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CLINICAL EVALUATION OF SIVELESTAT SODIUM HYDRATE IN ALI/ARDS PATIENTS IN THE ICU

Matsushita M[1], Ikeda T[1], Ikeda K[1], Nagura M[1], Taniuchi H[1], Kiuchi S[1], Kuroki Y[1], Suzuki K[1]
[1]Division of Critical Care and Emergency Medicine, Hachioji Medical Center, Tokyo Medical University, Hachioji, Japan

INTRODUCTION: The onset mechanism of ALI/ARDS and subsequent tissue injury are considered to be associated with neutrophil elastase. In Japan, sivelestat sodium hydrate, a selective neutrophil elastase inhibitor, was approved in June 2002 for ALI/ARDS accompanied by SIRS, and the drug has been evaluated in clinical practice.

METHODS: In this study, we performed a retrospective comparison of the effects of sivelestat sodium administration between two groups of patients: Group E, consisting of 126 patients (85 males and 41 females, aged 66±15 years old) with ALI/ARDS accompanied by SIRS who were treated with sivelestat sodium at a dose of 0.2mg/kg/hour for 72 hours or more, after approval of the drug; and Group C, consisting of 33 patients (20 males and 13 females, aged 65±14 years old) with ALI/ARDS accompanied by SIRS who were treated in the ICU under similar conditions, but using traditional methods for respiratory control, prior to approval of sivelestat sodium.

RESULTS: The APACHE ? scores of Groups E and C were 24.3±9.3 and 22.7±8.7, respectively, the SOFA scores were 9.0±3.8 and 9.3±4.3, respectively, and the lung injury scores (LIS) were 2.4±0.6 and 2.1±0.6, respectively, with no significant differences between the groups. The initial PEEP value of Group E was 4.6±3.4 cmH2O, which was higher than that of Group C(3.1±2.7 cmH2O), but not statistically significantly different. The PaO2/FIO2 (P/F) ratio under mechanical ventilation management was higher in Group C(146±70mmHg) than in Group E(139±64mmHg. However, the P/F ratios 24, 48 and 72 hours after the beginning of drug administration were 193±82, 210±84 and 210±79 mmHg in Group E, and 180±95, 194±83 and 208±95 mmHg in Group C. The ventilator free days (VFD) of Groups E and C were 18±9 and 10±12 days, respectively, and these values showed a significant difference (P?0.001). Furthermore, the survival rate after 28 days was significantly higher in Group E than in Group C (Group E: 75%, Group C: 52%, P?0.001).

CONCLUSION: These results suggest that sivelestat sodium is a good option as a treatment strategy for neutrophil elastase-associated ALI/ARDS accompanied by SIRS.

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PROSPECTIVE STUDY COMPARING HFOV VERSUS CMV IN PATIENTS WITH ARDS

Shah S B[1], Findlay G P[1], Jackson S K[1], Smithies M N[1]
[1]Critical Care Directorate, University Hospital of Wales, Cardiff, United Kingdom

INTRODUCTION: The purpose of the study was to changes in ventilatory parameters in patients with Acute respiratory distress syndrome (ARDS) comparing high frequency oscilator ventilation(HFOV)vs conventional mechanical ventilation(CMV)

METHODS: 28 patients with ARDS were enrolled into the study to receive either CMV or HFOV.

RESULTS: The improvement in P/F ratio in the HFOV group compared to CMV was statistically significant [at 8 hours (p=0.05) and 24 hours (p=0.001)] and this trend continued through the study period. Though the FiO2 was higher in the HFOV group at baseline, by 4,8 and 24 hours this was significantly lower as compared to CMV group(P<0.01and P<0.05 and P<0.01 respectively)and again this trend continued over the study period.

Baseline Demographics & Ventilatory Para.

	CMV (n=13)	HFOV (n=15)
Age	54(26-74)	45(18-77)
Sex	9:4	9:6
APACHE II	19.61(10.21)	18.47 (5.46) {p=NS}
Peak insp. pressure	31(6.04)	34.4 (3.01) (p=NS)
Mean airway pressure	17.5(4.2)	20.8 (6.8) (p=ns)
PEEP	9.9 (6.29)	13.1 (2.4) (p=ns)
Tidal vol.	566.5 (126.5)	536.3 (125.9) (p=ns)
PaO2	96.6 (23.5)	82.2 (19.5) (p=ns)

Data [mean(SD)]

Changes in P/F ratio and FiO2 with time

Time Hours	0	4	8	12	24	48	72
HFOV (P/F)	102.8	178	200.5	174.3	199.5	205.1	227.3
CMV (P/F)	119.5	137	121	137	124	154	187
HFOV (FiO2)	.93	.58	.59	.59	.5	.46	.46
CMV (FiO2)	.81	.75	.72	.67	.70	.57	.57

CONCLUSION: There was an earlier and significant improvement in both P/F ratio and FiO2 in patients with ARDS when on HFOV as compared to CMV.

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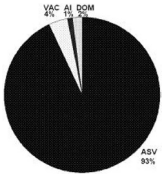
UTILIZATION OF ADAPTIVE SUPPORT VENTILATION (ASV) IN A POLYVALENT INTENSIVE CARE UNIT

Arnal J M[1], Nafati C[1], Wysocki M[2], Donati Y S[1], Granier I[1], Durand-gasselin J[1]
[1]Intensive care unit, Hopital Font-pré, Toulon, France, [2]Hamilton, Medical, Bonaduz, Switzerland

INTRODUCTION: Adaptative Support Ventilation (ASV) is a closed-loop mode of mechanical ventilation. It was proven to simplify postoperative respiratory management (1, 2) and to improve patient-ventilator interaction (3). This observationnal epidemiologic study reports its utilization in a large population of intensive care patients.

METHODS: While clinicians set a minute ventilation, ASV algorithm determines tidal volume and respiratory frequency according to respiratory mechanics. The breathing pattern adopted corresponds to the minimal work of breathing (4). Moreover, ASV encourages spontaneous breathing activity, providing full or partial ventilatory support. Therefore, it may be used in the initiation, maintenance or weaning phase of mechanical ventilation. In a 11 beds polyvalent intensive care unit where ASV has been used for two years, clinicians are used to set ASV first. They change to another mode of ventilatory support if plateau pressure is above 30 cmH2O or in case of patient-ventilator asynchrony. Contre-indication of ASV are non invasive ventilation, bronchopleural fistula and Cheynes-Stocke breathing. A daily recording of ASV use was undertaken for a period of five months. Results are mean ± SD.

RESULTS: During the study, 231 patients were admitted in intensive care unit totalizing 1579 days of hospitalisation. Mean IGS II was 48 ± 20. There was 1182 days of ventilation (75%) with 1058 days of invasive ventilation (89%). ASV was used in 93% of invasive ventilation days (figure 1). Mean duration of ventilation and stay in intensive care are 6,5 ± 8,2 and 6,7 ± 7,1 days respectively . Mortality rate was 35%.There was no incident with the use of ASV.
Figure 1 : Modes of ventilatory support used.VAC : volume control, AI : pressure support,DOM : home design ventilator.



CONCLUSION: After a training period, ASV can be used in most of the patients invasively ventilated in intensive care unit.

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3)Tassaux D. Crit Care Med 2002;4)Otis AB. J Appl Physiol 1950

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LUNG AND HEART-LUNG TRANSPLANTATION: LUNG GRAFT DYSFUNCTION EARLY POSTOPERATIVE PERIOD

Vicente R[1], Loro J[1], Morales P[2], Sole A[2]
[1]Anesthesiology and Critical Care, [2]Pneumology, Hospital La Fe, Valencia, Spain

INTRODUCTION: Severe lung graft dysfunction is defined as a lesion of the pulmonary endothelium [1]. Inhaled nitric oxide as possible prophylactic treatment against reperfusion injury of the lung[2]. After 9 years of experience we reviewed to the presence of graft dysfunction in patients after Lung Transplantation and Heart-Lung Transplantation in the early postoperative period.

METHODS: A retrospective study of 190 patients underwent lung and heart-lung transplantion from 1.993 to 2.002, for emphysema (59), pulmonary fibrosis (40), cystic fibrosis and bronchiectasic disease (68), pulmonary hypertension (14) and miscellaneous (9). The 22,63% patients received single lung transplantation and 71,05% bilateral seqential transplantation and 7,36% heart-lung transplantation. The 38,42% patients received inhaled nitric oxide at 20 ppm. Haemodynamic and respiratory parameters were monitored during the operative technique and the critical care for 24 hours.

RESULTS: The 37,2% patients had lung graft dysfunction but only 12,2% was severe graft dysfunction. All patients were ventilated on a 50% fraction of inspired oxygen within a 24-48 hours and 61,56% patients were extubated before the first five postoperative day and 38,43% after 6 days. Ischemic time data were available 220-378 minutes. Anaesthetic time was almost 500-600 minutes. The variables associated with a significant increase of graft dysfunction were bilateral transplantation and cardiopulmonary bypass requirement. Stay ICU for patients with graft dysfunction were higher than the patients without graft dysfunction. Mortality directly related with graft dysfunction was 4,07%.

CONCLUSION: Although allograft dysfunction was significantly impaired inmediately (within 24 hours) after transplant, there are a correlation between graft ischemic and early postoperative morbidity and duration of critical care unit stay but no significantly negative impact on the mortality.

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2. Struber M, Harringer W, Ernst et al. Inhaled nitric oxide as a prophylactic treatment against reperfusion injury of the lung. Thorac Cardiovasc Surg 1999; 47 (3): 178-182.

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EFFECTS OF RECRUITMENT MANEUVERS DURING PRONE POSITIONING IN ACUTE RESPIRATORY DISTRESS SYNDROME

Oczenski W[1], Hoermann C[2], Keller C[2], Lorenzl N[1], Kepka A[1], Schwarz S[1], Fitzgerald R D[1]
[1]Anaesthesia and Intensive Care Medicine, Ludwig Boltzmann Institute for Economics of Medicine, Vienna City Hospital Lainz, Vienna, [2]Anaesthesia and Intensive Care Medicine, University of Innsbruck, Innsbruck, Austria

INTRODUCTION: Recruitment maneuvers (RM) have been proposed as an adjunct to mechanical ventilation in acute respiratory distress syndrome (ARDS) to counteract low tidal volume induced atelectasis (1). To evaluate the interaction between RM and prone positioning on gas exchange in patients with early extrapulmonary ARDS, we hypothesized that RM performed after six hours of prone positioning induce further improvement in oxygenation (PaO2/FiO2) and venous admixture (Qs/Qt).

