BMI at last FU	7.55 ± 4.35	7.30 ± 4.00	0.799	7.46 ± 4.18	7.53 ± 4.41	0.940

P338

Safety And Efficacy Of Outpatient Pleated Laparoscopic Adjustable Gastric Banding

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Introduction: The Pleated Laparoscopic Adjustable Gastric Band, (Pleated Band) is an operative modification that combines the placement of a standard band with a gastric plication below the band. We examine our initial experience with this new technique at our ACS accredited outpatient center.

Methods and Procedures: Our prospectively collected patient database was retrospectively queried. We studied all patients performed at our freestanding outpatient surgery center. Short term (30 day) complications were evaluated.

Results: Over a two-year period 259 patients underwent outpatient Laparoscopic Adjustable gastric band surgery. All were discharged the same day. Seventy-seven patients underwent pleated band, and 183 had Lap-band only. There were no deaths or major complications in either group. There were three patients who required postoperative IV fluids for dehydration (two in the pleated group, one in the non-pleated group.) One patient in the pleated group suffered from significant persistent nausea that required upper endoscopy for evaluation.

Conclusion: The Pleated Laparoscopic Adjustable Gastric Band is a procedure that can effectively and safely be performed at a free standing outpatient surgery center.

P339

A Prospective Controlled Study Of Gastric Bypass Surgery For The Type 2 Diabetes Patients With Or Without Obesity

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Background: Gastric bypass surgery is an effective surgical procedure for the type 2 diabetes patients with obesity. However, the application of gastric bypass surgery for no obese type 2 diabetes patients is still controversial in China. Objectives To evaluate the procedure of gastric bypass for the type 2 diabetes patients without obesity.

Methods: Twenty-four patients suffering from type 2 diabetes were selected to undergo laparoscopic gastric bypass surgery and were enrolled at Beijing Shijitan Hospital, Capital Medical University. Based on BMI before surgery, they were divided into two groups: no obesity group (BMI < 30 kg/m²) (group 1) and obesity group (BMI > 30 kg/m²) (group 2). Before and after surgery, the serum glucose, C-peptide and insulin were measured and the results were compared.

Results: It took two years spanning April 2011 to April 2013 to complete the study. 24 patients suffered from type 2 diabetes underwent laparoscopic gastric bypass surgery successfully (a mean age of 41 years), 12 were male and 12 were female. The mean BMI was 29.96 ± 5.36 kg/m² of 24 patients before surgery. There were 12 patients in group 1 (a mean BMI of 25.71 ± 2.18 kg/m²) and 12 patients in group 2 (a mean BMI of 34.33 ± 3.85 kg/m²). There were no significant difference in the age and sex in two groups (P > 0.05). The mean fasting blood glucose of all patients was 9.86 ± 3.20 mmol/L (normal 3.90~6.10 mmol/L) before surgery and was significantly decreased after surgery (P < 0.001). The 0.5 hr-, 1 hr-, 2 hr-, 3 hr-postprandial blood glucose were also significantly decreased respectively (P < 0.001) in all patients after surgery. The mean fasting serum C-peptide of all patients was 3.37 ± 1.45 ng/ml (normal 3.90~6.10 mmol/L) before surgery. The mean fasting, 0.5 hr-, 1 hr-postprandial serum C-peptide of all patients were significantly decreased after surgery compared with those before surgery (P < 0.001). Compared before and after surgery, there were no statistical difference in the levels of fasting, 0.5 hr-, 1 hr-, 2 hr-, 3 hr-postprandial serum insulin respectively in all patients (P > 0.05). By contrast, there were no significant difference statistically in the changes of serum glucose, C-peptide and insulin in two groups after surgery (P > 0.05).

Conclusions: This research shows that gastric bypass procedure is effective to treat the patients who suffered from type 2 diabetes without obesity and can be applied widely in China.

Keywords: Gastric bypass surgery; Type 2 diabetes; Obesity

P340

Laparoscopic Management Of Abdominal Abscess Associated To Gastric Band

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Adjustable gastric band colocation is a procedure that has had an exponential growth. In the last years it has grown in a 329%, being the second most common bariatric surgery. However, this has also brought an increased in its complications.

We report the case of a 41-year-old woman with history of laparoscopic gastric banding 9 years before. She presented to our hospital with abdominal pain. She stated that she woke up with no symptoms 48 hours before, and as the morning progressed she suddenly started to develop epigastric pain. She denied prior episodes of similar pain. She reported a 38 degree Celsius fever. Abdominal pain had been continuous in nature and on arrival was 9/10.

The patients vital signs were temperature of 38 degree Celsius, heart rate 96 beats per minute, respiratory rate 26 breaths per minute, and blood pressure of 126/78. On physical exam, pertinent positives included tender abdomen in the epigastric region with voluntary guarding.

Laboratory investigations included an abnormal complete blood count that reported neutrophilic leukocytosis of 20.3 × 10⁹/L. Due to inconclusive physical exam and the concerning leukocyte level and associated fever, she was sent for a computed tomography scan for further evaluation of abdominal pain. The findings were reported as slipped gastric band located in the proximal stomach in close proximity to the hiatus; density changes in fat adjacent to gastric band, and lymphatic nodes of inflammatory aspect. Superior endoscopy was done, without any significant findings.

The patient was taken to the operating room for a diagnostic laparoscopy with a preoperative diagnosis of abdominal infection. Intra-abdominal exploration revealed a slipped gastric band and an associated abscess on the lesser curvature. The gastric band was removed without complications, and the abscess was drained. The patient had a favorable evolution and was discharged at 5th postoperative day after a normal hydrosoluble swallow.

Band slip is one of the most common complications of gastric banding. It occurs in 24% of patients, causing a cephalad herniation of the stomach. The occurrence of infection is a serious complication of gastric slip, almost always associated to gastric wall erosion. Incidence of erosion is of 0.2 to 2%, most of the time being microscopic in nature. The management of abdominal abscess associated to gastric band slip can be laparoscopic without added complications.

P341

Gender-Specific Outcomes After Laparoscopic Adjustable Gastric Banding

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Introduction: The objective of the study is to evaluate whether men lose more weight than women after a laparoscopic gastric banding procedure, as well as compare the rate of complications between the two genders.

Methods: Analysis consisted of a single institution, retrospective cohort study of 553 patients who underwent laparoscopic adjustable gastric banding between 2006 and 2010. Follow-up beyond 2 years was available for 268 patients. Weight loss measure by the difference at the 2–3 year mark was compared against the initial consult weight. We defined successful weight loss at 2–3 year mark if a patient lost > 30% of their excess body weight.

Results: Of the 268 patients, 211 (79%) were female and 57 (21%) male. The average initial weight at the time of presentation to the surgical weight loss center was 121 kg. At the 2–3 year mark, the average weight loss for males was 27.4 kg and for females 13.1 kg. Successful weight loss was accomplished in 61% of females and in 65% of males ($p = 0.602$). During follow-up, there were a total of 9 band-related complications (3.4%), 7 in females (3.3%) and 2 in males (3.5%) ($p = 1.056$). Table 1 compares the types of complications to the percent excess weight loss (%EWL) in each gender group.

Conclusions: There is no statistically significant difference in the proportion of weight loss in males versus females after laparoscopic gastric band at 2–3 years. There was also no statistical variation in the rate of band-related complications in both genders. However, the complications in females were in the patients who were successful in losing > 30% their excess weight, where the opposite held true for males.

Table 1

Gender	Band Complication	%ESL
M	Pain at port site	–3.43
M	Pain at port site	29.35
F	Band slippage	80.52
F	Band slippage	54.74
F	Esophageal food impaction	49.6
F	Dysphagia	44.3
F	Tubing disconnection	40.22
F	Port leakage	47.00
F	Port malfunction	83.97

P342

Type 2 Diabetes Remission In Obese Patients After Laparoscopic Sleeve Gastrectomy

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Introduction: there is clear evidence that type 2 diabetes obese patients are more likely to achieve diabetes control after bariatric surgery than those patients medically treated. The majority of the reports are based on gastric bypass or adjustable gastric band results; however, short term outcomes after laparoscopic sleeve gastrectomy (LSG) are encouraging. Our goal was to evaluate midterm results in patients who underwent LSG at our Institution.

Methods and Procedures: this was a retrospective review of prospectively collected data. Patients with type 2 diabetes who underwent LSG were included in the study. Diabetes remission criteria were: postoperative fasting glucose < 126 mg/dl, hemoglobin A1c < 6%, and oral hypoglycemic agents (OHA) discontinuation. Lipid profile was also assessed. Xlstat software was used to perform the statistical analysis.

Results: Between January 2006 and February 2013, 101 patients underwent LSG at our Institution. There were 42 (42%) men, mean age was 48 yo. Initial BMI was 46 kg/m². Mean time from diabetes diagnosis was 4.9 years (range 1–31). Mean prep hemoglobin A1c was 7.7%. Previous treatment: insulin 13 (13%), OHA 80 (79%), and diet 8 (8%). Mean follow up was 37 months. Percentage excess weight loss (%EWL) at 1, 6, 12, and 24 months was 38%, 60%, 60%, and 62% respectively. BMI at 1, 6, 12, and 24 months was 39, 34, 35, and 34 respectively. There was no statistical difference in %EWL when comparing patients with remission vs. non remission. Diabetes remission was seen in 72 (71%) patients, and improvement in 25 (25%); in 4 (4%) patients remained unchanged. The longer history of diabetes, and indication of insulin therapy were significantly related to decrease chances of remission ($p 0.018$ and 0.001 respectively); thus, remission was observed in 23% of patients on insulin therapy, and 78% of patients without insulin ($p 0.001$). Pre and postop laboratory results were as follows:

Conclusion: these data showed that, midterm results after LSG were excellent, not only in regards to weight loss, but also for type 2 diabetes control. There was no statistically significant difference when pre and postop total cholesterol, LDL, and HDL were compared. However triglycerides were significantly decreased after the operation. Long term follow up will be necessary to better define the role of LSG on metabolic syndrome.

	Preop	Postop	p
Fasting glucose	138 ± 45	98 ± 22	<0.001
HbA1C	7.4 ± 1.6	5.8 ± 0.1	<0.001
Cholesterol total	185	175	NS
LDL	112	110	NS
HDL (male/female)	38/44	46/51	NS
Tryglycerides	179	116	<0.001

P343

Relationship Between Smoking And Weight Loss After Bariatric Surgery

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Introduction: bariatric surgery is the most effective treatment for obesity. Discontinuing tobacco use has been typically associated with weight gain. Thus far, there are no reports supporting this fact. Herein, our objective was to evaluate the relationship between smoking habit and weight loss in patients who underwent bariatric surgery.

Methods and Procedures: retrospective analysis of prospective collected data of smokers undergoing bariatric surgery was performed. Demographics, and weight loss at 6, 12, and 24 postoperative months were evaluated. Tobacco use at the time of the operation was considered, and patients were classified using the Heavy Smoking Index.

Results: 150 patients who underwent sleeve gastrectomy between January 2006 and June 2012 were selected. Patients were classified as Smokers = 50 patients, Ex-smokers = 50, and Non-smokers = 50. Mean age was 42 yrs; 88 (59%) were female, and 62 (41%) were male. Initial BMI was 46 ± 8 kg/m². Mean follow up was 23 months. For the total group, % EWL (% excess weight loss) at 6, 12, and 24 months was 65 ± 17, 75 ± 20, and 77 ± 22 respectively. Comparison of weight loss among groups:

Follow up	%EWL			p
	Smokers	Ex-smokers	Non-smokers	
6 mo	67 ± 21	59 ± 16	68 ± 21	NS
12 mo	84 ± 17	69 ± 21	74 ± 21	NS
24 mo	74 ± 14	76 ± 23	74 ± 65	NS

Smokers were then divided in Severe smokers = 13, and Non severe smokers = 37. Moreover, smoking status was reassessed after surgery within the smokers group: 29 patients were still actively smoking while 21 had abandoned the habit. Again, there was not statistically significant difference in weight loss when compared severe vs. non severe smokers, and actively smokers vs. patients who had quit smoking after the operation.

Conclusion: short term results demonstrated that smoking status did not influence weight loss after bariatric surgery. Furthermore, abandoning the habit after surgery and severity of tobacco consumption did not affect the results either.

P344

Randomized Trial of OFIRMEV Versus Placebo After Laparoscopic Sleeve Gastrectomy

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Introduction: Ofirmev is an intravenous form of Acetaminophen approved by the FDA in 2010. The indicated uses include the treatment of pain with and without the use of opioids. Several studies have administered Ofirmev in an attempt to reduce the amount of narcotics used in post-operative patients with mixed results. A meta-analysis reported decreased opioid usage in 10 of 14 studies of intravenous Acetaminophen compared with placebo. We designed a randomized control trial using Ofirmev versus placebo in conjunction with single narcotic patient-controlled analgesia (PCA) in post-operative laparoscopic sleeve gastrectomy (LSG) patients for twenty-four hours.

Methods and Procedures: 19 patients which met criteria for LSG were enrolled and randomized into 2 separate limbs of the study. The Ofirmev and placebo group had similar mean age ranges (54.6 ± 2.4 and 51.0 ± 4.8, respectively) and male: female ratio (3:8 and 2:6, respectively.) The patients received postoperative administration of intravenous Ofirmev 1 g every 6 hours for 24 hours in addition to single narcotic PCA. The remaining 8 patients received intravenous placebo administered at the same time intervals also with a single narcotic PCA. At the conclusion of 24 hours, the total amount of narcotic was recorded. Secondary endpoints included the measurement of liver function tests at 24 hours and 48 hours post-operatively.

Results: In our interim analysis, patients receiving Ofirmev trended towards increased narcotic use at 24 hours compared with the placebo group, but this did not meet statistical significance. There has been no consistent relationship of the elevation of liver function tests and the administration of Ofirmev or placebo.

Conclusions: At this time, it appears that early in our study that the Ofirmev group has a trend towards increased narcotic use at 24 hours post-operatively compared with placebo. Further patient enrollment will hopefully elucidate the relationship between our two study groups.

P345

Obesity And Gastroesophageal Reflux Disease: Preoperative Evaluation Of The Esophageal Function

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Introduction: multiple studies indicate that there is a strong correlation between obesity and gastroesophageal reflux disease (GERD). Published data reporting the influence of laparoscopic sleeve gastrectomy (LSG) on GERD are controversial. It has been said that LSG could induce de novo GERD or worsen it due to disruption of the anti-reflux barrier. Therefore, Roux-en-Y gastric bypass (RYGB) would be the best treatment option for GERD in the obese patient. Our goal was: 1) to show esophageal manometry (EM) and 24 hr pH monitoring results in a selected population; 2) to compare results sorting the patients according to their BMI; 3) to evaluate change in surgical technique according to the esophageal function tests. **Methods and Procedures:** retrospective review of prospectively collected data. Esophageal function test (EFT's) were performed preoperatively in all patients scheduled for LSG. Patients were divided according to their initial BMI. Group A (non morbid obese patients): <40 kg/m², and Group B (morbid obese patients): ≥40 kg/m². Demographics and EFT's results were analyzed. **Results:** 92 patients underwent EFT's; results for 24 hr pH monitoring were available in 81 patients; 78% were female, mean age 41 ± 9 years. Group A: BMI 37 ± 2 kg/m²; Group B: BMI 42 ± 2 kg/m². Results were expressed as mean ± SD.

Manometry	Total (92 pts)	Group A (21 pts)	Group B (71 pts)	P
LES length (cm)	3 ± 1	3 ± 1	3 ± 1	NS
LESP (mmHg)	17 ± 6	17 ± 7	17 ± 6	NS
LES diagnosis				
Abnormal	9 (10%)	2 (10%)	7 (10%)	NS
Esophageal Body				
Abnormal	13 (14%)	2 (2%)	11 (15%)	NS
DEA (mmHg)	73 ± 25	76 ± 24	72 ± 26	NS
pH monitoring	Total (81 pts)	Group A (19pts)	Group B (62 pts)	p
% time pH <4	3.6 ± 3.4	3.8 ± 3.5	3.5 ± 3.4	NS
De Meester	14 ± 13.2	14.9 ± 12.3	13.7 ± 13.5	NS
#pts w/ GERD	25 (31%)	8 (42%)	17 (27%)	NS

LES:lower esophageal sphincter; LESP: LES pressure esfinter esofágico inferior; DEA: distal esophageal amplified

EFT's results modified our decision on the surgical technique in 9 (11%) patients, choosing RYGB instead of LSG; 18 (20%) patients still preferred LSG, even though they were explained they would probably need long term PPI's therapy. **Conclusions:** our study showed that: 1) there was no statistically significant difference in EFT's results when comparing Group A vs. B; 2) surgical technique was modified according to EFT's results in 11% of patients, and it would have been modified in other 20% of them. Future studies based on postoperative EFT's results would provide objective data to assess the real influence of LSG on GERD.

P346

Comparison of Tisseel® and Seamgurad® Application in Laparoscopic Sleeve Gastrectomy

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Aim and Background: Laparoscopic sleeve gastrectomy (LSG) is becoming a very popular surgical technique in the management of morbid obesity. Staple line hemorrhage is the number one cause of bleeding in LSG and previous multicenter studies have proven that staple line reinforcement is an effective method in preventing this problem. The aim of the present study is to compare the efficacies of Tisseel® and Seamgurad® application to reinforce the staple line during LSG.

Patients and Methods: As a total 145 patient underwent LSG; all of which were performed by the same surgeon (leading author). 15 of these patients had their adjustable gastric band removed and therefore excluded from the study. Remaining 130 patients (24 Male) had a mean age of 39.9 (19-62 years) were included.

Results: The mean body mass index was 48 (40-65) kg/m². In 57 patients Tisseel® and in 73 patients Seamgurad® was used. The mean operation time significantly lower in the Seamgurad® group (46 min v.s. 60 min; p < 0.05). The mean hospitalization time was 5.5 days. At the end of their hospitalization; a leak test was performed under X-ray control; before the drain removal. Mean drainage in the postoperative first 24 hours were not significantly different among Seamgurad® and Tisseel® groups (131.1 mL v.s. 165.2 mL). As for the postoperative complications; postoperative gastric leak (1.6%) from the staple line developed in two patients which were both from the Tisseel® group. During the study period one patient developed staple line hemorrhage (0.8%) in whom Seamgurad® had been used. The use of Seamgurad® significantly increased the hospital costs which were 4 times higher than the Tisseel® group.

Conclusion and Discussion: Reinforcing the staple line previously had been found to be an effective method to reduce staple line hemorrhage. As a result of the present study there were no significant difference between Tisseel® group and Seamgurad® groups in terms of hospitalization, complications and drainage volumes. On the other hand Seamgurad® reduced operating time and application of Tisseel® reduced the hospital costs. These two reinforcement methods can both be safely used during sleeve gastrectomy.

P347

Splenic Abscess After Sleeve Gastrectomy

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Introduction: Splenic abscess after a sleeve gastrectomy is an extremely rare occurrence, with only one case reported internationally and none were yet documented in United States. We are reporting a rare case study of splenic abscess as a progression of splenic infarction after a routine sleeve gastrectomy.

Methods: Reviewed literature using Pubmed database on the most common complications after a laparoscopic sleeve gastrectomy. Information for preferentially selected ideas and theories supported in multiple studies was reviewed to identify the most appropriate management for this condition.

Results: 19 year-old morbidly obese male had a laparoscopic sleeve gastrectomy. Past surgical history included laparoscopic cholecystectomy. During the operation, the liver, stomach and spleen were of normal anatomy and there were no intra-operative complications. Post-operative course was unremarkable. He tolerated a liquid diet and was discharged home in a stable condition on postoperative day 1. Two weeks after the operation he presented to outpatient clinic with an isolated temperature of 38.8 C and no other clinical signs and symptoms. Complete blood count and metabolic panel were within normal limits. Computed Tomography (CT) scan of the abdomen revealed a focal medial splenic infarct (Fig. 1). Two days after, the fevers became persistent and this time the laboratory findings were consistent with hepatic and renal failure: AST 752, ALT 587, alkaline phosphatase 255, total bilirubin 3.2, INR 1.8, amylase 60, lipase 123. Complete blood count remained within normal range. Hepatitis panel, toxicology, blood cultures and serology for other potential viral and parasitic pathogens were negative. Patient was being empirically treated for suspected Acetaminophen toxicity with N-acetylcysteine.

Work-up for cholelithiasis was negative and upper gastrointestinal swallow study showed no evidence of leak from the gastric sleeve staple line. Because continuous fevers and absence a clear diagnosis at hand, CT scan of abdomen and pelvis was repeated and this time revealed a new multifocal splenic abscess on top of splenic infarction (Fig. 2). Percutaneous aspiration of the splenic abscess showed gram-negative rods. He was urgently taken to the operating room for a splenectomy. The cultures of the splenic abscess grew *Salmonella* species. He recovered well after the operation and was discharged home on two-week course of Ciprofloxacin.

Conclusions: Splenic abscess in a setting of splenic infarct adds to the list of differential diagnoses as a potential complication of laparoscopic sleeve gastrectomy. Fever of unknown origin in an otherwise negative workup after a sleeve gastrectomy may signify an evolving splenic abscess. CT scan is the best modality to diagnose a splenic abscess and definitive management of multiloculated splenic abscess is splenectomy.

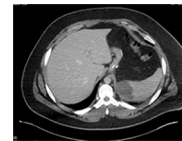


Fig. 1



Fig. 2

P348

Laparoscopic Sleeve Gastrectomy Is An Effective Treatment For GERD Symptoms

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Introduction: Laparoscopic sleeve gastrectomy (LSG) is an increasingly popular and effective bariatric procedure. However, it's effectiveness in treating GERD has been questioned. Some studies have even demonstrated worsening GERD symptoms. Our objective was to investigate the effect of LSG on GERD symptoms (GS) in our patient population.

Methods: Retrospective review of prospectively collected data of a single surgeon's LSG series (excluding revisions) between 2008 and 2013. Routine PPI's were not used postoperatively. GERD symptoms and medications were recorded preoperatively and postoperatively at 3, 6, and 12 months. Symptoms were categorized as either resolved (asymptomatic off medications), improved, or worse. Patient demographics presence and repair of hiatal hernia, and %EWL were also recorded. All patients with at minimum of 3 months follow up were included.

Results: 226 LSG met inclusion criteria. Follow up at 3, 6 and 12 months was 71%, 61% and 50% respectively. Demographics: mean age 45.0 ± 10.1, gender: 78.8% female, preoperative BMI 43.8 ± 5.6. LOS: 2.2 ± 0.7 days. The mean OR time was 74.7 ± 30.2 minutes, 21% had a combined hiatal hernia repair. There were no leaks or perioperative reoperations. 44.6 % patients had preop GS. At 3, 6 and 12 months after surgery 72%, 82% and 82% respectively had improvement or resolution of their GS. At 12 months follow up 2 patients had developed new GS (asymptomatic preop) and 6 (8.2%) had worsening of their preop GS. There were no differences at any time point for operative time, EBL, LOS and percent excess weight loss associated with improvement in GERD (all p > 0.05). At 3 months those with improved reflux were more like to undergo hiatal hernia repair (29.2% vs 14.0%; p = 0.017). However, these were not significantly different at 6 and 12 months.

Conclusion: The vast majority (82%) of patients in our study with pre-existing GERD symptoms had improvement or resolution of their GS after LSG. Only 2.7% of asymptomatic patients developed GS after LSG. Our findings indicate that LSG rarely leads to new onset or worsening of GERD based on patient reported symptoms. Further studies are required to determine the endoscopic and quantitative (pH study) changes in GERD after LSG.

Gerd outcomes 1 year after LSG	resolved/ improved		worse	P-value
% EBW loss	51.1		54.4	
Preop BMI	51.36		55.71	0.636
AGE	43.6		43.3	0.521
% female	86%		100%	0.498
% Caucasian	59%		50%	0.179
				0.764

P349

Endoscopy-Assisted Laparoscopic Removal Of Prosthetic Devices In Patient With Roux-En-Y Gastric Bypass: Case Report

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Introduction: Obese patients lose more weight with bariatric surgery than with medical weight-loss treatment. The laparoscopic Roux-en-Y gastric bypass (RYGB) procedure results in more short-term weight loss than laparoscopic adjustable gastric banding, but the latter has fewer postoperative complications and a lower mortality rate. Prosthetic devices have been used in bariatric operations to control the outlet of the gastric pouch and thus maintain weight loss as well as marked gastrostomy site to decompress distal gastric pouch with a gastrostomy. Marked gastrostomy site provides easy access to study distal bypassed stomach radiologically and/or endoscopically, as needed, access for enteral feeding in the rare case of excessive weight loss. A complication of these prostheses is erosion or migration into the gastric lumen

Case Report: A 33 year old woman with previous Laparoscopic Lap Band Placement 2008 (Fig. 1) did not show significant weight loss after the surgical procedure. In 2010 she underwent a conversion to a laparoscopic Roux-en-Y gastric bypass with two prosthetic ring silastic; one of them in gastric pouch (Fig. 2) and the other one to mark gastrostomy site (Fig. 3). After five years of RYGB she experienced abdominal mesogastric pain, which she describe as colic pain with no time relationship. Diagnostic laparoscopy (Fig. 4) and trans-operative upper GI endoscopy (Fig. 5) were performed, and they showed that the silastic ring that marked the gastrostomy was located in the jejunum due to erosion in the original site of placement. It was endoscopy-assisted laparoscopic removal, since endoscopic removal was impossible because the silastic ring was not totally extruded in the GI lumen.

Discussion: The silastic ring erosion is an uncommon complication of the RYGB. The erosion can be asymptomatic or it can develop symptoms such as epigastric and mesogastric pain, melena, or hematemesis. Endoscopic evaluation is the best diagnosis tool. Laparoscopic and endoscopic removals are both adequate management options.

Conclusion: Currently the therapeutic approach for bariatric surgery should always be minimally invasive. Possible complications can be managed with endoscopic, laparoscopic or Endoscopy-assisted laparoscopic repair. Open surgical treatment should be the last resource because of the inherent risk.



Fig. 1

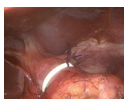


Fig. 2



Fig. 3



Fig. 4

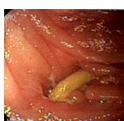


Fig. 5

P350

Role Of Laparoscopy In Blunt Abdominal Trauma

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Introduction: The Key issue in the choice of investigation is the cardiovascular stability of the patient. Diagnostic peritoneal lavage (DPL) is no longer the gold standard for determination of the need for laparotomy in blunt abdominal trauma not only because more specific and sensitive diagnostic procedures are available like delayed laparoscopic exploration (DLE), but also to avoid the unnecessary laparotomies even in cases of true positive DPL. The aim of this study is to compare conservative versus DLE for blunt abdominal trauma management as regards accuracy of diagnosis, decreasing incidence of complication, decreasing the need for unnecessary laparotomies and to shorten the hospital stay.

Material and Methods: 28 hemodynamically stable patients with blunt abdominal trauma (BAT) were selected randomly and divided into two group, there was no statistically significant difference in the mode of trauma between the two groups using the rank student 7 – test, also, no statistically significant difference in the age and the sex distribution between the two groups, as they passed the normality test.

Group (A) : included 15 patients, managed by the classic conservative management with close monitoring by vital signs. Urine output. Laboratory tests and repeated imaging by abdominal US.

Group (B) : Included 13 patients managed by (DLE) at the third day of the trauma, patients had US, CT abdomen on admission and remain under observation till the third day. Follow-up for the patients from both groups after discharge to detect late complications after 3 months.

Results: In 9 patients included in the study representing approximately 32% of all patients, there were injuries missed by U/S and detected by CT. and in 17 patients representing approximately 64%, U/S and CT detected the same injuries. Among the 13 patients that underwent delayed laparoscopic exploration (DLE) representing approximately 46% of all patients there were 5 missed injuries by CT that was discovered during (DLE) representing 38% of the 13 patients. Therapeutic laparoscopic intervention occurred in 3 patients representing approximately 23% of the 13 patients. Hospital stay for the patients managed with (DLE) ranged between 4 to 10 days with an average of 5.69 days (+ 1.887). hospital stay for the patients managed with conservative management ranged between 5 to 14 days with average of 8.93 days (+ 2.89). Follow – up information was available for all the patients over a period of 3 months after discharge, neither infective nor late hemorrhagic complications were observed.

P351

Right Lower Quadrant Pain: Platelet Count an Indicator for Laparoscopic Appendectomy?

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Introduction: Right lower quadrant (RLQ) abdominal pain work-up for appendicitis (AP) has evolved from a wholly approach, to a more imaged based one. Delays in diagnosis due to non-diagnostic imaging, necessitating laparoscopy for critical treatment decisions, urges a revisit to the initial clinical presentation, diagnostic adjuncts and management of RLQ pain.

Methods: A retrospective case control study was conducted for RLQ pain patients, all of which had underwent appendectomy. Those negative for AP pathologically (NAP)(n = 17) were compared to an AP control group (n = 34), matched for age, gender, lean body weight, and were evaluated by logistic regression. NAP group included cases with lymphadenitis, pelvic inflammatory disease, endometriosis, benign appendices(ranging from atrophic, fibrotic, or obliterated, to dilated or with mucocoele) and carcinoid. Variables included laboratories, imaging (ultrasound and computed tomography), OR time (OT) and length of stay (LOS). Laparoscopy was preferred approach (n = 47), sensitivity, specificity and predictive values for AP were calculated.

Results: Imaging is most sensitive for appendicitis but the least specific. AP diagnosis in RLQ cases is related to a lower platelet count (plt) (NAP 335K, AP 271k p = 0.002), and as well as a lower platelet: white blood cell ratio (plt/wbc) (NAP 31.05, AP 21.18, p = 0.002). Using both plt and imaging results in logistic regression, sensitivity and specificity increased (from 79 to 91%, and 69 to 87%, respectively), as well as the predictive values (PV) (see Table 1). Similarly, imaging and plt/wbc combination showed an increased sensitivity, specificity, PPV, NPV. Plt correlation with LOS was close (r = 0.264) (p = 0.061) but not significant for all RLQ pain cases (n = 51). Streptococcus+ peritoneal microbiology (n = 11) did not affect Plt, OT, LOS. Longer OT was related to longer LOS (r = 0.286, p = 0.042).

Conclusions: For RLQ pain cases, clinical laboratories, specifically plt and plt/wbc ratio, coupled with positive imaging, predicts AP more accurately, and warrants appendectomy. Consideration of alternative diagnosis is necessary with RLQ pain cases having higher plt counts, high plt/WBC ratios and non-diagnostic imaging. Laparoscopy remains both a diagnostic and treatment adjunct for RLQ pain, and its timely completion predicts shorter hospitalization.

Table 1 RLQ Pain cases' Platelet (plt), Platelet:WhiteBlood Cell ratio(plt/wbc) and Imaging(positive for AP) with Sensitivity, Specificity, Predictive Values (PV) for AP

exams	Sensitivity(%)	Specificity(%)	Positive PV(PPV)(%)	Negative PV (NPV)(%)
plt	79.0	69.0	88.2	52.9
plt/wbc	76.2	77.8	94.1	41.2
Imaging	100.0	43.8	78.0	100.0
plt+Imaging	91.0	87.0	93.8	81.3
plt/wbc+imaging	85.7	84.6	93.8	68.8

P352

Ergonomic Assessment Of The French And American Position For Laparoscopic Cholecystectomy

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Aims: The cholecystectomy was one of the first surgical procedures to be performed with laparoscopy in the 1980s. Nowadays, there are generally two operation setups to perform a laparoscopic cholecystectomy: the French and the American position. In the French position the patient lies in the lithotomy position, while in the American position the patient lies supine with the left arm in abduction. In order to find an ergonomic difference between the two operation setups the movements in the vertebral column of the surgeon were analyzed in this crossover study.

Methods: The posture of the surgeon's vertebral column was recorded intraoperatively using an electromagnetic motion tracking system with three sensors attached to the head and to the trunk at the level of Th1 and S1. A three-dimensional posture analysis of the cervical and thoracolumbar spine was conducted on 4 surgeons performing a laparoscopic cholecystectomy in the French and in the American position. The body angles that were assessed consisted of: flexion/extension of the cervical and the thoracolumbar spine, axial rotation of the cervical and thoracolumbar spine, lateroflexion of the cervical and thoracolumbar spine and the orientation of the head in the sagittal plane. For each body angle, the mean, the time percentage within an ergonomic acceptable range and the relative frequencies were calculated and compared.

Results: No statistical differences were observed in the mean body angles and time percentages within an acceptable range between the French and the American position. The relative frequencies of the body angles might indicate a trend towards slight cervical flexion in the American position and slight thoracolumbar flexion in the French position.

Conclusion: In a modern dedicated minimally invasive surgery suite, there were no significant differences in body posture of the neck and trunk and orientation of the head between the French and American position.

P353

Laparoscopic Rectopexy; Is It Useful for Persistent Rectal Prolapse In Children?

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Introduction: Rectal prolapse is a relatively common, usually self-limiting illness in children. Peak incidence is between 1 and 3 years. [1],[2] The intervention is required for the persistent rectal prolapse (PRP). Only scanty experience is available with laparoscopic rectopexy in children, there on available work using both mesh and suture laparoscopic rectopexy in literature. This work is unique in that it presents our clinical experience with both mesh and suture laparoscopic rectopexy in children. This is a prospective clinical study for the outcome of laparoscopic rectopexy (LRP) by both mesh and suture technique in children with persistent rectal prolapse (PRP).

Materials and Methods: fourteen cases of PRP were managed with LRP from February 2008 to August 2012.

Results: Of the 14 children, 10 (71.42%) were males and 4 (28.57%) were females. Male to female ratio was 2:1. The mean age of presentation was 5 years (range 3–8 years). The presenting complaints were mass descending per rectum along with bleeding per rectum lasting from 1 to 3 years. All had rectal prolapse of 5–7 cm in length. 12 out of 14 child had recurrence even after sclerotherapy before referral to laparoscopic rectopexy. The mean duration of surgery was 30 minutes (range 20–60 minutes). No intraoperative complications were reported, only one case get constipation and managed conservatively and no recurrence.

Conclusion: LRP is safe, feasible in children and gives satisfactory results after failure of all conservative even sclerotherapy injection.

Keywords: Rectal prolapse, laparoscopy Rectopexy.

P354

Laparoscopic Removal of a Retroperitoneal Teratoma Presenting as Epigastric Pain

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Introduction: Teratomas are a relatively common tumor seen in children. Most of these occur within the ovary. However, there are many reports in the literature of extraovarian teratomas. Here we report a case of a retro gastric, peri-pancreatic teratoma in an adolescent female that we removed laparoscopically.

Case: The patient was an 11 year old female who had been treated for gastritis and gastroesophageal reflux disease for generalized abdominal discomfort for years without relief. A plain radiograph of her abdomen identified a calcified mass in her right upper quadrant (RUQ) and subsequent ultrasound found a normal appearing gallbladder, liver and biliary tree. A CT scan was therefore performed and she was found to have a 3 cm retroperitoneal calcified mass consistent with a teratoma versus partially calcified lymphangioma. The decision was made to perform a laparoscopic exploration and possible excision of the mass. One 12 millimeter umbilical port and two 5 millimeter ports were inserted. The lesser sack was entered by dividing the gastrocolic ligament and the mass was removed from the surrounding retroperitoneum without complication. The patient had an uneventful post-operative course and was discharged home tolerating a regular diet on post-operative day two. The mass was found to be a cystic teratoma on final pathologic specimen.

Conclusion: This case and associated video demonstrates a unique presentation of a peri-pancreatic teratoma and the feasibility of laparoscopic excision.

P355

Successful Laparoscopic Management of Gastric Perforation Due to Grill Brush Wire Bristle

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Introduction: Recent studies have revealed increased reports of internal injuries due to unintentional ingestions of grill-cleaning wire bristles. The paucity of reports earlier to 2012 stands in contrast to reports of cases surfacing after this date, suggesting an increase in exposure to a common risk factor. We present a case of wire bristle induced gastric perforation, along with its successful laparoscopic management.

Case Report: A 25-yr old female presented to the emergency room with a three-day history of progressively worsening epigastric pain and nausea, subsequent to eating chicken cooked on a grill. Physical examination revealed rebound tenderness compatible with an acute abdomen. A CT scan showed a 3 cm linear radiopaque structure going through the gastric wall (Fig. 1). The patient was emergently taken to the operating room for diagnostic laparoscopy. A foreign object was identified extending from the gastric wall with abundant fibropurulent exudate (Fig. 2). After successful removal of a linear metallic object (Fig. 3), the gastrotomy was repaired using an endostich device with a modified omental patch technique as has been previously described. All exudate was aspirated and the peritoneal cavity was irrigated with 3 L warm saline solution with bacitracin. Cultures were sent (Fig. 4). Intraoperative endoscopy revealed no air leak. A #10 flat JP drain was placed.

The patient had an uncomplicated post-operative course. Her peritoneal fluid cultures were positive for proteus mirabilis and she was treated with intravenous piperacillin-tazobactam every 6 hours. She had rapid resumption of po intake and passed flatus on day 2. JP drain was removed and she was discharged home on post-operative day 3.

Discussion: To date, there have been reports on 25 patients presenting bristle wire ingestion related internal injury, ranging from embedment within the upper airway or gastrointestinal tract requiring endoscopic intervention, to perforation and abscess formation requiring surgical intervention. The majority of cases have entailed the wire bristles lodging in lingual and cervical tissue. There have been three cases of esophageal involvement, two of which were perforations requiring open operative intervention. Three cases of small bowel perforation have been reported, which were laparoscopically managed. There has been one case reported of gastric perforation leading to a hepatic abscess, treated with laparotomy. The common factor reported in all cases is consumption of food products cooked on a grill previously cleaned with commercially available wire bristle grill-cleaning brushes. To the best of our knowledge, this is only the second report in the literature to report gastric perforation by a wire bristle, and the first report on its successful laparoscopic treatment. Therefore we submit it is possible to manage wire bristle gastrointestinal perforation laparoscopically, with the use of an endostich and omental patch technique to close the defect in the gastric or intestinal wall, as has been previously described for perforated peptic ulcers as well as perforated marginal ulcers. Intraoperative endoscopy should be used as an adjunct for verification of the integrity of the repair, as has been described in the bariatric surgery literature.



Fig. 1

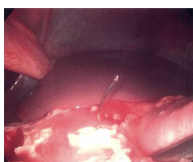


Fig. 2

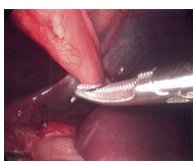


Fig. 3

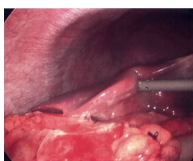


Fig. 4

P356

High Dose Opioid Analgesia Use Prior To Laparoscopic Gastric Stimulator Placement Reduces Likelihood of Clinical Success

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Introduction: Gastroparesis is a chronic, common, and costly disorder for which medical therapy is often unsuccessful. Gastric electrical stimulation (GES) has been used to treat refractory cases however response is variable and difficult to predict. This study aims to assess whether pre-operative opioid analgesics (OA) use affects clinical success of GES.

Methods: Records of 128 patients, who underwent laparoscopic GES placement from March 2001 to September 2012, were analyzed retrospectively. Data collected included demographics, surgical outcomes and clinical parameters. Pre- and post-operative opioid analgesic dosing (No=0 morphine equivalents (ME)/day, Low = 0–40 ME/day, Mid = 41–80 ME/day, High>80 ME/day), as well as clinical symptom assessment was collected for up to three years post-operatively. Clinical success was defined as 1) OA reduction of >50%, 2) maintenance of weight, or 3) symptom improvement. Descriptive statistics were computed for all factors. A $P < 0.05$ was considered statistically significant.