METHODS: In a prospective interventional preliminary study 13 patients with early extrapulmonary ARDS were investigated. After six hours of prone positioning a sustained inflation was performed with 50 cm H2O which was maintained for 30 seconds. Data were recorded in supine position (= baseline), after six hours of prone positioning, at 3, 30, 60 and 180 minutes following the RM.

RESULTS: Compared to baseline prone positioning led to a significant improvement of PaO2/FiO2 in 8 of 13 patients (PaO2/FiO2: 147+39 mmHg vs. 243+92 mmHg; Qs/Qt: 34.6+8.5 % vs. 27.8+9.9 %; $p < 0.05$). Five patients did not respond to prone positioning. After six hours of prone positioning the responders showed a further improvement of PaO2/FiO2 and Qs/Qt at 3 minutes following the RM. PaO2/FiO2 increased from 243+92 mmHg to 378+90 mmHg and Qs/Qt decreased from 27.8+9.9 % to 17.5+5.6 % ($p < 0.05$). In all five nonresponders to prone positioning the RM resulted also in a significant increase of PaO2/FiO2 from 131+19 mmHg to 276+66 mmHg and in a decrease of Qs/Qt from 34+6.7 % to 22.6+6.2 % ($p < 0.05$) at 3 minutes following the RM. The effects on oxygenation and venous admixture could be maintained in both responders and nonresponders for the whole study period of 3 hours.

CONCLUSION: In patients with early extrapulmonary ARDS a RM performed after six hours of prone positioning led to a sustained improvement of oxygenation and venous admixture in both responders and nonresponders to prone positioning.

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LUNG RECRUITMENT AFTER CARDIAC SURGERY: A COMPARISON OF 2 DIFFERENT ALVEOLAR RECRUITMENT STRATEGIES

Roekaerts P M H J[1], Heijmans J H[1], Heines S J H[1], Dinjens J J[1]
[1]Anesthesiology, University Hospital Maastricht, Maastricht, Netherlands

INTRODUCTION: Atelectasis occurs during anaesthesia and cardiopulmonary bypass. It was shown that alveolar recruitment can improve oxygenation for a limited time (1).Our aim was to define a recruitment stategy with a more prolonged clinical benefit.

METHODS: Patients were randomised into three groups: Group 1, Control + 8 cm H20 PEEP (n=10); thirty minutes after arrival in the ICU, patients in group 2 (n=10) were recruited by setting the ventilator on CPAP (ASB = 0) with a PEEP of 35 cm H20 during 30 seconds. In group 3 (n=10), recruitment was performed by setting the ventilator in the BIPAP mode with a Pinsp of 25 cm H20 and PEEP + 10 cm H20. Ventilation was maintained in this setting for 1 minute; thereafter Pinsp and PEEP were increased with 5 cm H20 steps until a Pinsp of 35 cm H20 was reached. In the same manner, with 5 cm H20 steps, PEEP and Pinsp were decreased to 10 and to 25 cm H20, respectively. Each step was maintained for 1 minute. Statistics: Wilcoxon Signed Ranks Test and Kruskall-Wallis Test, as appropriate.

RESULTS: Mean oxygenation indices are shown in Table1. No important haemodynamic changes were observed during the recruitment manoeuvres.* = $P < 0.05$ versus corresponding value in group 1.

Oxygenation Indices

Oxygenation Index	Baseline	1 hour	2 hours	4 hours	8 hours	12 hours
Group 1	37.52	36.83	33.97	35.57	40.92	42.61
Group 2	36.49	48.46*	46.14*	45.93*	48.48	48.80
Group 3	39.40	45.53	48.44*	44.76*	47.34	46.00

CONCLUSION: A single recruitment manoeuvre has beneficial and long-lasting effects and therefore should be routinely performed. The continuous high pressure recruitment manoeuvre might be superior to the stepwise technique.

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STATUS ASTHMATICUS ADMITTED TO INTENSIVE CARE. CLINICAL COURSE AND OUTCOME - 8 YEARS REVIEW

Gomes S H[1], Correia R[2], Dias C S[1], Paiva J A[1], Mota A M[1]
[1]Anestesiologia e Cuidados Intensivos, [2]Medicina B, Hospital de S. João, Porto, Portugal

INTRODUCTION: Asthma is a common medical emergency. Severe episodes of asthma are associated with significant morbility and mortality rates and Intensive Care Unit (ICU) admission is frequently needed.

METHODS: Retrospective analysis of medical records of 25 admissions to intensive care units of a terciary-care university hospital from January 1994 to December 2002.

RESULTS: Patients in the study made up 0.4% of all ICU admissions during this period. Fifty-six percent of patients were male, with mean age of 46.3 years, and 45.8 years for female group. The status asthmaticus was caused by infection in 64%, alergy 16%, AINEs 4%, bad adhesion to therapy 4% of cases. In 12% underlying factores were unknown. The mean of time between hospital and ICU admission was 10.52 hours. Cardiorespiratory arrest occurred in 22% of cases in this period. According to the first arterial gas determined in the emergency department, 80% of patients presented acidotic (mean pH 7.15), 68% hypercapnic (mean PaCO2 77.25 mmHg) and 48% hipoxic (mean PaO2 94 mmHg, range 29.5–400). All patients required intubation and mechanic ventilation support with mean of 7.6 days and average of 5.2 days, being inferior to 4 days in 56% of cases. The neuromuscular block was necessary in 64% of cases with mean lengh of 2.2 days. The broncodilatator effects of cetamina, isoflurane and halotane were required for 48%, 8% and 4% of patients, respectively. Forty-four percent of patients didn't have complications during ICU stay. Nosocomial pneumonia was developed in 36% and pneumothorax in 8%. Total hospital mortality was 16% and 12% in ICU. No readmission was observed.

CONCLUSION: Status asthmaticus is a rare cause of admission in ICU. Despite the short mean time between the hospital and ICU admission, a significant percentage of patients had cardiorespiratory arrest in this period. More than 50% of partients had complications. Intubation and mechanical ventilation were always necessary, but of short duration. Compared with survivors, non survaviors had longer time since hospital and ICU admission.

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PROGNOSTIC FACTORS FOR CHRONIC OBSTRUCTIVE PULMONARY DISEASE PATIENTS UNDERGOING TRACHEOSTOMY

Vazquez A[1], Varela A[2], Zaheri M[2], Quesada G[2], Blasco J[2], Recio M L[2]
[1]Critical care service, Antequera Hospital, Antequera, [2]Critical care service, Antequera Hospital, antequera, Spain

INTRODUCTION: Timing is one important clinical question remaining about temporary tracheostomy in ICU patients. Probably, comorbid conditions and severity on ICU admition are important items to take in count. We'll try to apply this point of view to our COPD tracheostomy pattients.

METHODS: In our five beds ICU of a Public Health Service Hospital (with medical, surgical and traumatologic patients), 70 patients underwent tracheostomy during a four year period, having been recorded the following characteristics: gender, age, diagnosis at ICU admission, indication for mechanical ventilaion (MV), preceding clinical history, APACHE II score in the first 24 h ICU stay period, time of MV preceding and following tracheostomy, indications for tracheostomy, techniques used (surgical, Ciaglia or Griggs), early and long term complications, mortality and outcome. For our COPD patients we also assessed their previous pulmonary function tests (FEV1), when present in their clinical history.

RESULTS: The general characteristics of the serie were: 70 patients (50 male), with mean age 68.9 years. Diagnosis for ICU admision: abdomino-thoracic elective surgery (8 cases), trauma (9), pneumonia (17), COPD (13), cardio-pulmonary arrest (8) and other medical procedures (17). Mean APACHE II score 26.7. Hospital mortaliy, 43 patients. 21 patients had clinical criteria for COPD, though we could assess previous FEV1 in only 17 cases. Of these 21 patients, 7 patients had the FEV1 less than 30 % of that predicted, 14 ones were older than 64 years and 15 ones had the APACHE II score over 20 points. 2 COPD patients had none of these three variables. We assessed the hospital mortality depending of whether the COPD patients joined none, one, two or all these three variables. The result was as follows: five patients of five ones having the three variables, died during the hospital stay, as well as 7 patients of 8 ones having two variables, 3 of 6 having one variable and none of the only two patients with none of the variables. The mean time preceding and following tracheostomy in these 21 cases were 6.9 and 6.9 days, respectively.

CONCLUSION: Our data suggest that, despite offering some potential benefits over prolonged translaringeal intubation in managing ventilator dependent patients, in some chronically ill patients (for example, severe COPD patients with high severity acute and chronic scores on admition), the clinical outcome is not especially afected. However, some potential advantages, as reducing ICU stay or MV time, or increasing patients' confort, are still important. On the other hand, we wonder whether in those severe chronic cases an earlier approach would accelerate these potential benefits.

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NEGATIVE PRESSURE PULMONARY EDEMA: DO WE HAVE CRITERIA TO CONFIRM THE DIAGNOSE?

Alb M[1], Meinhardt J[2], Tsagogiorgas C[2], Van Ackern K[2]
[1]University Hospital Mannheim, Department of Anesthesiology and Intensive Care Medicine, [2]University Heidelberg, Institute of Anesthesiology and Intensive Care Medicine, Mannheim, Germany

INTRODUCTION: Development of negative pressure pulmonary edema (NPPE) caused by acute upper airway obstruction is an underestimated perioperative problem,whereas the clinical symptoms vary from severe to mild. This study reviews the literature of the past thirty years in order to investigate the number of published cases and to verify the diagnostic criteria which are used to confirm NPPE.

METHODS: We further found the entire references using the keywords "postobstructive pulmonary edema, NPPE, negative pressure pulmonary edema" via Pubmed-search.We investigated the number of cases and the used criteria to confirm the diagnosis NPPE.

RESULTS: We identified 58 articles which show 169 patients (99 male, 40 female, mean age 33,5years). Two retrospective case report studies from Tami et al [2]and Deepika et al [1] give different statements concerning the occurrence of NPPE. Tami used a preselected collective of patients which were reintubated, without publishing details about other diagnostic criteria. Deepika et al used clinical findings like tachypnea associated with pulmonary crackles on auscultation, pink frothy sputum, hypoxemia on arterial blood gas analysis or pulse oxymetry and radiological findings. All further articles are case reports that are based on different criteria.

Pink frothy sputum	**Acute / late onset**	
Subjective Dyspnea	Pulmonary crackles on	
Radiological manfest pulmonary edema	O2-mask with high	oxygen flow >6l/min
Not conditioned by cardiac disorders	SaO2 < 90% despite	oxygen therapy
Stridor	Long monitoring in	the recovery room
Paradoxical inspiration		

CONCLUSION: NPPE is a rare entity. Its rarity is due to lack of identification, especially in mild cases, because there are no international criteria to verify NPPE. We propose clinical symptoms (table 1) as Deepika used, in addition to high oxygen flow via O2-mask and long monitoring in the recovery room.

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Pulmonary edema and acute upper airway obstruction. Laryngoscope 96: 506-509

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IDIOPATHIC PULMONARY FIBROSIS AND ACUTE RESPIRATORY FAILURE. EMERGENCY LUNG TRANSPLANTATION?

Palomar M[1], Sanchez A[1], Tenorio L[1], Roman A[2], Laborda C[1], Marquina S[1], Angles R[1], De Latorre F[1].
[1]ICU, [2]Pneumology, H Vall Hebron, Barcelona, Spain

INTRODUCTION: Several studies indicate the bad prognosis of patients with Idiopathic Pulmonary Fibrosis (IPF) who are admitted with respiratory failure at the Intensive Care Unit (ICU), with a rate of mortality that reaches the 100% in some of the series. Lung transplantation could be a therapeutic option for these patients. The aim of this study was to analyze the prognosis of the patients with IPF who are admitted to an ICU of a Hospital with Lung Transplantation program.

METHODS: Retrospective, case-series,observational study. We evaluated the patients with IFP and acute respiratory failure admitted to the ICU of a third level Hospital between January 1998 and September 2003. Complete information about the cause of IPF, clinical course, current clinical status, ventilatory support, LOS, pulmonary functional tests, possibility of transplantation, complications and mortality was collected.

RESULTS: Thirteenth patients (5 women/8 men) were included. Seven with idiopathic pulmonary fibrosis, 5 associated collagen diseases and 1 due to radiotherapy. All of them were admitted for acute respiratory failure. The mean age was 54.23 years and the mean length of stay 18 days. During their stay, 8 from the 13 patients were included on the list for lung transplantation in emergency situation. One of them had no donor. The mean length in days until transplantation was 10.57 and the mean interval between admission to the ICU and death was 12.2 day. Four patients died from multiple organ failure, two of them from cardiac arrest (both of them during the surgery) and four from refractory hypoxemic failure. In the ICU, 5 from the 7 patients who were transplanted required mechanical ventilation previous to the operation, with a global mortality of 71%. All of the 6 non-transplanted patients required mechanical ventilation, observing in this group a mortality of 83%. Only two patients survived after a lung transplantation in emergency situation. The follow- up of these patients showed that one of them died two years after the transplantation, so there is only one patient still alive.

	GLOBAL	Included on Transplan list	Not included on Transp list
pH	7,37	7,36	7,39
pCO2mm Hg	57,8	61,8	52,3
pO2 mm Hg	92	105	72
paO2/FiO2	97	110	97
Mechan Vent %	85	75	100
Mortality %	77	75	80

CONCLUSION: We confirm the bad prognosis of the patients diagnosed of FPI who need admittance to the ICU. Although in our experience the survival was higher than the one described in the literature, the benefit of the lung transplantation would need to be confirmed by bigger series.

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OXIDIZED FIBRINOGEN AND SCD14 ARE NOT ACCURATE AS MARKERS OF PNEUMONIA OR PULMONARY EDEMA

Kondratov A[1], Zveibil F[2], Mugrabi A[1], Michelis R[3], Makhouk N[2]
[1]Internal Medicine, [2]Critical Care, [3]Eliachar Research Laboratory, Western Galilee Hospital - Nahariya, Nahariya, Israel

INTRODUCTION: Community-acquired pneumonia, requiring hospitalization is a severe illness with high mortality rates, especially when appropriate treatment is delayed. At times, the correct diagnosis of the disease is difficult due to equivocal clinical picture or chest film, and accompanying diseases that may mask or simulate pneumonia. Oxidized fibrinogen levels were found elevated in chronic dialysis patients. The levels of sCD14 were found elevated in gram-negative bacterial septicemia. The aims of our study were: 1) The follow-up of levels of sCD14 and oxidized fibrinogen (OF) throughout hospitalization in patients admitted to the hospital due to pneumonia or cardiogenic pulmonary oedema ; 2) The analysis of their efficacy as markers for diagnosis of pneumonia and for follow up treatment.

METHODS: Three groups of patients were studied: I) group1- 15 patients admitted due to pneumonia; II) group 2- 15 patients admitted due to pulmonary edema; and III) a control group 15 healthy subjects. The blood samples for white blood cell count, erythrocyte sedimentation rate, levels of fibrinogen, C-reactive protein, albumin, sCD14, and oxidized fibrinogen were measured in each patient on admission, 48 and 72 hours following admission and on discharge day. The collected data were compared using Student T-test.

RESULTS: On admission, the levels of sCD14 were higher in the patients with pneumonia and pulmonary edema, but still in the normal range, in comparison with the control group (P<0.02 for both groups), with gradual decline throughout the hospitalization period (P>0.1 for both groups in discharge day). The comparison of sCD14 levels between groups of patients with pneumonia and pulmonary edema did not reveal statistically significant results (P>0.6). The rates of oxidized fibrinogen were in the normal ranges (<1.0 nmol/mg) throughout hospitalization period in both groups of patients, but surprisingly higher in the control group (P<0.013).

CONCLUSION: Oxidized fibrinogen and sCD14 are not reliable markers for primary diagnosis of pneumonia, for differential diagnosis from pulmonary edema, or for patient follow-up throughout hospitalization period. The finding of elevated levels of oxidized fibrinogen in the group of healthy persons demands additional studies for discovering other factors that cause changes in fibrinogen oxidation rates.

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NONINVASIVE MECHANICAL VENTILATION IN PATIENTS WITH ACUTE RESPIRATORY FAILURE AND CONTRAINDICATIONS

Carrillo A[1], Gónzalez G[1], Esquinas A[1], Jara P[1], Párraga M[1], Rodriguez M D[1], Gil B[1]
[1]ICU, H.Morales Meseguer, Murcia, Spain

INTRODUCTION: Noinvasive mechanical ventilation (NIV) have been shown efectivity in some forms of acute respiratory failure, specially in chronic respiratory failure. The Consensus Conference of NIV recommends that 10 Glasgow Coma score and hemodynamic inestability are contraindications for use (1).

METHODS: Prospective observational study in ICU patients treated with NIMV. Criteria for NIMV were respiratory rate > 30, ratio PaCO2/FiO2 < 200 with mask ventury and respiratory muscular accesory activity. Success was defined if avoid endotraqueal intubation and survival 24 hours after ICU.

RESULTS: Obsevational period 80 months, 1335 patients with NIMV; 362 (27.1%) did not have NIMV criteria by CC for NIMV, 132 neurologic contraindications, 216 hemodynamic inestability and 15 for both criteria. In the contraindications patients age was 70±13 years vs 68±14 in group without contraindications (p:0.003). Gender. 46.3 and 39.8% females respectivaly (p:0.033). Hypoxemic acute respiratory failure was 53.7 and 60.2% respectivaly (p:0.110). SAPS II y score SOFA maximun during ICU was 53±16 and 8.8±3.6 in contraindications group vs 40±11 and 5.1±3.0 in the other patients (p<0.001 and p<0.001 respctivaly). Diferents prognosis among groups were determinated by hemodynamic inestability and not by neurologic factors. Success of NIMV were in population with lower 10 points GCS or superior (77 y 70% respectively, p:0.063). Shock population had success rate 32% and 79% in population without shock (p<0.001)

	Contraindications	No contraindications	p-value
Baseline PaO2/FiO2	135±37	160±40	<0.001
1 hour NIV PaO2/FiO2	169±41	188±38	<0.001
Baseline PaCO2	67±31	61±22	<0.001
1 hour NIV PaCO2	60±26	56±21	0.003
Baseline RR	33±9	33±6	0.653
1 hour NIV RR	31±6	30±11	0.067
Success NIV	183 (50.4%)	764 (78.7%)	<0.001
ICU mortality	134(36.9%)	151(15.5%)	<0.001

CONCLUSION: Population with common major contraindications were more severely illness, that only may explain lower success and prognosis with NIMV in patients with haemodinamic inestability

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LUNG INJURY IN PATIENTS FOLLOWING THORACOTOMY

Ana C[1], Mercedes P[1], Joan Ramon M[1], Judit S[1], Maria D[2], Carolina C[1], Sandra M[1], Rosa A[1]
[1]ICU, [2]Thoracic Surgery, H. Vall d'Hebron, Barcelona, Spain

INTRODUCTION: Postoperative acute lung injury (ALI) is a posible complication of pulmonary resection and acute respitarory distress siyndrome (ARDS) is the most severe form of ALI (1).We investigate the frequency, mortality and complications of ARDS in our population of patients submitted to pulmonary resection.

METHODS: Observational study from January 1998 to March 2004. A total of 334 pulmonary resections were followed. We analyze the epidemiology, severity, management, complications and outcome. Statistical study with T test.

RESULTS: During the study period a total of 179 pneumonectomies and 165 lobectomies were performed, of these, 16 developed respiratory failure fulfilling the criteria for ARDS. Pulmonary resections was due to 14 cell lung carcinoma, 1 tuberculosis and 1 aspergiloma. There were 15 men and 1 women, with a mean age of 60 years (range 36-74). The APACHE II at the admission in ICU was 20 (7). The mean time to presentation following surgery was 3.56 days (range 1-7). According to the type of operation, the frecuency was higher following pneumectomies (5.5%) than lobectomies (3%), but without statistical significance. In all cases, admission to ICU was due to respiratory failure. All patients required endotraqueal intubation and mecanical ventilation for a mean of 14.4 (range 1-61) days. In 7 cases percutaneous traqueostomy was performed. The mean duration of hipoxemia (pO2/FiO2 < 200) was 7.1 (6.1) days. The worse mean of respiratory parametres were PaFi 78 (19.8), pH 7.27 (0.14), pCO2 63.6 (16.4). NO was adminstrated in 3 patients none of them whith good response. In any case prono decubit was performed and esteroids was administrated in 3 cases with good response. None patient received empiric antibiotic therapy in the admission at ICU. The mortality rate was 75%. Table 1 shows characteristics of patients, according outcome.

	SUVIVORS	NON SUVIVORS	P
N° patients	4	12	
AGE (years)	49 (13)	63.3 (7.5)	0.015
APACHE II	13.2 (3.5)	22.5 (6.2)	0.014
HIPOXEMIA (days)	15 (5.3)	4.4 (3.4)	0.02
ICU-LOS (days)	38.7 (13)	9.6 (17)	0.007

CONCLUSION: Our findings doesn't differ from other reported series that suggest that arround 5% of patiens with pulmonary resection develop lung injury. ARDS is a severe complication following pulmonary resection and is associated with high mortality(2). Non survivors were older, with higer APACHE score and spend less days at ICU.