Results: 53 patients were on OA pre-operatively compared to 69 patients who were not. Patients not on OA pre-operatively were less likely to be on OA post-operatively ($p = 0.005$), however there were no differences in weight or symptom improvement. Subgroup analysis of the 53 patients on OA demonstrated significant improvement in clinical symptoms in the low-morphine cohort compared to the mid-morphine cohort ($p = 0.02$), and OA dosing post-operatively in the low morphine cohort diminished significantly compared to mid- and high-morphine cohort ($p = 0.032$). There was no significant difference in weight.

Conclusion: OA dosing preoperatively significantly effect clinical success of GES placement. Criteria for GES placement may need to take OA dosing into consideration.

P357

Laparoscopic Approach To Repair A Type II Endoleak From The Median Sacral Vessel

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Introduction: An endoleak is a persistent blood flow in the aneurysm sac extrinsic to the endograft. It is the most common complication after endovascular aneurysm repair (EVAR), reported to occur in 10% to 30% of patients. Type II endoleak results from collateral retrograde flow usually from the lumbar arteries, inferior mesenteric artery, or median sacral artery. In general, they are thought to be clinically benign and treatment is reserved for endoleaks associated with enlargement of the aneurysm sac. We report a case of a 80-year-old patient who had a persistent Type II endoleak after endovascular repair of an abdominal aortic aneurysm (AAA). The endoleak was repaired with laparoscopy ligation of the median sacral artery.

Case Report: An 80-year-old male patient underwent an uneventful endovascular repair of 5.9 cm infrarenal abdominal aortic aneurysm in September 2009. Routine CT scan in 2012 revealed a type II endoleak and the aneurysm sac enlarged at 6.6 cm. An angiogram identified an Endoleak that appeared to be fed by retrograde flow in the median sacral artery with outflow to the L5 lumbar branches (Fig. 1). Unfortunately, embolization was not feasible.

The patient was taken to the operating room for a laparoscopic ligation of the median sacral artery. The camera was placed in the umbilicus using an open technique. Two others ports 12 mm and 5 mm were placed in the right side and one 5 mm in the left side. The patient was placed in steep Trendelenburg. The rectosigmoid was then pulled out of the pelvis. The right limb of the graft was identified, it was large and thrombosed. The space between the aortic bifurcation was dissected with the hook electrocautery to expose the sacral promontory. The left femoral vein was identified. The median sacral artery was found and double clipped (Fig. 2). There were no intraoperative or post-operative complications.

Discussion: Repair of Type II endoleaks can be accomplished by endovascular or open surgical techniques. Laparoscopic repair of endoleaks may offer another useful method in the treatment of refractory endoleaks. Richardson et al. were successful in two patients using laparoscopic ligation to stop back bleeding from the inferior mesenteric artery in expanding aneurysms after EVAR with low morbidity and no mortality. Our case is the first reported case of a laparoscopic ligation of middle sacral artery done to repair a type II endoleak. Few studies described a technique of laparoscopic ligation of the median sacral artery before the resection of a sacrococcygeal teratoma. In summary, the laparoscopy ligation offers a viable alternative in the management of select persistent type II endoleaks following endovascular aneurysm repair.

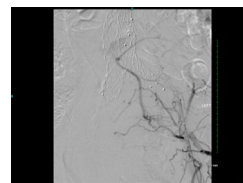


Fig. 1 The endoleak was visualized, the main arterial supply is retrograde flow within the median sacral artery



Fig. 2 Laparoscopic ligation of the median sacral vessel

P358

Inflammation And Coagulation Interaction After Open And Laparoscopic Left Partial Hepatectomy In A Porcine Experimental Model

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Objectives: The project compares the systemic and regional inflammation to the coagulation response between Open (OLPH) and Laparoscopic (LLPH), left partial hepatectomy in a porcine experimental model.

Materials and Methods: Twenty-nine (N = 29) domestic pigs (21–32 kg), were randomly allocated into two groups, the open (N1 = 19) undergoing OLP using a knife (A, n = 13) or a radiofrequency knife (RF knife) (B, n = 6) and the laparoscopic (N2 = 10) undergoing LLPH using a stapler (C, n = 5) or a stapler and a Radio-Frequency knife (RF knife) (D, n = 5), under general anaesthesia. By blood samples before (PD), after (PD0) operation, on the 1st (PD1) and on the 7th (PD7) postoperative day Hematological, Biochemical, Coagulation, Hormonal, Immunological parameters were measured. By two series of 29 stained liver tissue sections, taken on PD0 and on PD7 respectively, a regional inflammatory and a regional necrosis index were estimated by microscopic visualization.

Results: Systemic and liver regional inflammation and coagulation analysis resulted in the following statistically significant differences: 1) CRPPD7 (B>D, p = .005), 2) Cortisol (A PD0>C PD0, p = .002) and (B PD7>C PD7, p = .004) 3) Fibrinogen (BPD7, p = .004).

Conclusions: 1. In the porcine model, only the systemic and not the regional liver inflammatory response is significantly increased and extended, after OLP in comparison with the LLPH. 2. Coagulation seems to be significantly influenced in the early and in the late postoperative period of the laparoscopic sub-groups in comparison with the open ones and it is irrelevant to the systemic inflammatory response.

P359

Conversions During Laparoscopic Surgery: A Questionnaire Based Review According New Conversion Categories In Hungary

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The laparoscopic surgical procedures were introduced in Hungary in 1990. Since then, more than 180,000 operations have been performed. To date, the frequency of conversion from laparoscopic to open surgery for various procedures has not been comprehensively analyzed, so that neither in number and percentage of conversions nor the categories to which change is not well understood. We devised a questionnaire using new categories for conversions proposed by B. Lengyel et al. (Surg Endosc 2012; 26:508–513). This questionnaire was sent to 25 Surgical Units in Hungary and involved collecting data on the number of different laparoscopic operations performed in 2012, the rate and categories of conversions using these new categories.

These categories include: 1: inability to access peritoneal space 2A: lack of effort to achieve appropriate exposure, 2B: lack of exposure despite the effort to dissect, 3: emergent conversion. In the database 7,822 patients were enrolled, including 5,914 laparoscopic cholecystectomies, 1,113 laparoscopic appendectomies, 563 inguinal hernioplasties, 51 laparoscopic abdominal wall reconstructions, 47 laparoscopic antireflux procedures, 122 laparoscopic colorectal procedures and 12 laparoscopic liver resections. The total rate of conversions and the categories are as follows: laparoscopic cholecystectomy: 5% (1: 3.2%, 2A: 21.6%, 2B: 62.3%, 3: 12.9%), laparoscopic appendectomy: 6.8% (1: 0%, 2A: 17.04%, 2B: 83.5%, 3: 4.3%), laparoscopic inguinal hernioplasty: 2% (1: 0%, 2A: 77.9%, 2B: 0%, 3: 22.1%), laparoscopic abdominal wall reconstruction: 0%, laparoscopic antireflux procedure: 5.4% (1: 0%, 2A: 0%, 2B: 0%, 3: 100%), laparoscopic colorectal: 4.8% (1: 0%, 2A: 50%, 2B: 50%, 3: 0%), laparoscopic liver resection: 0%

Conclusions: The rate of conversion during laparoscopic surgery is not uniform across procedures and it is important for patient counseling. The frequency and the category of conversion is dynamic and likely related to the cumulative experience of the surgeon.

P360

SILS using conventional laparoscopic instruments, analysis of 50 cases in a developing country

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Background: In recent years SILS has had a remarkable growth and represents a safe and an aesthetic surgical option for patients with some abdominal illness. Surgeons in developing countries have not adopted these technique due to the lack of specialized equipment and the high cost of articulated instruments.

Objectives: The aim of these study was to explore the feasibility and safety of performing single incision laparoscopic surgery (SILS) with conventional laparoscopic instruments.

Methods: Retrospective analysis of 50 patients who underwent the above abdominal surgeries. Appendectomy (N = 29), cholecystectomy (N = 29), resection of ovarian cyst (N = 2), partial omentectomy (N = 1), aspiration of hemoperitoneum (N = 1).

Results: There was a rate of conversion to conventional laparoscopic surgery of 8% (N = 4), none of them where converted to open surgery. Of the 8% (N = 4) of the patients in which conversion was made, accessory ports were used. The mean surgical time was 36.5 minutes (15–120 min). The average age of patients was 36 years (10–70 years). The average BMI of patients was 24.38 (19–33 kg/m²). 44% (N = 22) were male and 56% (N = 28) female. Average hospital stay 1.8 days (1–6 days).

Conclusion: Single port surgery is a safe option with better aesthetic results. With ergonomic and geometric principles used by our group conventional laparoscopic instruments is a safe and reproducible technique.

P361

Study on Single Incision Laparoscopic Appendectomy With A Focus On The Frontal View Of The “Inverted Check Mark And Flap”

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At our hospital, we began performing laparoscopic appendectomy in September 2009, and single incision laparoscopic appendectomy in February 2011. To date, treatments have been provided to 40 patients, with average operation times of 41.8 minutes, with no cases requiring additional laparotomy. We focused on promoting abrasion with the aim of obtaining images to show the frontal view of the “inverted check mark” of the appendix and the “flap” of the mesoappendix on the dorsal side in the field viewed from the side of the umbilicus. When the frontal view of the “inverted check mark and flap” can be obtained, subsequent procedures, i.e., subserous incision of the mesoappendix, identification and incision of the arteries, and root procedures, can be performed with no problems. Among the 29 subjects of our study, 8 subjects exhibited “craniad inverted check mark and flap,” in which the top of the appendix faced the head side, and 21 subjects exhibited the “foot-side inverted check mark and flap,” in which the top of the appendix faced the foot side. The operation times for the subjects with the craniad type and those with the foot-side type were 28.9 and 48.1 minutes, respectively, showing a high level of difficulty in the subjects with the foot-side type. To obtain the frontal view of the “inverted check mark and flap,” ingenuity is required for patients with severe adhesion. In particular, for patients with severe adhesion to the retroperitoneum on the dorsal side of the cecum, sufficient abrasion is required, not only for the cecum but also for the external and dorsal side of the ascending colon. In addition, for patients with difficulty in securing the view to the appendix due to expansion/adhesion of inflammation to the terminal part of the ileum, for appropriate operation, it is important to compress the small intestine and elevate the surrounding tissues of the cecum and appendix by providing supplemental thin forceps or a 5-mm port.

It is important to perform single incision laparoscopic appendectomy by obtaining the frontal view of the “inverted check mark and flap” from the education perspective, and this operation method will provide a leading mark in the process of abrasion in severe cases. Herein, we report the key points of this surgical method, as well as a comparison with the conventional method, based upon 54 patients.

P362

Learning Curve In Single Port Endoscopic Surgery

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The MIS development towards a lesser invasive approach is evolving and in the last year the newly advocated Single or Reduced Port Endoscopic Surgery is gaining popularity. Single Port Endoscopic Surgery (SPES) has shown to have a favorable outcome in many surgical procedures and its utilization is increasing worldwide.

Early report showed a feasibility of the SPES technique in the most common procedures as appendectomy, cystectomy and cholecystectomy but seems to be technically more challenging. We started performing SPES since 2008 and we have reported its application in many different procedures from appendectomy to cholecystectomy, from adrenalectomy to TEP and TAPP. As for any procedure and especially for endoscopic procedures a time for learning is required until the outcome can be comparable to the standard procedure. Aim of our study is to evaluate the clinical data from patients who underwent single port surgery for appendectomy (N = 42), inguinal hernia (n = 73) and cholecystectomy (n = 65) and define the learning curve for each procedure. All parameters of patients operated using SPES were collected and analyzed. Data including patient demographics, operating time, conversions, intraoperative and early postoperative complications was analyzed and compared using SPSS software.

73 hernias were repaired using TEP (35) and TAPP (n = 28) (mean age was 49.39 years (range, 20–81)). The mean operating time for unilateral hernias was 75.67 minutes (range, 49–144) whereas for bilateral hernias it was 101.37 minutes (range, 62–150). No difference between TEP and TAPP procedure. 42 appendectomy performed (31F:11M), mean operative time was 40.4 min (range 29–76) while 65 cholecystectomy mean operative time was 36 min (range: 23–86) No intra-operative or early post-operative complications were reported except 2 conversion to standard lap in appendectomy group; 1 in TEP group. No conversion in the cholecystectomy group. None of the patients required a stay of more than 23 hours and none had a pain score > 2 at the time of discharge. No incisional hernia or recurrence detected during the mean follow-up of 13 months (9–34 months). OT time and intra-operative complications were evaluated and plotted on a graphical scale.

Results showed that the operating time stabilized at around 12 cases (46 min) for inguinal hernias, around 9 cases (38 min) for appendectomy and 11 cases for cholecystectomy (41 min). No intra-operative complications were observed.

Our study showed that SPES is a safe and feasible method for common surgical procedures and in experienced hands it can be mastered in about 10 cases and even during the learning curve it carries a low morbidity and conversion rate.

P363

Short Term Outcomes Of Thoracoscopic Esophagectomy In Prone Position For Esophageal Cancer

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Background: Thoracoscopic esophagectomy (TSE) for esophageal cancer has been spread as a less invasive surgery compared with conventional open thoracotomy approach. We have introduced the TSE in prone position since July 2009.

Methods: Our procedure consists of three steps. The first step is neck dissection including lymph nodes around the recurrent nerve. The second step is TSE with mediastinal lymph nodes dissection. The third step was laparoscopic gastric mobilization and gastric tube formation followed the neck esophago-gastric tube anastomosis. We retrospectively reviewed 46 consecutive patients who underwent esophagectomy by TSE for esophageal cancer between July 2009 and July 2013 at Kochi Medical School to analyze the outcomes.

Results: There were 39 (84.8 %) male and 7 (15.2 %) female. Median age was 66.5 (43–85) years old. In histological classification, 37 (80.4 %) cases were squamous cell carcinoma (SCC), 5 (10.9 %) were basaloid-SCC, 3 (6.5 %) were adeno-SCC, and the other 1 (2.2 %) was Barrett's adenocarcinoma. According to UICC TNM 7th, 19 (41.3 %) cases were IA or IB, 8 (17.4 %) were IIA or IIB, 17 (37.0 %) were IIIA or IIIB or IIIC, and 2 (4.3 %) were IV. Neo-adjuvant chemotherapy was performed for 26 (56.5%) cases. In abdominal procedure, 40 (87.0 %) cases were performed laparoscopic gastric mobilization, 6 (13.0 %) were open laparotomy. Forty-one (89.1 %) cases were performed a gastric tube reconstruction, 4 (8.7 %) were colon, and 1 (2.2 %) was 2-stage reconstruction. One patient needed the open-conversion because of the left subclavicular artery injury. Median thoracoscopic surgery time was 225 (140–385) min, blood loss volume was 220 (40–838) ml, and the number of dissected lymph nodes was 41 (20–100). Within 30 days mortality was observed in one patient (2.2 %), who died 4 days after the surgery caused by acute respiratory distress syndrome. Hospital mortality was observed in 2 patients (4.3 %). One patient died 35 days after the surgery due to non-occlusive mesenteric ischemia, the other one died 3 months after the surgery due to progression of cancer. In postoperative complications, pneumonia was observed in 4 (8.7 %) cases, surgical site infection was 14 (30.4 %) including 6 (13.0 %) of anastomotic leakage. Median length of postoperative hospitalization was 17 (4–90) days. Median follow-up period was 27 (0–49) months, and 41 (89.1 %) cases are alive.

Conclusions: The TSE was technically feasible, useful for postoperative early recovery, and oncologically acceptable for esophageal cancer patients.

P364

Single Incision versus traditional Laparoscopic Resection in Gastric GIST: A Retrospective Cohort Analysis of 39 cases at a single tertiary care center

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Introduction: GISTs are potentially malignant tumors and clinical practice guidelines for GISTs recommend surgical resection if it can be completely resected. Laparoscopic gastrectomy is now being accepted as a safe and feasible surgical procedure for GISTs owing to its better postoperative outcomes. In recent years, SILS has been performed for GISTs by some laparoscopic surgeons interested in further minimizing the invasiveness of laparoscopic surgery. In this current report, we present the cases with GISTs treated by SILS and traditional laparoscopic partial gastrectomy respectively to assess the safety and feasibility of SILS.

Methods: Data of gastric GISTs who had laparoscopic treatment were analyzed retrospectively. Of 39 patients at Shengjing Hospital of China Medical University between April 2008 and December 2012, 19 cases were treated by SILS partial gastrectomy (SILS group). Traditional laparoscopy was performed in the other 20 cases (conventional group). All the laparoscopic operations were performed by the same experienced surgeon. Demographic data, operative details, recovery parameters, and details of the specimen were obtained and analyzed based on the information obtained from the medical records. The location of tumor was evaluated by preoperative CT and EUS, also it was confirmed during the operation. Tumor size, grade and malignant risk were evaluated by pathology. Our standard clinical practice includes evaluating patients every 6 months until 5 years after operation with imaging and endoscopy to confirm the recurrence, and the adjuvant Glivec were performed for the patients with intermediate and high risk.

Results: The mean age and BMI were similar. Female were predominant in both groups (16 female vs 3 male, 12 female vs 8 male, respectively). The tumors can be seen at the fundus (9 vs 8), greater gastric curvature (3 vs 2), lesser gastric curvature (4 vs 5), the anterior (1 vs 1) and the posterior wall (2 vs 4). Tumor size (2.8 ± 1.7 vs 2.6 ± 1.7 cm, $p = 0.716$) and malignant risk grade were similar in both groups. All the patients were performed partial gastrectomy successfully. The only significant difference between the two groups was operative time, which was shorter in SILS group (99.0 ± 14 vs 112.2 ± 24.5 minutes, $p = 0.045$). Though the blood loss was less in SILS group, there was no statistical difference between them (49.5 ± 15.4 vs 60.3 ± 22.4 ml, $p = 0.09$). And the mean postoperative hospital stay was similar in both groups (12.8 ± 3.2 vs 12.3 ± 2.6 days, $p = 0.529$). No cases were converted to open surgery, and there were no conversions to traditional laparoscopic surgery in SILS group. The resection margins were tumor free confirmed by pathology. No intraoperative or postoperative complications such as anastomotic leakage, bleeding, anastomotic stenosis or incision hernia were experienced. All the patients were ambulant on the first postoperative day and regained liquid diet on the first postoperative day. 4 patients with intermediate risk in both groups were given Glivec by oral administration as adjuvant therapy for one year. During the median follow-up of 28 months, there was no disease recurrence on endoscopy and on CT.

Conclusions: Compared with the traditional laparoscopic procedure, SILS in gastric stromal tumors is feasible and safe when performed by experienced surgeons.

P365

A Novel Method Of Laparoscopic Port Site Closure To Significantly Decrease Postoperative Surgical Site Pain

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Introduction: There remain challenges in overcoming postoperative pain in laparoscopic surgery for large port sites in morbidly obese patients that require closure. Widely used ports site closure devices inevitably incorporate muscle and subcutaneous fat. We propose using the Endostitch device for port site closure. This is more precise at targeting only fascia and will significantly reduce postoperative pain. We thus compared postoperative port site pain assessment between laparoscopic gastric bypass and laparoscopic gastric sleeve patients who either underwent port site closure using the Endostitch or a port site closure device.

Methods: Data was gathered for a total of 253 patients over the course of 2 years from January 2011 to January 2013. These patients were selected from a private practice consisting of 3 surgeons conducting laparoscopic Roux-En-Y gastric bypass and gastric sleeve operations. Of these, 118 patients underwent port site closure using the traditional method with the closure device and 135 patients underwent port site closure with the Endostitch (As depicted in Figures 1 and 2). Postoperatively, all patients were placed on the same Dilaudid PCA (Patient Controlled Analgesia). Patients were consistently asked to rate their pain according to a standardized pain scale (1 to 10, 1 being the least painful, and 10 being most severe pain). Incisional surgical site pain was documented separately. Pain was assessed every 4 hours and a numerical value was obtained. Postoperative pain over the course of the first 2 days was averaged. These averages were compared between the two groups. A two tailed t-test was used to determine statistical significance.

Results: The overall pain rating for patients who underwent the traditional port site closure technique was 3.346 and 2.279 for the Endostitch closure technique. Figure 1 depicts the results of a two tailed t-test, showing a significantly reduced pain level for those patients who underwent port site closure using the Endostitch device.

Conclusion: Closing laparoscopic port sites with the Endostitch is a significantly less painful procedure than using other port site closure devices. The Endostitch technique targets the fascial layer without taking full thickness bites. Other port site closure devices incorporate subcutaneous fat as well as muscle layers causing significant pain.

Increased pain hinders mobilization and deep breathing, which are essential in the immediate postoperative period. Incentive spirometry use is especially important in bariatric patients where obstructive sleep apnea is a prevalent comorbidity. Patients with less pain are also inclined to ambulate, which has been associated with increased lung volumes and reduction in deep vein thrombosis. Practical advantages include a reduced risk of inadvertently puncturing blood vessels causing port site hematomas as well as less risk injuring other organs with large needles used in port site closure devices. When the Endostitch device is already being utilized, port site closure accrues no additional cost. We therefore propose utilizing the Endostitch device in any laparoscopic surgery. We advocate that this significant reduction in pain is essential in overall recovery and smoother return to functional status.

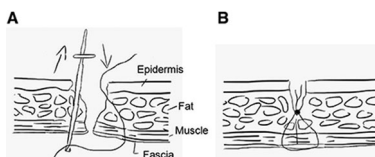


Fig. 1

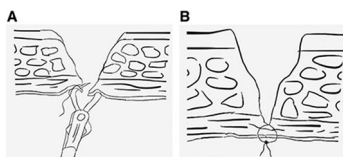


Fig. 2

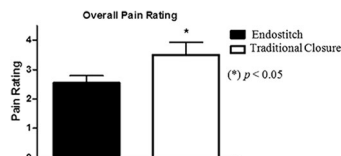


Fig. 3

P366

Transumbilical Single-Incision Laparoscopic Liver Resection In The Treatment Of Focal Lesions: Initial Experience

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Background and Study Aims: Trans-umbilical single incision laparoscopy (SILS) is a recently popular means of minimally invasive surgery. It is associated with milder pain and better cosmetic appearance, which makes it attractive to many patients. Our study has evaluated this technique and analyzed the results for trans-umbilical single incision laparoscopic liver resection (SILLR) at a single institution from January 2010 to February 2013.

Patients and Methods: Preoperative data of 17 patients (8 hemangiomas, 2 hepatocellular carcinoma, 2 liver metastasis, 2 calculus of left intrahepatic duct, 3 liver adenoma) planned for SILS liver resection were analyzed. Operations included 7 wedge resection, 8 left lateral lobectomy, one with both methods of wedge resection and left lateral lobectomy and one proximal left hemihepatectomy/segmentectomy. Four patients underwent simultaneous laparoscopic cholecystectomy. Three ports were constructed through an umbilical incision. Vascular control established and lesions resected 1 cm away from normal liver tissue. The specimens were placed in a bag and were extracted through the umbilical incision. All the patients were followed up for a minimum of 3 months.

Results: 17 cases were successfully operated through a single umbilical incision. Single incision surgery required 55 to 200 minutes to complete, with blood loss of 100 to 1000 ml. Patients regained bowel activity 0.8–2.3 days after operation and were discharged home after 7 to 15 days. However, intraoperative hemorrhage and bile leakage were the only complication that inevitably occurred.

Conclusions: Transumbilical SILS liver resection is challenging to perform through using conventional laparoscopic instruments. The risk of bleeding and technical difficulties is high for posterosuperior segment lesions. Cases should be chosen appropriately to optimize the benefits of this technique.

P367

Transumbilical Single-Incision Laparoscopic Subtotal Gastric Resection For Benign Gastroduodenal Ulcer

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Background: Single-incision laparoscopic surgery has been performed in a gradually widening field of application. Herein we share our experience with single-incision laparoscopic subtotal gastric resection for benign gastroduodenal ulcer.

Cases and Methods: We reviewed data from 6 patients who underwent single-incision laparoscopic subtotal gastric resection between Nov 2010 and Jun 2013 at Shengjing hospital. All procedures were performed with conventional laparoscopic instruments placed through a single operating portal of entry created within the umbilicus.

Results: All the operations were successfully completed without conversion to conventional laparoscopic or open surgery. The operations lasted from 230 to 360 minutes, with blood loss of 100 to 300 ml. No intraoperative complications occurred. Patients were satisfied with the therapeutic and cosmetic outcomes.

Conclusions: Our initial experience showed that single-incision laparoscopic subtotal gastric resection for benign gastroduodenal ulcer is feasible and safe when performed by experienced laparoscopic surgeons. Larger studies are required to confirm these findings.

Keywords: Single-incision laparoscopic surgery; Subtotal gastric resection; Gastroduodenal ulcer

P368

Laparoscopic Lumbar Artery Ligation for the Treatment of Type II Endoleak After Endovascular Aneurysm Repair (EVAR)

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Introduction: Endovascular aneurysm repair (EVAR) has spread widely as low invasive treatment for abdominal aneurysm (AAA) in recent years. Type II endoleak is one of the most common complication and is found in about 10% of the patients after 1 year of the surgery. Increase in aortic diameter is often considered an indication for intervention. In Japan, most of the centers opt for Transarterial embolization (TAE) as first choice treatment option. It is however technically challenging and has a high relapse rate of around 80%. Our center has recently started using laparoscopic lumbar artery ligation surgery for persistent type II endoleak after EVAR and is the first center to report this technique in Japan.

Objective: To access the feasibility and safety of laparoscopic lumbar artery ligation for type II endoleak after EVAR from our initial experience.

Method: The surgery is done using 1 port on umbilicus and 3 ports on left side of the patient. Left side of the aorta is exposed by sharp dissection of the mesenteric adhesions. Vertebrae and aorta is exposed by resection of sigmoid colon mesentery. Dorsal surface of aorta is dissected until the right border of Inferior vena cava. Lumbar arteries feeding the aortic aneurysm is identified and ligated using laparoscopic clips and resected. Intraoperative aortography is done to confirm that the leak has disappeared.

Objective: So far we have done two cases with this method.

Case 1: 79 year old male.

Time from the first surgery: 3 years 3 months.

Surgery performed: Laparoscopic lumbar artery ligation

Operation time: 2 hours 41 min

Operative blood loss: negligible

The patient was discharged on 4th post-operative day and is being followed up in outpatient department for 9 months without relapse.

Case 2: 81 year old male

Time from the first surgery: 2 years 10 months.

Surgery performed: Laparoscopic lumbar artery and inferior mesenteric artery ligation

Operation time: 2 hours 30 min

Operative blood loss: negligible

The patient was discharged on 6th post-operative day and is being followed up in outpatient department for 9 months without relapse.

Conclusion: Laparoscopic lumbar artery ligation is safe and technically feasible procedure for the treatment of type II endoleak after EVAR.

P369

Single-Port Access Transgastric Technique for a Gastric GIST

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Objective of the Study: Gastrointestinal stromal tumors (GISTs) are the commonest type of mesenchymal neoplasms of the gastrointestinal tract. 60% occur in the stomach. GIST of 20 mm or larger in size should be surgically resected while the attitude facing a tumor lesser in size remain controversial. Depending on their location, different laparoscopic wedge resections techniques have been increasingly used in the last years. Single-Port access is a minimally invasive surgical procedure which leaves only a single scar, generally undetectable. Compared to conventional laparoscopy, it may be associated with less postoperative pain, faster recovery time, fewer complications and better cosmetic results. We communicate the excision of a gastric GIST utilizing a SPA transgastric procedure.

Description of the Method: Surgery started with an endoscopic examination to locate the tumor. The anterior gastric wall where the incision was planned was endoscopically illuminated and brought to the anterior abdominal wall, where a 25 mm incision was performed in the midline, 2 cm above the umbilicus. Several points fixated the stomach to the anterior abdominal wall. The gastric wall was then vertically incised 2 cm under direct vision thus allowing the introduction of the QuadPort through the gastrotomy. A 5 mm 30 degree videolaparoscope was used, combined with 5 mm laparoscopic non-articulated graspers and shears. The tumor was evident and transected. Two sequential cartridges were required. The specimen was removed maintaining its anatomical integrity. Hemostasia of the operative field was ensured with 5 mm surgical clips. The QuadPort was removed, the defect was handsewn closed and the stomach was loosened from the abdominal wall.

Results: There was no need of optional accesses. Operative time was 80 minutes and the patient was discharged 75 hours after surgery without specific analgesia requirements (only on-request conventional analgesia). Cosmetic appearance of the incision was very satisfactory. A firm, well circumscribed tumor of 29x 28x 25 mm in size was sent to pathological examination. Histologic analysis yielded positive results for KIT (CD117) and CD34 and negative for S-100. Besides, mitotic rate was <5 mitoses/50 HPFs. Pathologic diagnosis was benign GIST with negative lateral and vertical margins.

Conclusion and Expectations: With the SPA transgastric approach that we describe, a direct exposition of the tumor is ensured and the tumor can be easily excised with appropriate margins, avoiding the transection of large sections of healthy stomach. On the other hand, it offers reduced operative times when compared with combined laparoscopic procedures. Finally, potential advantages of SPA surgeries may also be applied.

P370

The Surgical Management Of Gallstone Ileus In The Era Of Laparoscopy

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Background: During the last 20 years, the surgical community has witnessed the adoption of laparoscopy for the management of a wide spectrum of intra-abdominal pathologies. Despite this, to date there are very few reported cases of gallstone ileus managed through a totally laparoscopic approach. We will report our experience with this problem and review the available data.

Patients and Methods: From January 1994 to December 2012, a total of 4 patients presented with gallstone ileus at the Texas Endosurgery Institute. We reviewed patient and surgery-related data from a prospectively designed database (Texas Endosurgery Institute Liver and Biliary Procedures Database).

Results: Between 1994 and 2012, we have encountered 3 females and 1 male with gallstone ileus. Clinical details are shown in Table 1. All 4 patients were suspected to present gallstone ileus pre-operatively. We decided not to address the gallbladder and cholecystoenteric fistula in one patient due to high risk. Outcomes are detailed in Table 2. All patients were discharged before or on post-operative day.

Discussion: Our group originally reported the laparoscopic treatment of gallstone ileus in 1994. Since then, only a handful of reports have become available, with most authors describing laparotomy in this setting. The advantages of laparoscopy – less pain, wound complications, early return to bowel function, and improved cosmesis are well known and have prompted surgeons to employ this approach in almost every conceivable intra-abdominal procedure. Despite this, a recent review by Halabi et al. using data from the Healthcare Cost and Utilization Project Nationwide Inpatient Sample found that laparoscopy is seldom used when addressing gallstone ileus (10% of a 3268 patient sample) and even then, this group suffered a high conversion rate (53.03%). Patients with gallstone ileus are frequently elderly patients with multiple co-morbidities. We feel that this population is especially well served by a minimally invasive approach, offering relief of obstruction while avoiding potential complications associated with larger abdominal incisions.

In conclusion, laparoscopic enterolithotomy for gallstone ileus is a valid surgical approach. In centers without experience in advanced laparoscopy, a hand-assisted laparoscopic technique might be performed, avoiding prolonged surgical time as well as conversion to laparotomy. We encourage surgeons to consider the minimally invasive approach in most of their patients, and to consider one-stage enterolithotomy and cholecystectomy with fistula closure only in selected low-risk patients.

Table 1 Patient data

Age	ASA score	Abdominal X-ray	CT Scan
62	4	SBO	Pneumobilia
63	3	SBO	Not performed
85	3	SBO	Not performed
74	3	Non-specific	Gallstone ileus

Table 2 Surgical Outcomes

Cholecystectomy/ Fistula repaired	Operative time	Blood loss	Discharge	Complications
No	70	30	Day 4	No
Yes	155	70	Day 5	No
Yes	115	50	Day 5	No
No	120	40	Day 4	No

P371

A Prospective Trial Evaluating the Clinical Performance of a Novel Surgical Energy Device in Colorectal Surgery

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Introduction: This study reports the first USA prospective human trial evaluating the clinical performance of the THUNDERBEAT energy device. The quest for improvements and optimization of energy devices in surgery is ongoing. Recently the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) initiated the Fundamental Use of Surgical Energy (FUSE) program to develop training in energy device safety and optimal use. A combined energy device using ultrasound and bipolar energy has been developed [THUNDERBEAT, (TB), Olympus, Tokyo] to pursue this quest and is approved by the FDA. We previously reported on this technology's versatility within the porcine model, concluding that this device should decrease time and increase versatility during surgical procedures.

Methods and Procedures: Prospective pilot study with 30 subjects undergoing left or right colon resection for neoplasm in a single institution. All soft tissue dissection and vessel ligation was performed using TB. No other energy device was used within the abdomen. Recorded end-points were: dissection time (from start of colon mobilization to specimen removal), surgical procedure time, times TB was taken out of the abdominal cavity, use of other energy devices, intraoperative complications (bleeding at time of mesenteric dissection, bleeding at time of vessel ligation, visible thermal injury during surgery, injury of other organs), device technical problems, postoperative complications (post-bleeding, delayed thermal injuries, other postoperative complications within 30 days), length of hospital stay and mortality.

Results: To date, 25 subjects have been enrolled in the study and 40% were males. Median age and range was 66 (21–88) and BMI was 26 (20–35). Nine subjects underwent right and 16 left hemicolectomy. The mean surgical procedure time was 155 ± 47 minutes and mean time for dissection using TB device was 80 ± 35 minutes. Major vessel ligation was successful in all subjects. The mean number of TB applications to seal IMA was 3 ± 1.6. TB device was taken out of the abdominal cavity during dissection in only 9/25 cases for tip cleaning reasons. No intraoperative adverse events were noted in this study. There were no postoperative events (bleeding or delayed thermal organ injuries, etc.) related to the use of TB.

Conclusions: The THUNDERBEAT device demonstrated efficient and successful performance at tissue dissection and major mesenteric vessel ligation in all subjects. THUNDERBEAT technology can be employed in complex abdominal surgery and may save time through faster dissection but comparative studies with other energy devices are needed to confirm this.

P372

Multiple Small Bowel Carcinoid Tumors As A Cause Of Obscure Gastrointestinal Bleeding

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Introduction: Neuroendocrine (carcinoid) tumors of the gastrointestinal tract are rare, although their prevalence has steadily increased over the past three decades. There are many therapeutic options for these patients, however surgery offers the only potentially curative treatment.

Case Report: We report the case of a previously healthy 47 year old male, who presented with hematochezia. After negative upper endoscopy and colonoscopy, a capsule endoscopy was performed, revealing multiple ulcers with active bleeding at the jejunum and ileum. Continued bleeding warranted an operative approach; laparoscopy revealed at least 5 lesions on a 50 cm segment of small bowel. A laparoscopically-assisted bowel resection was performed. The patient was discharged without complications on post-op day 4. The pathology report revealed multiple (9) carcinoid tumors, the largest of which measured 1 cm. No transmural infiltration was noted.

Discussion: Tumors of the small intestine are an infrequent cause of obscure gastrointestinal bleeding, however one must bear in mind this possibility. The presence of multiple carcinoid tumors has been previously noted, although perhaps it remains underreported. In 2003, Yantiss et al. reported multiple tumors in 18 out of 68 patients with carcinoid tumors of the ileum, and this appears to remain the largest published series to date. These patients appear to be younger at presentation and have a higher recurrence and death rate.

P373

Single-Incision Laparoscopic Cholecystojejunostomy With Ileum Interposition For Malignant Biliary Obstruction

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Background: Palliative biliary bypass is a major management for malignant obstructive jaundice. Various modalities of biliary bypass and different fashions of biliary reconstruction have been reported. Herein we introduce a new approach of biliary reconstruction-cholecystojejunostomy with ileum interposition using single-incision laparoscopic surgery technique.

Methods: Five patients were identified to undergo single-incision laparoscopic cholecystojejunostomy with ileum interposition. The demographic, pre and post-operative data were collected.

Results: There was no conversion to multiple ports or open surgery. The mean operating time was 188.6 minutes. The mean hospital stay was 10.2 d. The total bilirubin decreased rapidly after the surgery. There was no short-term complication. No recurrence of jaundice occurred until the death after average 7 months.

Conclusion: The SILS biliary bypass is feasible. The benefits still need to be investigated in comparative study. The cholecystojejunostomy with ileum interposition is a new alternative to reconstruction of the biliary tree when proximal jejunum is not available. The long term physical change and complication are still needed to be observed.

P374

Laparoscopy In The Developing World: Perceptions of Patients at Komfo Anokye Teaching Hospital, Ghana About Laparoscopy

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Background: Laparoscopy has become the gold standard for many surgical cases in the developed world. It however, remains a rarity in developing countries for several reasons, a major one being cost. This study aimed to determine the knowledge and attitude of Ghanaian patients toward laparoscopic surgery and their willingness to pay for it.

Methods: Patients attending specialist outpatient clinics at the Komfo Anokye Teaching Hospital (KATH) in Kumasi, Ghana were interviewed using a structured questionnaire designed to elicit demographic information and the patients' knowledge and preferences regarding laparoscopy. If patients were unaware of laparoscopic surgical options, an explanation was provided. The patients' choice of either laparoscopy or open surgery and the reasons driving their choice was sought. For those who preferred laparoscopy, their willingness to pay more than baseline cost of open surgery was assessed. Logistic regression analyses were done to assess whether age, sex, highest educational level attained, home location, job category, and previous surgery had an impact on their choice of laparoscopic surgery and also on their willingness to pay for it.

Results: 1070 patients participated in the study. There were 562 (52.5%) females. Mean age was 40.5 ± 15.3. 60.4% of them had completed basic education or less. 53.6% lived in the city. 85.9% were either engaged in hourly-paying jobs or unemployed. None of them had a history of laparoscopic surgery. Thirty-one patients (3%) had some knowledge about laparoscopic surgery. When presented with a choice between open and laparoscopic surgery, 95% of patients preferred laparoscopy most commonly because of faster recovery and less post-op pain. Under univariate analysis client age (≤45 years vs >45 years), educational status (basic or less vs senior high or higher), history of previous surgery and history of previous abdominal surgery showed a significant association with their choice. On multivariate analysis, age>45 years (AOR = 0.53, p = 0.03) and education level of senior high or higher (AOR = 2.00, p = 0.04) were significant predictors of client choice. Among those who preferred laparoscopy, 78% were willing to pay some amount above the baseline cost of open surgery for laparoscopy. Multivariate analysis showed that history of previous abdominal surgery (AOR = 0.67, p = 0.02), having a salaried job compared to being unemployed (AOR = 2.36, p < 0.01) and living in the city compared to the village (AOR = 1.78, p = 0.04) were the significant predictors of patients' willingness to pay more for laparoscopy.

Conclusion: The overwhelming majority of patients attending specialist outpatient clinics in KATH will prefer laparoscopy if the option is made available to them. A high proportion of patients are also willing to pay for the service. Public education on laparoscopy is thus needed to increase general awareness. Health facilities wishing to provide patient centered care should anticipate an increase in demand by acquiring the necessary equipment and supporting staff training.

P375

Single Incision Laparoscopic Surgery for the Difficult Cholecystectomy

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Background: Single Incision Laparoscopic Surgery (SILS) is currently popular because it is less invasive. In many cases, SILS is performed for easy cholecystectomy. Here, we report SILS that was performed for all patients with difficult cholecystectomy except patients with poor general health.

Methods: Single Incision Laparoscopic Cholecystectomy was performed on 181 patients from May 28th 2009. [Remark 1] We analyzed the data that included the surgery duration, rate of using additional port, and DIC-CT or MRCP.

Results: The surgery duration was <120 min for 117 cases, 120–179 min for 41 cases, and >180 min for 22 cases. We classified the 22 cases that required >180 min as difficult cholecystectomy. Among these, 7 cases were cholecystolithiasis and 15 cases were acute cholecystitis. The reason for comparatively long surgery duration was inflammation in 15 cases and joint surgery in 4 cases. Additional port was used in 19 cases in which 12 cases were difficult cholecystectomy. In contrast, DIC-CT or MRCP did not detect cystic duct in 31 cases, and 9 of the 22 cases were difficult cholecystectomy.

Conclusions: In SILS for difficult cholecystectomy, care should be taken for cases with acute cholecystitis, cases in which DIC-CT or MRCP does not detect cystic duct, and cases in which the probability of using additional port is high.

P376

Single-Incision Versus Standard 4-Port Laparoscopic Cholecystectomy: A Single Institute Retrospective Study

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Background: We introduced the single-incision laparoscopic cholecystectomy (SILC) in May 2009 for selective cases with less inflamed gallbladders. Our indication of SILC was expanded for all the cholecystectomies in 2010. We tested various approaches including SILS port™, EZ-access™, and Gel-point™ and established pure SILC with the glove method in May 2011. This single institute retrospective study was aimed to evaluate the surgical outcomes of pure SILC compared to standard 4-port laparoscopic cholecystectomy (LC) after May 2011.

Methods: Between May 2011 and August 2013, we performed 246 cholecystectomies (SILC, n = 141; LC, n = 105) at our institute. Five patients with gallbladder cancer or pairing cholecystectomy with other intra-abdominal surgery were excluded, and 241 cases (SILC, n = 138; LC, n = 103) were analyzed. A 1.5 cm vertical transumbilical incision was used for SILC, followed by the glove method using the Alexis wound retractor™ (XS size) with two low-profile laparoscopic ports (all 5-mm trocars) and the Roticulator Endo Dissect™ inserted directly through the holes of the cut fingertip. An additional port was inserted when required. A 1.5 cm vertical transumbilical incision was used for LC with additional three 5-mm trocars. The surgical approach was selected by patients' preferences. More patients selected SILC (141 vs. 105) with the higher levels of preference evident among female patients (selected SILC: male, 48%; female, 66%). SILC was performed by five surgeons, including two residents who performed four cases (2.9%). LC was performed by twelve surgeons, including four residents who performed 24 cases (23.3%).

Results: There were no differences in patient characteristics. Operative time was significantly shorter with SILC (65 min, range 29–160 min vs. 118 min, range 51–207 min). Significant differences were observed for lengths of hospital stay (4.0 vs. 5.5, SILC vs. LC) and total doses of analgesics (1.5 vs. 2.6, SILC vs. LC). Postoperative complications were significantly less in SILC. There were eight complications (8/138, 5.8%) in the SILC group, including fat lysis (6 cases), wound infection (1 case), and biloma (1 case). There were eleven complications (11/103, 10.7%) in the LC group, including common bile duct injury (1 case), large bowel injury (1 case), fat lysis (4 cases), wound infection (3 cases), biloma (1 case), and small-bowel obstruction (1 case). No hernias were observed during the follow-up period (1 to 12 months). A supplemental miniport was required for only four cases (4/138, 2.9%; 5-mm port for 3 cases and 3-mm port for 1 case), and LC was converted to open surgery in 5 cases (5/103, 4.9%).

Conclusions: Pure SILC is a feasible and safe procedure in the hands of expert laparoscopic surgeons. Pure SILC is the first choice for the treatment of most patients with gallbladder disease, and we have to make a decision for additional ports, if necessary.

P377

Is Single-Port Access Surgery A Viable Approach For Ventral Hernia Repair? Comparison with Single Incision Multiport Surgery

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Introduction: Incisional hernias are the most common long-term complication following laparotomy, occurring after 3 to 13% of operations. Surgery through a single incision is an alternative to conventional laparoscopy and Natural Orifice Transluminal Endoscopic Surgery (NOTES). Various nomenclature and terminology describe similar surgical methods, such as SPA (Single port access), SPLS (Single port laparoscopic surgery), OPUS (One port umbilical surgery) and LESS (Laparoscopic single site surgery). The SPA technique has been applied to several surgeries.

The objective of the study is to communicate our group experience (2 hospitals of Madrid: Infanta Sofía and Torrejón de Ardoz) related to the treatment of ventral hernias using a single incision laparoscopic surgery.

Methods and Procedures: We present 33 ventral hernia repairs of two services located in Madrid within July of 2008 and March of 2013. Cases are divided in two groups: the first one include surgeries performed with a single-port access device (R-Port®, Advanced Surgical Concepts, Whitlock, Brey, Ireland). In the second one, the approach is performed with the reduced port laparoscopic technique (12 mm–5 mm–5 mm). A 3 cm skin incision, located laterally between the iliac crest and costal margin, was made in both groups. In the reduced port technique, fascia was separated using three different incisions. A 5 mm 30 degree videolaparoscope was used in every case, combined with 5 mm laparoscopic non-articulated graspers and shears and curved instrument. The R-Port™ is an abdominal access device which requires an incision of minimum 15 mm. A single external disk which has three special gel valves—two 5-mm valves and a 12-mm valve—capable of maintaining pneumoperitoneum during instrument exchanges, connects to a double-layered plastic cylinder that serves as the common channel or a single port. The internal anchoring ring, when deployed, stays flush against the abdominal wall. We compare mean operative times, closure techniques, complications, mean postoperative hospital stay, hernia recurrence and trocar site herniation.

Results: There was no significant differences between both groups in either number and type of complications or operative timings (mean follow-up 18 months). Mean hospital stay was under 24 hours in both groups. Average score of VAS was 2.

Conclusions: There are no significant differences when comparing single and multi-port single incision techniques of ventral hernia repairs. We consider SPA surgery of ventral hernias safe and feasible. Cosmetic results are better than in conventional multi-port laparoscopic technique. Whether this approach turns to be superior to conventional laparoscopy remains subject to more substantial research.

P378

The Rise and Fall of Single Incision Surgery at Community Hospital Teaching Program

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Single incision laparoscopic surgery (SILS) has recently become one of the promising new techniques for use in laparoscopic surgery. Initial reports touted the safety and potential improvement in cosmesis and pain. The success of any new technology depends on quality outcomes as well as the implementation by the surgical community at large. The purpose of this project was to evaluate our surgeons experience and implementation of single incision laparoscopic surgery.

Following IRB approval, a retrospective review of all single incision surgeons performed at our hospital from 5/2009 to 6/2012 was performed. Demographic information, indication for surgery, type of procedure, conversion rates, morbidity, and mortality were documented and descriptive statistics were performed.

During the study period, 12 surgeons (8 general surgeons and 4 gynecologist) performed 164 cases and 175 procedures. Cases included cholecystectomy (50%), appendectomy (29%), gynecologic surgery (13%), and other (8%). Six of the 11 surgeons performed only 1 single incision case. Conversion rate was 6.9%. One surgeon performed 64% percent of all cases and is still currently performing SILS. Morbidity rate was 3.7% with no perioperative mortality.

Several surgeons at our institution evaluated the SILS procedures with only 1 surgeon continuing to perform the procedure regularly. The low adoption rate in our community is likely multifactorial and requires further study.

P379

Laparoscopic Evaluation for Post-Operative Abdominal Pain

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Objective: Chronic post-operative abdominal pain especially after a heavy meal is a common problem in this setting. Approximately 20% of patients which underwent laparotomy have chronic post-prandial abdominal pain for months after operation. About 50% of them are referred to their doctors for treatment. Most of the surgeons are not interested for a second operation in this condition, and perform to do conservative treatment. This study evaluates the cause of this chronic abdominal pain with diagnostic and therapeutic laparoscopic surgery.

Method and Procedures: Elective laparoscopic surgery was performed on 76 patients suffering chronic abdominal pain mostly after heavy meal. They did not have any sign and symptom of acute intestinal obstruction and the most popular complaints were: abdominal pain in 100%, nausea in 30%, vomiting in 10%. Diagnostic laparoscopy was detected positive abdominal findings in 81% of patients. At the same operation, treatment modalities (laparoscopic enterolysis) were performed.

Results: In 81% of patients the cause of pain was intestinal adhesions do to adhesional bands. From the remaining, 10% had adhesions without any correlation to the patient's symptoms. Adhesiolysis (sharp release with scissor) is the treatment of choice. 95% of those patients that underwent adhesiolysis became pain free for a mean average of 11 months follow up (pre-operative average of pain episode was 4 time per week).

Conclusions: In a patient with post-prandial chronic abdominal pain and a history of previous laparotomy, diagnostic and therapeutic laparoscopic Adhesiolysis can be an effective method for treatment.

P380

Single-Port Access Cholecystectomy. A Comparative Study Of 150 Patients with the Gold Standard

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Introduction: Single Port Access (SPA) surgery, also known as Single Incision Laparoscopic Surgery (SILS) or One Port Umbilical Surgery (OPUS), amongst others, is an advanced, minimally invasive surgical procedure in which the surgeon operates exclusively through a single access port. Since the whole procedure is performed typically through the umbilicus, it does not leave any visible scar, unlike traditional laparoscopic surgery. Patients should benefit from less post-operative pain, less blood loss, faster recovery time, fewer complications and better cosmetic results. We present preliminary results of our experience in single-port access cholecystectomy compared with a simultaneous series of conventional laparoscopic cholecystectomy performed during the same period of time.

Methods and Procedures: We communicate a retrospective analysis of collected data from 150 patients subjected to SPA (SPAC) or multiport laparoscopic cholecystectomy (LC) during 2008 and 2012. Selection criteria included absence of previous cholecystitis and/ or cholelithiasis that required hospital treatment, no previous supramesocolic surgeries and BMI < 35 kg m².

Three conventional trocars were utilized in the LC group. SPAC were performed with an R-Port™ (Advanced Surgical Concepts; Whilock, Brey, Ireland). The R-Port™ consists of an external disc which has three valves with a gel interface, which fits onto a double-layered plastic cylinder that serves as the common channel or a single port. The plastic cylinder, when deployed, is held in place by an inner ring very much like a miniature hand port. Three separate valves allow insertion of one 12 mm and two 5 mm or three 5 mm instruments at the same time. A 5 mm 30 degree videola-paroscope was used, combined with 5 mm conventional laparoscopic instruments in both groups.

Results: 150 LC and 150 SPAC surgeries were performed. In the SPAC group mean age was 34.8 (range 21–53), mean weight was 65.1 kg (range 49–110) mean BMI 24.8 (range 18.7–39.6), mean operative time 58.2, mean hospital stay 25.2 hours and 4 complications were reported. In the LC group, mean age was 48.9 (range 19–76), mean weight 78.4 (range 55–102), BMI 29.8 (23.1–40), mean operative time 67.4 (range 28–125), mean hospital stay 45.5 (range 22–98) and 3 complications were described. SPAC comprised younger patients with minor BMI values. Complications rates and operative time did not differ significantly between groups. SPAC was associated with reduced postoperative hospital stay ($p < 0.05$).

Conclusions: Data obtained present selection bias, which we consider still necessary to evaluate SPA technique. Despite, results show the benefits of SPAC in terms of hospital stay. Compared to LC, SPAC showed no disadvantage concerning risk profiles and operative times.

We consider SPA cholecystectomies safe and feasible. Cosmetic results are better than in conventional multi-port laparoscopic technique. Whether this approach turns to be superior to conventional laparoscopy remains subject to more substantial research.

P381

Equipment Variation In Laparoscopic Cholecystectomy

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Introduction: Healthcare costs continue to rise while reimbursements are decreasing; furthermore, these reimbursements are increasingly tied to quality outcome metrics. Therefore, methods of improving operative efficiency, consistency and cost reduction are imperative. Prior studies have delineated process variation as a determinant of cost, length of operation and patient morbidity. One method to achieve both improved cost efficiency and patient outcome metrics is reducing variability in surgical equipment use. These processes can be utilized to streamline equipment purchases and storage, and decrease procurement costs. Laparoscopic cholecystectomy is used, for analysis of variance and application of potential methodologies for cost & metric improvements.

Methods: Retrospective analysis of costs of equipment sets used by total of 36 surgeons for laparoscopic cholecystectomy in two tertiary medical centers and an affiliated community hospital. Demographic and case volume data for each surgeon was obtained and analyzed by t-testing.

Results: The minimum cost of equipment was \$258, while the maximum was \$2,755 for a mean of \$649 and standard deviation of \$423. A total of 88 pieces of equipment were stocked due to surgeon preferences, but the most efficient surgeon used only 23 items. Cost was not related to specialty of practice, length of residency training, completion of fellowship, number of cholecystectomies, or number of cases performed per year ($P = NS$). Surgeons younger than 40 or with minimally invasive fellowship training performed more expensive procedures ($P < 0.05$).

Conclusion: Significant variation exists in equipment utilization for laparoscopic cholecystectomy. As a widely performed laparoscopic procedure, this represents an important opportunity for decreasing costs and variability, while increasing efficiency, and ultimately improving patient care.

P382

Laparoscopic Versus Open Appendectomy For Complicated Appendicitis: Tertiary Care Experience

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Introduction: Laparoscopic appendectomy (LA) has been an established treatment method for uncomplicated acute appendicitis. Still large numbers of surgeons feel confused regarding the superiority of either laparoscopic or open technique for the treatment of complicated appendicitis. The role of laparoscopy in management of complicated appendicitis ie gangrenous, perforated appendicitis and appendiceal abscess remain undefined. A retrospective study was conducted to review the feasibility, safety and efficacy of laparoscopic appendectomy for patients with complicated appendicitis.

Method and Procedures: From Jan 2008 to Dec 2012 patients older than 14 years of age with diagnosis of appendicitis were included. All patients underwent diagnostic laparoscopy to confirm the diagnosis of complicated appendicitis and patients subsequently underwent either laparoscopic or open appendectomies. Total of 114 patients had undergone appendectomy for perforated or gangrenous appendicitis (75 were males and 39 females). Sixty four patients underwent open appendectomies (OA) and fifty underwent laparoscopic appendectomies. Parameters studied were operative time, conversion rate, wound infection, intra abdominal abscess, duration of pain and hospital stay.

Result: It was seen that laparoscopic appendectomy took longer to perform (110 min versus 80 min) but was associated with less analgesic use, shorter median hospital stay (LA -3 days, OA -6 days), lower rate of wound infection (LA 9.1%, OA 25%). Intra abdominal abscess occurred in four patients in laparoscopic appendectomy group and 15 patients in open appendectomy group. Prolonged ileus was seen more in open appendectomy group as compared to laparoscopic group. There was no mortality in either group.

Conclusion: Minimal invasive laparoscopic technique is safe and efficacious. It is associated with less post operative pain, lower incidence of wound infection and reduced length of hospital stay as compared to patients who underwent open appendectomy.

P383

Laparoscopic Management Of Complicated Appendicitis

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Background: Complicated appendicitis is defined as acute appendicitis in which perforation or an intra-abdominal abscess is present. It occurs in 20% to 30% of acute appendicitis patients and is associated with much higher risks of postoperative complications. We herein study the safety, feasibility and post operative outcome of laparoscopic management of complicated appendicitis.

Material & Methods: During the period from January 2010 till the end of June 2013, all patients who underwent laparoscopic appendectomy (LA) for complicated appendicitis were included. Patient's demographics, diagnostic procedure, operative and post operative data were analyzed.

Results: Forty eight patients were included, with a male to female ratio 39:9. Fourteen patients (29.2%) had complicated appendicitis at the time of diagnosis. Mean age was 27.13 ± 11.13. Eleven patients (22.9%) were diagnosed preoperatively as complicated appendicitis by CT or ultrasound, while 3 patients were diagnosed intraoperatively. Mean operative time was higher in patients with complicated appendicitis compared to uncomplicated ones 91.8 ± 53.83 minutes vs 68.3 ± 24.2 minutes ($p > 0.05$). All appendectomies were completed laparoscopically except for one patient who was converted to open technique. Post operative course was uneventful except for 4 patients (8.3%), where 2 of them had a residual abscess at resection bed, one required percutaneous drainage while the other was managed conservatively. One patient suffered from a low output fecal fistula that resolved spontaneously and one patient was a female in her 1st trimester whose complicated appendicitis was managed successfully but she had an abortion 3 days later.

Conclusion: laparoscopic management of complicated appendicitis can be safe and feasible.

P384

Single Incision Laparoscopic Appendectomy: a review of 64 cases

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Background: Laparoscopic appendectomy using three-trocars has been widely used for treatment of appendicitis. The use of single incision laparoscopic appendectomy on the other hand is being used more frequently primarily because of the attractive cosmetic results.

Method: This is a retrospective study of our experience with single incision laparoscopic appendectomy. Single incision laparoscopic appendectomy was performed on 64 patients. The data and demographics were recorded and the results were analyzed.

Results: Single incision laparoscopic appendectomy was successfully performed on all 64 patients. The average operating time was 54 minutes. There were 41 female and 23 male patients with a mean age of 28 years. All procedures were carried out from a single umbilical incision and there were no complications associated with the procedure. Of the 64 cases, 52 were performed as an emergency case in the middle of the night whereas the remaining 12 cases were scheduled as routine procedures in the morning.

Conclusion: Single incision laparoscopic appendectomy is a safe procedure that can be performed as an emergency procedure. It is an attractive and feasible alternative for treatment of acute appendicitis.

P386

An Elegant Operative Approach To Gastric Outlet Obstruction Following Vertical Banded Gastroplasty

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This is the case of a 61yo morbidly obese Caucasian male with a history of vertical banded gastroplasty thirty years ago. He had only minimal weight loss postoperatively and remained obese his entire adult life. He had no issues with eating until 48 hours prior to presentation, at which point he complained of 2 days of non-bilious emesis. He had no other complaints. CT scan demonstrated a dilated proximal gastric pouch without passage of enteral contrast into the remainder of the stomach or beyond.

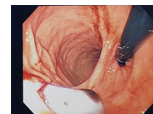
His medical history is significant for morbid obesity (BMI 45), atrial fibrillation, aortic stenosis/bicuspid aortic valve, obstructive sleep apnea, and diabetes mellitus type II. Aside from the VBGB, his surgical history is significant for multiple incisional hernia repairs, most recently one year prior with large biologic mesh underlay.

Surgical evaluation was requested. Aside from mild discomfort and morbid obesity, no physical exam abnormalities were found. Urgent endoscopy was performed revealing a dilated proximal pouch with moderate amount of retained food; a tight ring-like stricture measuring 12 mm in diameter was found at the location of the previous gastric band. Aside from mild gastritis in the antrum, there was no intraluminal pathology.

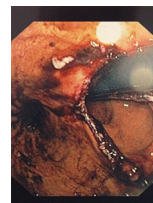
The following day, the patient was taken to the operating room. Endoscopy was performed and the pouch was once again evacuated. The gastric antrum was trans illuminated, and a brisk impulse was noted in the epigastrium. A safe tract method was utilized to pass a 12 mm blunt-tipped laparoscopic trocar into the gastric antrum. Through this, an endoscopic linear, articulating stapling device (Ethicon Echelon FLEX™ Endopath®) was passed. A 60 mm length, 2 mm closed staple height stapler was chosen. The stapler straddled the vertical gastric band. A single fire was utilized to release the gastric stricture.

A gastrostomy tube was placed in the site of the trocar. On postoperative day 5, a contrasted upper GI was obtained with demonstrated normal passage of contrast into the gastric antrum and slightly delayed transit passed the pylorus. He was initiated on a diet, first of clear liquids, then of bland solids. He was discharged on postoperative day six completely symptom free.

Endoscopic approaches to VBGB band erosions and migrations have been described in several case reports and small series. Additionally, intragastric surgery has been utilized safely in the treatment of mucosal-based pathologies, such as stromal tumors. In this case, the well-accepted standard of roux-en-Y gastric bypass was not an acceptable option for the management of his acute presentation based on medical co-morbidities, continued disordered eating and prior hernia repairs. Our hybrid approach provided a minimally invasive revision surgery, minimizing the peri-operative risk in a medically and surgically high-risk patient. Intragastric laparoscopy with endoscopy is an elegant solution to this difficult problem and should be considered in otherwise difficult operative patients



Before, endoscope is passed through the stricture and then retroflexed. The vertical band is fully visualized. The trocar is seen in the lower left corner.



After, the band has been stapled and the stricture has been released.

P385

Cost Analysis Of Laparoscopic Splenectomy For Liver Cirrhotic Patients With Massive Splenomegaly Based On The Learning Curve

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Introduction: Compared with open splenectomy (OS), laparoscopic splenectomy (LS) is increasingly seen as a superior technique for liver cirrhotic patients with massive splenomegaly. On the other hand, surgeons need a steep learning curve period to be adept in laparoscopic surgeries. During the early stage of the learning curve, longer operation time, greater consumption of disposable equipment and higher rate of conversions may contribute to the higher hospital charges. The aim of this study is to compare the hospital resource consumption connected to different laparoscopic and open methods of splenectomy for cirrhotic patients with massive splenomegaly at different learning curve periods.

Methods and Procedures: An institutional database was reviewed to identify liver cirrhotic patients with massive splenomegaly who underwent splenectomy from 2008 to 2011. All patients receiving LS (n = 45) were divided into Group 1 (n = 24), in which patients' LS were conducted during the early stage of the learning curve, and Group 2 (n = 21), in which patients were treated with LS after the learning curve phase was achieved. An additional 24 patients underwent OS from 2008 to 2011 were included as Group 3. In addition to clinical data and outcomes, a cost analysis including overall, operating theatre, anesthesia, and wards costs was performed.

Results: With respect to the clinical data and outcomes, no significant differences were found regarding the preoperative variables (age, gender, Child-Pugh class, ASA, and splenic length) among the three groups. Compared with patients in Group 2, patients in Group 1 required longer operative time (239 ± 32 min vs. 177 ± 41 min, P < 0.001) and postoperative hospital stay (8.1 ± 1.7 days vs. 6.2 ± 0.7 days, P < 0.001), and the other intraoperative and postoperative variables (blood loss, postoperative complications, time of returning to the first oral intake, transfusion rate, and conversion rate) were comparable. Compared with patients in Group 2, patients in Group 3 required similar operative time (169 ± 61 min vs. 177 ± 41 min, P = 0.60), longer postoperative stay (10.7 ± 3.5 days vs. 6.2 ± 0.7 days, P < 0.001) as well as longer time of returning to the first oral intake (3.3 ± 0.7 days vs. 1.8 ± 0.1 days, P < 0.001), and suffered more intraoperative blood loss (153.5 ± 65.7 mL vs. 440.7 ± 215.8 mL, P < 0.001) as well as more postoperative surgical complications. In regard to the cost analysis, after the learning curve phase was achieved (Group 2), compared with OS, LS was associated with significantly higher operating theater cost mainly due to the greater consumption of disposable equipment (13000 ± 2155 RMB vs. 5144 ± 2492 RMB, P < 0.001), which was balanced by decreased postoperative ward costs (12927 ± 2307 RMB vs. 19251 ± 6408 RMB, P < 0.001). The overall cost was similar between Group 2 and Group 3 (29691 ± 4599 RMB vs. 27967 ± 8286 RMB, P = 0.403), while the overall cost in Group 1 (42402 ± 5876 RMB) was higher than that in Group 2 (29691 ± 4599 RMB, P < 0.001) and Group 3 (27967 ± 8286 RMB, P < 0.001).

Conclusion: In an experienced surgeon's hand, LS, with better surgical outcomes and equivalent overall cost, is a superior choice for liver cirrhotic patients with massive splenomegaly compared with OS.

P387

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 2013 we performed single incision laparoscopic cholecystectomy in 373 patients. 124 of the patients were female, 249 were male. The mean age was 44 years (range: 7–79 years). 39 patients presented with acute cholecystitis, others with cholelithiasis. In 11 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 35 minutes (20–240 minutes). An additional trocar was inserted in 8 cases, because of difficulty at exploration in 5, for bleeding control in two and because of a choledochal cyst in one other case. An abdominal drain was used in 16 cases, which had been removed the following day. No any postoperative complication had been encountered. 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

P388

Single Incision Laparoscopy for Assessment and Treatment of the Acute Abdomen

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Background: Diagnostic laparoscopy is widely used for assessment and treatment of an assortment of surgical illnesses including critically ill patients.

Methods: We retrospectively reviewed 58 cases from 2009–2012 who presented with an acute abdomen and had equivocal findings on abdominal CT and/or ultrasound. These patients underwent diagnostic laparoscopy using the classic three port technique or with a single umbilical incision.

Results: Single incision diagnostic laparoscopy was performed in 37 patients. The remaining 21 patients had diagnostic laparoscopy using three separate abdominal incisions. The average operating time was 27 minutes. Of the 58 cases, positive laparoscopic findings were found in 9 cases. Of these 9 cases, 7 were performed using the single umbilical incision and 2 cases using the three ports. Conversion to open laparotomy was required in 3 of these 9 cases. The remaining 6 patients went on to have a therapeutic laparoscopy procedure. The findings on laparoscopy were: 3 cases of mesenteric ischemia, 2 cases with meckel's diverticulitis, 2 cases of appendicitis, 1 case with an appendiceal abscess, and 1 case with a foreign body with perforation into the mesentery.

Conclusion: Single incision laparoscopy as a diagnostic and as a therapeutic tool can be performed on patients who present with signs of an acute abdomen. It is particularly useful in equivocal cases and the results are similar to other laparoscopic techniques which use multiple ports.

P389

Single Port Hand - Assisted Laparoscopy Using A Rigid Rectosigmoidoscope, A Light Source And Manual Insufflators In Low Income Settings

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Background: Minimal invasive surgery (MIS) is a challenge in Africa and other developing regions due to lack of equipment and skilled personnel. In this study we demonstrated the feasibility of MIS using minimum available surgical instrument.

Methods and materials: This was a prospective study carried out at departments of surgery of Murtala Muhammad Specialist Hospital and Kazaure General Hospital over a period of 4 years (September, 2008 – June, 2012), during this period 70 patients were evaluated. The patients were divided into two groups (GPs). GP1 consists of 30 patients (42.9%) who undergone conventional laparotomy while GP2 includes 40 patients (57.1%) who had hand-assisted laparoscopy (HAL) using a rigid rectosigmoidoscope, a light source and manual insufflators. Demographic information, clinical characteristics, types of surgery, operation time, postoperative hospital stay, complications, conversion rate and postoperative mortality were evaluated and compared for the two GPs. Student's t tests for p values were evaluated for statistical significant.

Results: The age range of patients was 2 days to 14 years. The male: female ratio was 1:1.5. The age of 72.0% of all subjects was 4 to 8 years, while 24.5% and 3.5% were less than 1 and greater than 10 years respectively. In GP1 HAL was enough for 78.4% of the patients. There was a conversion of 13.6%. All patients in GP2 underwent conventional laparotomy. Mickel's diverticulum, acute appendicitis, intussusceptions, Hirschsprung's disease, colonic polyposis, typhoid perforation, duodenal atresia and ovarian cyst were included in the study.

Conclusion: Less privileged experienced MIS surgeon can obtain acceptable surgical outcomes with minimum available instrument in low income facilities.

P390

Laparoscopic Resection Of Retroperitoneal Schwannoma: Summary Of Diagnosis, Surgical And Pathologic Outcomes

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Introduction: Schwannomas are known to arise from neural sheath Schwann cells. It is usually found in head and neck area. However, the incidence of retroperitoneal schwannoma is very rare (1.5~3%).

Objective: We reviewed 9 cases of retroperitoneal schwannoma that were successfully excised by laparoscopic surgery.

Method: From Jan 2007 to July 2013, nine patients underwent surgical resection for retroperitoneal schwannoma in Yonsei University Severance hospital. We reviewed all patient's medical records for diagnosis, management and immunohistochemistry findings.

Results: The median age was 48 years old (26 to 67) and 7 patients (77.8%) were Female. In 6 patients, tumors were identified incidentally by routine medical checkup. 3 patients were presented with clinical symptoms, such as back pain, abdominal discomfort and anemia. All patients were diagnosed by image study not by histologic examination before operation. Tumor sized ranged from 1.5 to 10.0 cm (median, 4.6 cm. Complete resection was achieved in all patients. Mean post-operative day until discharge was 3.6 days (2 to 6 days) and mean operation time and intra-operative bleeding amount were 206 minute and 88.9cc. No intra-operative transfusion was needed and post-operative complication and mortality were not occurred in all patients. There was no recurrence during follow-up period (median 19 months, range 1 to 45 months). All patients who checked immunohistochemistry examination showed S-100 protein positive.

Conclusion: Even small number of cases, laparoscopic resection is feasible and effective with favorable perioperative surgical outcomes in treating retroperitoneal Schwannoma.

P391

Laparoscopic One-Handed Knot Tying Technique Of The Appendicular Stump

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Introduction: Laparoscopic appendectomy has gained acceptance over the past years. A critical step of this procedure is the closure of the appendicular stump which varies greatly and includes techniques such as mechanical suture, preformed knot and a polymeric clip. The objective is to describe the management of the appendicular stump by one-handed knot tying technique at a third-world country hospital.

Materials and Methods: 48 patients underwent laparoscopic appendectomy using one-handed knot tying technique for the appendicular stump at a public hospital in Colombia (February 2013–September 2013). All procedures were carried out by one of the authors. Records were reviewed for demographic data, operative time, intraoperative findings, length of hospital stay and postoperative complications.

Results: All procedures were carried out successfully. The mean operative time was 62.6 minutes, with an average in hospital stay of 26.3 hours. There were no conversions. A total of 11 (22.9%) patients were left with a drain. Superficial surgical site infection occurred in 2 (4.1%) cases. We registered no major complications such as stump leak, bowel obstruction or re-intervention

Conclusions: Laparoscopic one-handed knot tying technique can be safely applied for the closure of the appendicular stump. Additionally it is a cost-effective method, which is particularly important in developing countries.

P392

Home-Made Affordable Surgical Device For Single Access Laparoscopic Surgery

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Introduction: Major technological advances have led to the development of less invasive techniques such as Laparo- Endoscopic Single-site Surgery and Transluminal Natural Orifice Endoscopic Surgery, being the former the most popular. However this approach requires special devices and instruments which are expensive and in some places non affordable, limiting their use and subsequently their benefits. We have develop an home-made single access surgical device (ARGO) that enables single-port laparoscopic procedures to be carried out at a third world country hospital.

Materials and Methods: A self-designed affordable device was made using equipment routinely available in an operating room such as a chest tube, surgical gloves and silk sutures. It is inserted to the peritoneal cavity through a 2 cm incision at the level of the umbilicus. Conventional trocars are placed through the fingertips and secured with rubber bands. Pneumoperitoneum sets de glove port firm in the abdominal wall.

Results: We performed 57 non-consecutive cases (January 2013–September 2013) of single port laparoscopic surgery using the homemade surgical device. The most frequently performed procedure was cholecystectomy (82.4%), followed by appendectomy (12.2%). An additional 5 m trocar was inserted in 7 cases due to technical difficulties. Mean operative time for cholecystectomies was 46 minutes. There were no conversions to open surgery. No postoperative complications were registered in this series.

Conclusion: Several single access laparoscopic procedures have been describe in current literature, however most of these have been develop using commercially available single port devices. Our homemade surgical device presents as a cost-effective tool with a safe profile to be used in single access laparoscopic surgery, specially in emergent countries.

P393

The STOMACH Trial: Surgical Technique, Open Versus Minimally Invasive gastrectomy After Chemotherapy

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Objective: Aim of this prospective randomised, multi-center trial is to compare open gastrectomy with minimally invasive gastrectomy for gastric cancer in patients that received neoadjuvant therapy. Laparoscopic surgery has been shown to provide important advantages in comparison with open procedures in the treatment of several malignant diseases, such as less peri-operative blood loss, faster patient recovery and shorter hospital stay. All while maintaining similar results with regard to tumour resection margin and oncological long-term survival. In gastric cancer the role of laparoscopic surgery remains unclear. Current recommended treatment for gastric cancer consists of radical resection of the stomach with a free margin of 5–6 cm from the tumour, combined with lymphadenectomy. The extent of lymphadenectomy is considered a marker for radicality of surgery and quality of care. Therefore, It is imperative that a new surgical technique should be non-inferior with regard to radicality and lymph node yield.

Methods: Double-blind randomisation of patients between open gastrectomy, or minimally invasive gastrectomy. Primary endpoint is quality of oncological resection with regard to radicality and lymph nodes dissection. Secondary endpoints include postoperative complications, mortality and Quality of Life as measured by Patient Related Outcome Measures (PROM), the SF-36 and GIQLI score.

Preliminary Results: Several studies have focussed on laparoscopic versus open gastrectomy. However, these studies are predominantly conducted in Asian countries, where incidence of gastric cancer is higher. The screening program in Japan, which started in 1983, has enabled early detection and treatment of gastric carcinomas in these countries. As such, tumour stages are lower at the time of diagnosis compared to Western countries. Therefore it is difficult to translate the results of Asian studies to the Western population. Only a few Western studies were conducted that compare laparoscopic and open approaches for gastric cancer. An important previous finding is that laparoscopic gastrectomy showed similar results to open gastrectomy with regard to quality of oncological resection, as measured by the number of retrieved lymph nodes, and five-year survival. Whereas patient recovery was faster and admission duration shorter.

Conclusions/Expectations: Preliminary studies show promising results for laparoscopic gastrectomy, but the number of studies is small and due to lower incidence of gastric cancer in the West they are often underpowered. Furthermore these studies were conducted before implementation of neoadjuvant therapy. A prospective randomised clinical trial is indicated in order to establish the optimal surgical technique in gastric cancer: open versus minimally invasive gastrectomy.

P394

Pure Single-Incision Laparoscopic D2 Lymphadenectomy For Gastric Cancer: Novel Approach to 11p Lymph Node Dissection (Mid-Pancreas Mobilization)

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Purpose: We sought to evaluate the usefulness of a novel mid-pancreas mobilization for 11p lymph node dissection (LND) to accomplish D2 lymph node dissection in pure single-incision laparoscopic distal gastrectomy (SIDG) for gastric cancer.

Methods: Briefly, in pure SIDG, after the completion of 7, 8a/12a, 9 LND among the suprapancreatic portion, 11p LND was started from the mid-pancreas mobilization. After the whole mid-pancreas mobilization from the white line of Toldt, two gauzes were inserted behind the pancreas. This maneuver facilitated to expose the splenic vein because of the tilting of the pancreas and the complete detachment of soft tissue including 11p lymph node from the white line of Toldt. The dissection plane along the splenic artery and vein for 11p lymph node dissection could be visualized just by the control of the operator's grasper without an assistant.

Results: The procedure was completed in 10 patients without intraoperative events; conversion to conventional laparoscopy; and surgery-related complications, including postoperative pancreatic fistula. In all 10 patients, the standards of D2 lymph node dissection were satisfied by exposing the splenic vein. The mean numbers of retrieved lymph node and 11p lymph node were 60.6 ± 14.3 and 4.3 ± 2.3, respectively.

Conclusion: Mid-pancreas mobilization for 11p LND in pure SIDG seems feasible and embryologically ideal and may be applicable to conventional laparoscopic gastrectomy.

P395

Summary Of Laparoscopic Fenestration For Symptomatic Lymphocele After Kidney Transplantation

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Introduction: Symptomatic lymphocele is one of the most frequent complications after kidney transplantation and belongs to the family of perirenal fluid collections such as hematoma and urinoma. Its origin is lymphatic leakage caused by either disrupting lymphatic channels of iliac vessels or the graft itself. Some authors reported significant associations of lymphocele formation with diabetes, new immunosuppressive agents (tacrolimus, mycophenolate mofetil (MMF)), and acute rejection episode. Treatment of this complication should be need, because it is thought to cause graft dysfunction, infection, deep vein thrombosis, abdominal pain or leg edema. The effective treatment of this complication is a surgical drainage of the cavity, which traditionally, is widely opening the wall connecting the lymphocele cavity to the intraperitoneal space. So, laparoscopic approach would be useful of its minimal invasiveness. We had 15 cases of post-transplant lymphocele patients with clinical symptoms. In this presentation, we report the procedure of laparoscopic fenestration and the summary of 15 cases of successfully released from the complication.

Methods and Procedures: Three hundred and sixty-six patients with renal failure were performed kidney transplantation at our institution between April 2004 and August 2013. Fifteen patients had symptomatic post-transplant lymphocele and underwent laparoscopic fenestration. With this operation, the patient was placed in the supine position. Placements of three working ports were as follows (scope port (5 mm); under umbilicus, 12 mm port; right upper lateral abdomen, 5 mm port; left lower lateral abdomen). We firstly confirmed the location of the cavity with laparoscopic ultrasonography and decided the place of fenestration. We made an enough window from the lymphocele cavity to intraperitoneal space.

Results: The overall incidence of symptomatic lymphocele was 4.1% (15/366). Seven patients cured just only with conservative treatment, two patients received open fenestration, and six patients received laparoscopic fenestration. The mean time from transplantation to diagnosis was 100 ± 90 days (range 27–219 days). All patients had been treated initially by percutaneous aspiration, and persistent lymphoceles finally needed other surgery treatment. Total operation time was 64 ± 13 (159 ± 74)minutes. An estimated blood loss was almost nothing (36 ± 16 mL). Post operative hospitalization period was 6.0 ± 2.2 (32 ± 2.1)days (open approach). All patients left the hospital without other complications.

Conclusions: Laparoscopic fenestration would have many advantages such as minimal invasion, short stay in hospital and low recurrence for post-renal-transplant symptomatic lymphocele. And laparoscopic ultrasonography would be useful to make sure the spot of fenestration. It indicates that laparoscopic fenestration should be considered a first-line therapy for the surgical treatment of post-transplant lymphocele.

P396

Ultrasonographic Evaluation of Optic Nerve Sheath Diameter During Laparoscopic induced Pneumoperitoneum as an Indirect Measurement of Intracranial Pressure

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Introduction: The elevation of intraabdominal pressure is seen in different clinical situations, being abdominal trauma and laparoscopic procedures amongst the most common ones. The effect of intraabdominal pressure on intracranial pressures is well known. The measurement of intracranial pressure is fundamental, but can be performed only using invasive techniques that are not exempt of complications. The direct relationship between the optic nerve sheath and brain enables to obtain a non-invasive evaluation. Our objective was to estimate through ultrasonography the modifications of the optic nerve sheath diameter after establishing pneumoperitoneum during laparoscopic procedures.

Methods and Procedures: All patients that underwent a laparoscopic procedure in supine position between July and August 2013 were included. Non of the patients had history of ocular pathology. Intraabdominal pressure was controlled at 14 mmHg. The optic nerve sheath diameter was measured with a 12 Mhz transducer sagittally 3-mm from its origin at 0, 15, 30 minutes and at the end of the operation.

Results: There were 44 subjects (female: 16, male: 28, 44.22 ± 10.44 yrs and body mass index of 29.45 ± 6.53 m/kg²). The median optic nerve diameter was 48.13 ± 10.01 mm at baseline, 54.68 ± 10.96 mm at 15 min, 59.16 ± 10.45 mm at 30 min and 51.02 ± 11.93 mm after desinflation of pneumoperitoneum. The diameter increased significantly at 15 min by a median of 6 mm (interquartile range (IQR): 3, 8; $p < 0.0001$) and at 30 min by a median of 10 mm (IQR: 7.5, 14; $p < 0.0001$).