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EFFECT OF RADICAL SCAVENGER TEMPOL ON ENDOTHELIAL AND COAGULATION DYSFUNCTION DURING PORCINE SEPSIS

Krouzecky A[1], Matejovic M[1], Martinkova V[1], Radej J[1], Radermacher P[2], Novak I[1]
[1]ICU, Dept of Internal Medicine I, Charles University Hospital Plzen, Plzen, Czech Republic, [2]Sektion APV, Dept of Anesthesia, University Hospital Ulm, Ulm, Germany

INTRODUCTION: Endothelial cells play a central role in sepsis-induced activation of coagulation. The vascular endothelial surface is a major target of oxidative stress (1). This study evaluated the effects of the membrane permeable radical scavenger Tempol (Temp) on P. aeruginosa (Pa)-induced endothelial and hemostatic stress.

METHODS: 12 h after induction of shock with continuous i.v. Pa 14 pigs received either no drug (CON, n=7) or Tempol (n=7, 30 mg/kg/h). Hydroxyethylstarch was infused to maintain hyperdynamic circulation. Before, 12,18 and 24 hrs after the start of Pa plasma levels of markers related to endothelial function (von Willenbrand factor (vWf), hypercoagulability (trombin-antithrombin complexes (TAT), and fibrinolysis inhibition (activity of plasminogen activator inhibitor type 1 (PAI-1 act) were measured.

RESULTS: Data are median and interquartile range, P<0.05. * vs. Preshock (RM ANOVA on Ranks);§ Temp vs CON (Mann-Whitney Rank Sum Test).

	Baseline	12 hours	18 hrs	24 hours
vWf CON mU/g prot	8 (7,31)	15(13,48)*	22(14,57)*	25(15,99)*
vWF TEMP mU/g prot	7 (6,7)	10(8,17)*	10(7,18)*§	13(8,21)*
TAT CON ug/g prot	1 (1,3)	3(1,5)*	6(3,13)*	6(5,14)*
TAT TEMP ug/gprot	2(2,5)	3(2,4)	3(2,5)	6(4,7)
PAI1 CON U/ml	22(16,23)	37(31,39)*	39(38,39)*	37(32,39)*
PAI1 TEMP U/ml	18(14,20)	27(23,36)*	33(3037)*§	27(20,36)*

CONCLUSION: This longterm model of hyperdynamic sepsis is characterized by significant activation/dysfunction of endothelial cells and coagulation system. Free radical scavenger Tempol exerted incomplete protection against sepsis-induced endothelial and hemostatic stress.

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ADMINISTRATION OF ACTIVATED PROTEIN C (Xigris) IN A EWE MODEL OF SEPTIC SHOCK

Wang Z[1], Su F[1], Wijns W[2], Cai Y[3], Nguyen N D u c[4], Rogiers P[5], Jean-Louis V[1]
[1]Intensive Care Department, [2]Chemical Department, Erasme Hospital, [3]Diabete Center, [4]Intensive care department, Vrije University, Brussels, [5]Intensive Care Department, Meddelheim General Hospital, Antwerp, Belgium

INTRODUCTION: Activated protein C (APC) has multi-potential pharmacological properties (anti-inflammatory, antithrombotic, profibrinolytic, and anti-apoptotic properties) that can improve outcome from severe sepsis and septic shock. However, some clinicians still challenge these beneficial effects. The aim of this study was to investigate whether early administration of APC is beneficial in a well controlled model of septic shock due to peritonitis.

METHODS: The study included 14 fasted, anesthetized, invasively monitored, mechanically 2.3kg) who received 0.5 kg/kg body weight of±ventilated female sheep (30.9 feces into the abdominal cavity to induce sepsis. Fluid resuscitation with Ringer´s lactate was titrated to maintain pulmonary arterial occlusion pressure at baseline. No vasoactive agents or antibiotics were utilized. Two hours after the induction of sepsis, animals were randomized to receive APC (drotrecogin alfa activated, Xigris, kindly provided by Eli Lilly and Co, Indianapolis, USA) g/kg/hr (n=7) or equivalent vehicle in a controlmintravenously at a dose of 24 group (n=7). The primary end-point was mortality at 30 hours.

RESULTS: The APC group had a significantly longer survival time than the control group (27.1 ± 5.2 vs 18.2 ± 2.2 hrs respectively, p<0.01). APC significantly ameliorated pulmonary arterial hypertension (p<0.05) and improved PiO2/FiO2. The wet/dry ratio was significantly lower in the APC than in the control group (6.3 ± 0.7 vs 7.1 ± 1.2, p<0.05). APC significantly decreased arterial lactate concentration (p<0.05) and better maintained colloid oncotic pressure (p<0.05).

CONCLUSION: In this clinically relevant model of septic shock due to peritonitis, APC showed beneficial effects in significantly improving oxygenation, ameliorating capillary leakage, decreasing arterial lactate concentration, and prolonging survival time.

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INHIBITION OF ADP-INDUCED PLATELET ACTIVATION BY ANTITHROMBIN III

Kaneider N C[1], Mosheimer B A[1], Djanani A[1], Wiedermann C J[1]
[1]Internal Medicine, University of Innsbruck, Innsbruck, Austria

INTRODUCTION: Disseminated intravascular coagulation is an early complication in patients with sepsis. In response to endothelial disruption occuring in sepsis, platelets adhere within seconds to sub-endothelial matrix molecules, additional platelets and leukocytes are recruited to the initial platelet layer resulting in the formation of thrombi. Platelet recruitment crucially depends on amplification systems provided by autocrine and paracrine factors such as adenosine diphosphate (ADP). It was observed that antithrombin (AT) limits inflammation in animal studies of endotoxin (LPS)-induced sepsis. Compared with control animals, AT significantly reduced LPS-induced arteriolar and venular leukocyte adherence and prevented depression of functional capillary density. This observation led to the conclusion that specific interaction with cell-surface glycosaminoglycans on the endothelium rather than anticoagulant properties is the mechanism of AT-mediated attenuation of leukocyte-endothelial cell interaction and capillary perfusion failure.
Aim. - The aim of the study was to investigate the effect of AT on platelet-neutrophil interactions, on platelet activation, and the implication for a possible role of antithrombin in DIC.

METHODS: Respiratory burst of neutrophils was measured fluorometrically. ATP- and ADP-levels were measured by HPLC. CD40Ligand and syndecan-4 surface expression by platelets was determined immunologically by FACS. ADP-induced dissociation of Rho-GTPases and phophorylation of p38MAPK was assesed by Western blotting. Soluble syndecan-4 in platelet supernatants was measured by sandwich ELISA. Syndecan-4 mRNA expression in platlets was performed by RT-PCR.

RESULTS: AT limited activated platelet-induced increased respiratory burst of neutrophils. No effect of AT on respiratory burst was observed without platelets. An inhibition of the ATP and ADP secretion from activated platelets was seen. Treatment of platelets with chondroitinase, heparinase and mAb against syndecan-4 or pretreatment of AT with pentasaccharide abolished the anti-oxidative effect of AT on neutrophils, suggesting a role for syndecan-4. RT-PCR and FACS analysis demonstrated the expression of syndecan-4 on platelets. Signaling studies showed an involvement of p38MAPK and Rho-GTPases. Furthermore we observed a decrease in CD40L expression in ADP-activated platelets.

CONCLUSION: AT may exert its beneficial effects in animal studies DIC via a platelet-dependent inhibition of respiratory burst of neutrophils, decreased platelet activation observed as inhibition in ADP- and ATP-release from activated platelets and down-regulation of ADP-induced CD40L-expression. AT might act on ADP signalling via syndecan-4.

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ADMINISTRATION OF HUMAN PROTEIN-C IMPROVES SURVIVAL IN AN EXPERIMENTAL MODEL OF SEPSIS

Messaris E[1], Markogiannakis H[1], Chatzigianni E[1], Economou V[1], Theodossiadis G[1], Georgiadis G[2], Petrosian A[2]
[1]A' Department of Propaedeutic Surgery, University of Athens, [2]Intensive Care Unit, Hippocration Hospital, Athens, Greece

INTRODUCTION: The aim of this study was to examine the effect of human Protein-C concentrate (PCcon) on survival of septic rats subjected to cecal ligation and puncture. We also investigated the microscopic changes that occurred in the brain, heart, lung, liver, kidney and gastrointestinal tract after PC administration.

METHODS: Cecal ligation and puncture (CLP) was performed in 210 rats. Half of the septic rats were randomly assigned to receive intravenously 100IU/Kg of human PCcon 1, 7, 13 hours post CLP. Septic animals were randomly re-divided in a survival group (n=90) that was monitored for 50 hours and in six time groups (n=120) that were studied in 6h, 12h, 24h, 36h, 48h and 60h after the operation. Brain, heart, lung, liver, kidney, gastric, colon and cecal tissue were removed and post-fixed in paraffin sections. Histological changes were evaluated by light microscopy in hematoxylin and eosin-stained specimens. Plasma levels of Tnf-a and IL-6 were measured.

RESULTS: Significant reduction in sepsis mortality was demonstrated 50 hours post CLP in the group that received PCcon (25% vs 46%, p=0.03). Furthermore, this was associated to reduced tissue necrosis of vital organs. Microscopic findings showed an anti-inflammatory and anti-apoptotic effect for PCcon. Cytokine plasma levels were significantly reduced in PC treated animals, especially during the hypedynamic phase of sepsis (p=0.001).

CONCLUSION: Human PC administration in animals with severe sepsis is beneficial, since it prolongs their survival. Human PC limits the extent of tissue necrosis and apoptosis in vital organs and decreases the plasma levels of inflammatory cytokines.

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RECOMBINANT FACTOR VIIA TO TREAT LIFE-THREATENING HEMORRHAGE IN SEPTIC AND NON-SEPTIC PATIENTS

Kalenka A[1], Münch E[1], Fiedler F[1]
[1]Departement of Anesthesiology and Critical Care Medicine, Faculty of Clinical Medicine Mannheim, University of Heidelberg, Mannheim, Germany

INTRODUCTION: Recombinant factor VIIa (rFVIIa; NovoSeven, Novo Nordisk, Agsvaerd, Denmark) has been approved for prevention and treatment of bleeding in patients suffering from hemophilia with inhibitors. Numerous case reports and retrospective studies submitted to a web-based drug surveillance have been published, that record the sucessfull use of rFVIIa to treat life-threatening haemorrhage in patients without pre-existing coagulation disorders. However, it is unknown whether rFVIIa induces hemostasis in septic patients with disseminated intravascular coagulation. Therefore, the objective of this study was to investigate clinical efficacy of rFVIIa in septic and non-septic patients with bleeding complications

METHODS: Between 09/2001 and 03/2004, 25 adult patients with life-threatening haemorrhage without pre-existing coagulopathy were entered into the study retrospectively. Out of 6 patients with severe sepsis and DIC (known infection and at least 1 organ dysfunction) and 17 non-septic patients with severe bleeding complications due to different reasons, we reviewed coagulation parameters and the amount of transfused blood products prior to and 48 hours after application of rFVIIa. The patients´s underlying diseases and dosages of administered rFVIIa are illustrated in Table 1. Relevant thromboembolic complications were recorded

RESULTS: Prior to administration of rFVIIa, 17.4 ± 3.3 (mean ± standard error of the mean) units of Red Blood Cells (RBC), 9.7 ± 1.6 units of Fresh Frozen Plasma (FFP) and 3.2 ± 0.6 units pooled platelets (Plt) were substituted to the non-septic patients. After administration of rFVIIa, significantly less RBC 4.4 ± 1.2 (p<0.01), FFP 3.3 ± 1.6 (p<0.01) and Plt 1.3 ± 0.8 (p<0.05) were transfused. Coagulation analysis demonstrated normalisation of international normal ratio (1.3 ± 0.01 versus 1.1 ± 0.01; p<0.01) and Partial Thromboplastin Time (58 ± 11.0 s vs. 34 ± 2.6 s; p<0.05) after administration of rFVIIa. No differences were detected concerning the platelet count. In the septic-group administration of rFVIIa neither resulted in a reduction of transfused blood products nor in a reversed coagulopathy.
Three thromboembolic complications were observed in the non-septic patients. Mortality rate was 29% in the non-septic group vs. 83% in the septic group (p=0.02)

Indication	n	µg/ kg Dosage (range)
Sepsis	6	100 (60-160)
Trauma	7	115 (70-160)
Post Surgery	5	80 (60-120)
Intraoperative	4	80 (60-140)
Other	3	87 (60-130)

n = number; µ/kg = Dosage µg/kg bodyweight

CONCLUSION: Recombinant factor rFVIIa appears to be effective in from life-threatening haemorrhage due to non-septic reasons. In septic patients administration of rFVIIa did not influence the hemostatic abnormalities.

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EVIDENCE FOR LEUCOCYTE ACTIVATION IN THE COAGULATION PROCESS IN HEATSTROKE

Chollet-Martin S[1], Malaquin C[1], Pease S[2], Arnaud B[3], Bezeaud A[3], Venisse L[3], Wolff M[2], Huisse M[1].
[1]Haematology and Immunology, [2]Intensive Care Unit, [3]Inserm E348, Bichat University Hospital, Paris, France

INTRODUCTION: The inflammatory and coagulation responses to heatstroke result in injury to the vascular endothelium, disseminated intra-vascular coagulation (DIC) and microthrombosis leading to multiorgan failure and death. The physiopathology is still uncompletely elucidated. We focused our study on the role of the tissue factor (TF) pathway together with leucocyte activation.

METHODS: We studied 18 patients with heatstroke admitted in ICU during the August 2003 heat wave in France. Plasma samples were available at the admission for all 18 patients and during the course of the disease in 13 patients. To assess the extent of the inflammatory response in the patients, plasma concentration of cytokines was studied by ELISA. Leucocyte activation was evaluated by the expression of \beta2 integrins and L-selectin by flow cytometry using specific MoAbs; reactive oxygen production (ROS) by chemoluminescence and metalloproteases MMP9 and MMP2 by gelatin zymography. As markers of cell activation and/or apoptosis, microparticles (MP) isolated from plasma were double-stained with annexinV (AV) and cell specific MoAbs against platelets (CD41) or granulocytes (CD15) and analyzed by flow cytometry. Microparticles procoagulant phospholipids were measured by prothrombinase assay. Whole blood and microparticles TF was determined by a specific clotting assay.

RESULTS: Increased levels of IL6, IL8 and IL1-RA were observed whereas IL18, IL1-\beta and TNF\alpha were normal or undetectable (table). Blood leucocyte activation was demonstrated by:- an up-regulation of \beta2-integrin expression, -a down-regulation of L-selectin expression, -an increased ROS production. Moreover, pro-MMP2 and 9, possibly released by activated granulocytes were increased in the 5 tested patients with presence of active MMP9 in three. Markers of DIC (thrombocytopenia, decreased FVII and FV levels, presence of soluble fibrin and increased levels of TAT) were observed in 17/18 patients. Whole blood TF was increased in all patients (235±199 pg/ml, mean ±SD) vs controls (< 40 pg/ml). Compared to healthy controls, the number of AV positive MPs was not increased, but the cellular origin was different, with a significant decrease in platelet MPs (p<0.05) and a significant increase in granulocyte MPs (p<0.05). Furthermore, MPs TF was increased and contributed for a large part to the high procoagulant state.

	IL6	IL8	IL1-RA	IL8	IL1\beta	TNF\alpha
Patients n=18	252±119	520±272	5372±3036	278±49	<5	5±1
Controls n=15	<5	<5	200-400	246±62	<5	<5

mean (pg/ml)+/-SEM

CONCLUSION: High levels of inflammatory cytokines play a crucial role in leucocyte activation leading to down regulation of L-selectin, ROS production and active MMP9. Our results suggest a major role of MPs of granulocyte origin in the TF-dependent procoagulant state that correlates with the severity of the disease.

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EFFICACY AND SAFETY OF FONDAPARINUX SODIUM IN THE CRITICALLY ILL

Koole M A[1], Wester JP [1], Bosman RJ [1], Oudemans-van Straaten HM [1], Van der Spoel JI [1], Haak EA [2], Leyte A [3], Zandstra DF [1]
[1]Intensive Care Unit, [2]Clinical Pharmacy, [3]Clinical Chemistry, Onze Lieve Vrouwe Gasthuis, Amsterdam, Netherlands

INTRODUCTION: In critically ill patients, heparin-induced thrombocytopenia (HIT) accounts for 6-11% of all causes of thrombocytopenia. As HIT may be complicated by arterial and venous thrombosis (HITT), alternative anticoagulation is indicated. Fondaparinux sodium (Arixtra®) is a newly developed synthetic pentasaccharide acting by selective antithrombin-mediated indirect factor Xa inhibition resulting in subsequent thrombin inhibition without cross-reactivity to heparin . It is almost exclusively renally eliminated in unmetabolised form. Data on dosing schedules in critically ill patients are non-existent. We describe our experience with fondaparinux anticoagulation in critically ill patients.

METHODS: Between March and August 2003, we have treated 7 patients with thrombocytopenia and suspected HIT with fondaparinux sodium. Awaiting the test results of the HIT ELISA test, fondaparinux sodium (Arixtra®, Sanofi-Synthelabo, The Netherlands) was administered as a once daily subcutaneously injection or a continuous infusion of 2.5 mg/day without loading dose. For monitoring, aXa-levels were measured every 12 hours, and creatinin clearance was calculated. Study endpoints were thrombo-embolic and bleeding complications and need for transfusion.

RESULTS: Four female and three male patients, aged between 50 and 80 years, APACHE II scores between 14 and 40, with suspected HIT were treated with fondaparinux sodium for 3-5 days. Creatinin clearances varied from 0 ml/min to 104 ml/min. Two anuric patients were treated with continuous venovenous hemofiltration. Anti-Xa levels varied from 0.1 to 0.6 U/ml. HIT-antibodies were absent in all patients. There was a negative correlation between creatinin clearance and mean aXa-levels (r = -0.86) and maximum aXa-levels (r = -0.87). No thrombo-embolic complications occurred. In 2 patients overt minor bleeding occurred and in 3 patients occult minor bleeding occurred.

CONCLUSION: In 7 critically ill patients with thrombocytopenia, anticoagulation with fondaparinux sodium seems to be efficacious. Despite thrombocytopenia, bleeding complications were clinically acceptable. Decreased creatinin clearance may result in high prophylactic or low therapeutic aXa-levels even in low dose fondaparinux administration.

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PROTEIN C WAS PREDICTIVE OF MORTALITY AND DROTRECOGIN ALFA (ACTIVATED) EFFICACY IN SEVERE SEPSIS

Macias W L[1], Nelson D R[1], Bernard G R[2], Dhainaut J[3], Levi M M[4]
[1]Lilly Research Laboratories, Eli Lilly and Company, Indianapolis, [2]School of Medicine, Vanderbilt University, Nashville, United States, [3]Cochin Institute, Royal University Hospital, Paris, France, [4]Department of Medicine, University of Amsterdam, Amsterdam, Netherlands

INTRODUCTION: Reductions in protein C (PC) levels are generally associated with poorer outcomes for severe sepsis patients. The levels at which PC deficiency becomes a significant risk factor for mortality and the timing relative to overall disease progression remain poorly defined. We tested the hypothesis that baseline PC was a risk factor for severe sepsis mortality, and that early changes in PC influence patient outcome. Additional analyses evaluated the efficacy of drotrecogin alfa (activated) [DrotAA] in patients sub-classified by PC status.

METHODS: Patients from PROWESS with PC measures at baseline and Day 1 were studied (n=1452). PC levels expressed as %. Baseline PC and change during the first day were assessed as risk factors by logistic regression using placebo patients only (n=709), adjusting for significant baseline factors for all-cause 28-day mortality. Chi-square tests determined significant differences between DrotAA and placebo patients in subgroups based on PC class.

RESULTS: Placebo patients with <40% at baseline (n=253) were at greater risk of death vs patients with >40% (37.6% vs. 24.3%, 28-day mortality; OR: 3.3 [2.0-5.3]; adjusted for baseline risk factors). Among placebo patients with >40% PC at baseline, those experiencing a >5% decrease during the first day (n=189) were at greater risk of death vs those that did not (32.3% vs 18.7%, 28-day mortality; OR: 2.2 [1.4-3.6]). Placebo patients who were <40% at baseline but improved to >40% in the first day (n=49) significantly reduced their risk of death vs those without such an improvement (24.5% vs 40.7%, 28-day mortality; OR: 0.42 [0.20-0.92]). DrotAA improved PC status, as the percentage of patients with baseline PC>40% that experienced a >5% drop in PC during the first day was lower for DrotAA vs placebo (27.3% vs 41.5%, % of patients with >5% decrease; p<0.0001). Additionally, patients with baseline PC<40% that received DrotAA were more likely to increase to >40% in the first day than those treated with placebo (35.5% vs. 19.4%, % patients increasing to >40%; p<0.0001). These effects translated to lower mortality rates in patients that received DrotAA, observed earlier in patients with baseline PC<40% (7 day mortality: 14.7% vs 22.5%, p=0.02) and later for baseline PC>40% (hospital mortality: 24.4% vs 30.7%, p=0.06).