Conclusion: Pneumoperitoneum induced elevation of intraabdominal pressure during laparoscopic procedures significantly increased the optic nerve sheath diameter as an indirect sign of elevated intracranial pressure. All changes are immediately reversible without clinical sequelae.

P397

Low Early Postoperative Wound Complication Rate After Single-Incision Laparoscopic Colectomy Using Straight Laparoscopic Instruments

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Background: Laparoscopic colectomy represents a minority of colon resections performed. Single-incision laparoscopic colectomy requires specific expertise and carries a potential concern for wound complication. Here we study early postoperative wound complication rates.

Methods: A prospective database of consecutive single-incision laparoscopic colectomies performed by two surgeons at a single institution was retrospectively reviewed. Straight laparoscopic instruments and a 5-mm, 30-degree laparoscope were introduced through a SILS™ port (Covidien, New Haven, CT) after a 3 cm fascial incision and a 2.5 cm skin incision were made. Specimens were removed through the single incision using an Alexis® wound protector (Applied Medical, Rancho Santa Margarita, CA). The fascia was closed with interrupted figure-eight 0-vicryl suture. Patients were discharged from hospital after tolerating oral diet and resumption of bowel function, and seen in follow-up 2 weeks after surgery.

Results: Thirteen patients underwent single-incision laparoscopic colectomy by a single surgeon. Four patients underwent left colectomy, six right colectomy, two low anterior resection, and one abdominoperineal resection; six of the operations were performed for cancer. They had a mean age of 66 years, 54% were male, and mean body mass index was 23.8 kg/m². Average length of stay was 5.5 days. Wound infection, seroma, and fascial dehiscence were identified in 0/13 patients.

Conclusion: Single incision laparoscopic colectomy using straight instruments and a 3-cm fascial umbilical incision can be performed with minimal postoperative wound complications.

P398

ICG Infrared Imaging: A Novel Alternative to Intraoperative Cholangiography

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Introduction: ICG (indocyanine green) infrared imaging has been proposed as an alternative to classic intra-operative cholangiography, but has not been accepted in clinical use due to inadequate image quality. The purpose of this study was to determine the minimum image quality required for clinical use. A baseline measure of detection threshold was determined using the classical psychophysics Method of Limits, while the performance in identification of clinical biliary conditions was determined using Signal Detection Theory.

Methods: Twenty-one subjects were exposed to images of a mock biliary system that contained various concentrations of green food dye. 18 images were presented to the subjects in alternately increasing and decreasing concentrations to determine the threshold concentration for detection. Then, 24 mock clinical biliary conditions of obstruction, leak, and normal were presented to the subjects, also at different concentrations of dye. There were seven different concentrations in each of the three biliary conditions, plus 3 controls with no dye. Subjects were asked to determine whether there is dye present (signal), and if so, which of the three clinical conditions was presented.

Results: The threshold of detection was determined to be at a contrast ratio of 1.35–1.09:1. The average d' (sensitivity) was 2.51 ± 0.72 with a criterion level of 1.77 ± 1.13 . The optimal beta (decision criterion) for detection in this study was 0.143. The probability of correct identification of each clinical condition averaged 78%, with the obstructive state having the highest identification rate of 79.8%.

Conclusion: Dye in this study could be visually seen even at low concentrations. Detection rates of pathological conditions were high (78%) although there remained a number of false negative findings. Post image processing should be considered to decrease the threshold of detection and improve condition identification rates. In the era of increasing laparoscopy and robotic surgery, ICG may prove to be the option of choice for common bile duct identification but further refinement of the technique is necessary.

P399

Use of Harmonic Scalpel in Single Site Laparoscopic Cholecystectomy: A Safe Alternative. Experience in 100 Consecutive Cases

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Background: Single site cholecystectomy is a surgical technique that is rapidly becoming an accepted alternative for laparoscopic cholecystectomy. The technique used in this procedure may vary as technology and instruments continue to improve. In this study we review our experience with this technique in the setting of 100 consecutive patients to assess the safety of a harmonic scalpel as the main dissecting instrument during the procedure.

Methods: This is a review of 100 consecutive single site cholecystectomies performed by a single surgeon at a single institution using a laparoscopic harmonic scalpel as the main dissecting instrument. Several parameters were analyzed including: age, sex, pre-operative diagnosis, ASA score, Body Mass Index (BMI), operating time, conversion to open cholecystectomy and post-operative complications.

Results: Demographics showed a group of patients in which 60% were females, average age was 50.6 ± 16.8 years. The average BMI was 31.4 ± 8.67 . The average ASA class was 2.3 ± 0.65 . The operating time averaged 58.33 ± 25.46 minutes. As far as preoperative diagnosis, 9% had a diagnosis of acute calculous cholecystitis, 24% had a diagnosis of biliary dyskinesia, 43% had a diagnosis of chronic Cholecystitis, 24% had a diagnosis of symptomatic cholelithiasis. There were a total of four complications; 1 patient had a urinary tract infection and prolonged ileus, 1 patient had a bile leak from the cystic stump, 1 patient had an enterotomy during trocar placement and 1 patient was readmitted for respiratory distress and pleural effusions. The patient with an enterotomy was the only one who underwent a conversion to open exploratory laparotomy.

Conclusions: None of the complications reported were directly associated to the use of harmonic scalpel to perform a single site cholecystectomy. The harmonic scalpel is a safe instrument which can also improve efficiency in the operating room. Further studies are needed to evaluate the cost-effectiveness of the harmonic scalpel in single site laparoscopic cholecystectomy.

P400

Benefits Of Needlescopic Surgery - A Systematic Review Of The Evidence

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Needlescopic surgery may be an alternative to conventional laparoscopic surgery as it uses smaller instruments, thereby potentially reducing postoperative pain, hospital stay and improving cosmesis. We performed a systematic review of published randomised controlled trials (RCTs) and nonrandomised comparative studies (non-RCTs) to assess the efficacy of needlescopic surgery in comparison with conventional laparoscopic surgery in patients undergoing intra-abdominal surgeries. We searched The Cochrane Central Register of Controlled Trials, MEDLINE and EMBASE until June 2013. Reference lists of included citations were screened for potentially relevant articles. Continuous variables were compared as weighted mean differences (WMD) and pooled odds ratios (OR) were calculated for categorical variables using a fixed effects model. We identified 36 studies (16 RCTs and 20 non-RCTs), with a total of 2980 participants. Our review included cholecystectomy procedures (14 RCTs and 10 non-RCTs), appendectomy procedures (2 RCTs and 2 non-RCTs), Nissen Fundoplication procedures (2 non-RCTs), Heller Myotomy procedures (2 non-RCTs), inguinal hernioplasty procedures (3 non-RCTs), adrenalectomies (2 non-RCTs) and 1 non-RCT reported on both splenectomy and sympathectomy procedures. Meta-analysis of the cholecystectomy RCT and non-RCT data demonstrated a significant reduction in postoperative length of stay: WMD = -0.15 days, 95% CI = [-0.22 days, -0.07 days]. Rates of overall complications and conversion to open procedure for needlescopic cholecystectomy were not significantly different from the laparoscopic cholecystectomy group. The overall complication rate seems to favour the laparoscopic cholecystectomy group, with higher complication rates associated with needlescopic procedures, although this result was not statistically significant: OR = 1.38, 95% CI = [0.92, 2.05], $p = 0.1079$. Meta-analysis of pain and cosmesis outcomes was not possible for any of the studies due to the heterogeneity in reported outcomes. However, results from individual studies seem to suggest that needlescopic cholecystectomy and appendectomy procedures are associated with less postoperative pain and improved cosmesis. The only trade-off appears to be a longer operative time for needlescopic surgery procedures. Meta-analysis of the cholecystectomy studies revealed a significantly longer operative time for needlescopic procedures versus laparoscopic procedures: WMD = 8.52 min, [6.81 min, 10.24 min]. Meta-analysis of the appendectomy studies revealed a significantly longer operative time for needlescopic procedures as well: WMD = 7.24 min, [3.96 min, 10.51 min]. Needlescopic surgery appears to offer some benefits to patients requiring intra-abdominal surgery as compared to the laparoscopic approach, particularly with regard to postoperative pain and cosmetic outcomes. However, larger studies using standardised assessment tools are necessary to confirm or refute these findings.

P401

Laparoscopic Repair Of An Omphaloenteric Remnant In An Adult Male

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Background: The persistent omphaloenteric remnant is a rare condition, which is most commonly diagnosed at child hood. Symptoms usually occur at an early age and may include chronic abdominal wall infections, abdominal pain and small bowel obstruction. It is rarely seen in adults and only few cases of laparoscopic management have been reported thus far.

Case Report: A 32 year old male underwent open primary repair of an umbilical hernia without MESH at an outside hospital. Within few weeks after the procedure he developed a chronic infection of his umbilicus, which was treated with antibiotics and dressing changes. The infection however progressed and the patient presented with a phlegmone of his abdominal wall. On CT-scan a tubular structure adherent to the inner surface of the abdominal wall was seen and it was suspected that the patient had a urachus cyst, which was the cause of his chronic infection. He was treated with antibiotics and after resolution of the acute infection he was prepared for laparoscopic exploration and removal of the pathology. At this point he had a persistent purulent leakage from his umbilicus. During laparoscopy first adhesions of the omentum and the abdominal wall were divided. The reported tubular structure was identified and found to have no relationship with the bladder but instead could be followed towards the mesenterium and mimicking a small bowel loop. Now, as an omphaloenteric duct was suspected, the small bowel was run starting at the terminal ileum and at 100 cm the origin of the remnant was identified. After intraabdominal mobilization and ligation of the feeding artery, a 4 cm incision was made below the umbilicus. The chronic fistula including three prolene stitches, which had been placed during his primary procedure, was excised. By this the entire duct could be brought out of the abdominal cavity. At the origin, the bowel was excised in a longitudinal fashion and the enterotomy was closed transversely in two layers. The abdominal wall was closed with interrupted absorbable sutures, the skin was left open. The patient recovered well from his operation; however, a surgical site infection developed despite perioperative prophylaxis and required local therapy for 4 weeks. The patient is well 3 months after surgery.

Discussion: Surgeons should be aware of this rare condition. The omphaloenteric remnant is suitable for laparoscopic repair.

P402

Postoperative Pain Evaluation Of Liposomal Bupivacaine In Patients Undergoing Laparoscopic Cholecystectomy

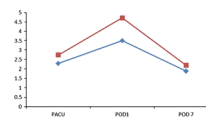
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Introduction: Postoperative pain frequently is highest on postoperative day one and has physiological, physical and mental consequences for a patient. Enhanced recovery pathways utilize multimodality pain regimen including local anesthetics. We hypothesized that patients who received a longer acting liposomal bupivacaine (EXPAREL®) after laparoscopic cholecystectomy within a standardized postoperative pain regimen experience less pain postoperative day #1 (POD 1), than those receiving regular bupivacaine.

Methods: This is a cohort analysis study of prospectively collected postoperative pain data of 37 patients undergoing laparoscopic cholecystectomy between May 2011 to August 2013. Liposomal bupivacaine was introduced into the patient care in November 2012. Pain scores were assessed with visual analog scale (VAS) pain score scales in PACU (postanesthesia care unit), POD 1, & POD 7. A pain regimen with Tylenol and NSAIDs (tramadol for patient who could not tolerate NSAIDs) was standardized. Comparative Kruskal-Wallis analysis was used for pain scores POD 1 on patients with liposomal bupivacaine vs. patients with regular bupivacaine.

Results: Thirty-seven patients underwent laparoscopic cholecystectomy. 24 women and 13 men, with mean age of 53 years and mean BMI of 31. Eight cholecystectomy patients received EXPAREL®. The overall VAS pain score for all patient in PACU was 2.65 (+ 3.4), on POD 1 was 4.4 (+ 3.08) and on POD 7 the score was 2.1 (+ 1.9). In the liposomal bupivacaine group, mean pain score on POD 1 was 3.50+/-2.51 and 4.72 +/-3.25 with regular anesthetic group ($p = 0.36$). (See figure)

Conclusions: This small study did not show a significant pain difference on POD 1 between patients receiving EXPAREL® compared to regular bupivacaine for patients undergoing laparoscopic cholecystectomy. Given the large standard variation and small patient number, the question warrants future analysis with a larger patient population.



P403

During Laparoscopic Cholecystectomy; Cystic Artery Can Be Cauterized Safely

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Introduction: Gall stones disease is a common disorder affecting females of all ages especially in their forties, cholecystectomy usually performed laparoscopically, the traditional procedure during laparoscopy is to ligate both cystic duct and cystic artery by clips. The gall bladder is removed with its duct (cystic duct) close to its junction with the common bile duct, both cystic duct and cystic artery ligated by clips (less commonly by suture material), cystic artery cauterization carries risk of uncontrolled bleeding and possibility of thermal injury to the nearby structures especially thrombosis of the feeding vessel (most commonly right hepatic artery), finally the gall bladder dissected by monopolar diathermy and delivered through a 10 mm port at the epigastric region or around the umbilicus. The aim of this study is to proof the safety of cauterization of the cystic duct by monopolar diathermy instead of ligation.

Methods and procedure: This study is a prospective study, it included 50 patients who underwent laparoscopic cholecystectomy in Erbil Teaching Hospital in Erbil city (the capital city of Kurdistan Region of Iraq), in all of procedures the cystic artery were cauterized by monopolar diathermy, the coagulation power were set at 30–40 Wats, the artery cauterized in three points before cutting by scissors, these patients were followed by color Doppler ultrasound by a specialist sonographer for detecting the patency of both right and left hepatic arteries; in 15 patients the Doppler done at third postoperative day, in the other 35 patients Doppler done at 7–10th postoperative day.

Results: In all the 50 cases the cauterization of the cystic artery done without risk of bleeding from the stump, color Doppler ultrasound showed normal blood flow in both right and left hepatic arteries in all of the 50 cases, also no cases of common bile duct stricture were encountered.

Conclusion: cystic artery can be cauterized safely provided appropriate power setting of the monopolar diathermy done and cystic duct is not abnormally wide.

P404

Neuroendocrine Tumors Of The Appendix: 2 Case Reports Of Successful Curative Treatment

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Introduction: Neuroendocrine tumors (NET) of the appendix (formally known as "carcinoids") are rare and usually found incidentally at appendectomy. Appendicular carcinoid tumors are among the most frequent malignant neoplasms of the appendix and are detected at the intervention or at histological examination, in 0.3% of the patients undergoing appendectomy.

Case Reports: We report here 2 cases of patients, a 14 years old man and a 41 years old woman, presenting with typical signs of appendicitis, which has been confirmed by CT-scan. Both underwent laparoscopic appendectomy with an uneventful postoperative follow-up and with discharge 24 and 48 hours after the intervention, respectively. Histology revealed in both a neuroendocrine tumour of the appendix, classified as a T1a and T2 stage, respectively. Both cases have been presented at our interdisciplinary tumorboard in order to propose these patients an adequate follow-up: The young boy with the early lesion underwent CT-Scan every 6 months for the first two years and then once a year. The woman with the T2 -lesion underwent a right oncological hemicolectomy 3 month after appendectomy followed by the same controls by CT-scan. Both patients are in complete remission, 5 and 6 years after detection of the neuroendocrine lesions, respectively.

Conclusion: Appendicular carcinoid or neuroendocrine tumors are rare (prevalence of 0.3% in patients undergoing appendectomy) and patients present most often with the symptoms of an acute appendicitis. However, in some cases the clinical presentation is non-conclusive and only advanced lesion might be detected by CT-scan. Frequently, the tumor has been only diagnosed at histopathological examination. In order to achieve a high percentage of a successful curative treatment, oncological right hemicolectomy should be performed, especially when the lesion has been classified as T1b or higher. T1a lesions confined to the mucosa and submucosa may be followed-up by CT-scan only.

P406

Diaphragmatic Pacing Can Subjectively Improve Symptoms And Quality Of Life In Patients With Idiopathic Diaphragmatic Dysfunction

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Introduction: Electrical pacing of the diaphragm was introduced over 40 years ago to treat patients with chronic apnea due to injury or diseases of the central nervous system. It provides a means to improve ventilation and eliminate the need for continuous ventilator support in patients with a variety of neurologic disorders. Laparoscopic implantation of diaphragm pacemaker system (DPS) electrodes directly into the diaphragm is an FDA approved procedure for diaphragmatic dysfunction from spinal cord injury or ALS (Lou Gehrig's disease). Little data exists about the efficacy of DPS use in patients with diaphragm dysfunction from unknown etiology. Here we present a case of DPS implantation in a patient with off label indication of idiopathic diaphragm dysfunction with improved symptoms and quality of life.

Case: A 46 year old obese male (Body Mass Index 47) was referred for consideration of DPS implantation. Months prior, the patient presented with dyspnea on exertion and subjective shortness of breath. Routine investigations for pneumonia demonstrated elevated left hemidiaphragm. Symptoms were progressive and were affecting quality of life and ability to perform activities of daily living. There was no evidence of underlying cardiopulmonary disease and no history of traumatic injury to the phrenic nerve. Pulmonary function tests demonstrated a restrictive pattern. FEV1, FVC, CT confirmed persistent left diaphragm elevation and no thoracic or cervical mass. Fluoroscopy showed limited excursion of the left dome of diaphragm without paradoxical movement, ruling out total paralysis. Electromyography revealed intact phrenic nerve bilaterally. Pulmonary, neurologic and thoracic evaluations failed to reveal source of his dysfunction. With institutional review board approval for off label use, the NeuRx DPS TM (Synapse Biomedical Inc. USA) system was successfully placed laparoscopically. During the mapping process, there was evidence of bilateral weakness as demonstrated by poor diaphragm contraction when electrically stimulated. Successful implantation was achieved and confirmed bilaterally. Post-operatively the patient had no acute issues and was discharged on day 2. He developed a superficial surgical site infection along the electrode tract controlled with antibiotics. Over a 5 month interval his symptoms improved dramatically. He is again able to carry out all his daily activities and can walk a mile without shortness of breath. He is currently enrolled in our surgical weight loss program for consideration of a bariatric procedure to facilitate weight loss and further improve his pulmonary function. Repeat pulmonary function testing is pending.

Conclusion: This case shows the successful use of DPS in a patient with idiopathic diaphragm dysfunction. Careful patient selection, including thorough evaluation for recognized diseases and an intact phrenic nerve is warranted. Further investigation into the use of DPS in the setting of idiopathic dysfunction is necessary to further elucidate the role of this technology in alleviating symptoms and restoring pulmonary function.

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P405

Direct Access ERCP: A Novel And Reliable Surgical Technique For Patients With Roux-En-Y Anatomy

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Background: The universal need for surgically-assisted access to the biliary tree following Roux-en-Y gastric bypass (RYGB) has grown as the incidence of bariatric surgery has increased. Even with the availability of expert enteroscopy, interrogation of the biliopancreatic tree following RYGB is technically challenging and a significant proportion of patients will require surgically-assisted access. In our early experience, we utilized the typical approach of placing a 15-mm trocar directly into the gastric remnant and noted poor gastric fixation, slippage of the endoscope, difficulty in maintaining an air seal, and lack of sterility. Based on these initial challenges, our technique has evolved into a novel transgastric method that provides secure and gentle fixation of the remnant and enables easy diagnostic and therapeutic maneuvers of the biliopancreatic tract.

Methods: Our technique involves initial placement of two peri-umbilical 5-mm ports and a small gel-sealed access system through a left upper quadrant incision. The gastric remnant is retrieved laparoscopically, delivered into the access system, and directly incised. A smaller wound protector is fitted through the gel seal, passed through the access system, and inserted into the remnant lumen. Deployment of the wound protector allows secure radial fixation of the gastrotomy to the anterior abdominal wall with equally-distributed tension on the stomach wall. Next, a 15-mm port is placed through the two interlocked systems directly into the gastric remnant to allow endoscopic access. Endoscopic retrograde cholangiopancreatogram (ERCP) is then performed. At the conclusion of the procedure, the inner system is removed, and the exteriorized gastrotomy is closed in two layers. Finally, the outer system is removed, and the incision is closed.

Results: Eight patients, 34 to 61 years old, required direct access ERCP. Five patients had failed prior attempts to access the papilla by enteroscopy. Indications were choledocholithiasis (3), gallstone pancreatitis (1), sphincter of Oddi dysfunction (2), biliary stricture (1), and cholangitis (1). Endoscopic access to the biliary tree was successful in all cases. Mean operative time was 187 ± 50 minutes. Mean length of stay was 2.25 ± 1.3 days. At up to two years post-procedure, only two patients had unresolved symptoms. No conversions to open, no peri-operative complications, and no post-operative wound infections occurred.

Conclusions: The distinguishing elements of this novel technique are the capability to protect the incision and provide air tight fixation of the gastric remnant to the anterior abdominal wall. This ensures direct alignment of the endoscope and gastric remnant, thus decreasing endoscope manipulation and minimizing scope torque and coiling. Repeat cannulation and full endoscopic surveillance of the remnant are also facilitated. This platform provides stability, and prevents dislodgement of the port during ERCP. The risk of gastric remnant injury is reduced because of the absence of traction sutures as well as the balanced radial distribution of tension on the wall of the stomach by the inner radial retractor. Additionally, wound contamination and gastric spillage are prevented by the outer gel-sealed system and the inner system, respectively. Our technique allows safe, easy, reliable, and reproducible direct gastric access for ERCP in post-RYGB patients.

P407

Single Stage Conversion of Laparoscopic Adjustable Gastric Band (LAGB) to Modified Laparoscopic Duodenal Switch (DS)

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Introduction: Re-operative bariatric surgery carries a higher risk of complication and it is generally accepted that long-term outcomes are worse. Common indications for revision following LAGB are adverse symptoms and failure to lose weight. It remains controversial whether conversion to stapled bariatric procedure should be staged, with band removal preceding reconstruction, and what is the ideal conversion procedure.

Methods: Between 2008 and present, 30 single-stage LAGB removal to laparoscopic DS procedures were performed by a single surgeon. The technique involved band and port removal with full dissection and separation of the overlying plication. The gastric sleeve was created over 42F bougie and over sewn with 2-0 PDS without use of buttress material. The duodenal enteral anastomosis was hand sewn with creation of a 175 cm alimentary limb, and 125 cm common channel, making total intestinal length exposed to food 3 m. Synchronous cholecystectomy was performed.

Results: The mean pre-operative BMI was 45.5 (range 35.5–61), the mean age was 47.4 (range 24–70), with 21 females and 9 males. All procedures were completed laparoscopically. The mean OR time was 220 minutes (range 170–349). There were no mortalities. Two complications required surgery. A leak of the duodenal-enteral anastomosis on POD 2 requiring open exploration and repair. This patient was discharged without further issue on POD 12. Another patient was noted to have cystic duct leak from a synchronous cholecystectomy and was treated with laparoscopy and re-clipping of the cystic duct and was discharged on POD 6. There were no leaks of the sleeve gastrectomy. To date, follow-up is available for 28 of 30 patients. Greater than 6-month follow-up is available for 24 patients. Of these, the mean pre-operative BMI was 45 (35.6–57.7). The mean post-operative BMI was 28.2 (19.2–39). In total, there was a mean loss of excess BMI of 84% with a mean follow-up 25.2 months (6–69). Twelve patients have reached 2-year follow-up. Their mean pre-op BMI was 45.0 with a current BMI of 29.1 (80% loss of excess BMI). Six patients have reached 3-year follow-up with a mean pre-op BMI of 48 and a current BMI of 28.6 (85% loss of excess BMI). This data is shown in Table 1. One patient had severe complaints of GERD and was subsequently converted to RYGB. No patient required revision or parenteral nutrition for nutrient deficiency.

Conclusions: Single stage conversion to DS provides impressive lasting weight loss in patients that have failed a previous bariatric procedure with complication rates comparable to reports of other stapling procedures. Lengthening the total intestinal length of the alimentary and common channels to 3 M with 1.25 common channel mitigates the risk of protein deficiency and excess BMI weight loss.

P408

Repair Of Diaphragmatic Defect Complicating Peritoneal Dialysis With Laparoscopic And Thoracoscopic Approach

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Introduction: Hydrothorax is an uncommon but significant complication of peritoneal dialysis catheter use resulting from pleuroperitoneal communication. Attempts at non-operative management have limited efficacy. Although surgical repair has been traditionally performed with chemical pleurodesis or open thoracotomy with defect repair, these methods have associated morbidities. We present a case of a diaphragmatic defect repaired with pledgeted sutures using both thoracoscopic and laparoscopic approach.

Case Description: A 35 year-old male with a history of end-stage renal disease, hypertension, hyperhomocystinemia, and ruptured appendicitis presented with dyspnea and findings of right-side hydrothorax following peritoneal dialysis. The patient had previously exhausted all hemodialysis access sites to both upper extremities. A chest x-ray confirmed worsening of a right sided pleural effusion following dialysate infusion. A peritoneogram was performed with contrast instillation through the dialysis catheter that confirmed a centrally located diaphragm leak. Attempt was first made to perform laparoscopic repair. A small linear defect was visualized with the laparoscope after insufflation within the central tendon of the right hemidiaphragm which was posterior to the dome of the liver. Due to inability to gain access to this area for repair, a thoracoscope was then inserted in the right chest. The defect was found by instilling water into the chest and observing air bubbling up from the abdomen. Pledgeted EndoKnot suture was then used for repair of the defect with fibrin glue incorporated into the knots. Following the procedure, the patient recovered expeditiously. Several months following this procedure, his peritoneal dialysis catheter was replaced laparoscopically. Two weeks later, he was successfully using his dialysis catheter and has not had further complication.

Discussion: Peritoneal dialysis is the best option for some patients with end-stage renal disease, such as those that desire independence and those that may be limited from other forms of dialysis access. Loss of diaphragm integrity resulting in hydrothorax is a complication that may prevent further use. Surgical repair has typically been performed with pleurodesis or thoracotomy with primary repair. Although often well tolerated, these methods may pose risk for the patient, including respiratory complications and difficulty with repair of a recurrent defect. This case presents a surgical approach for repair of a pleuroperitoneal communication allowing localization, pledget enforced repair, minimally invasive technique, and with potential for early return to peritoneal dialysis use.

P409

Totally Laparoscopic Vesico Cutaneous Fistula Resection After Incisional Hernia Repair with Mesh. A Case Report

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Introduction: A vesico cutaneous fistula is an abnormal congenital or acquired opening that connects the urinary tract to the skin surface. They usually appear after prolonged suprapubic catheterization or any other procedure on the anterior vesical wall.

Case Report: A 62-year-old male with history of sigmoidectomy and Hartmann's procedure for complicated diverticulitis and latter incisional hernia, which was repaired by laparoscopic IPOM three years ago. He was admitted with urine draining from the stoma scar. A fistulogram and a CT scan were completed; they revealed a 7 cm length path connecting the stoma scar on the left inferior quadrant of the abdomen to the bladder. Cystoscopy was normal. The fistula was canalized with a Franklin® colangiography catheter, then the fistulous path was identified and totally removed laparoscopically. In the same procedure the prosthetic material (meshoma) was identified proximal to the bladder and it was removed.

Discussion: Usually the etiological factors include trauma, radiation, vesical diverticula, obstetric complications, orthopedic surgery, radiation among others. Surgical correction is imperative as there is a risk of life-threatening complications like sepsis. Treatment must be individualized; conservative management is not effective in all cases. Enterocutaneous fistula is a known late complication of prosthetic mesh repair of incisional hernia and is usually due to chronic erosion of bowel by mesh placed in direct contact with intestinal loops both in open and laparoscopic repairs, nevertheless, vesicocutaneous fistula associated to mesh repair has not been widely described in literature.

Conclusions: Vesicocutaneous fistula has a tremendous impact for the patient and on the quality of life. The constant leakage of urine results in maceration and eventual destruction of skin with ensuing infection, discomfort, and malodor. Laparoscopic approach offers a minimally invasive procedure with low morbidity and favorable outcome. To our knowledge, this is the first case described in literature.

P410

The Strategy And Technique Of Laparoscopic Pancreaticojejunostomy

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Introduction: The aim of this study was to introduce how to perform a safe laparoscopic pancreaticojejunostomy.

Methods: Laparoscopic pancreaticojejunostomy is performed with the end-to-side anastomosis for the pancreatic duct smaller than 2 mm and the duct-to-mucosa anastomosis with stent for the pancreatic duct ranging from 2 mm to 5 mm, and the duct-to-mucosa anastomosis without stent for pancreatic duct greater than 5 mm. The anastomosis methods, the outcomes of the procedure about the laparoscopic pancreaticojejunostomy in 21 consecutive patients were analyzed between January 2010 and September 2013.

Results: 10 patients underwent laparoscopic central pancreatectomy and the others were with laparoscopic pancreaticoduodenectomy. In all 21 laparoscopic pancreaticojejunostomy, 7 cases were performed with the procedure of the end-to-side anastomosis. Another 14 patients underwent the duct-to-mucosa anastomosis, in which group there were 4 patients of the pancreatic ducts bigger than 5 mm without stents, and remaining 10 patients of the pancreatic ducts bigger than 2 mm and smaller than 5 mm with stents. The mean time of the end-to-side anastomosis was 40 min and the duct-to mucosa was 55 min, there was no obviously different between the operation with stent and without stent. Based on the international Study Group on Pancreatic Fistula criteria, 5 patients developed pancreatic fistula (grade A), 2 with the duct-to-mucosa anastomosis with the stent and 3 with the end-to-side anastomosis, whereas the other 16 patients did not. There was no abdominal or digestive bleeding.

Conclusion: This individual strategy for laparoscopic pancreaticojejunostomy is feasible and safe.

P411

Short-Term Surgical And Long-Term Survival Outcomes After Laparoscopic Distal Gastrectomy with D2 Lymphadenectomy For Gastric Cancer

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Introduction: This study aimed to investigate the survival outcomes of laparoscopic distal gastrectomy(LDG).

Methods: There were 240 consecutive patients with gastric cancer who received LDG at our institution from October 2004 to April 2013. Early surgical outcomes of laparoscopy-assisted distal gastrectomy(LADG) and totally laparoscopic distal gastrectomy (TLDG) were compared and operative experiences were evaluated.

Results: Of the 240 patients, 93 underwent LADG and 147 had TLDG. There were 109 T1, 36 T2, 31 T3, and 64 T4a lesions. The median follow-up period was 31.5 months (range: 4–106 months). Tumors recurred in 40 patients. The 5-year disease-free survival (DFS) and overall survival (OS) rates according to the stage of tumor were 90.3% and 93.1% in stage I, 72.7% and 67.6% in stage II, and 34.8% and 41.5% in stage III, respectively. There were no significant differences in early surgical outcomes such as operation time, blood loss and postoperative recovery between LADG and TLDG.

Conclusions: The findings show that LDG for gastric cancer had acceptable long-term oncologic outcomes. And the early surgical outcomes of LADG and TLDG were similar.

P412

Tools For One Port Laparoscopy Surgery

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Objective:The One Port Laparoscopy (IPLS) is a unique form of single port technique developed over fifteen years, using the assistance of different types of percutaneous needles. We used the leash and three types of needles: the Laparoscopy Rein, Hook and Suture Passer Needle. The use of the needle assistance has solved the problems in exposure of the Calot, which is encountered in most single port techniques.

Methods: This paper presents our statistics in 2431 cholecystectomies. Our analysis was focused on three factors: Safety, Effectiveness, and Cost.

Results: Safety was supported by a non-compromise exposure. The effectiveness is shown by the 96% feasibility, and the 4% conversion rate to laparoscopy or laparotomy. Costs were analyzed by a comparison between the different kinds of instruments used in single port techniques and our percutaneous needles in IPLS.

Conclusion: The traditional laparoscopic cholecystectomy with multi-ports is now considered to be the gold standard for cholecystectomy. However, all other Single Port techniques continue to be criticized as a great disadvantage because of the physical restriction to free movement of instruments from a single platform, having to adapt instruments, modifying his angle structures, curving it, and transforming opticals, tweezers and tools to ensure safe exposure and triangulation. This is critical, the exposure of the Calot triangle should be optimum and it should not compromise the view of the vascular and bile ducts during dissection and section. IPLS was performed with less morbidity and mortality rates than those reported for the traditional laparoscopy and single port incision. The percutaneous needles are a useful tool for port reduction as well as for the NOTES techniques, providing an effective triangulation exposure of the Calot triangle. These percutaneous needles are a cost contained, and safer alternative that should be considered by surgeons wishing to go beyond traditional laparoscopy.

P413

Laparoscopy-Assisted Versus Open Gastrectomy For Gastric Cancer: A Case-Matched Cohort Study

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Introduction: To evaluate short- and long-term outcomes of laparoscopy-assisted gastrectomy (LAG) for gastric cancer.

Methods: There were 85 patients who underwent LAG were individually matched to 85 patients who underwent OG between October 2004 and March 2008 at Sir Run Run Shaw Hospital. Beyond the patients' demographic data (age and gender), extent of gastrectomy and lymphadenectomy, as well as differentiation and TNM stage of the tumor are as matched index. The operative time, intraoperative blood loss, postoperative recovery, complications, pathological findings, and follow-up data were compared between the two groups.

Results: The mean operative time was significantly longer in the LAG group than in the OG group (276.5 ± 61.5 min vs. 210.7 ± 46.2 min, $P < 0.05$), whereas intraoperative blood loss was significantly lower (161.3 ± 89.9 ml vs. 267.2 ± 140.5 ml, $P < 0.05$). In addition, the LAG group in comparison with the OG group showed a significant reduction in the time to first flatus and postoperative hospital stay (3.7 ± 1.3 days vs. 4.2 ± 1.1 days and 10.2 ± 3.0 days vs. 11.8 ± 5.6 days, respectively; $P < 0.05$). There was no significant difference between the LAG group and OG group with regard to the number of harvested lymph nodes and overall postoperative complications. The 5-year disease-free survival rates and overall survival rates were 76.4%, 77.6%, respectively, in the LAG group and 74.9%, 72.8%, respectively, in the OG group. There was no significant difference between the two groups with regard to the survival rate. Comparing the survival rates of LAG and OG with regard to different TNM stage of the tumor, and the survival rates were still not significantly different between all specific groups.

Conclusions: LAG is suitable and minimally invasive for treating gastric cancer. Compared to OG, the LAG does not increase the risk of recurrence and death after surgery.

P414

Laparoscopic Extraction of a migrated Intrauterine Device from the Sigmoid Colonic wall under Colonoscopic Visualization
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Background: Migration of intrauterine contraceptive devices (IUDs) into the peritoneal cavity is uncommon, but may result in serious complications including bowel perforation. We present the case of a 30 year old female with migration of an IUD into her sigmoid colonic wall five months after insertion.

Case: Five months after an IUD was inserted into a previously healthy patient, a routine pelvic examination failed to identify the device in the uterine cavity. Abdominal X-Ray detected the device in the region of the left pelvic brim. A diagnostic laparoscopy was attempted and aborted by GYN when a limb of the device was seen protruding from the sigmoid colon. Using a combined laparoscopic and endoluminal approach, we confirmed that there was no invasion of the device into the colonic lumen. Using harmonic scalpel, we carefully dissected off the device from the extensive pericolic adhesions and colonic wall under direct colonoscopic visualization. Attention was paid not to breach the colon during the dissection to avoid fecal spillage. The device was successfully extracted. Post-operative x-ray confirmed the absence of additional foreign bodies. Patient was discharged the following day without complications.

Conclusion: A combined endoscopic and laparoscopic approach for extraction of intrabdominal foreign bodies can be safe, effective, and can provide accurate assessment of breaches in the colonic mucosa. Laparoscopic approach can avoid the attendant complications of exploratory laparotomy in carefully selected patients.

P415

Virtually Scarless Laparoscopy for Gastrointestinal and Gynecologic Procedures: A Novel Technique

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Introduction: We propose a laparoscopic approach which presumes better cosmetic results than single incision laparoscopic surgery (SILS) and the same results as conventional laparoscopic technique for four different gastrointestinal and gynecologic procedures.

Today, laparoscopy is the gold standard for different surgical scenarios including cholecystectomy, appendectomy, antireflux and different gynecologic procedures. Great efforts have been done in search of less invasive procedures, with aims of reducing morbidity and improving cosmetic results. This led to the development of techniques such as SILS and natural orifice transluminal endoscopic surgery (NOTES), but with considerable disadvantages: special equipment is required, increases in costs are significant and a need of a new learning curve is required.

Methods: We performed a retrospective chart review of patients who underwent scarless laparoscopic (SL) cholecystectomies (SLC), appendectomies (SLA), oophorectomies (SLOP) and antireflux procedures (SLAP) between January 2008 and August 2013. Two laparoscopic surgeons performed all different procedures. Baseline characteristics of groups are presented as mean and standard deviation or median and ranges according to data distribution.

Technique: The abdomen is accessed through an open technique, a 30° 10-mm scope is inserted through a 11 mm trocar at the umbilicus, two 5-mm trocars are placed in the right and left suprapubic region, just medial to the lateral umbilical ligaments, one 3-mm trocar is placed as needed according to the requirement of each procedure. Only the SLAP obligates for an extra 10 mm left upper quadrant. Longer, 45 cm bariatric instruments are used. For vascular or thermal dissection a 3 mm pulsed bipolar coagulator (Gyrus ACMI, Olympus Corporation) is required. The extraction of gallbladder/appendix is done by a retrieval endoscopic bag through the umbilical port. Only the 10 mm port aponeurosis needs to be closed.

Results: 154 patients underwent SL, the most common operation was cholecystectomy (n = 85), followed by appendectomy (n = 40), oophorectomy (n = 21) and antireflux procedure (n = 8). Demographic and surgical data is presented in Table 1. There was no mortality or readmission.

Conclusion: We present a novel technique that requires no special equipment, it is viable using traditional laparoscopic instruments, no additional training for surgeons is necessary and results are comparable with those reported in published data, but with better cosmetic results.

Table 1

	SLC	SLA	SLOP	SLAP
n	85	40	21	8
Sex (M:F)	26 : 59	18:22	0:28	22: 9
Age (yrs)	35, (22-62)	26, (13-56)	34, (23-39)	40, (31-54)
BMI	29.4 ± 4.5	25.8 ± 3.7	25.2±5.1	26.78 ± 6.2
ASA	1.4 ± 0.69	1.8 ± 0.43	1.1 ± 0.5	1.7 ± 0.41
PAS	24	12	8	2
Operative Time	42.1 ± 14.1	40.3 ± 14.7	15.8 ± 17.6	82 ± 25.3
EBL	40.2 ± 22	15.3 ± 3.8	15 ± 4.6	15.7±5.6
Complication	1 Bleeding cystic artery	None	None	None
Length of Stay	1 (1-3)	1 (1-5)	1 (1-4)	2 (1-4)

BMI: Body mass index, ASA: American society of anesthesiology score, PAS: Previous abdominal surgery, EBL: Estimated Blood loss

P416

Can Single Anastomosis Post Pyloric Bypass or Loop Duodenal Switch be the Bariatric Operation of the Future?

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Introduction: For years the mechanisms of action for bariatric procedures were considered to be restriction and malabsorption. Recently, it has been found that hormonal changes such as reduction of ghrelin, or increased PYY and incretins are involved in hunger suppression and satiety. As a result, a procedure that could achieve ghrelin suppression, stimulate L cells by having food enter the distal intestine, preserve the pyloric valve to control emptying and reduce the technical difficulty of the classic Duodenal Switch could be an attractive alternative.

Methods: Between February 2013 and present we have performed 8 single anastomosis or Loop duodenal switches. The technique involves creation of a sleeve gastrectomy over a 42F bougie, division of the duodenum with 3 cm cuff, and attachment end-to-side (hand sewn) to the small bowel 3 meters proximal the ileo-cecal valve. Synchronous cholecystectomy was performed.

Results: The mean BMI was 56.4 (48–74). Four of the patients were female and 4 were males. The mean OR time was 111 minutes. There were no significant complications or leaks. Early weight loss results appear identical to the classic DS. No patient has required treatment for frequent bowel movements or hospital re-admission.

Conclusions: Single Anastomosis Post Pyloric Bypass or Loop Duodenal Switch is a rational concept that begs further exploration. At this stage, no conclusion regarding outcomes can be delivered. Eliminating an anastomosis and potentially lengthening the common channel, while still performing a sleeve gastrectomy, preserving the pyloric valve and titrating total intestinal length are attractive features. In comparison to mini gastric bypass, bile travels several meters in an afferent limb and meets the duodenum past the pylorus. Thus the risk of bile reflux gastritis or increased oncologic risk to the stomach is remote. Long-term studies that investigate complications, the risk of micronutrient deficiencies and impact on co-morbid conditions are necessary.

P417

Increasing Use of Exploratory Laparoscopy at a Level I Trauma Center: Impact on Negative Laparotomy Rate

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Introduction: Exploratory laparoscopy for evaluating stable trauma patients for intraperitoneal injury has seen increased usage in recent years. We hypothesized that the use of laparoscopy for trauma at our Level I Trauma Center has been increasing for both blunt and penetrating injuries, and might influence the number of negative laparotomies performed.

Methods and Procedures: We performed a retrospective review of all patients with documented blunt or penetrating trauma at the University of New Mexico Hospital (UNMH) from January 1, 2012 to September 25, 2013. Mechanism of trauma, type of operative intervention, and length of hospital stay were examined.

Results: In 2012, exploratory laparoscopy was performed in 9 patients, with 5 patients requiring conversion to an open operation based on intraoperative findings. In 2013, exploratory laparoscopy was performed in 17 patients, with 7 patients converting to open. Of the 26 laparoscopies, 22 were for penetrating and 4 were for blunt injuries. Exploratory laparoscopy was used to rule out peritoneal penetration (9/26 cases), diaphragmatic injury (7/26 cases), or to identify hemoperitoneum (5/26 cases). In the same time period, 236 exploratory laparotomies were performed. Between 2012 and 2013, the use of laparoscopy increased from 9 to 17 operations, and the number of negative laparotomies decreased from 21 to 6 operations.

Conclusion: The use of exploratory laparoscopy for diagnosis and treatment of blunt and penetrating trauma is increasing at UNMH; there is a concurrent decrease in the rate of negative laparotomies. The main use of the laparoscopic approach was for evaluating for peritoneal penetration, diaphragmatic injury, or hemoperitoneum (Table 1).

Table 1 Operative Demographics

	2012 (12 months)	2013 (9 months)
Exploratory Laparoscopy: Total	9	17
Exploratory Laparotomy: Total	142	94
Laparoscopy: Converted to open	5 (55.6%)	7 (41.2%)
Negative Laparoscopy	4 (44.4%)	8 (47%)
Negative Laparotomy	21 (14.8%)	6 (6.3%)

P418

Natural Orifice Endoscopic Drainage of Perforated Duodenal Ulcer

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Objective of the Study/Technique: To determine whether natural orifice drainage of perforated ulcer disease is feasible.

Description of the Methods: To treat a perforated duodenal ulcer associated with a large abscess cavity in the lesser sac in a patient who was a poor candidate for operative or percutaneous drainage, we electively placed a fenestrated feeding tube transnasally and through the duodenal perforation into the abscess cavity using endoscopic and fluoroscopic guidance. Medical management consisted of intermittent suction, TPN, Zosyn, and difflucan.

Preliminary Results: Following transnasal placement of the fenestrated feeding tube into a ten cm abscess cavity in the lesser sac associated with a large duodenal ulcer, the abscess cavity resolved and the patient was discharged on hospital day ten on a regular diet.

Conclusions/Expectations: In a select group of patients with perforated duodenal ulcer disease, natural orifice drainage can avoid the morbidity associated with open surgery or percutaneous drainage. This technique could be expanded to drain abscess cavities associated with other organs.

P419

Transvaginal Laparoscopic Appendectomy Simultaneously with Vaginal Hysterectomy: Icing on the Cake

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Background: Natural orifice transluminal endoscopic surgery (NOTES) involves the introduction of instruments through a natural orifice into the peritoneal cavity to perform surgical interventions. The vagina is the most widely used approach to NOTES. We report the utilization of the vaginal opening at the time of vaginal hysterectomy as a natural orifice for laparoscopic appendectomy.

Materials and Methods: We reviewed cases of ten patients with chronic appendicitis who underwent transvaginal laparoscopic appendectomy simultaneously with vaginal hysterectomy. A laparoscopic approach was established after removal of the uterus, and the appendix was removed transvaginally. Among the cases, five were conducted under gasless laparoscopy by using a simple abdominal wall-lifting instrument.

Results: All procedures were performed successfully without intraoperative or major postoperative complications. The appendectomy portion of the procedure took approximately 15 minutes to 35 minutes. All patients were discharged 3 days after surgery without external scars.

Conclusions: Transvaginal appendectomy with rigid laparoscopic instruments following vaginal hysterectomy appears to be a feasible and safe modification of established techniques with acceptable outcomes.

P420

Hybrid Natural Orifice Transluminal Endoscopic Surgery: Laparoscope-Assisted Endoscopic Full-Thickness Resection Of Gastric Gist

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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. We have performed hybrid NOTES with laparoscope-assisted endoscopic full-thickness resection for 14 patients with a gastric gastrointestinal stromal tumor (GIST). Briefly, the tumor is resected with a full-thickness gastric wall endoscopically with the aid of a laparoscope. Then, suture closure of the stomach is completed laparoscopically. The specimen is usually removed through the mouth. All the tumors were resected en bloc with a negative surgical margin. Histologically, 3 cases were classified in the high-risk group, 2 in the medium-risk group, and 9 in the low-risk group according to Fletcher's criteria. The mean tumor size was 27.5 mm (range 10–60 mm). Seven tumors were located in the upper stomach and 6 were in the middle stomach. The mean operating time and estimated blood loss were 305 min (range 205–420 min) and 4.2 ml (range 0–20 ml), respectively. The median hospital stay was 10 days (range 7–13 days). No cases were converted to open gastrectomy. The postoperative course was uneventful in all cases with no anastomosis leakage, stenosis, or bleeding. During a mean observation period of 19 months (range 3–35 months), no recurrence was detected in this series. We conclude that hybrid NOTES for resection of gastric GIST can be performed safely and that the success of this procedure does not depend on the tumor location.

P421

Stress Response And Well-Being After Open, Laparoscopic And Notes Transgastric Uterine Horne Resection – An Experimental Study In A Porcine Model

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Introduction: The aim of this study was to investigate whether a NOTES procedure induces less inflammatory response than corresponding open and laparoscopic surgery. Natural Orifice Transluminal Endoscopic Surgery (NOTES) is a minimal invasive surgical method where the abdominal cavity is accessed through the stomach, colon or vagina without skin incisions why it is believed to induce less trauma than other surgical techniques. The degree of surgical trauma can be assessed by measuring serum levels of acute phase proteins as CRP and TNF- α .

Methods & Procedures: Thirty Swedish landrace pigs were randomized into three groups: open, laparoscopic or transgastric uterine horn resection. All animals were kept on liquid diet for three days before the study. At induction of anaesthesia one dose of Cefuroxime was given. The left uterine horn was carefully dissected from its mesentery using electrocautery and then ligated at its base. Venous blood samples were taken at start and end of each procedure and postoperatively at day 1, 3, 5, 7, 14, 21 and 28 for analysis of CRP and TNF- α . The animals were observed postoperatively and time till standing up and starting to drink/eat was recorded. Body temperature and weight were recorded at postoperative day 1, 3, 5, 7, 14, 21 and 28. Analyses of CRP and TNF- α were performed using pig-specific ELISA-assays.

Results: The total procedure time was significantly longer using NOTES technique, median 121 min (94–155), compared with open surgery, median 22 min (14–27) and laparoscopy, median 37 min (20–45) ($p < 0.0001$). Despite the longer operating time there was a non-significant tendency for shorter recovery time for the NOTES animals. (Time till standing up) Twenty-seven animals survived for four weeks. One animal in each group was euthanized prior to four weeks. All animals gained weight as expected during the 4-week-period with no significant differences. (Mean weight at 4 weeks: 46.3 ± 4.0 kg). However, during the first postoperative week only animals in the NOTES group showed a significant weight gain $p = 0.007$ not found in the other two groups. There was no difference in CRP-levels pre- and post-operatively. However, on post-operative day 1 CRP was significantly lower in the NOTES group compared with the open and laparoscopic groups (mean 0.72 ± 0.22 , mean 0.98 ± 0.26 and 0.97 ± 0.20 respectively, $p = 0.048$). On post-operative day three and on the following time points there were no significant differences between the groups. The CRP-levels were normalized to pre-operative values on day 14. TNF- α in all animals started at mean 0.0061 ± 0.008 pg/mg protein with no differences between the groups. At the end of procedure and throughout the study there were no significant changes in TNF- α levels in the laparoscopic and NOTES groups. At POD 3 the open surgical group showed significantly higher TNF- α levels than the other groups ($p = 0.036$).

Conclusion: Despite the longer operating time the transgastric NOTES approach seems to be less traumatic than open or laparoscopic uterine horn resection in this porcine model.

P422

GASTRIC Bacterial Colonisation In A Swedish Population, With And Without PPI – Is There A Need For Antibiotic Prophylaxis Prior To Transgastric Notes Procedures?

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Introduction: The aim of this study was to investigate and characterise the gastric bacterial flora in patients with or without PPI treatment. There is a concern about bacterial contamination of the abdominal cavity during transgastric NOTES procedures. Previous studies have shown that the gastric bacterial flora differs from the oral or oesophageal floras. However here are few modern studies on this topic. The common use of PPIs is believed to change gastric bacterial content.

Methods & Procedures: This study was approved by the local IRB-committee. Patients referred for routine gastroscopy, without a history of recent (3 months) or current antibiotic treatment, were eligible for inclusion. Use of PPIs was recorded. At the beginning of the gastroscopy sampling for bacterial culture was performed using a routine ERCP-cytology-brush. Culture analyses were carried out at the hospital laboratory for microbiology. Positive cultures were further analysed for types and subtypes. Gastric biopsies were also taken using ordinary biopsy forceps for CLO-test to detect *Helicobacter Pylori*.

Results: 34 patients were included, 15 of them had ongoing PPI medication. 13 patients had positive bacterial cultures. Significantly more patients with positive cultures had ongoing PPI medication, 9/13, than those without PPI ($p = 0.034$). The dominating bacterial type was *Streptococci* of several different subtypes. *Hemophilus influenzae* and *Lactobacillus* also occurred. This pattern indicates an oral and upper air-way origin. One patient had fungal growth. Only a few patients had positive CLO-test why further comparisons are not possible.

Conclusion: The stomach seems to contain bacteria mainly of oral origin. Therefore patients undergoing transgastric NOTES procedures should receive antibiotic prophylaxis covering the oral bacterial flora. Special attention is needed for patients with ongoing PPI medication.

P423

A Diverse Range Of Applications Of Transanal Minimally Invasive Surgery

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Introduction: Transanal minimally invasive surgery (TAMIS) has been used increasingly for local excision of neoplasm in the rectum, but can be useful for other various clinical or pathological situations. The aim of this study was to assess the wide range of clinical applications of TAMIS.

Methods: From September 2010 to September 2013, 15 consecutive patients who underwent TAMIS were identified and analyzed. After a single-incision laparoscopic surgery port was introduced into the anal canal, pneumorectum was established with laparoscopic equipment, followed by transanal procedure with conventional laparoscopic instruments. Indications, surgical results, and perioperative outcomes were determined retrospectively.

Results: Of 15 patients, benign and malignant lesions of the rectum were resected in 12 patients; 5 had neuroendocrine tumors, 2 had tubular adenomas with high-grade dysplasia, 2 had tubular adenoma with low-grade dysplasia, 1 had hyperplastic polyp, 1 had adenocarcinoma, and 1 had multiple polypoid masses which were proven to actinomycosis. In 2 patients who developed anastomotic fistula after low anterior resection for rectal cancer, fistulous openings were closed by primary sutures. In patient who had self-expandable metal stent for the obstructive upper rectal cancer, distal part of the stent was removed for the safe rectal transection. The median distance from the anal verge was 8 (range 4–19) cm. The median operative time was 70 (range 30–255) minutes and the median postoperative hospital stay was 3 (range 1–9) days. There was no conversion to laparoscopic resection, but peritoneal perforation occurred in 1 patient. No postoperative complications were detected except postoperative fever in 2 patients.

Conclusions: TAMIS is safe and feasible for local excision of various pathologies in the rectum, avoiding radical resection. Other clinical or pathological findings including anastomotic fistula or foreign body in the rectum can be managed by TAMIS.

P424

Defining the Learning Curve for Transanal Minimally Invasive Surgery (TAMIS)

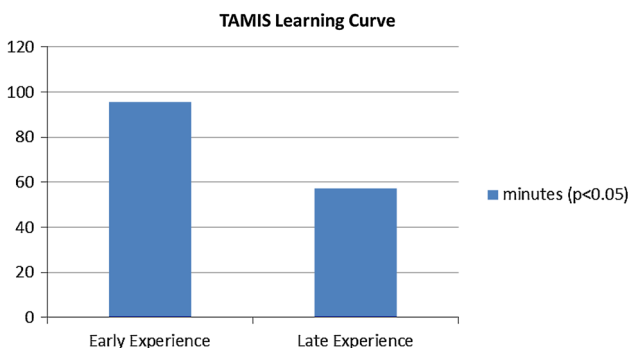
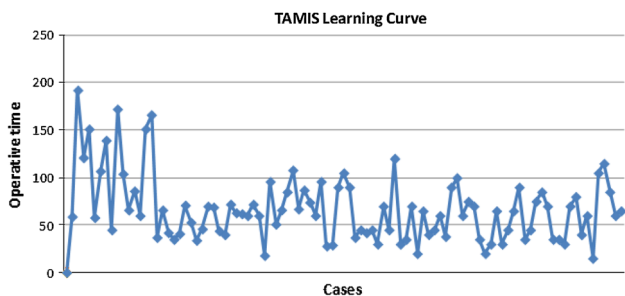
Henry Schoonyoung, MD, Francisco Quinteros, MD, Beatriz Martin-Perez, MD, Lawna Hunter, BA, George Nassif, DO, Teresa deBeche-Adams, MD, Sergio Larach, MD, Matthew Albert, MD, Sam Atallah, MD, Florida Hospital

Introduction: TAMIS is a new approach for local excision of rectal neoplasms. It is technically demanding, and the number of cases required to gain competency has not yet been established. The purpose of this study is to define the learning curve for local excision of rectal neoplasms using TAMIS.

Methods: A prospectively maintained database of patients who have undergone TAMIS between 7/2009 and 9/2013 at a single-center was retrospectively reviewed.

Results: 100 patients underwent TAMIS for local excision of rectal neoplasia over a four-year period. We divided these patients into 5 groups, (n = 20 per group) in order to evaluate differences in operative times between the groups. The mean operative time for the first group of cases (n = 20) was 95.6 minutes (range 35–192) and for the next 4 groups combined (n = 80) the mean operative time was 56.6 minutes (range 15–115). The difference in mean operative time between the first group and the remaining 4 groups was statistically significant (p < 0.05). Comparisons of patient characteristics (age, gender, BMI, ASA classification) and tumor characteristics (malignant versus benign disease, size, distance from anal verge) did not vary between groups. There was no difference in the incidence of post-operative complications among groups.

Conclusion: TAMIS is a new, advanced transanal platform which allows surgeons to perform high-quality local excision of rectal neoplasms. As this technique becomes increasingly adopted by surgeons, it is necessary to define a learning curve. With prerequisite training, this data reveals that the learning curve for TAMIS for local excision of rectal neoplasia is approximately 20 cases.



P425

Transanal Minimally Invasive Surgery (TAMIS): Challenging the Limits of Traditional Local Excision

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Background: Transanal endoscopic microsurgical (TEM) resection is associated with improved outcomes compared to transanal excision of rectal lesions. However, TEM equipment requires additional operative setup time, and tumor location dictates patient positioning. Transanal minimally invasive surgery (TAMIS) was first reported in 2010 as a technique for local excision of well selected rectal neoplasia. The purpose of this study was to review our initial experience with TAMIS.

Methods: This study is a retrospective review of prospectively maintained IRB approved database. Seven consecutive patients underwent TAMIS resection of endoscopically unresectable rectal polyps by a single colorectal surgeon in a single hospital system between August 2012 through August 2012. Demographic data, intra-operative parameters, and post-operative outcomes were assessed.

Results: Seven consecutive patients underwent TAMIS resection of rectal neoplasms all measuring greater than or equal to 3 cm in maximum diameter. Demographics, neoplasm location, intra-operative and peri-operative parameters as well as final pathology are depicted in the below table. Average operative duration was 154.2 min. Length of hospitalization was averaged less one day as 3 patients went home the day of surgery. There were no conversions. Six of seven neoplasms contained high grade dysplasia (HGD). The median maximum diameter of the neoplasm was 4.8 cm with an average of 4.2 cm in this very small sample size. One HGD neoplasm contained a focus of ypT1 Sm1 rectal adenocarcinoma. One benign specimen had a positive margin. No post-operative complications occurred. All patients with HGD are followed up every 6 months with proctoscopic evaluation. There were no conversions to open. Long-term follow-up is pending.

Conclusions: This is a report describing full thickness rectal resection utilizing TAMIS. Key instrumentation includes the angled needle tip cautery and the use of Lapra-Ty or V-lock in order to close sizable rectal defects transversely. TAMIS is a feasible and cost effective alternative to transanal endoscopic microsurgery. The learning curve is comparable to TEM as the primary surgeon only had prior experience with TEM during fellowship training. Limitations include the very small sample size in this early experience.

Age/ Sex	ASA score/BMI	Tumor Location	OR Position	OR Time (Min)	EHL (mL)	Conversion	LOS (days)	Perioperative complications	Path/TRUS
A 61 y/F	ASA 3/49	Left lateral side wall to anterior rectum 9 cm from anal verge	Left lateral pike	142	50	None	1	None	Tubulovillous adenoma with High grade dysplasia 6.0x4.9 cm
B 60 y/F	ASA 2/28	Right lateral side wall 8 cm from anal verge	Right lateral pike	82	25	None	0	None	Tubular adenoma with High grade dysplasia 3.5 x 2.2 cm
C 70 y/F	ASA 3/25	Posterior wall 9 cm from anal verge	Modified lithotomy	187	25	None	1	None	Tubulovillous adenoma with High grade dysplasia 4.8x3.2 cm
D 58 y/F	ASA 2/34	left lateral to anterior midline 10 cm from anal verge	left lateral pike	220	25	None	1	None	Tubulovillous adenoma with High grade dysplasia 3.5x3.2 cm
E 64 y/M	ASA 3/29.4	Posterior wall 7 cm from anal verge	Modified lithotomy	148	100	None	0	None	Tubulovillous adenoma with High grade dysplasia 3.6x2.8x1.4 cm
F 46 y/M	ASA 2/25.2	Left lateral side wall 4 cm from anal verge	left lateral pike	110	250	None	0	None	chronic mucosal prolapse with polypoid frangulation No dysplasia 5.0x3.8 cm
G 65 y/F	ASA 3/27.6	Posterior, 60% circumferential BCM from anal verge	supine	186	15	None	1	None	Giant Tubulovillous adenoma with High grade dysplasia 2 mm Focus of invasive adenocarcinoma, T1, sm1 (0/3 LN+) 8.6x6.6x2.8 cm

P426

Preliminary Face Validation Of A Virtual Translumenal Endoscopic Surgery Trainer (VTEST)

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Introduction: The first virtual reality simulator for the Natural Orifice Translumenal Endoscopic Surgery (NOTES), VTEST™ was developed to train surgeons in the hybrid transvaginal NOTES cholecystectomy procedure in Fig. 1. A preliminary evaluation study was performed to assess the face validity of the VTEST™.

Methods and Procedures: In this Institutional Review Board (IRB) approved study, a total of thirteen subjects with varying NOTES experience (ten NOTES and three GI surgeons) participated in the study at the 2013 Natural Orifice Surgery Consortium for Assessment and Research (NOSCAR) summit. The subjects were asked to perform the hybrid transvaginal NOTES cholecystectomy procedure on VTEST™ that included the four tasks shown in Fig. 2, and then were asked to answer a 5-point Likert scale feedback questionnaire consisting of fourteen questions: (1) realism of the anatomy, (2) realism in identification of the Calot's triangle, (3) realism of the appearance of the simulator interface, (4) realism of the instrument handling, (5) overall realism of the blunt dissection task, (6) overall realism of the gall bladder removal task, (7) overall realism compared to the traditional laparoscopic tasks, (8) quality of the force feedback, (9) usefulness of the force feedback in performing the tasks (10) usefulness in learning hand-eye coordination (11) usefulness in learning ambidexterity skills, (12) overall usefulness in learning the fundamental NOTES skills (13) trustworthiness of the simulator in quantifying accurate measures of performance (14) trustworthiness of the simulator in providing different hand-eye coordination compared to traditional two-port laparoscopic approach.

Results: The results from the face validity questionnaire are given in Table 1. Overall subjects rated ten of the questions above 3 or greater (60%) which includes the realism of the anatomical features, interface, and the tasks. Subjects also rated highly of trusting this simulator for measurement of performance. Results show that further improvement in blunt dissection and gall bladder removal tasks and the quality of force feedback is required.

Conclusions: The face validity of the first virtual reality NOTES simulator VTEST™ was established. The result from this preliminary study shows that the simulator established validity on many aspects of the simulation and further refinement are currently taking place to improve the VTEST™ simulator based on feedback.



Fig. 1 Hybrid transvaginal NOTES Simulator

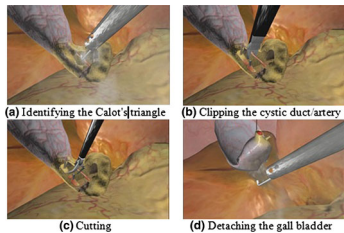


Fig. 2 Screens shots of the NOTES cholecystectomy simulation

Table 1 Descriptive statistics obtained from the questionnaire study*****

#	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Mean	3.10	2.70	3.50	3.40	2.60	2.80	3.00	2.30	3.63	3.09	3.09	3.09	3.20	3.78
SD	0.88	0.57	0.97	0.84	1.17	1.03	0.94	0.82	0.92	0.94	0.83	0.94	1.47	0.97

P427

Transanal Video Assisted Surgery Using Single Access Port-Initial Experience And Lessons Learned

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Introduction: Transanal endoscopic microsurgery (TEM) was initially developed in the early 1980s as a minimally invasive option for the surgical management of rectal neoplasms and has been reported as a safe, effective, and more efficient alternative to traditional surgical techniques. However, the instrumentation and equipment is not readily available and requires a capital set up cost. Recently, utilization of laparoendoscopic single site (LESS) port devices for transanal video assisted excision of middle and upper rectum lesions have been reported by several authors. However, the use of video assisted single site port instrumentation requires some adjustment and getting used to as well as a willingness to experiment with different devices and instrumentation. In this presentation, we report our early experience and the lessons learned from using a variety of single site ports, instrumentation, suture devices, different laparoscopic lenses, and high definition video.

Methods and Procedures: Our center maintains a database of prospectively collected patient information. Using this database, we identified patients who underwent Transanal Video Assisted Surgery. Indications were adenoma, carcinoid, early carcinoma, and rectovaginal fistula.

Results: From December 2011 to May 2013, ten patients underwent a total of eleven Transanal Video Assisted Surgeries. These procedures were performed by both attending surgeons as well as minimally invasive surgery fellows. Single access ports were used, including the SILS port (Covidien, Inc, Westbury, MA). For these procedures, a variety of laparoscopic lenses were utilized, including flexible tip cameras, standard length lenses, bariatric length lenses, and the EndoChameleon lens (Karl Storz, Tuttlingen Germany). Suturing techniques for closure of the defect, if suturing was performed, were performed with Endostitch (Covidien, Inc, North Haven, CT) or direct suturing techniques. One patient required a second procedure in order to obtain adequate deep margins. One patient required diagnostic laparoscopy in order to ensure that the lesion of interest was below the peritoneal reflection. During our early experience with transanal video assisted surgery, closure of the defect was not performed. However, with one of our patients developing post-operative bleeding and pelvic sepsis, all defects subsequent to this were closed. All patients were discharged on the same hospital day as their procedure. One patient required re-admission due to the development of pelvic sepsis, deep vein thrombosis, and pulmonary embolism, which was later determined to be secondary to a Protein S deficiency.

Conclusions: Transanal excision of mid and upper rectal lesions can easily be performed using laparoscopic instrumentation and laparoendoscopic single site (LESS) port devices that are readily available. This transanal video assisted surgery, from our experience, can be easily taught as our procedures have been performed by both minimally invasive surgery fellows in training as well as attending surgeons. We have found that, for lesions located in different quadrants of the rectum, utilizing different camera tips and lenses can be very helpful. We have also found that employing different suturing techniques can also aid in closure of the defects that remain after excision.

P428

Creating efficiency in Per Oral Endoscopic Myotomy

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Introduction: Per oral endoscopic myotomy (POEM) is a novel endoscopic procedure for treatment of esophageal achalasia. We have implemented POEM at our institution since early 2012, and now it represents the treatment of choice of most patients with esophageal achalasia. We report our experience with twenty five POEM procedures performed at our institution.

Methods and Procedures: Twenty five POEM procedures were performed since 2012. Twenty three of them were done for esophageal achalasia. Two of them were done for diffuse esophageal spasm (DES). Achalasia patients had a 10 cm myotomy extending from 7–8 cm proximal to the GE junction to 2–3 cm into the cardia of the stomach. Patients with DES had a myotomy extending 15–18 cm. Average preop Eckardt score was 9–11. Our patients age range from 21–90 years old (66.5), operative time 80–190 minutes (122.5) and the hospital stay was 1–8 days (1.8). Endoscopic examination at the conclusion of each procedure was performed to evaluate for injury or perforation, as well as for adequacy of the myotomy in improving passage of the endoscope into the stomach. All patients were admitted to the hospital following the procedure. A gastrograffin swallow study was performed for each patient on difficulty and post-operative day #1. Only in one patient there was a confined tear of pyriform sinus likely as a result of use of an overtube. No major complications. All but one patient had relief from achalasia symptoms (Eckardt score <2). Such failure patient underwent a laparoscopic Heller myotomy one month after POEM with no technical with optimal results.

Conclusions: Per oral endoscopic myotomy is safe and effective for treatment of esophageal achalasia. With increased experience of the entire surgical team, case efficiency improved. POEM is an excellent first surgical treatment for esophageal achalasia. Even when incomplete myotomy may be present, further therapy is not compromised.

P429

Durability of the Effect of Transversus Abdominis Plane Blocks on Patient Outcomes in Laparoscopic Colorectal Surgery: Review of 200 Consecutive Cases

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Background: Quality improvement in colorectal surgery requires implementation of tools to improve patient and financial outcomes, and assessment of results. Our objective was to evaluate the durability of transversus abdominis plane (TAP) blocks and a standardized enhanced recovery protocol (ERP) on a large series of laparoscopic colorectal resections.

Methods: 200 consecutive laparoscopic colorectal surgery patients received bilateral TAP blocks (15 ml of 0.5 % Marcaine per side) under laparoscopic guidance at the end of their operation. All were managed postoperatively with a standardized ERP. Demographic, perioperative, and postoperative outcome variables were analyzed. The main outcome measures were length of stay (LOS), readmission, reoperation, morbidity, and mortality rates.

Results: Of the 200 cases, 194 were elective and 6 emergent. The main operative indications were colorectal cancer (45%) and diverticulitis (17%). The mean age was 61.2 years and 56% were female. The mean BMI was 29.2 kg/m² and the majority (63%) were ASA class III. The main procedures performed were segmental colectomy (64%) and low anterior resection (25%). Mean operative time was 181 minutes. Nine cases (4.5%) were converted to open. The mean and median LOS were 2.6 (SD 1.5) and 2 days (range, 1–8), respectively. 21% of patients were discharged by postoperative day (POD) 1, 41% by POD 2, and 77% by POD 3. By POD 7, 99% of patients were discharged; almost all patients (97.5%) were discharged home without the need for temporary nursing. Twenty-four patients had complications (12%). The readmission rate was 6.5% (n = 13). There were 3 unplanned reoperations and no mortalities. The durability of the effect of the TAP block was further tested by comparing the first and second groups of 100 consecutive patients. With comparable demographics, there were no significant differences in readmission, complication, or reoperation rates over the entire series.

Conclusions: Adding TAP blocks to a well-implemented ERP facilitated shorter LOS with low readmission and reoperation rates. The effect appears durable and consistent in a large consecutive case series. TAP blocks may be an efficient and cost effective method for improving results after laparoscopic colorectal surgery.

P430

Predictors of Venous Thromboembolism in Open and Laparoscopic Bariatric Surgery

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Background: The number of bariatric surgeries performed annually in the United States continues to rise. Venous thromboembolism (VTE) is a major complication of bariatric surgery leading to significant morbidity and mortality. We sought to identify predictive factors that increase the risk of deep venous thrombosis (DVT) and pulmonary embolism (PE) using the National Surgical Quality Improvement Program Database (NSQIP).

Methods and Procedures: Bariatric patients were identified in the NSQIP protocol for all types of stapled bariatric procedures except adjustable gastric banding. Stepwise logistic regression prediction models were examined for outcomes of PE and DVT.

Results: 41,445 patients underwent gastric bypass surgery (35,696 laparoscopic; 5,749 open). Table 1 shows predictors of PE and DVT in laparoscopic and open bariatric surgery. Age greater than 50, increasing body mass index (BMI) and congestive heart failure (CHF) were associated with an increased risk of DVT in the laparoscopic group while female gender decreased risk of DVT. Similarly, age over 50, increasing BMI, chronic obstructive pulmonary disease (COPD), and CHF were associated with an increased risk for PE. In open bariatric surgery, race and CHF increased the risk of DVT and CHF increased the risk of PE. Vascular disease including hypertension and previous percutaneous coronary intervention (PCI) did not increase the risk of VTE in either surgical group.

Conclusions: CHF is a significant risk factor for VTE in bariatric surgery in addition to previously identified variables of increased age, BMI, and male gender. Surgeons should consider aggressive screening and prophylaxis in patients with CHF and other risk factors in both open as well as a laparoscopic bariatric surgery in order to decrease post-operative morbidity (Table 1).

Table 1 Predictors of DVT and PE in Laparoscopic and Open Bariatric Surgery

	Laparoscopic Bariatric Surgery n = 35,696			Open Bariatric Surgery n = 5,749		
Outcome	Predictor	p	Odds Ratio (95% CI)	p	Odds Ratio (95% CI)	
DVT	Female Gender	.03	0.62 (.41–.95)	NS	NS	
	Age ≥ 50	.04	1.57 (1.03–2.38)	NS	NS	
	BMI	.01	1.03 (1.01–1.05)	NS	NS	
	CHF	.0004	14.11 (3.22–61.75)	NS	NS	
	HTN	.09	1.49 (.94–2.37)	NS	NS	
	Previous PCI	NS	NS	NS	NS	
	Age ≥ 50	<0.0001	2.97 (1.78–4.94)	NS	NS	
PE	BMI	.0013	1.04 (1.02–1.06)	NS	NS	
	COPD	.03	2.91 (1.13–7.48)	NS	NS	
	CHF	.0002	17.79 (3.98–79.53)	.01	13.83 (1.68–113.67)	
	HTN	NS	NS	NS	NS	
	Previous PCI	NS	NS	NS	NS	

NS = Not Significant

P431

Outcomes Of Laparoscopic Versus Open Ladd's Procedure For Intestinal Malrotation In Adults

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Introduction: The purpose of this study was to investigate outcomes for adult patients undergoing laparoscopic vs open surgical repair for intestinal malrotation. Intestinal malrotation results from errors in fetal intestinal rotation and fixation beginning in the first trimester of pregnancy. Most patients are diagnosed in childhood, typically before two years of age; however, some patients remain undiagnosed into adulthood. Laparoscopic repair is now an accepted alternative to laparotomy in children but has not been well-studied in adults.

Methods and Procedures: After IRB approval, a retrospective chart review was performed for all patients ≥ 18 years of age diagnosed with intestinal malrotation presenting to a single tertiary-care institution from 2002–2013. Data collected included: age at diagnosis; pre-operative diagnosis; details of pre-operative imaging, surgical management, and complications; rates of re-operation, and symptom resolution. Patients were evaluated on an intent-to-treat basis. Categorical data were analyzed using Chi-squared or Fisher's exact test. Continuous data were analyzed using Student's T-test. A two-tailed p-value ≤ 0.05 was considered statistically significant.

Results: Twenty-two patients were identified (age range 18–63). Fifteen patients were diagnosed pre-operatively; 4 received an intra-operative diagnosis of malrotation during an elective procedure for an alternate diagnosis. Twenty patients had some type of pre-operative imaging (data not available for one patient), with CT being the most common imaging modality employed (77.3%). Four patients had volvulus. Six patients underwent successful laparoscopic repair; an additional three began laparoscopically but converted to laparotomy. There were no significant differences in age, operative time, or estimated blood loss between the two groups. There was a trend toward reduced need for nasogastric (NG) tube in the laparoscopic group (1.86 ± 2.7 d vs 5.67 ± 4.1 d, p = 0.07), and a statistically significant difference in length of stay (5.0 ± 2.5 d vs 11.6 ± 8.1 d, p = 0.0148). Three patients required re-operation: 2 underwent side-to-side duodeno-duodenostomy; 1 underwent a re-do Ladd's procedure after an initial open procedure. Ultimately, 4 patients (2 laparoscopic, 2 open) had persistent symptoms: bloating (n = 2), constipation (n = 2), and/or pain (n = 2) (Table 1).

Conclusions: Laparoscopic Ladd's repair appears to be safe and effective in adults. While small numbers limit our ability to identify important differences, there was a statistically significant decrease in LOS and a trend toward decreased need for postoperative nasogastric decompression. There were no significant differences in major or minor complication rates, need for re-operation, or persistence of symptoms between the two groups.

Table 1 Comparison of Adult Patients Undergoing Laparoscopic vs Open Repair for Intestinal Malrotation

	Laparoscopic	Open	P Value
Number of patients	9	13	–
Pre-Operative Diagnosis of Malrotation n (%)	8 (88.9)	7 (53.8)	0.5630
Age (years)	34.9 ± 9.5	41.2 ± 14.4	0.2686
Operative Time (minutes)	174.6 ± 69.7	200.5 ± 89.6	0.4807
Estimated Blood Loss (cc)	102.8 ± 191.6	99.2 ± 125.5	0.9585
NG Tube Decompression (days)	1.9 ± 2.7	5.7 ± 4.1	0.0701
Length of Stay (days)	5.0 ± 2.5	11.6 ± 8.1	0.0148
Re-Operation n (%)	1 (11.1)	2 (15.4)	1.00

P432

Robotically-Assisted Laparoscopic Biliopancreatic Diversion with Duodenal Switch. Learning Curve and Progress in Five Years of Practice

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Introduction: Laparoscopic biliopancreatic diversion with duodenal switch (BPD/DS) is the most technically challenging procedure in bariatric surgery. This procedure has been shown to result in better resolution of diabetes mellitus, hypertension, and hypercholesterolemia, as well as more sustained weight loss compared to gastric banding or RY gastric bypass. Advanced minimal access skills and a significant learning curve are required to achieve optimal outcomes. This study was designed to evaluate our progress with this procedure over the past 5 years of bariatric practice.

Materials and Methods: A prospectively-maintained database of all patients who underwent robotically-assisted laparoscopic BPD/DS between 2008 and 2013 was reviewed. Patients were divided into the following two groups (Group A – the initial 90 patients, and Group B – the last 89 patients). Perioperative outcomes and complications between the two groups were compared, using student T-test. P-value of <.05 is considered statistically significant.

Results: A total of 179 consecutive patients (F:M=137:42) were included in the study. Group A patients had an average age of 44.7 years (range: 20–67), BMI of 50.7 kg/m² (range: 37.4–70), and 6.3 obesity-related comorbidities (range: 2–12). Group B patients had an average age of 43.6 years (range: 21–72), BMI of 49.9 kg/m² (range: 35–78.8), and 6.9 comorbidities (range: 3–14). Within 5 years, our mean operative time decreased from 285 minutes (Group A) to 235 minutes (Group B). All cases were completed using a robotically-assisted approach, with no major intraoperative complications in either group. Two patients in Group A returned to the operating room: one for endoscopic release of an inadvertently-sutured nasogastric tube and another for port-site infection. Three patients in Group A were readmitted within 30 days of discharge due to fluid retention, incarcerated ventral hernia, and gastrointestinal bleeding, respectively, while one patient in Group B was readmitted for deep venous thrombosis and pulmonary embolism. Average length of hospital stay was also shorter in the later group (2.3 vs 3.1 days, p-value >.05). Comparable weight loss at 1,3,6,9,12,18,24, and 36 months postoperatively were achieved by both groups. No mortality occurred in this series.

Conclusions: Within 5 years of experience performing robotically-assisted laparoscopic BPD/DS, our outcomes have improved, as reflected by shorter operative time, lower rate of reoperation, and shorter duration of hospital stay.

P433

Minimally Invasive Approach To Small Bowel Obstruction Caused By Metastatic Lung Cancer

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Introduction: One half of lung cancer patients have metastatic disease at the time of presentation. The commonest sites of metastases are lymph nodes and the liver(1). Small bowel metastasis from lung cancer is rare and is invariably a marker of advanced disease. We report a case of metastatic small bowel obstruction managed successfully at our institution using the minimally invasive approach.

Case: A 69 year old male presented to our institution with recurrent colicky abdominal pain, nausea, and inability to tolerate oral diet for 3 weeks. He had history of stage IIIB squamous cell cancer of the lung which was treated with chemotherapy and radiation in the year prior to presentation. He had had no abdominal surgery in the past. On examination, the abdomen was distended with hyperactive bowel sounds. Computerized tomography of the abdomen showed high grade small bowel obstruction with a transition point in the left lower quadrant. The patient was resuscitated and bowel decompressed with a nasogastric tube. At diagnostic laparoscopy, he was found to have an 2 × 2 cm obstructing mass in the ileum 4 feet from the ileocecal junction. The rest of the peritoneal cavity was free from gross metastatic disease. The umbilical incision was extended vertically by 1 cm on either side and the affected segment of bowel delivered into the incision. Small bowel resection with a stapled anastomosis was performed. The patient made a steady recovery and was discharged on post-operative day 3. He was well at follow up in clinic 2 weeks later. Histopathological examination of the lesion was reported as metastatic squamous cell carcinoma. The tissue demonstrated CK7+/CK20– immunoprofile, indicating origin from the lung.