CONCLUSION: Early measures of PC were predictive of 28-day mortality in severe sepsis. Dynamic measures over the first day were a sensitive indicator for later events. DrotAA generally preserved or improved PC status in severe sepsis patients, and these effects were associated with more favorable outcomes.

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DROTRECOGIN ALPHA (ACTIVATED) IN THE TREATMENT OF ACUTE SEPTIC DESCENDING MEDIASTINITIS

Marsilia P F[1], Imperatore F[1], Munciello F[1], Scarpelli M[1], Teodori R[1], De Cristofaro M[1], Occhiochiuso L[1]
[1]Unit of Anaesthesia and Intensive Care, Department of Emergency, A. Cardarelli Hospital, Naples, Italy

INTRODUCTION: Acute septic descending mediastinitis (ASDM) has been defined as the mediastinum infection which results from the spreading of oropharyngeal infections, or deep neck structures (1). Drotrecogin-alpha (activated) or recombinant human activated protein C (rhAPC) is the only biological agent approved for use in severe sepsis syndrome that has demonstrated efficacy in reducing 28-day all-cause mortality and new data suggests a trend towards longer term survival(2). Very few data in literature report the use of rhAPC in the treatment of ASDM. Aim of this study is to report our experience of 7 cases of ASDM complicated by a severe sepsis-induced multiple organ failure syndrome (MOFS) and successfully treated with the infusion of rhAPC.

METHODS: Four male and three female patients were admitted to our Intensive Care Unit for ASDM due to oropharyngeal infection and complicated by a severe sepsis-induced MOFS. All patients were undertaken to combined cervicotomy and thoracotomy surgical operation with toilette and drainage of infection. Moreover the infusion of rhAPC at 24 gamma/kg/min for 96 hours was given together with all other certain established procedure. Respiratory failure was managed with sedation, orotracheal intubation and invasive mechanical ventilation. Cardiac failure was managed with invasive arterial and central venous pressure monitoring together with the infusion of catecholamines up to standard doses; while renal failure was managed with continuos venous-venous haemodiafiltration. Antibiotics were given first empirically and then according to lab test results.

RESULTS: All patients were discharged alive at home. Main characteristics of patients were: age 52.3±12.4, SAPS II 45.4±11.8. Moreover mean ICU and hospital length of stay were of 14.5±7.2 and 36.2±8.4 days respectively.

CONCLUSION: The results of these reports suggest that the early intensive treatment and the administration of rhAPC are efficacious in managing ASDM complicated by severe sepsis-induced MOFS.

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GUIDELINE APPLIED PRACTICE: EVALUATING THE CLINICAL INTRODUCTION OF DROTRECOGIN ALFA

Stallwood M[1], Nolan J[1], Wenstone R[1], Masterson G[1], Marx G[2]
[1]Intensive Care Unit, Royal Liverpool University Hospital, [2]University Department of Anaesthesia, University of Liverpool, Liverpool, United Kingdom

INTRODUCTION: An institutional guideline for Drotrecogin alfa (DA) use was developed and approved by the local drugs and therapeutic committee. It incorporated the presence of three or more criteria of the systemic inflammatory response syndrome, at least two-system organ failure, an APACHE II score of 25 or more and prescription by a consultant intensivist within 48 h of onset of sepsis-induced organ failure. The objective of the study was to monitor guideline compliance and assess characteristics and outcomes of patients treated with DA.

METHODS: Clinicians were provided electronically with the guideline and an information manual. A research nurse retrospectively reviewed records of the patients receiving the drug. The results are presented as mean ± standard deviation.

RESULTS: Between March 2003 and December 2003 11 patients received DA. Complete records were available for all patients. 100% met guideline criteria for administration of DA. 5 female and 6 male patients received DA with a mean age of 65 ± 16 years and an APACHE II score of 31.4 ± 3.7. All patients required mechanical ventilation and the use of vasopressors. 6 patients had 3 system and 5 patients 2 system organ failure. 73% had a positive blood culture. Time after onset of sepsis-induced organ failure until start of DA was 13 ± 13 hours (range: 4-48 hours). The mean duration of infusion was 66 h (range: 2-96 hours). Overall 28 day mortality was 55% with a predicted APACHE II mortality of 74 %. Notably, 64% (7/11) of the patients completed the 96-hour infusion. Of those completing the full course mortality was 29% (2/7) whereas all 4 patients not completing the 96 h course died. One non-intervention related major haemorrhage occurred (gastrointestinal) and haemostatic concerns prompted drug discontinuation in three other patients. One was an intervention-related haemorrhage (bronchoscopy performed without stopping DA administration - protocol violation), one due to a decrease of platelets to 6000 /mm3 after DA administration was initiated and lastly, one haemorrhage at a catheter-insertion site.

CONCLUSION: Guideline applied practice could be successfully used for local introduction of Drotrecogin alfa treatment. Our data suggest a possible association between treatment duration and mortality.

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EFFECTS OF ANTITHROMBIN ON EXPRESSION OF ENDOTHERIAL ADHESION MOLECULES

Nishiyama T[1], Yokoyama T[2], Yamashita K[2], Hanao ka K[1]
[1]Anesthesiology, The University of Tokyo, Bunkyo-ku, [2]Anesthesia and Critical Care Medicine, Kochi University Medical School, Nangoku, Japan

INTRODUCTION: Endotherial adhesion molecules increase in severe inflammation (1) or coagulation and fibrinolytic disorder (2). The effects of antithrombin (AT) on adhesion molecules are examined only in animal experiment (3). Therefore, we investigated its effects clinically in major vascular surgery.

METHODS: Sixteen patients scheduled for Y graft replacement for abdominal aortic aneurysm were divided into two groups (AT and Control groups) after informed consent and institutional approval. Anesthesia was performed with sevoflurane, nitrous oxide and epidural block with mepivacaine. Heparin 2,000 units were administered before clamping the aorta. In the AT group, AT 3,000 units were infused before clamping the aorta and 24 hours later. Serum concentrations of AT, intercellular adhesion molecule 1 (ICAM-1), endotherial leukocyte adhesion molecule 1 (ELAM-1), and vascular cell adhesion molecule 1 (VCAM-1) were measured before, at the end of, and one and two days after surgery.

RESULTS: Results are summarized in the table. Mean values are shown in the table (AT group/Control group). *: P < 0.05 between the two groups, $: P < 0.05 vs. the value before surgery.

	Before surgery	End of surgery surgery	One day after surgery	Two days afte
AT (mg/L)	213/208	299$/167$,*	314$/158$,*	333$/143$,*
ICAM-1 (ng/mL)	220/198	184$/167$	229/219	249/269$
ELAM-1 (ng/mL)	29.7/27.9	26.5/25.9	30.3/29.0	34.3/32.2
VCAM-1 (ng/mL)	487/507	495/485	669$/799$,*	621$/836$,*

CONCLUSION: After graft replacement for abdominal aortic aneurysm, VCAM-1 but not ICAM-1 and ELAM-1 increased. The increase of VCAM-1 was inhibited by antithrombin.

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REDUCTION OF D-DIMER LEVELS AFTER SUBSTITUTION OF ANTITHROMBIN IN ACUTE DIC

Kountchev J[1], Semenitz B[1], Bellmann R[1], Garimorth K[1], Wiedermann C[1], Joannidis M[1]
[1]General Internal Medicine, Medical Intensive Care Unit, University Hospital, Innsbruck, Innsbruck, Austria

INTRODUCTION: Disseminated intravascular coagulation (DIC) is a systemic process producing both thrombosis and hemorrhage. DIC is characterized by elevated fibrin-related degradation products, prolongation of the prothrombin time (PT) and activated partial thromboplastin time (aPTT) as well as reduced levels of endogenous coagulation inhibitors such as antithrombin (AT). Marked reduction in AT levels at the onset of septic shock may be a sensitive marker of unfavorable prognosis, presumably by permitting persistence of the procoagulant state. Little is known about the possible influence of AT substitution on the elevated markers of hyperfibrinolysis, in particular D-dimer, observed in acute DIC.

METHODS: We studied 7 consecutive patients presenting with acute DIC associated with severe sepsis/septic shock, occurring on the basis of bacterial pneumonia (n=2), myeloproliferative disorder (n=2), spontaneous bacterial peritonitis with acute on chronic liver failure (n=3). All patients had reduced AT levels. Mean APACHE II scores were 36 +2. AT dosis was substituted as a bolus infusion over 30 min aiming to achieve physiologic AT levels (AT 70-120% of normal). Hemostatic parameters including PT, aPTT, fibrinogen, antithrombin and D-dimer were measured prior to and after the AT substitution. One patient was receiving systemic heparin for anticoagulation during continuous renal replacement therapy (CRRT).

RESULTS: Mean values before AT substitution were as follows: AT 37 + 7%, D-dimer 3254 +1053 µg/l, PT 45 +9 % and aPTT 60 +5 sec. Six hours after AT correction, laboratory parameters were re-measured. Administration of antithrombin (mean AT dosis administered 2500 +258 IE, raised the AT level from 36 +8 to 72 +5% (p=0,027) of normal, as expected. Following AT substitution, a significant decrease of D-dimer levels from 3254 +1053 µg/l to 2388 +822 µg/l (p=0,028), corresponding to a 20,5 +8 % reduction of D-dimer levels, was observed. None of the other parameters (aPTT, PT, fibrinogen) measured showed any consistant or significant change. Notably, the patient receiving heparin concomitantly demonstrated an increase of the D-dimer concentration from 1368 to 1631 µg/l. No case of de novo bleeding was observed.

CONCLUSION: Fibrin-related degradation products including D-dimers play an integral role in diagnosing and monitoring of the acute DIC. Keeping in mind the small number of patients included in the study, we hypothesize that, by reducing the hypercoagulation, AT is able to favourably influence the hyperfibrinolysis and consumption accompanying DIC.

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HIGH-DOSE ANTITHROMBIN III IN THE TREATMENT OF SEVERE SEPSIS WITH A HIGH RISK OF DEATH

Wiedermann C J[1], Hoffmann J N[2], Ostermann H[3], Briegel J[4], Strauss R[5], Keinecke H[6], Jürs M[7], Kienast J[8]
[1]Department of Internal Medicine, Central Hospital of Bolzano, Bolzano, Italy, [2]Department of Surgery, [3]Internal Medicine, [4]Department of Anesthesiologyiol, University of Munich, Munich, [5]Department of Medicine, University of Erlangen-Nuremberg, Erlangen, [6]Covidence GmbH, Covidence GmbH, Marburg, [7]Aventis Behring GmbH, Aventis Behring GmbH, Hattersheim, [8]Department of Medicine, University of Münster, Münster, Germany

INTRODUCTION: Patients with either low risk or very high risk of death from severe sepsis may not benefit from treatment. From the KyberSept study, a randomised controlled trial with high-dose AT III in severe sepsis, data on efficacy and safety in patients with predicted mortality of 30% to 60% (high risk of death) are reported.