Discussion: The incidence of small bowel metastasis from a lung primary ranges from 0.4–0.5% (2). These metastases most commonly originate from squamous or large cell carcinoma of the lung(3). The initial presentation may be non-specific; but progression to intestinal obstruction, bleeding or perforation necessitates surgical intervention. Surgical resection offers the best palliation; but long term outcome remains poor. As demonstrated in this case, the laparoscopic-assisted approach is a viable option in these high-risk patients, with quick recovery time and minimal morbidity.

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P434

The Controversy Of Prophylactic Ivc Filters In High Risk Patients Undergoing Gastric Bypass Surgery

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Introduction: Patients undergoing gastric bypass surgery have a high risk for thromboembolic events. Over the last decade the use of prophylactic IVC filter (IVCF) placement has drastically increased for patients who are considered high risk. However, the role and efficacy of prophylactic IVCF placement remains controversial and the literature is limited to a few retrospective studies.

Methods: We conducted a systematic review of the literature. Twenty-one articles were analyzed and a total of eight relevant retrospective studies were chosen for review of data. Data from laparoscopic gastric bypass surgery was compared to open gastric bypass surgery.

Results: The relevant eight retrospective studies included a total of 597 patients. Patients had IVCF placement before laparoscopic gastric bypass (41%) and before open gastric bypass (59%). There were 5 postoperative pulmonary emboli (PE) (0.84%), 21 DVTs (3.52%), 5 minor IVCF related complications (0.84%), 2 major IVCF related complications (0.34%) and 10 deaths (1.68%). The rate of postoperative PE was the same in the laparoscopic group and the open group (0.84%). The rate of DVT in the laparoscopic group was 5.02% and in the open group it was 2.23%.

Discussion: It is estimated that 55% of bariatric surgeons use IVCF in high risk patients. Prospective research that supports the use of IVCF is very limited and individualized placement relies on retrospective studies only. In addition, patient characteristics associated with high risk vary between different studies. Our review showed that most of the published studies support the use of prophylactic IVCF and found it to be safe. On the other hand, the largest and most recent retrospective cohort study does not support its use.

Conclusion: The efficacy of prophylactic IVCF before gastric bypass surgery in high risk patients has not been established. Despite recent data suggesting no benefit, previous studies have supported its use in high risk patients. However, the patient population that is considered to be at high risk is not clearly defined.

P435

The powered Echelon Flex Endopath Stapler (EFPE) leads to less postoperative hemorrhage following laparoscopic Roux-en-Y gastric bypass; evidence for an unanticipated benefit from the powered staple device

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Introduction/Background: Ethicon Endosurgery has introduced a powered endoscopic stapling device (Echelon Flex Powered Endopath-EFPE). The benefits of this device include ease of use for individuals with smaller hands, and minimization of movement of the device during the cutting-stapling process. We have subjectively noted an improvement in staple line hemostasis. We compared outcomes in laparoscopic Roux en Y gastric bypass (LRYGB) using the EFPE to the non-powered Echelon Flex Endopath (EFE) endomechanical stapler. Our hypothesis was that the mechanized device led to less bleeding.

Methods: We present a series of consecutive LRYGB procedures, starting three months prior to the transition to EFPE (group A) and continuing for three months after the transition (group B). Cases were carried out by four surgeons who were all well beyond their learning curve. The surgical technique did not change, except for the introduction of the EFPE. All information was prospectively entered into a database used for quality assessment. Data included demographics of patients, preoperative hematocrit (Hct), four hour postoperative Hct (4 hr Hct), and post operative day one Hct (POD#1 Hct). We recorded number of blood products transfused.

Results: This series included 194 consecutive LRYGB. Group A and Group B were similar with regards to age, gender, and BMI. The decrease from the 4 hr Hct to POD#1 Hct was greater in Group A than in Group B (1.7 + 1.3 vs 1.2 + 1.4, p = 0.02). In Group A, three of 96 patients required a total of 8 units of packed red blood cells, while in group B, one of 99 patients required a total of one unit of packed red blood cells (p = 0.36). The postoperative length of stay was the same in both groups.

Conclusion: The EFPE stapler appears to lead to lower decrease in Hct after LRYGB, as well as a trend towards lower requirements for blood transfusion. This data suggests that the EFPE does indeed lead to less staple line bleeding. Furthermore, this study affirms a benefit of prospectively acquired databases, which is to assess the utility of surgical devices or change in technique.

P436

Two Year Prospective Follow Up Of Bowel Function After Cholecystectomy In 100 Patients

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Introduction: Bowel dysfunction after Laparoscopic cholecystectomy (LC) is a common issue, yet little has been described on its progression. By prospectively following patients for two years after LC with a bowel dysfunction survey and clinic visits, we aimed to characterize the incidence and symptomatic profile of post-cholecystectomy bowel issues and look for conditions that associate with poor bowel outcomes.

Methods and Procedures: Patients with acute and chronic cholecystitis, cholelithiasis, choledocholithiasis, gallstone pancreatitis, and biliary dyskinesia were offered participation in our Institutional Review Board-approved study. Patients were mailed or emailed the Surgical Outcomes Measurement System (SOMS) bowel dysfunction instrument and scheduled for follow up visits at three weeks, six months, one and two years. The instrument assessed the frequency of urgent bowel movements (BM), pain with BM, abdominal cramping/pain, loose BM, constipation, and accidental stool leakage with urination.

Results: Severe urgent BM were reported in 9.4% of patients preoperatively, 7.1% at one week, 10.7% at week three, 12.9% at six months, 12.7% at one year, and 7.5% two years after LC. One year after LC, those reporting moderate to severe urgent BM had significantly greater weight gain than unaffected patients (5.5 ± 4.3 kg v 0.50 ± 5.0 kg $P < 0.005$). Demographics and indications were not predictors of urgent BM. The incidence of severe loose BM was 9.4% pre-operation, 17.9% at week one, 3.6% at week three, 15.9% at six months, 9.1% at one year, and 7.5% at two years. In the six months prior to LC, patients lost 1.2 ± 5.8 kg, however, compared to weight at surgery, they gained 1.2 ± 4.4 kg at six months and 2.4 ± 6.4 kg at one year. Preoperative rates of severe constipation (15.6%) and bloating (12.5%) increased at one week to 21.4% and 39.3% respectively before each decreasing to less than 7.2% by week three, and below 6% through one year.

Conclusions: Constipation and bloating largely resolve by postoperative week three, while severe urgent and loose BM persist in some patients in the long-term after LC. The incidence of urgent BM may be associated with postoperative weight gain.

P437

Predictors Of Adenoma Detection In Colonoscopy By Gastroenterologists And General Surgeons

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Introduction: Adenoma detection rate (ADR) is a major indicator of colonoscopy quality. This study looks at predictors of adenoma detection.

Purpose: To identify factors that are associated with adenoma detection in patients who undergo colonoscopy.
Methods: This retrospective cohort study was performed on adults who underwent colonoscopy in the city of St. John's, Canada, in the year 2012. Subjects were identified through records from the health authority. Data were extracted from the electronic medical record (EMR), including both the endoscopist and nursing procedure reports. Data were recorded on a standardized data sheet and entered into SPSS version 20.0 for analysis. Univariate analysis was used to identify variables associated with adenoma detection ($p < 0.10$) and multivariate logistic regression was used to identify variables independently associated with adenoma detection ($p < 0.05$). Student's T-test and ANOVA were used for continuous variables and Chi-squared test for categorical variables. An adenoma was defined as a lesion classified histologically as any of the following: adenoma, adenoma with carcinoma, sessile serrated adenoma/polyp, serrated adenoma, serrated adenoma with dysplasia, traditional serrated adenoma.

Results: Complete data were collected on 2001 colonoscopies. Twenty-nine were excluded due to missing reports. Mean patient age was 59.4 years (± 11.6) with 1124 (57.0%) females. The most common indication for colonoscopy was family history of colorectal cancer in 510 (25.9%) patients. A Gastroenterologist performed 1293 colonoscopies (66%) and a General Surgeon performed 679 (34%). A total of 8 Gastroenterologists and 14 Surgeons were studied. Overall ADR was 21.9%. In univariate analysis, mean age was higher in patients who had adenomas compared to those without (61.4 years vs. 57.4 years; $p < 0.001$). Adenomas were found more frequently in men than women (27.2% vs. 17.9%; $p < 0.001$) and in patients with histologically confirmed colorectal cancer (CRC) (40.4% vs. 21.5%; $p = 0.002$). ADR was associated with the endoscopist performing the procedure (Range:10.5%–50.0%; $p < 0.001$). ADR was associated with the procedure indication (Range:4.9%–35.4%, $p < 0.001$), with the highest rates seen in: personal history of polyps, abnormal colonic imaging and anemia/fecal occult blood positive (35.4%, 33.3% and 26.1%, respectively). The nurse assisting with the procedure was also associated with ADR (Range:13.2%–50%; $p = 0.003$). In multivariate analysis, variables independently associated with ADR included gender (OR = 1.79), age (OR = 1.03), histologically confirmed CRC (OR = 2.65), indication ($p < 0.001$), endoscopist ($p = 0.002$), and nurse ($p = 0.021$). Indications most strongly associated include: abnormal colonic imaging, personal history of polyps and rectal bleed. Two endoscopists and 2 nurses had significantly higher ADRs when compared to the lowest detectors.
Conclusions: Adenomas were detected more frequently in male patients, patients of increasing age, patients with CRC and for a number of indications. Two endoscopists and two nurses had statistically significantly greater ADRs than the lowest detectors.

P438

Successful Medical Management Of Gastric After Minimally Invasive Three Fields Esophagectomy By Achalasia Megaesophagus

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Introduction: Achalasia is a disease that affects men and women equally, although it is not yet clear etiology, progression to a megaesophagus is evident in the terminal stages of the disease. In advanced cases esophagectomy is the best option for these patients. Since the advent of laparoscopic procedure has shown superiority over open esophagectomy with fewer complications and faster recovery.

Methods and Procedures: A case of a 50 year old patient with progressive dysphagia during six years of evolution with endoscopy, intestinal transit and manometry indicating megaesophagus for achalasia. He has lost 6 kg in 2 months, nutritional recovery starts before surgery per 10 days with nasoenteral feeding, and is scheduled for three fields minimally invasive esophagectomy. Procedure starts with a prone thoracoscopy evidenced, followed laparoscopy greater curve of the stomach tubularization and finally ascent of the stomach and cervical with blue cartridge laterolateral anastomosis of the esophagus with the stomach. The patient had an incidental finding of zencker diverticulum was resected with mechanical suture. We left a right thoracoscopy and nasoesophageal feeding tube and 6 hours after procedure started nutrition, the patient was early extube and he didn't need vasopressor drugs.

Results: The patient is transferred to ICU, fourth days left we ordered esophageogram showing no leaks and delayed gastric transit, per routine we don't perform pyloromyotomy. At seven postoperative day the patient shows change in the characteristics of tohoracis drainage and elevated acute phase reactants. We schedule an emergency thoracoscopy with evidence of emphyema handled successfully with drainage and leave anterior and posterior thoracoscopy, we did not see a perforation, by accident nasoenteral tube was move for nurse and we need a endoscopy for pass a new tube. During the passage of tube, air insufflation permit dehiscence of the suture line 1 cm opening which was not evident at the start of endoscopy, the patient was managed with thoracoscopy, enteral nutrition and New Whey protein. No infectious complications occurred after the emphyema drainage and, 60 days after the first surgery decreased production of intrathoracic tube, methylene blue test and negative esophageogram filtration test we started liquefied diet with good tolerance. level of Albumin at time of dehiscence was 1.7 and 3.0 at discharge.

Conclusion: Esophagectomy for minimal invasion is a safe and well tolerated procedure. 11% may have leaks, especially in the cervical anastomosis. Conservative management with drainage of fistula and optimizing the nutritional requirements allowed rapid recovery and sealing of the fistula on a record time of 60 days. The advantages of minimal invasion are shown in the short stay in ICU, reduced opioid analgesic requirement and early mobilization.

P439

Should We Routinely Transfuse Platelet for Immune Thrombocytopenia Patients with Extreme Low Platelet Count Who Underwent Laparoscopic Splenectomy?

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Background: Laparoscopic splenectomy (LS) is considered as the gold standard procedure for patients with immune thrombocytopenia (ITP). In many institutions, low platelet counts ($< 30 \times 109/L$) contraindicated LS. This study aimed to investigate the safety and feasibility of LS for ITP patients with low platelet counts.

Methods: A total of 88 cases of LSs were performed for ITP patients from June 2010 to December 2012. The patients were prospectively divided into three groups according to their immediate preoperative platelet count: $< 10 \times 109/L$ (group 1); $10 \times 109/L$ to $30 \times 109/L$ (group 2); and $> 30 \times 109/L$ (group 3). We recorded the patients' demographic characteristics, perioperative details, and platelet count response to surgery.

Results: The patients in the three groups had comparable demographic characteristics. Only one patient in group 1 required conversion (2.4%). The patients in group 1 required more operating time and suffered from more blood loss compared with those in group 3, but not statistically significantly. There were no significant differences between group 2 and group 3 in terms of operating time and blood loss. No statistically significant differences were found between the three groups with regard to complications and post-operative hospital stay.

Conclusions: It is safe and feasible to perform LS in ITP patients, whose platelet counts are extremely low, even without platelet transfusion. The indication for platelet transfusion during LS for ITP patients is the bleeding manifestations due to thrombocytopenia other than extremely low platelet count.

P440

Laparoscopic Splenectomy For Benign Splenic Tumor: Another Golden Standard

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Introduction: There is a paucity of data about evaluation and laparoscopic management for benign splenic tumors. We hypothesized that LS is feasible, safe, and effective in patients with benign splenic tumors.

Method: In this study, we retrospectively reviewed 29 laparoscopic splenectomy patients (group 1), 25 open splenectomy patients (group 2) with benign splenic tumors, and 46 laparoscopic splenectomy patients (group 3) with immune thrombocytopenic purpura as reference group from 2007 to 2011.

Results: Patients in group 1 and 2 had comparable preoperative details. Outcomes for group 1 had less estimated blood loss (88 ± 31 ml vs 133 ± 92 ml, $P = 0.029$), fewer complications (10.3% vs 36%, $P = 0.024$), less time of returning to oral intake (17.6 ± 2.6 hours vs 25.2 ± 2.7 hours, $P = 0$), and required less analgesia (13% vs 60%, $P = 0$). Compared with patients in group 3, patients in group 1 had larger splenic size (13.6 ± 2.6 cm vs 11.2 ± 2.2 cm, $P = 0$), higher platelet count (147 ± 43 vs 23 ± 25 , $P = 0$), and better ASA class. However, there were no significant differences in terms of intraoperative and postoperative variables.

Conclusion: We conclude that laparoscopic splenectomy is superior to open splenectomy in patients with benign splenic tumors, and also that outcomes for LS treated benign splenic tumor patients were safe, feasible, and effective.

P441

A Measure Of Recovery After Laparoscopic Vs Open Abdominal Surgery In Elderly Patients

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Introduction: Advances in perioperative care and the resulting improvements in outcomes such as length of stay and complications can make comparisons between laparoscopic and open surgery difficult. Recovery may be a construct that is more relevant to patients and better able to discern differences between different approaches. The purpose of this study is to describe the recovery of functional status in elderly patients undergoing laparoscopic versus open surgery.

Methods and Procedures: This is an ongoing prospective cohort study of 55 patients aged 70 or older who underwent major elective surgery, laparoscopic ($n = 12$) or open ($n = 43$), between October 2012 and July 2013. Patient characteristics were recorded including age, sex, Charlson Comorbidity Index (CCI), diagnosis, and procedure type. The primary outcome was lower-body function, as measured by the Short Physical Performance Battery (SPPB), a tool designed to quantify performance and decline over time, at 4 time points: preop, 1 week postop, 1 month postop, and 3 months postop. Patients were considered recovered when their postop scores were equal or higher than their preop scores. We provide descriptive results for exploratory purposes with group means compared using an unpaired Student's t-test. Proportions were tested using a Z-test of proportions and medians were tested using Mann-Whitney U test with p-values reported.

Results: The mean age in the open group was 77.5 ± 3.9 and in the laparoscopic group 76.9 ± 3.8 ($p = 0.43$). Males made up 56.4% of the open group 67% of the laparoscopy cohort ($p = 0.52$). The comorbidity status was similar in both groups with a median CCI median of 6.5 in the open group and 7.5 in the laparoscopic group ($p = 0.38$). Procedure types and cancer diagnosis were similar in both groups. The total percentage of patients with one or more complications in the open patient group was 35% versus 33% in the laparoscopic group ($p = 0.45$). Mean LOS was 6.5 ± 4.7 in the open patients and 5.5 ± 6.7 in the laparoscopic group ($p = 0.58$). A higher percentage of laparoscopic patients (71.4%) recovered to baseline SPPB levels at 3 months than in the open group (60%) ($p = 0.032$).

Conclusion: Preliminary data suggest that the SPPB may be a good measure to compare recovery in elderly surgical patients following laparoscopic and open surgery.

P442

Laparoscopic Gastric Bypass Gastrojejunostomy Construction Technique Correlates With Anastomotic Complications

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Introduction: This study sought to evaluate two of the surgical techniques employed to create the gastrojejunostomy during laparoscopic Roux-en-Y gastric bypasses (LRYGB). The hand-sewn anastomosis (HSA) and the circular-stapled anastomosis (CSA) are both common techniques. We hypothesized that the CSA was associated with a greater incidence of anastomotic complications such as marginal ulcer and stenosis. As a secondary aim, we also sought to determine if perioperative outcomes and long-term weight loss varied by technique.

Methods and Procedures: This study is a retrospective review of patients who underwent primary LRYGB at the Medical College of Wisconsin from January 2010 to December 2011. Procedures were performed by two surgeons (MIG and JRW). Clinical information and perioperative outcomes were collected up to one year following surgery. Statistical analysis of our data was conducted using VassarStats (Vassar College, Poughkeepsie, NY). Two-tailed Fischer's exact test was used to compare categorical data, and continuous data were compared using two-tailed T-tests.

Results: A total of 190 subjects underwent LRYGB during the study interval. The majority of subjects underwent HSA (table). The overall complication rate was 21.6%, with 41 of 190 patients experiencing one or more complications. There were no gastrojejunostomy leaks in this series. Most complications were Clavien Classification Grade III requiring endoscopic, radiologic, or surgical intervention (3 (2.2%) HSA patients and 6 (10.9%) CSA patients experienced grade III complications within 30 days post-surgery, $p = 0.02$). Seven surgical re-operations were performed in the 30-day postoperative period to treat one septic wound and six intra-abdominal hematomas.

Conclusions: The CSA technique of gastrojejunostomy in gastric bypass is associated with a higher rate of non-life threatening anastomotic complications than the HSA technique. Operative times are significantly longer for HSA, but LOS and long-term weight loss are equivalent.

Event	HSA	CSA	p-value
LOS*	2.2 (± 0.6)	2.3 (± 0.6)	0.60
OR Time	204.1 (± 37.0)	166.3 (± 34.3)	<0.01
%EBL at 12 months*	71.8 (± 28.0)	78.6 (± 26.6)	0.21
Anastomotic Stenosis	4 (3.0%)	9 (16.4%)	<0.01
Marginal Ulcer	1 (0.7%)	3 (5.5%)	0.04
Wound Infection	0 (0.0%)	2 (3.6%)	0.03
Postoperative Bleed	2 (1.5%)	6 (10.9%)	<0.01
Re-operation in 30 days	1 (0.7%)	6 (10.9%)	<0.01

* LOS=Length of Stay, %EBL = percent excess BMI loss

P443

Gastric Volvulus After Laparoscopic Pancreatectomy

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Introduction: Pancreatectomy is considered to be a last resort in treating pain due to chronic pancreatitis. A laparoscopic version of this procedure is becoming more and more common. This case report describes the serious complication of gastric volvulus with necrosis, which has not to our knowledge been described before.

Patient and Methods: A 20-year-old female was admitted to the ER with a history of abdominal pain and vomiting but a 12 hour history of being unable to vomit despite retching. Five months previously she had undergone a laparoscopic total pancreatectomy due to chronic pancreatitis at another institution. Abdominal X-ray showed a massively distended stomach. An attempt to place a nasogastric tube with the help of radiography failed and suspicion of a gastric volvulus arose.

Results: Emergency laparotomy revealed gastric volvulus with necrosis of the stomach. Total gastrectomy was performed with a Roux-en-Y esophageojejunostomy. The patient has since experienced difficulty with nausea and pain.

Conclusion: Gastric volvulus should be considered as a differential diagnosis in patients who have undergone laparoscopic total pancreatectomy. Borchardt's triad can be helpful in recognizing volvulus: severe epigastric pain, retching without vomiting and an inability to place a nasogastric tube.

P444

Gastric Bypass And Significant Surgically Induced Weight Loss Is Associated With Decreased Bone Mineral Density

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Introduction: Our objective was to examine the effect of laparoscopic Roux-en-Y gastric bypass (LRYGB) on patient's bone mineral density (BMD). BMD is a useful metric for evaluating patients' risk of developing osteoporosis and other bone related diseases. Bariatric surgical procedures such as the LRYGB that lead to weight loss through malabsorption may have a deleterious effect on BMD. We hypothesized that BMD would decrease at all examined locations following RYGB.

Methods and Procedures: This study is a retrospective review of patients who underwent primary LRYGB at the Medical College of Wisconsin and received preoperative and postoperative bone density scans between January 2005 and November 2012. Bone density was evaluated with dual-energy X-ray absorptiometry (DXA) BMD scans. Routinely collected lab tests that might correlate with bone loss or nutritional status were also evaluated. Statistical analysis of our data was conducted using VassarStats (Vassar College, Poughkeepsie, NY). A correlational regression analysis was used to examine correlations between bone density change and continuous variables. Other continuous data were compared using two-tailed T-tests while Fischer's exact test was used to compare categorical data. A p-value < 0.05 was considered statistically significant.

Results: A total of 24 subjects met inclusion criteria for this study. All subjects were female with a mean age of 45.2 (±9.0) years. The mean interval between DXA BMD scans was 22.5 (±9.5) months. The mean % excess BMI lost (%EBL) for this series was 82.3% (±22.1). Hip and femur BMD % change correlated significantly with %EBL (p < 0.01 and p = 0.04, respectively).

Postoperative serum values collected 12 months (±6 weeks) following surgery. Postoperative BMI collected at nearest date to follow-up DXA BMD scan. BMD values are mean total of right and left sides when available. * Percent change is reported as %EBL.

Conclusions: Our results indicate that RYGB is associated with significant decreases in bone mineral density at all routinely examined locations in the years following surgery. Absorptive changes and changes in weight-dependent mechanical stress are possible mechanisms for the observed changes in bone density.

	Preoperative	Postoperative	Mean % Change	p-value
BMI (kg/m ²)	46.1 (±7.2)*	22.7 (±9.6)*	-82.3 (±22.1)*	< 0.01
Bone Mineral Density (g/cm ²)				
Spine	1.31 (±0.13)	1.24 (±0.14)	-5.6 (±6.0)	< 0.01
Hip	1.16 (±0.14)	1.05 (±0.14)	-9.5 (±5.1)	< 0.01
Femur Neck	1.09 (±0.14)	1.00 (±0.12)	-8.4 (±4.7)	< 0.01
Radius	0.97 (±0.07)	0.9 (±0.10)	-7.1 (±5.6)	< 0.01
Serum Levels				
Intact PTH	47.6 (±23)	47.7 (±18.4)	8.1 (±40.6)	0.98
Total Protein	7.4 (±0.4)	6.8 (±0.4)	-7.2 (±5.8)	< 0.01
Albumin	4.2 (±0.3)	4.1 (±0.2)	-1.35 (±6.5)	0.25
25-OH-Vitamin D	22.9 (±10.7)	39.8 (±12.1)	105.2 (±107.2)	< 0.01
Ca ²⁺	9.3 (±0.4)	9.2 (±0.4)	-1.0 (±3.8)	0.21

P445

Management Of Complicated Appendicitis: Is Laparoscopic Single Site Surgery (LESS) A Safe Option?

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Introduction: Laparoscopic appendectomy is becoming the mainstay of treatment for acute appendicitis. However it remains controversial in cases of complicated appendicitis due to conflicting data in the literature regarding postoperative complications. The purpose of this study is to report the outcomes of patients with complicated appendicitis who underwent LESS appendectomy.

Methods and Procedures: We conducted a retrospective review of all patients who underwent LESS appendectomy between July 2008 and September 2013. Complicated appendicitis was categorized in four groups: phlegmon, localized peritonitis, diffuse peritonitis and appendiceal mass. The same surgical team performed all procedures with standard technique. Records were reviewed for demographic data, operative time, intraoperative findings, onset of diet, length of hospital stay, drain requirement, postoperative pain, postoperative complications, cosmetic results and readmissions at 30 days.

Results: A total of 247 patients who underwent LESS appendectomy were included in our analysis. Sixty-three patients (25.50%) met the definition for complicated appendicitis: 32 (50.79%) with phlegmon, 24 (38.10%) with localized peritonitis, 6 (6.35%) with diffuse peritonitis, and 1 (1.59%) with appendiceal inflammatory mass who presented with 1 month of symptoms. There were no conversions to multiport or open surgery. Both operative time and hospital stay were positively correlated with the severity of intraoperative findings. More than half of patients (32 cases, 53.97%) were left with a drain. We registered 1 (2.17%) readmission due to postoperative ileus 24 hours after being discharged. There were only 2 (4.34%) deep abscesses in this series.

Conclusion(s): The management of complicated appendicitis and the surgical technique of choice is still a matter of debate. In our series we describe a group of patients with complicated appendicitis managed through a LESS approach with postoperative complications comparable to multiport and open appendectomy. In addition, this technique is associated with short hospital stay, less postoperative pain and excellent cosmetic results and no conversions. Based on these results LESS appendectomy is a safe and feasible option in complicated appendicitis and should be considered in all cases.

P446

The Efficacy of a Novel Sprayable Biopolymer Barrier in the Prevention of Postoperative Adhesions

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Introduction: Abdominal surgery can induce post-operative adhesion formation, which can result in significant patient morbidity including small bowel obstruction, female infertility, or chronic pain. We are developing a novel sprayable biopolymer hydrogel to act as a physical barrier between tissues during healing and protect susceptible surfaces from forming adhesions. The gel is easily applied as a two-part system in both open and laparoscopic procedures. The two components interact to form an easily-visualized gel during application and will degrade into biocompatible byproducts after healing is complete.

Methods and Procedures: Surgical defects were created on adjacent abdominal wall and cecum surfaces in Sprague-Dawley rats. The wounds aligned upon closure such that adhesions would form in untreated control animals. The wounds in treatment animals were sprayed with the hydrogel barrier prior to closure. Adhesion analysis was performed 14 days after the procedure. Scores were assigned to the adhesions formed between the abdominal wall and cecum injury sites. Animals received a score of 0–7 based on the extent and tenacity of the adhesions that had formed, with 0 indicating the absence of an adhesion and 7 indicating adhesion formation with significant coverage and strength. The incidence of adhesion formation and extent/tenacity scores were compared in control and spray treated animals to determine the efficacy of the treatment in preventing postoperative abdominal adhesions.

Results: The use of the sprayable hydrogel barrier decreased the incidence of adhesion formation between the abdominal and cecum injury sites to 31.3% as compared to 87.5% of the untreated control animals. Using the Fishers Test, the decrease was determined to be statistically significant ($p = 0.03$). Additionally, the mean overall adhesion score decreased from 5.6 to 1.6, as both the extent of coverage and tenacity of adhesions formed was reduced with treatment (Table 1). These results were statistically significant ($p < 0.01$ using the Mann-Whitney test). No adverse reaction or foreign body response was detected in any of the treated animals.

Conclusions: The application of a novel sprayable biodegradable biopolymer hydrogel over injured tissue successfully decreased the incidence of adhesion formation 14 days after surgery. The associated extent and tenacity of adhesions decreased with treatment, as did the overall adhesion score. The gel did not interfere with injury healing and is potentially a substantial advancement in postoperative adhesion prevention. Continued development and testing for potential clinical use is warranted.

Table 1

	Incidence	Adhesion Score	Extent of Adhesion	Tenacity Score
Control (n = 8)	7 of 8 (87.5%)	5.6 ± 2.4	70.6% ± 35.8%	2.4 ± 1.1
Treatment (n = 16)	5 of 16 (31.3%)	1.6 ± 2.6	19.1% ± 33.0%	0.8 ± 1.2

P447

Experience Of Single-Incision Laparoscopic Surgery For The Small Intestine Lesion

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Introduction: In late years, the laparoscopic surgery spreads out rapidly, and Single-Incision Laparoscopic Surgery for the small intestine disease is thought about with good adaptation above all. We examine safety and usefulness of the Single-Incision Laparoscopic Surgery for the small intestine lesion.

Methods and Procedures: Single-Incision Laparoscopic Surgery for small intestine lesions was performed in six patients between July 2009 and July 2013. Perioperative data and short-term outcomes were assessed.

Results: The diagnoses included small intestine cancer, carcinoid, malignant lymphoma, granulomatous inflammation, small intestine ulcer and Meckel's diverticulum in one patient each. Five patients, except one patient diagnosed as inflammatory granuloma pathologically, were undergone small intestine endoscopy and preoperatively diagnosed by the endoscopic biopsy and made a tattoo marking at the small intestinal lesion. We put the incision of 2–5 cm long to the umbilical region, and the approach in the abdominal cavity inserts a port in all cases. As platforms, the E.Z accessTM, was used in three patients and glove method was used in three patients, and a rigid 10 mm laparoscope was used in all patients. A segmental resection of the small intestine was performed in all patients, and the mean operative time was two hours 17 minutes. The quantity of operative blood loss was 30 ml and the mean postoperative hospital stay was 11 days. In addition, there was no postoperative complication.

Conclusion: Single-Incision Laparoscopic Surgery for the small intestine lesion was not only superior cosmetically, and it was thought that it was safe, useful method.

P448

Validation Of The SF-36 As A Measure Of Post-Operative Recovery After Colorectal Surgery

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Introduction: Surgery is evolving rapidly, and new techniques are being introduced on the basis that they improve "recovery". Post-operative recovery is complex, and evaluating the effectiveness of surgical innovations requires assessment of patient-centered outcomes. In the absence of a gold standard, the Short Form-36 (SF-36), a generic health-related quality of life questionnaire, is the most commonly used instrument in this context. The objective of this study was to contribute evidence for the validity of the SF-36 as a metric of post-operative recovery.

Methods: We analyzed data from a sample of 128 patients undergoing planned colorectal surgery at a university-affiliated center in 2005–2006 and 2009–2010. In the absence of a gold standard, we investigated the responsiveness and construct validity (known groups and convergent) of the SF-36. For the former, we computed standardized response means and used non-parametric tests to assess the statistical significance of the changes observed. We used multiple linear regression to determine whether the SF-36 discriminates between patients with versus without complications and between laparoscopic or open surgery (known groups), and Spearman's rank correlation to investigate correlations between the SF-36 and the six minute walk test (6MWT), a measure of functional walking capacity (convergent).

Results: We found the SF-36 to be sensitive to clinically important changes. Scores on six of the eight domains of the SF-36 and the physical component summary score deteriorated post-operatively (SRM 0.86 for the PCS, $p < 0.01$) and improved to baseline thereafter. Patients with complications had significantly lower scores on five SF-36 domains (with differences ranging from -9 ($-18, -1$), $p = 0.04$ to -18 ($-32, -2$), $p = 0.03$), and scores on all subscales were lower than those in a healthy population ($p < 0.01$ to $p = 0.04$). Adjusting for complications, age, gender, and ASA, the SF-36 did not differentiate between laparoscopic and open surgery. Physical functioning scores correlated with 6MWT distance at one and two months (Spearman's $r = 0.31$ and 0.36 , $p < 0.01$).

Conclusions: The SF-36 is responsive to expected physiological changes in the post-operative period, demonstrates construct validity, and thus constitutes a valid measure of post-operative recovery.

P449

Long Term Outcomes Of Intrathoracic Stomach Repair With Crural Reinforcement Using Vicryl Mesh And Bioglu

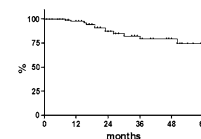
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Introduction: The traditionally high recurrence rate after laparoscopic repair of intrathoracic stomach has been reduced by use of mesh to reinforce the crural repair. We previously described a simplified technique for crural reinforcement using Vicryl mesh and Bioglu, with an acceptable recurrence rate at 1 year compared to other studies using mesh secured with sutures or tacks. The aim of this study is to assess outcomes in a larger series with long-term follow-up and determine the rate of recurrence.

Methods: The charts of all patients who underwent this repair from June 2006 to June 2013 using the previously described technique were retrospectively reviewed. Intrathoracic stomach was defined as $>50\%$ of the stomach herniated into the chest. Follow-up assessment was routinely performed at 1 year intervals, including endoscopy, video esophagram, and GERD-health-related-quality-of-life (HRQL) questionnaire. Recurrence was defined as any identifiable hiatal hernia on either EGD or VEG.

Results: A total of 145 patients ($m/f = 39/106$), with a median age of 69 years (36–93 years), underwent repair with a mean follow-up of 24 m (0–73). Follow-up for patients 2 years or more after surgery was available for 75/78 eligible patients (96% follow-up). The mean operating time was 134 minutes (60–311 minutes) and mean hospital stay was 2 days (1–21 days). There were 6 conversions (4.1%) and 2 intraoperative complication (1.4%) which were an esophageal perforation from placement of the bougie and a tear of the splenic capsule. Sixteen patients (11%) had postoperative complications including one reoperation for persistent pain and dysphagia 17 months postoperatively. This patient was found to have an abscess at the hiatus containing Bioglu. Another patient developed esophageal rupture after inducing vomiting on POD #10. There was one 30-day mortality in a patient who died from sepsis secondary to a perforated diverticulum on POD#10. 98/112 patients at least 12 months post-surgery (87.5%) had either an EGD or VEG. Recurrence was detected in thirteen patients (13.2%) with a median time to recurrence of 26.3 months (10–67 m). Recurrence rate over time was 2.3%, 12.7%, 20.3%, 20.3% and 25.3% at 12, 24, 36, 48 and 60 months, respectively. (see Kaplan-Meier recurrence-free curve below). 7/13 were defined as "small" (<2 cm), 5/13 as "moderate" (2–4 cm) and 1 as "large" (>4 cm). The mean GERD-HRQL was 3.8 in patients without recurrence (0–28) and 4.5 in patients with recurrence (0–15). The vast majority of patients (95%) were satisfied with the operation.

Conclusion: Laparoscopic intrathoracic stomach repair with crural reinforcement using Vicryl mesh and Bioglu proves to be effective, safe and durable, with excellent symptomatic results, and a high degree of patient satisfaction. The rate of recurrence tends to plateau over time with the majority of recurrences being small-moderate and asymptomatic.



P450

Is Blind Naso-Gastric Tube Insertion Safe After Sleeve Gastrectomy? A Porcine Model

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Introduction: Sleeve gastrectomy is an effective treatment to help morbidly obese patients lose weight. The major technical risk related to this procedure is staple line dehiscence. Naso-gastric tubes (NGT) are placed postoperatively reduce the risk of distension and usually are removed without complication. However, some patients who initially do well later decompensate and need a NGT replaced. Some surgeons are reluctant to place the NGT blindly due to the perceived risk of damage to the staple line from blind instrumentation of the stomach. We sought to determine whether such concern was warranted.

Methods: A thawed, frozen porcine tissue model (Animal Technologies, Inc, Tyler, TX) composed of esophagus, stomach, respiratory tract, heart and a small portion of liver was used. We performed a sleeve gastrectomy on the greater curvature of the stomach from pylorus to fundus using a flexible gastroscope as a guide for the Endo GIA staples (Covidien, New Haven, CT) in an identical fashion as we use in our patients. The suture line was checked for leaks by immersing the specimen in water while insufflating with a gastroscope. The specimen was then placed in a plastic model of the thorax to mimic anatomical constraint of the body cavities and to ensure proper alignment of the specimen (VATS Trainers, LLC, Lansing, MI). The total length of the specimen was determined by passing a 16 gauge NGT to the pylorus (55 cm) and the pylorus was then cross-clamped. The NGT then was blindly advanced to 55 cm for a total of 50 passes. Endoscopy with air distension was performed to evaluate for mucosal injury following the 5th, 15th, 25th, 35th, and 50th attempts. The specimen again was submerged to check for leaks after the 25th and 50th attempts. The NGT was then advanced to 75 cm to simulate excessive advancement in the same tissue model. This was done another 50 times. The specimen was examined for injury with endoscopy and a leak test was performed in the same manner as before.

Results: A single 3 mm injury to the gastric mucosa was observed by endoscopy after the first 5 attempts to a length of 55 cm. No additional injuries were observed after the 45 remaining 55 cm passes nor were leaks or perforations observed after 50 passages. Following 50 passes to 75 cm, multiple small, superficial petechiae were observed on the gastric mucosa, similar to but smaller than the 3 mm injury identified earlier. None were full thickness or penetrated the mucosa. Although some were located near the staple line, the staple line itself showed no evidence of trauma. The model was re-tested with underwater submersion and no leak was found. A subsequent gastrotomy demonstrated a pristine staple line.

Conclusion: In this porcine model, blind NGT placement was not associated with significant mucosal injury or damage to the sleeve gastrectomy staple line.

P451

Post-Laparoscopic Appendectomy Small Bowel Obstruction: An Unlikely Cause

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Background: A laparoscopic appendectomy is one of the most common acute pediatric surgery operations. Post-operative complications include abscess formation and both port site hematomas and hernias. There are rare reports of intestinal obstruction from loose linear staples in the adult literature, but this is the first report in a pediatric patient.

Case Presentation: A 5 year-old male presented to the emergency department with 24 hours of abdominal pain and fever. On exam he had right lower quadrant tenderness with rebound. He had a white blood cell count of 8.0 with 21 bands. An ultrasound did not reveal appendicitis, but a CT scan showed a hyperemic appendix without a fluid collection. He was given pre-operative antibiotics and taken to the operating room for a laparoscopic appendectomy. A three-trochar technique (umbilicus, suprapubic and left lateral quadrant) was used. The mesoappendix was divided with a harmonic scalpel and we used a Covidien Endo-GIA vascular load (2.5 mm staple height) at the appendiceal base. The stapler was opened slowly and the appendix was removed through the umbilical port. He initially did well post operatively and was discharged on post operative day 1. However, he developed nausea and vomiting at home and returned to the emergency department on post operative day 2. His abdomen was soft and mildly distended, with minimal tenderness at the trocar sites. He was afebrile and WBC was 7.0 with 2 bands. Obstruction series showed a non-specific gas pattern with mildly dilated bowel loops. He continued to have bilious emesis and a nasogastric tube was placed with sedation. As he improved his NGT was placed to gravity, but when sips of clears were initiated he became nauseous and vomited. An obstruction series showed an increase in the dilation of loops of bowel with air fluid levels. He was taken back to the operating room for a diagnostic laparoscopy.

Results: We identified a transition point in the proximal small bowel. All of the intestine was viable. At this location a staple was found tethering the serosa of a small bowel loop to a mesenteric lymph node, with several loops of small bowel trapped beneath. The bowel distally was collapsed and the appendiceal stump was intact. The staple was removed and enteric contents began to pass into the collapsed bowel. The bowel was run from the terminal ileum to Ligament of Treitz. Post operatively he did well. His bowel function returned on POD 3 and he was gradually advanced to a regular diet and was discharged on POD 4. He was doing well at a follow up visit 2 and 3 weeks respectively.

Conclusions: In the pediatric patient who develops an early small bowel obstruction after a laparoscopic appendectomy with use of an endoscopic stapler, a linear staple as a source should be included in the differential diagnosis. Additionally, an attempt at a repeat laparoscopic procedure to diagnose and treat the cause should be considered.

P452

Minimally Invasive Duodenojejunoscopy For Superior Mesenteric Artery Syndrome

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Introduction: Superior mesenteric artery syndrome (SMAS) is a disorder characterized by vascular compression of the duodenum leading to mechanical obstruction. Surgical intervention is indicated in patients who fail non-operative management, typically post-obstructive enteral feeding. Current surgical options include division of the ligament of Treitz, gastrojejunostomy, and duodenojejunoscopy; with duodenojejunoscopy favored based on previous small series. Given the rarity of the condition, knowledge of the optimal indications for surgery, risk of postoperative complications, and prognosis of SMAS after minimally invasive duodenojejunoscopy is limited.

Methods: A retrospective chart review was performed for patients undergoing duodenojejunoscopy for SMAS from March 2005 to December 2011 in the Cleveland Clinic Health System. We described patients' initial evaluation, and the main outcomes examined are symptom improvement and postoperative complications.

Results: A series of 11 patients (9 female/ 2 male) with SMAS underwent minimally invasive duodenojejunoscopy. All of these patients met clinical criteria of SMAS with radiological confirmation. Presentation typically involved persistent vomiting, esophageal reflux, and post-prandial epigastric pain. Average weight loss before surgery was 12.7 ± 7.1 kg. Depression and eating disorders were comorbid in 4/11 patients (36%). The mean age was 37 years (19–74). All operations were performed with minimally invasive technique. Nine operations were completed laparoscopically and two were performed with robotic assistance. Operation duration was 125 ± 67 minutes and average length of hospital stay was 4.8 days (1–10). There were no immediate post operative complications. One patient developed a delayed anastomotic stricture that responded to a single endoscopic dilation. Initial symptom improvement occurred in 10 patients (91%). At a mean follow up of 11 months, two patients experienced complications (2/11), including one infection at a simultaneously placed J-tube site and one patient with dumping syndrome. Mean weight gain was 2.4 kg (0.25–5).

Conclusion: Superior mesenteric artery syndrome should be considered a potential diagnosis in patients who present with a history of persistent postprandial vomiting, epigastric pain, and weight loss and confirmatory radiographic findings. Minimally invasive duodenojejunoscopy is a safe and effective treatment for SMAS with excellent short-term symptom results.

P453

Right Atrium Monitoring Using Transesophageal Echocardiography Could Prevent Critical Carbon Dioxide Gas Embolism In Laparoscopic Liver Resection

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Objectives: Owing to the development of new surgical devices, laparoscopic liver resection (LLR) has become an alternative to the conventional open liver resection despite the difficult surgical technique required. In liver parenchymal transection, not only techniques and instruments, including portal triad occlusion, pre-coagulation, and endostaplers, but also high-pressure pneumoperitoneum has been used to control bleeding. However, high-pressure pneumoperitoneum has been reported to be associated with the risk of carbon dioxide (CO₂) gas embolism, although this remains to be elucidated. This study is aimed to investigate that the right atrium monitoring using transesophageal echocardiography (TEE) could prevent life-threatening carbon dioxide gas embolism in LLR.

Methods: From January to September 2013, a total of 25 cases underwent LLR in our hospital. Among them, right atrium monitoring using TEE was performed in 19 cases without esophago-gastric varices. During hepatic parenchymal transection, bipolar coagulation, cavitron ultrasonic surgical aspirator, laparoscopic coagulating shears, and VIO soft-coagulation system containing a bipolar clamp (BiClamp) were used without portal triad clamping. The pneumoperitoneal pressure ranged from 8 to 12 mmHg during liver transection. CO₂ gas was assessed as bubbles in the bicaval view on TEE. The severity of bubbles were classified into three groups: Grade 0, 5 or less in a still frame; Grade 1, more than 5 in a still frame; Grade 2, the frame is completely filled with bubbles.

Results: TEE revealed Grade 0 bubbles in 12 cases, Grade 1 in 5 cases, and Grade 2 in 2 cases. In 5 cases with Grade 1 bubbles, intra-operative course was uneventful. 4 cases had Grade 1 bubbles in pure LLR while only 1 case had even during open parenchymal transection in hybrid LLR. When one case had Grade 2 bubbles continuously observed due to the injury of a tributary of the middle hepatic vein, the oxygen saturation (SpO₂) level abruptly decreased to 87%. Based on the report of the anesthesiologist that the TEE result indicated CO₂ gas embolism, pure oxygen ventilation (6 L/min) and compression hemostasis was performed immediately. Consequently, the bubbles completely disappeared on TEE, resulting in the improvement of the SpO₂ level. Whereas, the other case with Grade 2 bubbles, temporally observed due to the injury of the subphrenic vein, was treated with prompt compression hemostasis, resulting in the stable vital signs. Moreover, in 1 case, TEE revealed a patent foramen ovale, that is a high risk of cerebral infarction in case of Grade 2 bubbles.

Conclusion: Right atrium monitoring using TEE could be useful for preventing the development of critical CO₂ gas embolism in LLR. The immediate treatment would be an essential recommendation for cases with Grade 2 bubbles.

P454

Screening for Prothrombotic States Does Not Identify Patients at Risk for Portal and Splenic Vein Thrombus Following Laparoscopic Splenectomy

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Introduction: The aim of this study is to identify specific acquired prothrombotic risk factors contributing to the development of portal or splenic vein thrombosis (PSVT) following laparoscopic splenectomy (LS). PSVT are potentially lethal complications of splenectomy. Known risk factors for PSVT include malignancy and splenomegaly. While these patients are believed to be hypercoagulable, the specific mechanism unclear.

Methods and Procedures: Consecutive patients undergoing LS were prospectively studied between 2005 and 2013. Laboratory investigations were drawn preoperatively for screening of prothrombotic states including antithrombin III and Protein C and S deficiency, lupus anticoagulant, Factor V Leiden and Prothrombin 20210 mutations and elevation of Factor VIII levels. Surveillance duplex ultrasonography was performed between 1 week and 1 month postoperatively to assess for PSVT. The association between baseline prothrombotic disorders and PSVT was explored using descriptive statistics. Data are expressed as mean (95% CI) or median (IQR).

Results: Of 77 patients enrolled in the study, 69 were included in the analysis and 17 (25%) of which developed PSVT. There were no differences in patients with and without PSVT with respect to age, body mass index, gender or surgical time. Preoperative spleen size, as determined by diagnostic imaging, was associated with PSVT; 7 of 8 patients (88%) with massive splenomegaly (>20 cm) developed PSVT compared with 3 of 11 patients (27%) with splenomegaly (15–20 cm) and 6 of 39 patients (15%) without (p < 0.001). Fifty-two patients (75%) demonstrated at least one abnormal prothrombotic screening test at baseline, with elevated Factor VIII levels the most common (55%). However, none of the identified prothrombotic factors were associated with the development of PSVT (see table).

Conclusion: In patients scheduled for LS, screening for prothrombotic states is not useful to identify patients at risk for development of PSVT. In this study, only preoperative spleen size was predictive of PSVT formation.

P455

Hospital Readmission Following Appendectomy, Cholecystectomy, And Herniorrhaphy

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Introduction: Hospital readmissions are known to occur after surgery. We conducted a retrospective case review on a cohort of patients who had appendectomy, cholecystectomy, or hernia repair and were subsequently readmitted to the hospital within 30 days. Our objective was to find common variables, present at the time of surgery, which may help to identify patients at higher risk for readmission after surgery.

Methods and Procedures: We examined records of patients who underwent appendectomy, cholecystectomy, or herniorrhaphy at either of two community hospitals. Of 2,119 patients undergoing surgery between January 01, 2011 and April 30, 2012 (N = 2,119), 6.80% (n = 144) patients were subsequently readmitted within 30 days. For the cohort of readmitted patients (n = 144), we examined 51 variables covering demographic information; insurance status; pain level; comorbidities; medication use; discharge considerations; intraoperative events; and the length of hospital stay. Data was de-identified and tabulated in Microsoft Excel. Data analysis, including basic descriptive statistics and Wilcoxon two sample tests, was completed with SAS version 9.3 software.

Results: The cohort was comprised of 60 males and 84 females, with an average age of 45.94 years (StD ± 22.15 years). 51.88% of patients held private insurance (n = 69), 38.35% had government insurance (n = 61), and 9.77% were self-pay (n = 13). Insurance data was not available for 11 patients. The mean BMI value was 30 (StD ± 9); 45 patients were overweight (BMI 25–29.9), and 49 patients were obese (BMI ≥ 30). 61.11% (n = 88) had at least one of the following co-morbidities: CHF, CAD, hypertension, COPD, asthma, diabetes, renal impairment, chronic kidney disease, depression, or dementia. 29.86% (n = 43) were on pain medication prior to surgery. As for the surgical procedures, n = 27 underwent hernia repair (2 of these were laparoscopic); n = 27 underwent appendectomy (24 laparoscopic); and n = 87 had cholecystectomy (82 laparoscopic). 6.25% (n = 9) experienced an intraoperative event, including 1 conversion of a cholecystectomy from lap to open procedure. 35.41% (n = 51) were discharged the same day of surgery; 34.03% (n = 49) required a short hospital stay (<24 hours), and 24.31% completed a long stay following surgery (>24 hours). 27 patients were on antibiotics 24 hours post-op, and 6 patients experienced wound problems. Since 65.28% of the readmitted patients were overweight or obese (n = 94), we were curious to investigate the effect of this variable on surgery. Of 35 open procedures, only 3 were performed on overweight or obese patients (BMI ≥ 25). The mean operative time for the overweight and obese patients was 98.08 minutes, as opposed to 75.97 minutes for normal weight patients (p = .1045).

Conclusion: The majority of patients in our cohort were overweight or obese. We found that our overweight patients experienced longer intraoperative times, on average, than non-overweight patients. It is well-known that obesity can be attributed to a number of health conditions, including diabetes, hypertension, CHF, and gallstones, which could conceivably impact surgery and subsequent recovery. This study continues to track 30-day readmissions, in order to identify patients most at risk for readmission, and take measures to reduce readmission rates in this population in the future.

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Bubble grades in the patients examined

Age	Sex	Approach	Lr/resection	CVP (mmHg)	Pneumoperitoneum(mmHg)	Bubbles (TEE grade)	Duration	Low SpO ₂	Low FiO ₂	
1	65	M	Pure→Hybrid	Partial (S4)	7	11	2	continuous	87%	+
2	72	M	Hybrid	Partial (S6)	2	10	0	intermittent	-	-
3	82	M	Hybrid	Lx. hemihepatectomy	4	8	0	intermittent	-	-
4	62	M	Hybrid	Partial (S8, S2)	1	12	0	intermittent	-	-
5	44	M	Pure	Partial (S6)	1	10	0	intermittent	-	-
6	49	M	Pure	Partial (S3, S8)	3	8	0	intermittent	-	-
7	64	M	Hybrid	Lx. hemihepatectomy	3	8	0	intermittent	-	-
8	60	M	Hybrid	Rx. hemihepatectomy	2	8	0	intermittent	-	-
9	88	M	Hybrid	Rx. Ant. Sectonectomy	2	8	1 (during laparotomy)	continuous	-	-
10	31	F	Pure	Rx. hemihepatectomy	2	12	0	intermittent	-	-
11	49	M	Pure	Partial (S8, S6)	1	12	0	intermittent	-	-
12	67	M	Pure→Hybrid	Lx. hemihepatectomy	3	8	2	temporal	-	-
13	54	M	Pure	Partial (S3)	1	12	1	intermittent	-	-
14	65	M	Pure	Rx. hemihepatectomy	1	8	1	temporal	-	-
15	73	M	Pure	Partial (S8)	0	8	1	intermittent	-	-
16	58	F	Pure	Partial (S7)	0	4	0	intermittent	-	-
17	52	F	Pure	Partial (S3, S4)	3	10	0	intermittent	-	-
18	64	M	Pure	Lx. lateral + Partial (S6)	4	8	1	intermittent	-	-
19	60	F	Pure	Partial (S3)	3	8	0	intermittent	-	-

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P456

Meckel's Diverticulum – A Five Year Inpatient Analysis

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Introduction: Meckel's diverticulum is an uncommon disease process, often presenting as another surgical entity. It is typically described as a disease of youth. We review a national database to evaluate characteristics of patients admitted with Meckel's diverticulum.

Methods: The Nationwide Inpatient Sample was searched for patients with Meckel's diverticulum (ICD-9 = 751.0) from 2006–2010. Variables studied included age, sex, mortality, length of stay, diagnoses and procedures.

Results: Over 5 years, 11,750 patients were hospitalized with Meckel's diverticulum (2350 cases annually or 0.006% of hospital admissions each year. Mean age was 34.2 years. Presentation occurred across the age spectrum (see table) with the highest percentage at age 2 and younger (9.8%). 9,575 patients (81.5%) presented at age 10 or over. 8,292 were male (71%) and 3458 were female (29%). Mortality was too low to report a meaningful statistic. Mean length of stay was 5.9 which did not vary considerably over the study period. 10,834 patients (92%) underwent a partial enterectomy (55% diverticulectomy, 45% small bowel resection). 4,941 patients (42%) had an appendectomy during the same admission (60.3% open, 39.7% laparoscopic). Only 1,150 patients (9.8%) required a blood transfusion.

Conclusion: Meckel's diverticulum is an uncommon disease process which occurs more commonly in males. Most patients underwent a partial enterectomy and the mortality rate was extremely low, even in older patients. Although the most common presentation is at aged 2 or below, two thirds of patients actually present in adulthood.

P457

Minilaparoscopic Cholecystectomy Is Associated With A Lower Bile Duct Injury Rate A Systematic Review

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Introduction: Historically, the rate of bile duct injury (BDI) in the era of open cholecystectomy was approximately 0.2%. In the laparoscopic era BDI increased and reached a plateau of 0.4%. A recent review of 45 papers showed an increase in BDI rate with single incision laparoscopic cholecystectomy (SILC) to 0.72%. The aim of this study is to calculate the rate of BDI during minilaparoscopic cholecystectomy (MLC) and compare this rate to the accepted historic rate for open cholecystectomy, standard laparoscopic cholecystectomy and SILC.

Methods and Procedures: A comprehensive database search of MEDLINE and PubMed Central was performed to generate all relevant work with minilaparoscopic cholecystectomy to present. The following key-words were used: "minilaparoscopic", "needlescopic", "microlaparoscopic" and "cholecystectomy". The research was limited to reports of 25 or more patients based on current literature of existing MLC learning curves.

Results: A total of 16 original published reports were selected, covering the period 1999–2011. In aggregate, 3131 patients underwent MLC. The overall complication rate was 0.48%, including leaks, BDI, conversion and death. A similar review found 4.2% as aggregate complication rate in similar cases of SILC. Referring specifically to the BDI, the rate was approximately 0.10% (3 in 3131 cases of MLC).

Conclusion: Relevant studies on MLC have shown that BDI rate is lower when compared to traditional laparoscopic surgery, SILC or even open technique. The results indicate that minilaparoscopy with its increased visualization and delicacy may help to avoid BDI, when performed by an experienced surgical team.

P458

Innovative Approaches To Laparoscopic Cholecystectomy: A Comparison Of Outcomes For Single Incision Laparoscopic Cholecystectomy, Multi-Port Robotic Cholecystectomy, And Single Site Robotic Cholecystectomy

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Introduction: The past decade has witnessed the application of innovative approaches to laparoscopic cholecystectomy (LC). At our institution, we have performed single incision laparoscopic cholecystectomy (SILC), multi-port robotic cholecystectomy (MPRC), and single site robotic cholecystectomy (SSRC). We report our experience with the safety, feasibility, and outcomes of these three approaches.

Methods: All patients who underwent SILC, MPRC, or SSRC were included in this analysis. There were no patient-specific or diagnosis-related exclusion criteria. SILC and SSRC were performed through a single umbilical incision, while MPRC was performed through a standard four-port LC configuration. Demographic, diagnosis, operative, and outcome data were prospectively collected on all patients. For MPRC and SSRC, case start time (CST) was defined as the time from incision until being ready to dock the robot. Setup time (ST) spanned docking the robot and instrument placement. Robotic time (RT) was spent at the console performing the cholecystectomy. For all cases, total operative time (TOT) was defined from initial incision until skin closure. Statistical analysis was performed using ANOVA for continuous variables and Fisher's exact test for discrete variables. Statistical significance was set at $\alpha=0.05$.

Results: In this study, 330 patients with mean age of 45 ± 14 years and mean weight of 88.3 ± 24.1 kg underwent SILC (n = 36), MPRC (n = 162), or SSRC (n = 132). Most of the patients were women (73%). There were no statistically significant differences in age or gender distribution among the three groups of patients. MPRC patients weighed more than SILC patients (93.1 ± 24.7 kg vs 74.4 ± 15.8 kg, $p = 0.001$) and SSRC patients (93.1 ± 24.7 kg vs 86.2 ± 23.6 kg, $p = 0.03$). Patients underwent cholecystectomy for symptomatic cholelithiasis (79.1%), cholecystitis (13.64%), biliary dyskinesia (5.5%), and gallbladder polyposis (1.8%). There were no differences in the distribution of diagnoses among the groups ($p = 0.5194$). Decreased TOT was observed for SILC (62.3 ± 21.6 minutes) versus MPRC (80.9 ± 24.8 minutes) and SSRC (81.3 ± 23.3 minutes) ($p = 0.0002$). Differences were observed between MPRC and SSRC in CST (17.2 ± 8.7 minutes vs 10.1 ± 8.7 minutes, $p < 0.0001$) and ST (6.3 ± 3.7 minutes vs 4.4 ± 2.7 minutes, $p < 0.0001$) but not in RT (38.2 ± 15.5 minutes vs 39.7 ± 15.0 minutes, $p = 0.4$). Four SILC cases (11.1%), 7 MPRC cases (4.3%), and 13 SSRC cases (9.8%) were not completed via the intended approach ($p = 0.12$). One additional port was inserted in two SILC cases (5.5%) and one SSRC case (0.7%). Conversion rates were not significantly different among SILC (5.6%), MPRC (4.3%), and SSRC (8.3%). Most conversions were to LC, with only one MPRC (0.6%) and one SSRC patient (0.7%) requiring open conversion. Requirement for hospital stay was higher in the SSRC group (8.3%) versus SILC (0%) and MPRC (0.6%) ($p = 0.001$). Hospital readmission was highest in the SILC group (11.1%), lower in SSRC (6.8%), and lowest in MPRC (0.6%) ($p = 0.003$). Reoperation was required in one SILC and one SSRC patient. Complication rate or need for postoperative cholangiography was not statistically different among the three groups.

Conclusions: SILC, MPRC, and SSRC can be performed effectively with low conversion, complication, and reoperation rates. Thus, individual applicability of these approaches will be a function of surgeon preference and nature of the practice environment.

P459

Antenna Coupling From Monopolar Instruments Explains Unintended Thermal Injury Caused By Common Operating Room Monitoring Devices

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Introduction: Unintended thermal injury from patient monitoring devices connected to wires extending off the surgical field (e.g., neuromonitoring leads, EKG pads) is reported in the literature without a clear understanding of this injury's mechanism. The monopolar "bovie" instrument emits radiofrequency energy that can couple to nearby non-electrically active cables without direct contact by capacitive and antenna coupling. The PURPOSE of this study was to determine if, and to what extent, radiofrequency energy couples to common patient monitoring devices as well define practical steps to minimize the risk of this unintended thermal injury.

Methods and Procedures: In a porcine model, monopolar radiofrequency energy was delivered to a handheld 'bovie' pencil. Non-electrically active neuro- and cardiac-monitoring leads were placed in proximity to the bovie and its cord. Temperature changes of tissue were measured using a thermal camera at site of patient contact of the monitoring device. The experimental aims altered the relationship of the active electrode's cord and the patient monitoring device's cord by changing angulation between the cords and changing the distance of separation of parallel cords. Additional aims included comparing different monopolar generator power settings and comparing alternate energy sources.

Results:

Heat Generated by Non-Electrically Active Patient Monitoring Device		p value (a vs. b)
Cord Orientation	Parallel	39 ± 13°C ^a
	45° Offset	7 ± 5°C ^b
	Perpendicular	6 ± 2°C ^b
Separated Parallel Cords	Parallel	39 ± 13°C
	15 cm separation	10 ± 5°C
Power Setting	15 Watts	26 = 5°C
	30 Watts	39 = 13°C
Energy Source	Bipolar instrument	0.1 ± 0.4°C ^a
	Ultrasonic shears	0 ± 0.3°C ^a
	Argon beam	34 ± 15°C ^b
	Monopolar instrument	39 ± 13°C ^b

Conclusion: Stray current couples between the monopolar active electrode and its cord to commonly used patient monitoring devices. The energy transferred can increase tissue temperature by almost 40°C and causes visible thermal injury using standard settings (30 Watts coag mode). The most effective ways to decrease this stray current are decreasing power settings, increasing angulation between wires, increasing distance between wires, and choice of instrument. Antenna coupling may explain the rare but devastating thermal injuries at patient monitoring device sites reported in the literature. Awareness of the interactions between active electrode cord and patient monitoring lead can reduce the risk of unintended thermal injury.

P460

Surgical Treatment Of Medically Refractory Gastroparesis In Morbidly Obese Patients

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Introduction: The management of medically refractory gastroparesis remains a challenge. In addition to decompressive and feeding tube placement, additional surgical options for these patients include gastric electrical stimulation (GES) and near-total gastrectomy with Roux-en-Y reconstruction (NTG). Case series and smaller retrospective series describe clinical benefits from surgical intervention; however, no study reports the efficacy of GES or NTG in morbidly obese patients with severe gastroparesis. The aim of this study was to analyze the outcomes of morbidly obese patients treated with GES and NTG for gastroparesis.

Methods: A retrospective chart review was performed to identify all morbidly obese patients (Body Mass Index >35 kg/m²) who underwent GES or NTG for medically refractory gastroparesis from March 2001 to December 2011 at the Cleveland Clinic. The main outcomes examined were symptom improvement, postoperative complications, and change in Body Mass Index (BMI).

Results: A total of 24 morbidly obese patients underwent surgical treatment for severe gastroparesis. Among them, 17 patients (12 female/ 5 male) had GES placement and 7 patients (6 female/ 1 male) had NTG. All operations were completed laparoscopically. The thirty-day morbidity rate was lower for GES than NTG, but this result was not statistically significant (5.9% vs 14.3%, p = 0.5). Early complications included one infection at a simultaneously placed J-tube site in the GES group, and one duodenal stump leak in the NTG group. There were no mortalities in either group. At follow-up in the GES group, 15 patients (88%) rated their symptoms as improved versus 7 (100%) in the NTG group (p = 0.35). Four patients who failed GES were subsequently converted to NTG and had 100% short-term symptom improvement. The BMI change after GES implantation was 0.7 ± 4 kg/m² versus -6.7 ± 3.9 kg/m² in the NTG group (p < 0.01).

Conclusion: GES implantation and NTG appear effective in treatment for medically refractory gastroparesis in morbidly obese patients. Both options can be performed in a minimally invasive fashion with low morbidity. Patients who have no improvement of symptoms for refractory gastroparesis after GES implantation can be successfully converted laparoscopically to NTG.

P461

A Picture Is Worth A Thousand Words: Embedded Images Within Operative Reports Improve Understanding and Quality

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Introduction: Modern electronic health records allow surgeons to easily embed photographs or diagrams into the formal operative report. We hypothesized that such embedded images improve reader understanding and capture procedural information not easily conveyable in words.

Methods: A cohort of surgeons and non-surgeons were asked to read a text-only operative report and then answer Likert-style questions on their understanding of procedural steps, anatomy, findings, and difficulty of the operation. They then re-read the same operative report, this time with embedded photographs depicting key findings and points along the way. Respondents were surveyed again. Two operative reports were chosen for survey because of their conceptual complexity: 1) laparoscopic esophageal diverticulectomy with esophagomyotomy and 180 degree fundoplication in the setting of a large paraesophageal hernia, and 2) open radical resection of metastatic melanoma to the small intestines.

Results: Twenty-five respondents completed the survey. Embedded images significantly improved reader understanding of all categories: procedural steps, anatomy, tissue quality, specimens, and difficulty (Fig. 1, p < 0.03). Improvements were strongest in understanding of unusual anatomy, tissue quality, and specimen quality. Both surgeons and non-surgeons reported improved understanding when pictures were added to the operative report. 79% of respondents agreed that pictures improved patient care, and 96% agreed that pictures improved the overall quality of documentation.

Conclusions: Adding visual information to operative reports improved documentation quality and provider understanding for both surgeons and non-surgeons. Surgeons should routinely provide images within their reports of patient procedures, just as gastroenterologists, pathologists, and radiologists already do today.

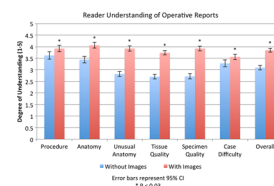


Fig. 1

P462

Treatment Of Unresolved Small Bowel Obstruction Of Different Origins Using Laparoscopy

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Introduction: In adhesive small bowel obstruction, surgical management is traditionally used only when medical, non-operative treatment has failed. The manipulation of dilated, ischemic bowel loops during small bowel obstruction is difficult and not free of complications under any approach. On occasions, other conditions force surgeons to operate since bowel viability is at risk. Authors present their experience using a minimally invasive approach in conditions causing acute small bowel obstruction.

Methods and Procedures: After confirmation of a small bowel obstruction requiring surgical treatment, patients were informed of the options including laparoscopic approach. After consentment, patients underwent a laparoscopic exploration to assess the feasibility of competing the operation with this technique. According to preoperative diagnosis and intraoperative findings, a definitive conduct was taken.

Results: From July 2010 to September 2013, 16 operations in 16 patients were identified. Age ranged from 21 to 86 years. There were seven men and eight women. Diagnostics are: small bowel adhesive obstruction, two inguinal hernias, one of them with bowel necrosis, one hernia of the Petersen's defect and one postoperative port hernia after a gastric bypass. Additional, two patients with endoluminal foreign bodies, both fitozeoar, and one patient with an appendiceal mass under medical treatment. One of the patients had an acute relapse of the adhesive obstruction, requiring reoperation, which was converted due to technical difficulties. Of them, three were converted to open. The appendiceal mass made impossible to identify anatomy; foreign body trapped in the ileocecal valve and therefore unidentifiable; and the first mentioned of the adhesions group. Complications found were an ileum perforation repaired laparoscopically during the initial intervention, prolonged ileus in seven patients. Mortality: A patient who had a bone marrow transplant a week before died, after a successful resolution of the obstruction, due to sepsis caused by complete leucopenia. Patients in whose laparoscopic procedure was completed, recovered uneventfully and were discharged uneventfully. They have been asymptomatic in posterior controls.

Conclusions: Laparoscopic treatment of different obstructive pathologies can be practiced with good results. Experience in bowel manipulation is fundamental to avoid damages. Long term follow-up will help to determine the incidence of new episodes as compared to open surgery.

P463

Combining Appendectomy With Cholecystectomy: Is It Worth The Risk?

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Introduction: Appendectomy performed at the time of other procedures has long been a point of controversy among practicing surgeons. We hypothesize that appendectomy at the time of cholecystectomy results in worse outcomes than when either procedure is performed alone, even in the absence of ruptured appendicitis.

Methods and Procedures: The ACS-NSQIP database was queried for all appendectomy alone (A), cholecystectomy alone (C), and both (B). Patients with age <18 years, ruptured appendicitis or abscess were excluded. Demographics, patient characteristics, operative details and outcomes were analyzed, including wound complications, overall morbidity and 30-day mortality by standard statistical methods with significance set at p < 0.01.

Results: A total of 155,824 (C), 101,150 (A) and 1119 (B) were performed. 0.4% of all laparoscopic cholecystectomies were performed as (B), compared to 2.6% of open cholecystectomies; however, open (B) comprised only 0.3% of all cholecystectomies (p < 0.0001). In comparing (C) patients with (B), although groups were similar for recent MI or angina, functional status and level of dependence, hypertension and COPD, significant differences between groups were present, and patients in B appeared sicker by multiple parameters (Table). With multivariate analysis controlling for age, BMI, modified CCI, ASA score, laparoscopic approach, wound classification and emergency status, patients who had (B) had worse outcomes with significantly increased risk of wound complications (OR = 1.59, CI 1.23–2.04), minor (OR = 1.68, CI 1.41–2.01) and major morbidity (OR = 1.49, CI 1.19–1.87) than (C).

Conclusion: These data indicate that combined appendectomy and cholecystectomy produces worse outcomes than either procedure performed independently, with a higher incidence of wound complications and morbidity. Overall, however, patients who undergo simultaneous procedures appear sicker with higher incidence of emergency cases, sepsis and disseminated cancer, CCI and ASA class. Further investigation is needed to define appropriate indications for these concomitant procedures as well as to identify the key factors that determine outcomes.

	Appendectomy (A)	Cholecystectomy (C)	Both (B)
Age	39.9 ± 16.2	50.6 ± 17.3	49.3 ± 16.1 * ^T
BMI	27.8 ± 6.7	30.8 ± 14.9	33.2 ± 12.1 * ^T
CCI (modified)	0.2 ± 0.7	0.4 ± 1.1	0.8 ± 1.8 * ^T
ASA Class III or IV	12.9%	32.6%	46.6% * ^T
Dyspnea (moderate exertion)	1.7%	6.5%	15.2% * ^T
Disseminated Cancer	0.5%	1.6%	6.0% * ^T
Sepsis	30.9%	8.0%	11.2% * ^T
Emergency	72.0%	9.4%	12.1% * ^T
Contaminated/Dirty	61.8%	21.7%	26.2% * ^T

* Significant difference between (C) and (B); ^T Significant difference between (A) and (B)

P464

Robotic Versus Laparoscopic Surgery for Colonic Disease: A Meta-Analysis of Intra-Operative Variables

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Background: The use of Robotic surgery has been proven to be a safe and effective alternative to laparoscopic techniques in the treatment of colorectal diseases, although drawbacks noted such as increase operative time (OT) and higher cost have been documented. This meta-analysis was done to compare laparoscopic colectomy (LC) versus robotic colectomy (RC) in terms operative time (OT), estimated blood loss (EBL) and conversion rate.

Methods: We performed a MEDLINE database search with secondary referencing to identify studies suitable for inclusion. Selected studies included those in which LC and RC were compared in terms of post-operative outcomes. We calculated the I squared statistic as a measure of heterogeneity. We used fixed and random effects models to calculate the standardized mean difference (SMD) and Odds ratio (OR) of the outcomes between the LC and RC groups.

Results: Seven studies with a total of 694 cases were analyzed; of these, 236 were RC cases and 458 were LC cases. Only 39.3% (273 patients) suffered from benign disease requiring colectomy, whereas the remaining 60.7% (421 patients) underwent colon resection for malignancy. LC had significantly lower OT compared to RC (p < 0.01) for right or left colon. Right RC had the least EBL (pvalue<0.01). The OR for conversion rate was 0.3 (0.1–1.25) p = 0.11 for LC when compared to RC.

Conclusions: Laparoscopic colectomy had a significantly lower operative time than robotic colectomy. Both operative techniques had similar conversion rates, however, right robotic colectomy had the least EBL.

	SMD (95% CI) p value for OR time	SMD(95% CI)p value for estimated blood loss
Left	-0.66 (-0.90-0.42) < 0.01	0.17 (-0.4-0.8) 0.57
Right	-0.72 (0.91-0.57) < 0.01	0.6 (0.4-0.8) < 0.01

P465

Robotic-Assisted AbdominoPerineal Resection: Efficacy and Safety in a Community Hospital Setting

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Background: Robotic assisted (@ da Vinci System, Intuitive Surgical, Inc) surgery for abdominoperineal resection (APR), can be a challenging procedure for approach to low rectal and anal cancers. This study presents a case series to highlight the safety and efficacy of robotic assisted APR even in a community setting. A review of the literature follows.

Methods: A retrospective analysis was done of 10 consecutive APR procedures performed by a single surgeon between January 2012 and December 2012. Six cases were open and four were done with robotic resection using the da Vinci robotic system. Patient demographics, perioperative, intraoperative and postoperative outcomes were reviewed retrospectively and prospectively as part of clinical follow up. Literature review was performed analyzing multicenter studies.

Results: 10 patients; 6 males and 4 females underwent abdominoperineal resection (APR). 6 patients were in the open group (OG) and 4 were in the robotic group (RG). Mean age was 49.1 years and the mean Body Mass Index (BMI) was 28.8 kg/m (2). The median American Society of Anesthesiologist (ASA) classification was 3. Average blood loss was lower in the robotic group at 265cc versus 596cc in the open group. Robotic docking time averaged 20.5 minutes and the console time was 80.0 minutes. Robotic operative time (OT) was 218 minutes +/- 35 minutes. Open APR operative time was 274 minutes. Surgical margins were adequate in all cases. There was one postoperative complication consisting of delayed perineal wound healing and there was a single intraoperative complication of bleeding towards the end of the robotic case for which the procedure was converted to open

Conclusion: Robotic assisted APR can be safe and effective in a community hospital setting. Operative exposure is enhanced deep in the pelvis. The tridimensional view and endowrist instruments with the robotic systems allowed adequate maneuverability and microdissection in the background of irradiated fields. Perioperative and oncologic outcomes were similar compared to open surgery.

Key words: Robotic abdominoperineal resection, safety, efficacy, microdissection

P466

Evaluating the Collaborative Approach to the Implementation of Robotic Kidney Surgery

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Since the initial adoption by urologist for performing prostatectomies, robotic surgery has become more widespread with almost all surgical specialties now performing robotic procedures. Robotic kidney surgery adoption has been less widespread possibly due to the difficulty of this procedure and potentially the need for surgeon assistance in the operating room. The purpose of this project was to evaluate our experience with robotic nephrectomies performed by a urologist/general surgery team and to evaluate the learning curve associated with this procedure.

Following Institutional Review Board (IRB) approval a retrospective review of the first 50 robotic kidney surgeries (nephrectomies, partial nephrectomies, and nephroureterectomies) performed by a two surgeon team (Urologist/General/operative surgeon) was performed. Surgeries took place from December, 2010–October, 2012. Demographic, operative, and outcomes were documented. Categorical data were analyzed using Fisher's Exact or Chi-Squared Test of Independence, while numerical data were analyzed with the Kruskal Wallis or Pearson correlation with a $p < 0.05$ considered significant.

Fifty robotic nephrectomies were reviewed with an average age of 61 years, 58% male, and 72% Caucasian. Procedures performed included robotic radical nephrectomy in 22 (44%), partial nephrectomy in 16 (32%), and nephroureterectomy in 12 (24%). Conversion rate to open surgery was 16%. Average OR time was 149 minutes and average length of postoperative stay was 3.6 days. Morbidity rate was 16% with no perioperatively mortalities. There were no significant differences in outcomes based on type of procedure ($p > 0.05$) except that partial nephrectomies were significantly younger ($p = 0.04$) and nephroureterectomies took significantly longer to perform ($p = 0.004$) compared to partial and radical nephrectomies. There was no correlation between OR time, conversion rate, or complication rate related to number of procedures performed ($p > 0.05$).

Robotic nephrectomies can be safely performed by a General Surgeon/Urology team. As experience grows, more complex cases including partial nephrectomies and nephroureterectomies can be safely performed with the robot. We were unable to document a learning curve for these procedures and may be related to the collaborative approach. Further study is needed to evaluate the role of robotic surgery in kidney surgery as well as the role of a general surgeon in these cases.

P467

Out by 3:30 – A Study in Bariatric Robotic Surgery Efficiency

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Introduction: One of the barriers to the acceptance of the use of robotics in bariatric surgery has been the overall increase in perioperative and operative times compared to laparoscopy. Several studies have shown an increase in operative times during the early learning curves. However, there is limited information regarding the effect of setup times to the overall time spent in the operating room. We compared the OR times of both laparoscopic and robotic assisted sleeve gastrectomies to determine the area of least efficiency.

Methods and Procedures: This study was conducted at an academic teaching hospital. We identified 25 consecutive laparoscopic (LSG) and robotic sleeve gastrectomies (RSG) performed by a single team starting from the beginning of the academic year. Using the operative log, we compared the pre-operative (patient enters OR to skin-incision), operative (incision, docking of robot, to skin closure), and post-operative (skin closure to out of OR) times for each of the cases. ANOVA analysis comparing robotic to laparoscopic times was performed. Results are presented as mean \pm SD.

Results: The mean pre-operative, operative, and post-operative times for LSG versus RSG is 42 ± 8.5 vs 46 ± 1 , 88 ± 18.6 vs 119 ± 31.6 , and 13 ± 7.57 vs 11 ± 4.6 minutes. There is a statistically significant difference between laparoscopic and robotic operative times ($P = 0.00013$) but there was no statistical significance between pre-operative ($P = 0.164$) and post-operative ($P = 0.395$) times. In fact, the preoperative and postoperative times were identical in both cases. The mean time difference between robot and laparoscopic surgery was 30 min. For the team, there was a 5 case learning curve to get to a comparable laparoscopic time (see Fig. 1).

Conclusion: The primary contributor to the longer duration of a robotic case is the operative time. Similar operative times can be achieved after surpassing a learning curve. Our team is now able to consistently complete three consecutive robotic sleeve gastrectomies by 3:30. Importantly, our experience also demonstrates that the robot setup, including anesthesia time, does not increase the overall operative time despite the patient preparation and positioning needed for the robotic platform. The robot can be utilized efficiently in bariatric surgery cases without considerable increases in operating room times.

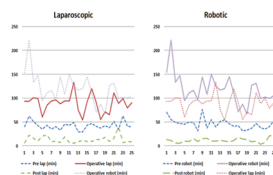


Fig. 1

P468

Robotic Colorectal Surgery: Shorter Operative Times, Low Conversion Rates, and Excellent Oncologic Yield – A Single-Surgeon Retrospective Cohort Study at a High-Volume Community Center

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Introduction: The purpose of this study is to evaluate the safety, effectiveness and short term outcomes of Robotic-assisted colon surgeries performed in a high volume community hospital. We believe that the learning curve for robotic-assisted surgery is shorter than that for laparoscopic colon surgery; hence, increased robotic experience in colon surgery will result in shorter operative times and improved outcomes as compared to what is reported in current literature.

Methods and Procedures: This is a retrospective cohort study of all Robotic-Assisted Colon Resections (da Vinci Surgical Robot System) performed in a high volume community hospital by a high volume surgeon between Jan 2011 and July 2013 for both benign and malignant colon diseases. Patient characteristics like age, sex, body mass index [BMI], American Society of Anesthesiologists classification [ASA], and indication for surgery (benign vs. malignant disease) were collected from chart analysis. Outcomes analyzed were operative times, conversion rates, post operative complications, length of hospital stay, and mortality. For malignant disease, we also evaluated the adequacy of margins and average lymph node yield.