METHODS: Uni-factorial and multi-factorial analyses of a prospectively defined subgroup of patients from the randomized double-blind multinational study were the design. Setting of the study was in the participating centers of the KyberSept study. 1,008 patients (43.6 %of the intention-to-treat population, n = 2,314) with a predicted mortality of 30% to 60% at study entry as defined by SAPS II were the study subjects. 490 patients received 30,000 IU intravenous AT III in total over 4 days, and 518 patients received placebo (1 % human albumin).

RESULTS: In Kaplan-Meier analysis of patients with a predicted mortality of 30% to 60% the survival time followed up for 90 days was significantly increased by AT III (p=0.04). In the subgroup of patients not receiving concomitant heparin during the 4-day treatment phase with AT III (n = 140) or placebo (n = 162), the effect was more pronounced: mortality after 28 days , 35.7% vs. 44.4% (Risk ratio: 0.804, 95% confidence interval: [0.607 – 1.064]); 56 days, 39.9% vs. 52.2% (0.764 [0.593 – 0.984]); 90 days, 42.8% vs 55.1% (0.776 [0.614 – 0.986]). In patients receiving AT III, a significantly increased bleeding incidence was observed (any bleeding on days 1 to 5, 17.8% vs. 8.1%, (2.2 [1.6 – 3.1]); p<0.0001) which was lower when no concomitant heparin was given (17.1% vs. 9.3%, (1.9 [1.0 – 3.4]); p=0.06).

CONCLUSION: Treatment with high-dose AT III significantly increased survival time followed up for 90 days in patients with severe sepsis and a high risk of death. For this subgroup, the treatment benefit with AT III in patients not receiving concomitant heparin was confirmed which had been seen previously in the overall study population. Identification of patients profiting from AT III treatment may require exclusion of those with low (<30%) and those with very high (>60%) predicted mortality.

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HEPARIN MEDIATED ADVERSE EFFECTS IN THE KYBERSEPT (HIGH DOSE AT III) STUDY - 28, 56 AND 90 DAY SURVIVAL AND USE OF HEPARIN OVER TIME

Hoffmann J[1], Wiedermann C[2], Briegel J[3], Juers M[4], Kienast J[5], Ostermann H[6], Strauss R[7], Opal S M[8]
[1]Department of Surgery, Universityhospital Grosshadern, Munich, Germany, [2]Department of Medicine, Central Hospital of Bolzano, Bolzano, Italy, [3]Department of Anaesthesiology, Universityhospital Grosshadern, Munich, [4]Business Unit Critical Care-Corporate Safety, Aventis Behring GmbH, a ZLB Behring company, Hattersheim, [5]Department of Haematology-Oncology, Universityhospital Muenster, Muenster, [6]Department of Haematology - Oncology, Universityhospital Grosshadern, Munich, [7]Department of Medicine, Universityhospital of Erlangen-Nuremberg, Nuremberg, Germany, [8]Medical Infectious Disease Division, Brown University School of Medicine, Pawtucket, R.I., United States

INTRODUCTION: In vitro and in vivo experiments provide evidence for a substantial adverse effect of heparin on anti-inflammatory antithrombin (AT III) actions (1). Concomitant administration of low dose heparin was performed for venous thrombosis prophylaxis during the recent high-dose AT III trial in patients with severe sepsis (KyberSept). Only patients without concomitant heparin administration showed improved 90-day survival (2). The present publication analyses adverse effects of heparin in this trial in more detail.

METHODS: The following analyses in the KyberSept study had been predefined: 28-, 56-, and 90-day mortality in the overall ITT population and in subgroups of heparin use, as well as survival time analysis (up to 90 days) in the ITT population. All further statistical analyses were exploratory.

RESULTS: The initial AT III treatment benefit was lost during the further study conduct. Correspondingly, there was a highly significant increase in the concomitant use of heparin in the AT III and placebo group (p=0.002). For patients not receiving concomitant heparin but high-dose AT III, a constant treatment benefit at 28, 56- and 90-days was observed. For placebo patients receiving concomitant heparin, a "pseudo" treatment benefit at Day 28 decreased considerably over time and was fully lost until Day 90. Without heparin, one thrombosis (serious adverse event) was seen in the AT III group (1/354; 0.3%) in contrast to four thromboses (4/345; 1.2%, serious adverse events) in the placebo group, indicating that AT III application sufficiently reduced the risk of venous thrombosis if heparin is not administered.

CONCLUSION: Heparin therapy interfered negatively with the use of high-dose AT III in patients with severe sepsis. We observed an increasing use of heparin in the study population over time, which corresponded to a reduction of the initially positive AT III effect on mortality. There was no tendency towards an increased incidence of venous thrombosis in patients treated by AT III without heparin.

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SUPRANORMAL LEVELS OF INTRATHORACIC BLOOD VOLUME IS APPROPRIATE IN PATIENTS DURING HYPERTHERMIA

Deja M[1], Frerking I[1], Hildebrand B[2], Ahlers O[1], Riess H[2], Wust P[3], Gerlach H[4], Kerner T[1]
[1]Department of Anesthesiology and Critical Care Medicine, [2]Department of Hematology and Oncology, [3]Department of Radiology, Charite Medical Center, Virchow Hospital, Humboldt-Univerity, [4]Department of Anesthesiology, Critical Care Medicine, and Pain Management, Vivantes-Klinikum, Neukölln, Berlin, Germany

INTRODUCTION: To optimize volume therapy during induced whole body hyperthermia (WBH) we performed a goal-directed volume therapy comparing intrathoracic blood volume index (ITBVI) to pulmonary capillary wedge pressure (PCWP).

METHODS: 51 treatments with whole body hyperthermia (body core temperature of 41.8 °C - 42.1 °C for 1 hour) in combination with hyperoxemia, hyperglycemia and cytostatic drugs, the so called systemic cancer multistep therapy, was performed in 25 patients with disseminated malignancies. For guidance of goal-directed volume therapy in 31 treatments we used a pulmonary-artery catheter (PAC) and substituted volume up to PCWP of 10-12 mmHg. In 20 treatments using the transpulmonary double indicator dilution technique (TDID) volume was replaced up to ITBVI of 800-1100 ml/m2 (group B). In both groups, a cardiac index > 3.5 l/min/m2, a hemoglobin concentration > 10 g/dl, and a mean arterial pressure (MAP) > 55 mmHg was achieved. Measurements included the total amount of cristalloids, colloids, lactate levels, extravascular lung water (EVLW), as well as norepinephrine dosages. All parameters were measured at four defined points: after induction at 37°C (1), at 40°C (2) during the warming-up phase, 30 minutes after reaching the plateau phase at 41.8 °C (3), and at 39°C during cooling phase (4). For statistical analysis SPSS was used (Chicago.Il). Difference between groups were explored with Mann-Whitney U Test, statistical significance was accepted for $p < 0.05$.

RESULTS: In group A patients received significant more cristalloids 6231 +/- 458 ml versus 4050 +/- 370 ml) and colloids (2346 +/- 145 ml versus 1812 +/-133 ml) compared to group B. Patients of group B, in contrast, obtained significant higher dosages of norepinephrine to maintain MAP > 55 mmHg at 40 °C, 41.8°C, and 39°C. EVLW and blood lactate levels increased in both groups during WBH compared to the initial values but showed no significant differences between both groups.

CONCLUSION: Monitoring for guiding volume therapy during WBH using PAC as well TDID technique is feasible. Patients in such hypercirculatory conditions, however, require supranormal values of ITBVI to maintain MAP.

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CENTRAL VENOUS VERSUS MIXED VENOUS OXYGEN SATURATION IN HYPOVOLEMIC AND SEPTIC SHOCK PATIENTS

Lee Y[1], Moon B[1], Kim J[1]
[1]Anesthesiology, Ajou University, Suwon, South Korea

INTRODUCTION: The central venous saturation (ScO2) is normally lower than the mixed venous saturation (SvO2). During low flow state or shock state this gradient can be reversed or approximated. This study was performed to see whether the ScO2 accurately reflect the SvO2 in hypovolemic and septic shock patients and is their any difference in metabolism.

METHODS: In 60 critically ill patients over 16 years old who were admitted to the SICU with the diagnosis of hypovolemic (Gr=1, n=26) or septic (Gr=2, n=34) shock. Pulmonary artery catheter was inserted after admission. The ScO2 was obtained from superior vena cava (SVC) and the SvO2 was obtained from pulmonary artery (PA). Total 127 comparative measurements were obtained until the initial shock condition was released with the therapeutic intervention.

RESULTS: SvO2 was 70.9 ± 1.3% (Mean ± SEM) and ScO2 was 74.3 ± 1.3% in hypovolemic shock group ($p < 0.071$). SvO2 was 75.1 ± 0.6% and ScO2 was 76.5 ± 0.7% in septic shock group ($p < 0.061$). Correlation coefficient of the ScO2 and the SvO2 of the each group were 0.729 and 0.521 (P<0.000, P<0.000). There were no significant differences in CI, DO2, V02 except ERO2 between groups.

CONCLUSION: There are no significant differences between the SvO2 and ScO2 in both shock groups, however, hypovolemic shock shows higher correlation than septic shock. It seems to be possible to use the ScO2 instead of the SvO2 in hypovolemic shock patients in the initial period of shock without pulmonary artery catheter.

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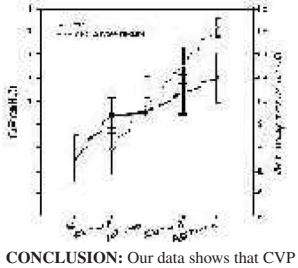
THE INFLUENCE OF INTRATHORACIC AIRWAY PRESSURE ON VALUES OF CENTRAL VENOUS PRESSURE

Marangoni E[1], Volta C A[1], Alvisi V[1], Bertacchini S[1], Ragazzi R[1], Orlando A[1], Alvisi R[1]
[1]Anesthesia and Intensive care, University of Ferrara, Ferrara, Italy

INTRODUCTION: Several studies provide compelling evidence on the clinical role played by fluid optimization. Till now, the assessment of the intravascular volume has been based on data derived by pulmonary-artery catheter. However, some studies suggest that the use pulmonary-artery catheter is associated with an increased mortality and hence the central venous pressure (CVP) remains the only parameter to be used.