Results: Sixty-seven patients underwent Robotic-assisted colon resections (right colectomy $n = 24$; left colectomy $n = 43$). The mean age of patients was 62 ± 12.3 years. The mean BMI was 28.7. Fifty-five percent of patients were female. Forty-nine percent ($n = 33$) belonged to ASA class 2 and 51% ($n = 34$) to ASA class 3. Mean operating time, including robot docking time, was 71.2 ± 20.2 min for right colectomy and 97.0 ± 28.4 min for left colectomy. The operative time for right colectomy was significantly shorter than for left colectomy ($p < 0.01$). Conversion to an open procedure was noted in 2 patients (2.9%). Post-operative complications were noted in 6 patients (8.9%), which included 1 contained anastomotic leak. The 90-day mortality rate was 1.5% ($n = 1$). The average length of hospital stay was 4.62 days (range 2 to 15) for right colectomy and 4.7 days (range 2–29) for left colectomy. There were 28 patients with malignant disease (42%), of whom 27 had adequate resection margins, and the average lymph node yield was 13.3.

Conclusion: We conclude that Robotic Colon surgery is safe and feasible for both right- and left-sided colon resections even in high operative risk patients (based on high ASA) with satisfactory outcomes. The conversion rate is low and oncologic yield in terms of lymph node and margins is excellent. Mean operating times in this study are shorter than those reported in literature, which we believe is related to the high volume of cases performed by the surgeon at this center. Future studies should focus on the overall cost-effectiveness of robotic surgery in light of reduced complications and hospital stay.

P469

Totally Robotic Complete Mesocolic Excision and Central Vascular Excision for Right-Sided Colon Cancer

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Background: Although robotic surgery aims to overcome the limitations of conventional laparoscopic surgery, the role of robotic surgery for colon cancer is still largely undefined. A concept of complete mesocolic excision (CME) and central vascular ligation (CVL) for colonic cancer has been recently introduced. The aim of this study is to describe our initial experience and assess the clinicopathologic outcomes of robotic CME and CVL for right-sided colon cancer.

Methods: The study group included 28 patients who underwent a totally robotic CME and CVL for right-sided colon cancer between February 2008 and May 2013.

Results: All 28 procedures were technically successful without the need for conversion to laparoscopic or open surgery. The mean operation time, console time, docking time were 315 ± 93 , 145 ± 55 , and 6.8 ± 4.0 min, respectively. Mean estimated blood loss was 128 ± 133 ml. The mean time to soft diet was 4 ± 1.5 days and length of stay was 7.2 ± 1.6 days. The proximal and distal resection margin was 14.3 ± 10.9 and 16.2 ± 8.9 , respectively. The median total number of lymph nodes harvested was 29.6 ± 14.2 . According to the Clavien–Dindo classification, the numbers of complications for grade 1, 2, 3a, 3b, and 4 were 2, 2, 0, 0, and 0. There was no mortality within 30 days.

Conclusions: Robotic CME and CVL for right-sided colon cancer could be safely performed with a favorable clinicopathologic outcomes. Robotic technique can be a suitable procedure to maximize the dissection of the lymph nodes around central vessels with the stable camera platform and articulated instruments without tremor.

P470

Da Vinci® Low Anterior Resection For Rectal Cancer With Full-Robotic Single-Docking Technique: A Single Institutional Experience

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Introduction: The robotic colorectal surgery enhances the advantages of laparoscopy providing a three-dimensional view, ambidextrous capability, tremor elimination and instruments with multiple hand-like degrees of freedom (Endowrist® technology). The robotic technique is a gold standard for prostatectomy and is gaining worldwide acceptance for rectal cancer since the narrow pelvis is the same operative field of the rectal dissection. Therefore, in 2005, we started our robotic experience in colorectal surgery and we introduced the new four-arm DaVinci® Si HD in 2010 to perform low anterior resections (LAR) for rectal cancer with our current and standardized full-robotic single-docking technique.

Methods and Procedures: From March 2010 to September 2013, we performed 88 robotic LAR for cancer. Our standardized full-robotic single docking technique starts from splenic flexure mobilization and takedown and continues with the vascular control of the inferior mesenteric vessels and total mesorectal excision (TME). Bowel continuity was restored with transanal stapled end-to-end or end-to-side anastomosis in 74 patients and with manual coloanal anastomosis for ultralow anterior resections in 14 patients. A diverting loop ileostomy was performed in 69 out of 88 patients (78.4%). Since the introduction of the integrated near-infrared (NIR) fluorescence imaging system in 2011, evaluation of bowel stump perfusion with intravenously injected indocyanine green was carried out in 28 patients.

Results: Full-robotic LAR was performed in 80 out of 88 patients (conversion rate: 9%). No intraoperative complications were observed. Mean age was 66.9 ± 9.6 years (37–87). Mean operative time was 399.6 ± 97.8 minutes (245–780). Mean distal resection margins were 3.64 ± 1.85 cm (0.5–10) and two specimens (2.3%) showed circumferential resection margins involvement. All patients were submitted to a perioperative fast-track program. The mean hospital stay was 10.1 ± 5.4 days (4–37). Fluorescence imaging allowed clear visualization of bowel stump perfusion in all cases (100%).

Conclusion: Low anterior resection for rectal cancer with full-robotic single-docking technique is safe and feasible. Moreover, since surgeons lack predictive accuracy for anastomotic leakage, fluorescence imaging system is the only tool to evaluate bowel stump perfusion objectively and might be the way to go in the next future. Larger sample sizes and further studies are needed to confirm its role.

P471

The Safety and Feasibility of Single Incision Robotic Laparoscopic Cholecystectomy in the Acute Setting

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Introduction: Since its introduction in 2011, single incision robotic cholecystectomy has gained in popularity. Numerous centers have adopted it as an acceptable alternative to conventional laparoscopic cholecystectomy. There have been numerous studies proving its safety and feasibility in the elective, outpatient setting. However, its use in the acute setting has not been thoroughly investigated. The aim of this work was to further study the safety, feasibility and efficacy in single incision robotic cholecystectomies performed specifically on inpatients.

Methods: Data was collected using a retrospective review of consecutive single incision robotic cholecystectomies from March 2012 to July 2013 at a single institution by two minimally invasive surgeons. A total of 87 cases were included in this study. The parameters assessed included age, gender, indication for surgery, inpatient vs. outpatient, operative time (skin-to-skin), conversions to multiport robotic surgery or conventional laparoscopic surgery, and post operative complications. The surgeries were performed using the Single Site® surgical platform on the da Vinci Robotic system® (Intuitive Surgical, Sunnyvale, CA, USA).

Results: A total of 84 cases were included in the study. There were 38 inpatient robotic single incision cholecystectomies included compared to 46 as outpatient. Average age for inpatients was 44.3 ± 15.8 compared to 56.6 ± 14.8 for outpatients. For inpatients, 44.7% had symptomatic cholelithiasis and 34.3% had acute cholecystitis. For outpatients, 74% had symptomatic cholelithiasis and only 1% had acute cholecystitis. The average length of case for the outpatient and inpatient group was 95 ± 34.2 minutes and 119 ± 33.8 minutes, respectively ($p < 0.005$). There were two conversions to conventional laparoscopic cholecystectomy and one case in which one additional 5 mm port was added. One of these conversions occurred immediately after the insertion of the robot laparoscope due to the presence of many adhesions. The other conversion was due to dense adhesions between the duodenum and gallbladder. There was one intraoperative complication which was an enterotomy caused upon initial abdominal incision. There were no deaths and no postoperative inpatient complications related to surgery.

Conclusion: Single incision robotic cholecystectomy is safe and feasible in the inpatient setting. The longer operative times may be due to a more difficult dissection involving acutely inflamed gallbladders. A comparison in outcomes and length of case between conventional laparoscopic cholecystectomy and single incision robotic cholecystectomy in a prospective manner is needed.

P472

Robotic Versus Laparoscopic Colorectal Surgery: A Case Matched Study From A Tertiary Referral Center

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Introduction: Robotic assisted colorectal surgery is an emerging technique. In this study we aimed to compare peri-operative and short-term outcomes of robotic colorectal operations to laparoscopy. **Methods and Procedures:** Patients undergoing robotic colorectal surgery between 11/2010 and 7/2013 were included. Robotic cases were case-matched to laparoscopic counterparts based on diagnosis and operation type. Operative and short-term postoperative outcomes were compared. Quantitative data were reported as mean \pm standard deviation and categorical data as numbers.

Results: There were 57 patients who underwent robotic colorectal surgery. There were no differences between the groups in terms of age (52 vs. 57 years; $p = 0.29$), gender (29 vs. 35 males; $p = 0.26$), body mass index (28 vs. 28 kg/m²; $p = 0.94$) and history of previous abdominal operations (22 vs. 21; $p = 0.85$). ASA score was higher in patients who underwent robotic surgery (2 vs. 3; $p = 0.01$). Blood loss (300 vs. 374 ml; $p = 0.27$) and conversion rate to open surgery (6 vs. 5; $p = 0.75$) were similar between the groups. Operating time was longer in robotic surgery (185 vs. 267 min; $p < 0.0001$). Time to first bowel movement (4 vs. 4 days; $p = 0.38$), hospital stay (7 vs. 8 days; $p = 0.22$) and postoperative complications were comparable between the groups (table).

Conclusions: Our early experience in robotic colorectal surgery shows similar short-term outcomes when compared to a carefully matched group of patients who underwent conventional laparoscopy. With increasing experience and numbers, the benefits of robotic colorectal surgery may declare.

Operations performed, diagnosis and specific complications

	Laparoscopic (n = 57)	Robotic (n = 57)	P value
Operations performed, (n)			>0.99
Abdominoperineal resection	14	14	
Completion proctectomy/proctocolectomy end ileostomy	2	2	
Ileocolectomy	1	1	
Ileal pouch anal anastomosis	9	9	
Proctosigmoidectomy	16	16	
Rectopexy	5	5	
Right colectomy	1	1	
Sigmoidectomy	3	3	
Sigmoidectomy/rectopexy	6	6	
Diagnosis, (n)			>0.99
Cancer	33	33	
Crohn's disease	3	4	
Rectal prolapse	11	11	
Ulcerative colitis	9	8	
Diverticulitis	1	1	
Specific complications, (n)			
Abdomino-pelvic abscess	1	4	0.36
Anastomotic leak	2	5	0.44
Stoma retraction	1	0	>0.99
Ileus	7	14	0.09
Postoperative bleeding	2	0	0.5
Pneumonia	0	2	0.5
Sepsis	1	1	>0.99
Wound infection	2	1	>0.99
Urinary retention	5	5	>0.99
Urinary tract infection	3	0	0.24
Venous thromboembolism	1	1	>0.99
Overall morbidity, (n)	24	23	0.85
Mortality, (n)	1	0	>0.99
Reoperation, (n)	3	4	>0.99
Readmission, (n)	6	9	0.41

P473

Retrospective Comparative Analysis Of Robotic Versus Laparoscopic Paraesophageal Hernia Repair: A Single Center Experience

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Introduction: The objective of this study is to compare the efficacy and short-term outcomes of Robotic Paraesophageal hernia Repair (RPR) with the standard Laparoscopic Paraesophageal hernia Repair (LPR) in a high-volume community hospital. Laparoscopic elective repair is currently the standard of care for treating paraesophageal hernia. Robotic surgery overcomes the potential pitfalls of conventional laparoscopy by providing excellent steady-state 3D visualization, precision maneuverability, and superior ergonomics. Its role is especially promising in technically complex surgical procedures involving a confined surgical field, like the esophageal hiatus.

Methods and Procedures: This was a retrospective cohort study. 34 patients with Paraesophageal Hernia who underwent Robotic Paraesophageal Repair using the da Vinci Surgical Robot System (Intuitive Surgical, CA) between January 2010 and August 2013, and 9 patients who underwent Laparoscopic Paraesophageal hernia Repair during the same time frame were included in the study. Patient demographic characteristics such as Age, Sex, Body Mass Index (BMI), and American Society of Anesthesiologists (ASA) classification, as well as clinical data (Type of Paraesophageal hernia and Indications for surgery) were obtained from chart review and analysis. Mean operative time, Conversion rate, Post operative complications, Mortality, and Length of hospital stay were the main outcomes, which were analyzed between the two groups using the student t-test and chi-square test.

Results: Demographics were comparable between the two groups. The mean age of the patients was 69.7 years in the RPR group and 76.8 in the LPR group, and the Mean Body Mass Index (BMI) was 28.5 and 27.6, respectively. Since the introduction of the Surgical Robot system in our institution in February 2011, 83% of these cases were performed robotically, accounting for the lower number of cases in the LPR group. There was no statistically significant difference between robotic and laparoscopic paraesophageal hernia repair in terms of mean operative time [86.2 min vs 90.2 min, $p = 0.68$] and length of stay [3 vs. 4.3, $p = 0.26$]. There was one conversion (2.9%) and one mortality (2.9%) in the RPR group. The frequency of postoperative complications was lower in RPR vs LPR (14.7% vs 22%).

Conclusions: Robotic paraesophageal hernia repair is safe and associated with better outcomes. The operative time and length of stay is comparable to standard laparoscopic repair. The robotic approach is becoming more popular, as is evident by the dramatic replacement of laparoscopy with robotic paraesophageal hernia repair in our institution, which could be attributed to the shorter learning curve and technical advantages of robotic surgery. Future studies need to be done to compare the cost-effectiveness of the two approaches.

P474

A Single Surgeon's Experience Of Single Site Robotic Cholecystectomy: The Timeline of Progress

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Background: Use of single-site robotic cholecystectomy can overcome the limitations of single-site laparoscopic cholecystectomy. We analyze the first 102 cases of single-site robotic cholecystectomy performed by a single surgeon.

Methods: A retrospective review of a prospectively maintained database was performed on the first 102 cases of single-site robotic cholecystectomy. Preoperative data, length of stay, conversion rate, complications, robot docking time, robotic dissection time, and overall surgery time were collected. Patients were divided into five chronological groups based on the date of surgery, with 20 patients in each group except the 5th group which had 22 patients. The groups were compared by docking time, robotic dissection time, and overall surgery time. A P value of 0.05 was used as statistically significant.

Results: The female to male ratio was 2:1. The mean age was 51 years (18–87) and the mean BMI was 28 (18–41). Overall, 69% of the patients underwent elective cholecystectomy and 31% required urgent surgery. The groups were comparable for perioperative data. The overall conversion rate was 4.9% and the complication rate was 4%. The docking time, robotic time, and average operative time were significantly different in the first group as compared to the remaining the five groups ($P = 0.000$). Further analysis of the above variables for groups 2 through 5 did not differ statistically.

Conclusion: Single-site robotic cholecystectomy is safe and feasible in both elective and urgent conditions, and in patients with previous abdominal surgeries. It requires a short learning curve and has the benefits of minimally invasive surgery.

P475

Robotic Single Site Cholecystectomy- Retrospective Outcome Analysis From A High Volume Community Hospital

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Introduction: The objective of this retrospective review is to analyze the operative and post-operative outcomes of Robotic Single Site Cholecystectomy (RSSC) performed in a high volume robot center. Single Site Laparoscopic surgery has shown decreased parietal trauma and improved cosmesis but with the restraints of lack of triangulation, cross-handling, and instrument collision. Robotic Single-Site surgery effectively overcomes these technical pitfalls of Laparoscopic single incision surgery with a shorter learning curve while maintaining the advantages.

Materials and Procedures: After a University of Miami Institutional Review Board approval, we retrospectively collected data of all Robotic Single Site Cholecystectomies (da Vinci Si Surgical Robot System, Intuitive Surgical, CA) performed at our center from April 2012 through September 2013. All the patients in this study underwent RSSC for gallbladder disease such as cholecystitis, symptomatic gallstones and biliary dyskinesia.

Results: One hundred and twenty three patients underwent Robotic Single Site Cholecystectomy at our hospital over an 18-month period. The mean age of the patients was 53 years (+/-17.46). 79% of the patients were female and the mean BMI was 27.3 +/-4.6. Eighty-five patients (69%) belonged to ASA class 2 and 26 patients (21%) to class 3. The most common indication for surgery was chronic cholecystitis ($n = 100$, 81%). The mean operating time (MOT), including robot-docking time was 49 min (+/-17.1). The average length of hospital stay (LOS) was 0.79 days (0–6), with 56% of the cholecystectomies performed as outpatient procedures. The conversion rate was 6.5% ($n = 8$), of which 4 cases were in the first 20 performed cases. Post-operative complication rate was 5.6% ($n = 7$), of which 2 patients had a bile leak requiring ERCP and stenting. There were no mortalities. On subset analysis, mean operating times and length of stay were not significantly different when patients were analyzed on the basis of age (<65 and >65 years) or BMI (<30 and >30). The length of hospital stay was significantly more for patients belonging to ASA class 3 or 4, as compared to ASA 1 or 2 (0.64 vs 1.3 days, $p < 0.01$) while the operating times were comparable between the 2 groups (45.5 vs 49.8 min $p = 0.26$). The complication rate was comparable among all the above-analyzed groups. Conversion rate was higher in patients with BMI >30 when compared to <30 (13% vs 3.6%).

Conclusions: Robotic Single Site Cholecystectomy can be safely performed with low operating times and low conversion and complication rates, even in older patients and those with high operative risks. High BMI is associated with higher conversion rates. Operating times and complication rates in this study are low when compared to large reported series on Laparoscopic Single Site Cholecystectomy. We believe that the addition of robotic platform will improve the widespread use of Single site surgery.

P476

Single-Site Robotic Cholecystectomy: Initial Experience

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Aim: Recently single-site robotic platform has been introduced to alleviate some of the technical challenges with laparoscopic single site surgery. We present a single institution single surgeon's experience with the single-site robotic cholecystectomies since FDA approval.

Methods: From February 2012 to 2013, 31 patients underwent robotic single-site cholecystectomies at a tertiary care facility. Patient's demographics, intraoperative and postoperative outcomes were analyzed retrospectively from a prospectively maintained database. No exclusion criteria were used.

Results: 25 women and 6 men with mean age, Body Mass Index (BMI) and weight of 33.64years, 32.20 kg/m², 86.33 kg respectively for symptomatic cholelithiasis. 11 patients (35.48%) had previous abdominal surgeries. The mean operative time was 81.48 ± 21.07 minutes with average time for port insertion, docking, console, fascia/skin closure of 12.03 ± 4.81, 5.29 ± 5.96, 36 ± 16.75, and 24.64 ± 6.78 minutes respectively. The average EBL was 8.38 ± 4.16 ml. Twenty-four (77.41%) procedures were performed on an outpatient basis. There were no conversions to the open or multiport approach, and no major complications of biliary ductal injury, bile leak, reoperations, or mortality occurred. There was one case of superficial wound infection treated with oral antibiotics.

Conclusion: Single-site robotic cholecystectomy is feasible, safe with good outcomes and requires a minimal learning curve to transition from traditional multiport to single-port robotic cholecystectomy.

P477

Robotic Revisional Bariatric Surgery: Single Surgeon Case Series

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Aim: Laparoscopic revisional bariatric surgery is fraught with increased morbidity and higher conversion due to the complexity of the procedures. The utility of robotic platform with better ergonomics than laparoscopic approach has not been explored in terms of safety, feasibility and outcomes.

Materials and Method: Revisional bariatric surgeries performed from 2009 to 2013 for insufficient weight loss or weight regain or complications from primary procedure were retrospectively reviewed from a prospectively maintained bariatric database.

Results: Of the fourteen cases of revisional bariatric procedures, 5 cases were band to gastric bypass, 6 band to sleeve, 1 stricturoplasty from vertical banded gastroplasty, 2 marginal ulcerations with one case of gastro-gastric fistula. There were 13 women, mean age, preoperative BMI and weight of 45.28 (± 11.41) years, 40.12 (± 8.71) kg/m², and 109.43 (± 26.09) kg respectively. The mean operative time, hospital stay and estimated blood loss were 220.64 (± 64.30) minutes, 3.35 (± 1.49) days, and 31.07 (± 22.71) ml respectively. No intraoperative complications or conversion to open. One case of diagnostic laparoscopy on Post op day 5 for bowel obstruction from a previously existing ventral hernia. Two patients were re-admitted and two patients treated outpatient for pain management.

Conclusion: Robot assisted revisional bariatric procedures can be performed safely without increased morbidity. Larger series might establish a role of robotic platform in these complex procedures.

P478

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 presented after road traffic accidents (77%). 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 80–130 minutes with a mean of 110 minutes. 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 7–21 days with a mean of 9.5 days. Postoperatively, all of the tested patients showed normal platelet count and normal clearance of Howell-Jolly bodies and 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.

P479

Hand-Assisted Laparoscopic Splenectomy For Malignant Lymphoma Of The Spleen

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We have established hand-assisted laparoscopic (HALS) splenectomy for patients with thrombocytopenia due to chronic viral liver disease and presented this procedure at the SAGES meeting in 2009. We have also applied HALS splenectomy to four cases of splenic malignant lymphoma.

Our standard procedure for HALS splenectomy is as follows. An 8 cm median skin incision is made in the upper abdomen and the GelPort™ device is placed. Three trocars are placed at the left side of the umbilicus. The spleen is then mobilized with spatula type electric cautery and LCS. The surgeon's left hand makes a good operation field. The splenic vessels are ligated using the intracorporeal one hand ligation technique, and the splenic hilus is sealed and cut with LigaSure™. The spleen is then taken out in a plastic bag through the skin incision.

For the current cases, the volume of the spleen was estimated by preoperative CT scan. The average volume was 1802.4 cm³ and for the three cases over 1000 g (huge group) the average volume was 2322.3 cm³. The volume of the spleen in the remaining case was 242.4 cm³. The case with the largest spleen had a history of liver transplantation nine years ago. The average operation time and blood loss for the huge group were 289.3 min and 2400 ml, respectively, and for the other case were 140 min and 90 ml, respectively.

The three cases in the huge group each required blood transfusion due to blood loss. Two of these cases required L-shaped laparotomy for ligation of the splenic hilus. One case required a linear stapler to dissect the splenic hilus after laparoscopic mobilization of the spleen, and vessel ligation was done after open conversion in one case. Dissection of the splenic hilus was extremely difficult in the huge group, perhaps due to inflammation in the splenic hilus.

Two cases among the huge group showed prolonged ascites after surgery, however no serious post-operative complications were encountered.

HALS splenectomy can be applied to splenic malignant lymphoma cases; however the open conversion rate is high for the huge spleen. In addition, for some cases dissection of the splenic hilus was difficult due to inflammation.

P480

Transumbilical Single-Incision Laparoscopic Splenectomy Using Conventional Instruments: Preliminary Experience In Consecutive Patients And Comparison To Standard Multiple-Incision Laparoscopic Splenectomy

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Background: Application of single-incision laparoscopic surgery (SILS) technique in splenectomy is still in its infancy with limited literature reports for limited indications. The purpose of this study is to study the feasibility and safety of transumbilical single -incision laparoscopic splenectomy using conventional instruments in consecutive patients, and compare outcomes of the procedure to standard laparoscopy.

Methods A retrospective review was conducted to evaluate all transumbilical single-incision splenectomies performed by a single surgeon between March 2010 and January 2013. Additionally, patients who underwent standard laparoscopic splenectomy by other surgeons in the same surgical group during the same period were evaluated to serve as a control group. Demographic data, operative parameters, and postoperative outcomes were assessed.

Results: 13 patients underwent successful single-incision splenectomy during the study period without conversion to an open procedure or requiring additional ports. The median operative time was 165 min. There was 7.7 % morbidity and no mortality in the study group. Median length of stay was 8.8 days. Additionally, 12 patients who underwent standard laparoscopic splenectomy were evaluated for comparison. No significant differences were identified in the preoperative patient characteristics between the two groups. Single-incision splenectomy using conventional instruments was associated with reduced postoperative pain scores [(1.60 \pm 0.20) vs. (3.60 \pm 0.90) for postoperative day 1, P < 0.01; (0.50 \pm 0.10) vs. (2.00 \pm 0.45) for postoperative day 2, P < 0.01?], equivalent operative time, conversion rate, length of stay, similar mortality, morbidity, and cost. The umbilical incision of the single-incision group can be easily hidden in the umbilical fold with ideal cosmetic result.

Conclusions: Single-incision splenectomy is feasible, safe, and efficient in an unselected patient population in the hands of an experienced laparoscopic surgeon. The single- incision technique is comparable to standard laparoscopic splenectomy in terms of operative time and perioperative outcomes. Reduced postoperative pain and ideal cosmetic effect may be its potential advantages.

P481

Laparoscopic-Assisted Autotransplantation of a Renal Artery Aneurysm

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We present a 63 year old healthy man with hypertension, who was evaluated for hematuria, at which time a 2.8 cm renal artery aneurysm (RAA) was identified by CT angiography. An unrelated bladder mass was discovered to be the cause of the hematuria.

A diagnostic angiogram to evaluate the potential for endovascular treatment by coiling or stenting was performed. The aneurysm was found to be amenable to coiling, however given the extensive involvement of the vessels feeding the upper pole of the kidney, it was felt this would potentially be a large functional sacrifice. A nuclear renal scan (MAG3) confirmed equal right and left renal function. The option of nephrectomy as means of treating the aneurysm was discussed with the patient, however he opted for renal salvage. We performed a laparoscopic hand-assisted nephrectomy with extracorporeal aneurysmectomy and right renal autotransplantation through the same incision. The complex back-table reconstruction included arterial reconstruction by excising the mouth of the aneurysm and anastomosing the transected superior pole artery into the main renal artery, thus maintaining blood flow to all renal artery branches. The right renal vein was anastomosed to the right iliac vein similar to standard renal transplantation technique in the right iliac fossa, and the reconstructed artery was anastomosed to the right external iliac artery in a fashion similar to an IVC patch. The ureter was anastomosed directly to the bladder over a temporary ureteral stent.

The patient was discharged on post-operative day four. On follow up evaluation, he was pain free with normal serum creatinine and a renal duplex ultrasound confirming stenosis-free patency of the renal vessels and good flow to the renal parenchyma.

P482

Single Incision Laparoscopic Splenectomy: Feasibility and Comparison to Multiport Laparoscopic Splenectomy

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Background: We have started single incision laparoscopic splenectomy (SILS) since 2009, and have treated 24 patients (pts). The aim of this study was to compare the clinical outcomes after SILS and conventional multiport laparoscopic splenectomy (LS) to evaluate the feasibility and safety of SILS.

Patients and Methods: Twenty four pts who underwent SILS and 89 pts without splenomegaly who underwent LS were included in this analysis as a control group. Indications for SILS were the same as standard splenectomy except for patients with splenomegaly (>500g) and obesity (BMI>30). The operative procedure was identical to LS. Patient demographic data, operative parameters, and postoperative outcomes were assessed.

Results: Indications for SILS were ABO incompatible kidney transplantation (n = 16) and idiopathic thrombocytopenic purpura (ITP) (n = 5). In the control group, ITP is the most common indication (n = 67), and ABO incompatible kidney transplantation was only 6 cases. Thirteen pts (54%) underwent SILS successfully without additional ports. SILS was converted to LS in 2 pts and 1 patient required conversion to an open procedure because of hemorrhage at the splenic hilum. In 8 pts, one additional port was required. Reasons for additional ports were difficulty in hemostasis, tissue dissection, and obtaining clear operative visual field. There was no treatment related death in the both groups. Three and 2 pts had post-operative bleeding at the stump of splenic vessels in the SILS group and the control group, respectively, but they did not require re-operation. In the control group, sub-phrenic fluid collection was detected in one patient. The median operative time, blood loss, and splenic weight were 137.5/120 min, 40/30 ml, and 165/140 g, in the SILS/control group, respectively. SILS is associated with a bit longer operation time and demands operative skills to perform without additional ports. Additional ports allow good visual fields, and easy hemostasis.

Conclusion: SILS is feasible and safe for normal sized spleen in the hands of an experienced laparoscopic surgeon. Additional ports requirement is common and necessary in case of bleeding and bad visual field.

P483

Laparoscopic Splenectomy

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Introduction: Laparoscopic splenectomy has become the preferred surgical procedure for the elective splenectomy. In this study, we present our experience with laparoscopic splenectomy.

Materials and Methods: The files of patients who underwent laparoscopic splenectomy reviewed retrospectively. Diagnosis, operation finding and follow information were recorded.

Results: Laparoscopic splenectomy were performed in 31 (17 women, 14 men) patients with age ranging 14–67 (mean: 30.8). Operation time was 60–150 (mean: 102.6) minutes. Operation indications were idiopathic thrombocytopenic purpura (25 patients), anemia (2 patients), myelodysplastic syndrome (1 patients), hodgkin lymphoma (1 patients), thalassemia major (1 patients), hereditary spherocytosis (1 patients). Conversion to laparotomy was necessary in three patients. In one patient who has massive splenomegaly, small left subcostal incision was applied for get out spleen. In two patients accessory spleen was seen and resected. In follow up, in four patients with idiopathic thrombocytopenic purpura thrombocyte levels didn't increase. In one patient from those patients accessory spleen was detected and resected with second operation.

Conclusion: Laparoscopic splenectomy is the preferred surgical approach for treatment of hematologic disorders. Several studies have documented advantages of a laparoscopic approach for splenectomy such as lower analgesia requirements, earlier mobilization, fewer wound as well as other complications such as ileus and pneumonia, in addition to earlier return to work. We conclude that laparoscopic splenectomy is safe and effective methods for elective splenectomy.

P484

Wandering Spleen Presenting With Torsion, ITP Exacerbation

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Introduction: Wandering spleen is a rare medical condition in which the spleen is not located in the left upper quadrant but rather in variable locations of the dependent abdomen due to the absence of peritoneal attachments. The condition is often asymptomatic but presentation is variable from abdominal pain, nausea, vomiting and obstruction as a result of splenic torsion and ischemia. We present a case of an elderly white female with a known history of idiopathic thrombocytopenic purpura (ITP) presenting with symptoms consistent with a bowel obstruction, who was diagnosed with a wandering spleen and subsequently developed an ITP exacerbation requiring laparoscopic splenectomy.

Case Description: A 78 year old multiparous white female presented with worsening abdominal pain, nausea and vomiting three days prior to admission. She had a past medical history of idiopathic thrombocytopenic purpura, gastroesophageal reflux disease and Wolff-Parkinson-White syndrome status post ablation. Physical exam revealed a palpable mass in the right lower quadrant, CBC unremarkable with a platelet count of 77,000. CT scan initially revealed a non-enhancing mass in the pelvis and absence of a spleen in the left upper quadrant. On hospital day 3, the patient's physical complaints had resolved but had an acute drop in her platelets to 6,000. She was treated with high dose steroids and IVIG with no resolution of the thrombocytopenia. Repeat CT scan revealed a partially enhancing spleen with partial torsion in the pelvis. The patient's platelets were repleted and successfully underwent laparoscopic hand assisted splenectomy. Intraoperative findings confirmed a wandering spleen without peritoneal attachments and a long splenic artery and vein. The post operative course was uncomplicated and the platelet level was greater than 100,000 upon discharge. At three weeks post operative, the patient is noted to be doing well with platelets within normal range.

Discussion: This case presents a common clinical scenario but an unusual diagnosis and hospital course. Awareness of this rare condition may enhance diagnostic acumen.

P485

Laparoscopic Removal Of An Accessory Spleen For Recurrent Idiopathic Thrombocytopenic Purpura 5 Years After Laparoscopic Splenectomy

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Background: Treatment of idiopathic thrombocytopenic purpura (ITP) refractory to medical management consists of splenectomy with a high success rate. Recurrent ITP may be due to regrowth of a missed accessory spleen.

Case Report: A 59 year old female had undergone laparoscopic splenectomy for ITP refractory to medical management five years ago. After several years of stable platelet count, her platelet count started to drop to as low as 1K/ml and she developed purpura. On liver/spleen scan and CT-scan a 5 × 5 cm mass containing splenic tissue was found close to the tail of the pancreas. We recommended laparoscopic removal. The patient was placed supine with her left side elevated at 45 degrees. A Verres needle in the left upper quadrant was used to establish pneumoperitoneum and a 5 mm visiport was placed under the left ribcage. Under visual control another 5 mm trocar and a 10–12 mm trocar were placed in the left flank and above the umbilicus, respectively. Dense adhesion of the omentum to the abdominal wall and the stomach were divided. The colon was now identified and the lesser sack opened through the gastrocolic ligament. The splenic flexure was taken down and the stomach was lifted anteriorly and medially to expose the tail of the pancreas. In the area of the previous splenic hilum the mass was identified and carefully dissected off the pancreas. Dorsally it was lifted off the left kidney and adrenal gland. To the medial adhesions to the stomach were divided. Blood supply for the mass originated from a side branch of the splenic artery and splenic vein at the tip of the tail of the pancreas. We used an endo GI with a white load to divide this structure and this was secured with an endoloop around the tip of the tail of the pancreas to achieve hemostasis and secure a potential leak of the pancreatic duct. The accessory spleen was placed into an endobag, cut in small pieces and removed through the 10–12 mm port. The patient recovered well from the procedure without any complications and her platelet count normalized within few weeks.

Discussion: Regrowth of splenic tissue causing recurrent ITP is a rare condition. Laparoscopic re-splenectomy can be safely done.

P486

Number of Lymph Nodes Removed During Radical Prostatectomy for Early Prostate Cancer as It Relates to Outcome

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Background: Pelvic lymphadenectomy has always been considered as a gold standard method in staging of prostate cancer. It is also worthy to note that to this date there is no consensus within the medical literature concerning localized prostate cancer LPC on the ideal number of lymph nodes LN that should be removed in order to cause a beneficial outcome to patients.

Aims: To find an optimum number LN which are removed during pelvic lymph node excision in radical prostatectomy for LPC which has an influence on post-operative outcome in terms of the following parameters; post-operative complications, biochemical recurrence (BCR), pathological TNM and pathological Gleason score.

Methodology: applying PRISMA we searched PubMed and Sciencedirect databases covering all articles published in the English language since 1996 that included the following; studies where radical prostatectomy was performed, pelvic lymphadenectomy was performed, studies which included non-metastatic prostate cancer (T1–T2, N0, M0), articles which include number of lymph nodes removed, studies mentioning Pre and post-operative complications and oncological outcomes.

Results: 26 studies were analysed. The mean number of LN removed during pelvic lymphadenectomy in radical prostatectomy ranged from 4–28. Post-operative lymphocele (Clavien score IIIa) were the highest reported complication of 161 cases associated with the excision of a mean number of 17.7 LN. Neuropraxia was second recorded complication associated with a removal of 17.8 LN. The third post-operative complication was SSIs associated with a removal of a mean number of 18 LN. DVT and PE both were associated with the removal of a mean number of 28 LN. On the oncological outcomes, high number NL removed (23.1) uncovered larger number of patients with positive biochemical recurrence (BCR) (91%). Longer follow-up period (152–2831 days) does play a role in uncovering more patients with positive biochemical recurrence. When BCR was analyzed it showed a strong association with T2 pathological stage. Survival rates were not always reported. Two studies reported that 81% and 83% of their patients had a 5-year survival (Masterson et al. and Toujier et al. respectively). Both these studies remove a mean number of 9 lymph nodes and 12 lymph nodes respectively.

Conclusion: No clear cut off point can be drawn from the available literature in regard to the optimum number LN that can be removed during pelvic lymphadenectomy that may influence post-operative complications in patients with localized prostate cancer. The highest reported complication was lymphocele. Data also illustrated that the higher the number of LN removed (23.1) during pelvic lymph node dissection in radical prostatectomy for localized prostate cancer the greater the number of patients with BCR is uncovered (Jindong et al. 91% of patients). In the absence of large sample single-center studies, a unified reporting system is highly warranted in future studies for better analysis comparative evaluation toward a more definitive cut off point of optimum number LN which are removed during pelvic lymph node excision in radical prostatectomy for LPC.

P487

Renal Parenchyma Perfusion During Laparoscopic Donor Nephrectomy

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Introduction: Renal blood flow during Laparoscopic Donor Nephrectomy is poorly documented. This is important because there is concern about the effects of arterial spasm on renal perfusion during mobilization and dissection of the renal artery. Some surgeons feel it is important to give the donor kidney a period of rest after complete mobilization prior to delivery. The purpose of this study is to identify changes in renal parenchyma perfusion by Restrictive Index (RI) during Laparoscopic Donor Nephrectomy, before and after renal artery dissection.

Methods and Procedures: Restrictive Index (RI) in the renal parenchyma arterioles was collected using a doppler ultrasound and an intra-abdominal laparoscopic probe by a standardized technique. Pneumoperitoneum was set at 15 mmHg. RI was measured at the beginning of the case and then immediately after ureter dissection, after renal vein dissection, and after renal artery dissection. RI was then followed at 5, 10, 15 and 20 minutes after renal artery dissection.

Results: 4 patients have been evaluated since June 2013. Average RI for the mentioned time points is summarized (Table 1). On average, RI immediately after Renal Artery dissection was 67% of the baseline RI. RI decreased after renal artery dissection and time to return of RI to near baseline levels was 5 minutes in 1 patient, 10 minutes in 2 patients and greater than 20 minutes in 1 patient.

Conclusion: In this preliminary evaluation it appears that arterial dissection does reduce renal perfusion. The effects lasted up to 20 minutes. We are actively obtaining more data for this study. Until further data is acquired the authors recommend a post arterial dissection rest period of at least 20 minutes prior to harvest and delivery of the organ so that normal arterial flow is reinstated prior to harvest.

Table 1

	Start	Ureter	Vein	Artery	5 min	10 min	15 min	20 min
Average RI	.789	.741	.813	.546	.647	.711	.719	.734

P488

Laparoscopic Assisted Splenectomy For Splenomegaly By Malignant Lymphoma And Hypersplenisms

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Introduction: Laparoscopic splenomegaly has become the standard surgery for the management of many hematological disorders and hypersplenisms. Although the benefits of laparoscopic resection of the spleen has been widely accepted, laparoscopic and hand assisted splenectomy for a very large spleen and portal hypertension are still considered relative contraindications. (Surg Endosc. 2008) Massive splenomegaly is defined as the splenic volume of 500 ml or more by volumetry in computed tomography (CT). The aim of this study is to estimate the operative short-term outcomes of laparoscopic assisted splenectomy in massive splenectomy.

Methods and Procedures: At Kumamoto Shinto General Hospital and Kumamoto Regional Medical Center, we performed a retrospective analysis of 26 patients who underwent laparoscopic assisted splenectomy from 2010 through 2013 (One patient was excluded because of conversion to laparotomy). Surgical outcomes, including operation time, counted blood loss, postoperative complications, postoperative hospital stays and platelet count of the preoperative and the one month after surgery were compared in massive splenomegaly (MS) group, not massive (normal) splenomegaly (NS) group. To compare groups, Unpaired t-test with or without Welch's correction was applied to continuous data and the chi-square tests were applied to categorical data. A P value of less than 0.05 was considered significant.

Results: Of the 26 patients, 11 (42%) were MS group (malignant lymphoma were 4, hypersplenisms were 7) and 15 (58%) were NS group (malignant lymphoma were 2, hypersplenisms were 13). There was no difference in age, gender, Body Mass Index and preoperative platelet count. In the MS group, splenic volume by volumetry in CT was significantly bigger than that in the NS group (894 ml vs. 339 ml; p = 0.003). Operation time, postoperative complications, length of postoperative hospital stay and platelet count of the one month after surgery were similar among both groups. There was no statistically significant difference in operation time (MS group 186 min vs. NS group 168 min), otherwise there was statistically significant difference in blood loss (MS group 556 g vs. NS group 190 g; p = 0.0016).

Conclusion: Although there is small number of patients and needs future examination, among patients with massive splenomegaly, laparoscopic assisted approach is feasible and safe if careful about blood loss getting increasing.