METHODS: Nine patients undergoing mechanical ventilation were enrolled. CVP was determined while patients were breathing spontaneously (SB) and during assisted control ventilation (ACV) at different PEEPe levels (0-4-8-12 cmH2O). Patients clinical characteristics are (mean±SD): age (yr) 59±23; weight (kg): 63±7; tidal volume (ml, ACV): 405±6; respiratory rate (b.min-1, ACV): 19±5; static compliance of the respiratory system (ml.cmH2O-1, ACV): 35±7. The following parameters were determined: mean airway pressure (ACV), mean systemic blood pressure (MAP), CVP.

RESULTS: The most dramatic increase of CVP was registered when the patients were ventilated in ACV compared to spontaneous ventilation (fig. 1). Surprisingly, CVP values were much less influenced by progressive rise of mean airway pressure obtained by different PEEPe level. Moreover, MAP variations were closely linked to those of CVP.



CONCLUSION: Our data shows that CVP monitoring is useful for assessing the intravascular volume in patients requiring high PEEPe level. However, the CVP values obtained during ACV are very different from those calculated during SB and hence, when possible, it is advisable to determine CVP during SB.

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THE SYSTOLIC PRESSURE VARIATION (SPV AND ΔDOWN) IN ASSESSING HEMODYNAMIC STATE AFTER CARDIAC SURGERY

Bubenek-Turconi S S t[1], Stelian E[1], Miclea I[1], Boros C[1], Timofiev L[1], Sefu F[1], Moldovan H[2], Iliescu V[2]
[1]1st Cardiovascular Anaesthesia and Intensive Care Dept., [2]1st Cardiac Surgey Dept, Institute of Cardiovascular Diseases C. C. Iliescu, Bucharest, Romania

INTRODUCTION: In cardiac surgery, more than in any other type of surgery, in early postoperative period can occur low cardiac output syndromes due to hypovolemia or to myocardial failure. Our objective is to evaluate the accuracy of the systolic pressure variations (SPV) and of its negative component Δ down under mechanical ventilation in predicting the response to volume loading and to diagnose hypovolemia.

METHODS: In a group of 50 patients who underwent CABG surgery, in the early postoperative period we monitored: CO/CI, CVP, PCWP, BP (S/D/M), VPS and Δ down. The including criteria were: sinus rhythm, CI ≤ 2.5 L x min-1 x m-?, PCP < 18 mm Hg. All the patients underwent a fluid challenge (500 ml of colloids in 10 min). According to the CI variation the patients were then divided in two groups: group A (28 pts) with a raise of CI > 15%, and group B (22 pts) with a CI variation < 15%. We analyzed the variations of the parameters mentioned above due to fluid loading and the differences between the two groups.

RESULTS: In the following table are the data obtained. All parameters are measured in mm Hg and are expressed as the average value ± standard deviation (*p<0.05).Statistical analysis shows significant differences between the two groups regarding only the initial value of SPV (14.07 ± 1.82 mm Hg in group A, 6.45 ± 2.32 mm Hg in group B, p<0.01) and Δ down (9.78 ± 2.14 mm Hg in group A, 1.5 ± 1,65 mm Hg in group B, p<0.01). There also significant differences of the values before and after the fluid challenge only in group A and for the same parameters: SPV (from 14.07 ± 1.82 mm Hg to 9.75 ± 1.26, p < 0.001) and Δ down (from 9.78 ± 2.14 mm Hg to 5.42 ± 1.23 mm Hg, p<0.001). In predicting a significant raise of CI after volume loading a SPV > 12 mm Hg had the sensitivity of 92.85 % and the specificity of 90.90 %, and a Δ down > 5 mm Hg had the sensitivity of 96.42 % and the specificity of 96.45 %.

	Group A Initial	Final	Group B Initial	Final
MAP	60.14±6.44	63.78±4.19	57.09±5.49	57.59±4.58
CVP	8.57±2.84	8.85±2.44	10.13±2.89	10.5±2.13
PCWP	11.82±3.76	13.42±2.71	14.72±2.07	16.45±1.05
SPV	14.07±1.82	9.75±1.26*	6.45±2.32	5.45±1.5
Δ down	9.78±2.14	5.42±1.23*	1.5±1.65	1.09±1.15
Δ up	4.28±1.41	4.32±0.72	4.86±0.99	4.36±1.0

CONCLUSION: The new parameters of preload dependency tend to replace the classic pressure parameters in hemodynamic assessment, being more accurate as predictor of CI response to volume loading and as detector of hypovolemia (1). The low costs and accuracy of the SPV method advocate for using it in critical care settings, even in cardiac surgery.

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PULMONARY CATHETER IS NOT ENOUGH AFTER CARDIAC SURGERY

Pottecher J[1], Bouyges S[1], Caron S[1], Moreau X[1], Beydon L[1]
[1]Dept of anesthesia, Hôpital Larrey, ANGERS, France

INTRODUCTION: Routine use of pulmonary artery catheters (PAC) measuring continuous cardiac output but not SvO2 is controversial in cardiac surgery. Oxygenation derived variables like arteriovenous oxygen difference (AVDO2) could better reflect supply-demand balance than cardiac index (CI). Moreover, bedside, respiratory changes in arterial pulse pressure (DeltaPP) are a more reliable indicator of fluid responsiveness than pressures obtained from PAC (CVP and PCWP). The goal of our study was to compare two hemodynamic assessment methods: one based on PAC derived variables, the other taking AVDO2 and DPP into account.

METHODS: Fifty consecutive mechanically ventilated patients emerging from cardiac surgery in a university hospital ICU were included without informed consent since PAC insertion is systematic in our institution.An independent observer simltaneously recorded PAC variables (CVP, PCPW, CI) (first set, S1), AVDO2 and DeltaDPP (second set, S2). Initially, the caring physician could get the first set of value, was asked about volemia, inotropism and vasomotor tone and gave a therapeutic option. Then he had access to the second set of value, answered the same questions and was able to maintain or to change his opinion. Patients were divided in four categories, according to DeltaPP (<13 or >=13) and AVDO2 (<5 or >=5) and discrepancies between the two sets of answers were analysed.

RESULTS: Based on S1 data, 41 new drugs or therapeutic were introduced (82% of patients): 4 inotropic drug, 27 fluid loading, 5 diuretic, 4 vasodilatator, 1 vasopressor. After knowing S2, in 25 patients (50%) we challenged the initial decision. DeltaPP did not correlate with CVP nor with PCPW. Similarly, CI did not correlate with AVDO2. According to table: case 1: 11 therapies decided knowing S1 challenged by S2: all should not have been fluid loaded; case 2:4 therapies decided knowing S1 challenged by S2: they should have received a fluid load; case 3: 6 therapies decided knowing S1 challenged by S2: 2 should not have been fluid loaded and 4 should have received inotropes; case 4: 4 therapies decided knowing S1 challenged by S2: 4 should have been fluid loaded and 2 should not have received inotropes.

Distribution of patients (nbre of errors)

	DeltaPP >= 13 (n)	DeltaPP >= 13 (n)
AVDO2 <5	19 (11) case	1 9 (4) case 2
AVDO2 >=5	12 (6) case 3	10 (4) case 4

CONCLUSION: Conventional PAC measurements do not allow optimal therapeutic guidance, postoperatively in cardiac surgery. Indeed, CI does not reflect metabolic requirements at best measured by AVDO2. Also, CVP and PCPW do not reflect hypovolemia contrarily to DeltaPP. The association all data provided by S1

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NONINVASIVE CORONARY ARTERY IMAGING: ACCURACY AND CLINICAL APPLICABILITY OF COMPUTED TOMOGRAPHY

Albers J[1], Heggemann F[1], Kayhan N[1], Bahner M[2], Vahl C F[1]
[1]Abt. Herzchirurgie, ICU, [2]Abt. Radiodiagnostik, Chirurg. Universit, Heidelberg, Germany

INTRODUCTION: Noninvasive imaging of coronary artery disease (CAD) using multidetector computer tomography (MDCT) provides theoretically additional information to the classical 2D coronary angiography. The objective was to determine: (1) How accurate is the 3D imaging compared to the 2D method? (2) Is it feasible to profit from the additional 3D information in the clinical setting?

METHODS: Study population consisted of consecutive patients with diagnosis of 3-vessel-CAD (n = 30).Every patient underwent both, 2D coronary angiography and MDCT scanning (Siemens Somatom Plus 4 VZ, slice thickness 1.5 or 3.0 mm, pitch 1.5, contrast medium 70 ml). Retrospective gating was used. 3D visualization was performed using raytracing. Comparison of 2D and 3D imaging was performed in a blinded manner, 3 blinded investigators scored applicability of the coronary segments (CS) for aortocoronary bypass grafting (ACB) (necessary/not necessary) and stenosis (stenosis <25%/26-50%/51-75%/76-100%).

RESULTS: (1) Agreement in applicability for ACB was (CS number/% agreement) 1/73.3, 2/76.7, 3/53.3, 5/70.0, 6/93.3, 7/70.0, 8/63.3, 9/46.7, 11/80.0, 13/30.0. CS rarely being object to ACB, showed poor agreement: 4/16.7, 10/10.0, 12/16.7, 14/16.7, 15/40.0. Agreement in quantification of stenosis was: 21.7% for the right coronary artery, 40.4% for the left anterior descendent and 26.1% for the circumflex coronary artery. (2) 3D volume data were acquired in a single breathhold. Temporal resolution was 170 ms (reconstruction time 1 min/image) enabling calculation of stroke volume. 3D visualization showed distribution of coronary calcifications together with non-calcified lesions.

CONCLUSION: Severe CAD was identified noninvasively in all cases studied. (1) Accuracy of the 3D method was sufficient for bypass planning purposes. However, quantification of stenosis was not acceptable. (2) Data acquisition was quick, safe and provided additional data superior to conventional 2D (calcification, soft plaques, 3D quantification of stroke volume). In conclusion, patients with severe CAD can be diagnosed with high accuracy using noninvasive imaging.

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PROGNOSTIC VALUE OF INDOCYANINE GREEN PLASMA DISAPPEARANCE RATE IN SEPTIC PATIENTS

Creteur J[1], Pozzi M[1], De Backer D[1], Vincent J[1]
[1]Department of Intensive Care, Erasme University Hospital, Brussels, Belgium

INTRODUCTION: Multiple organ failure still remains the most frequent cause of death in the intensive care unit (ICU). Various techniques have been suggested for the estimation of liver perfusion and function, but with methodological problems. Recently, a transcutaneous technique has been developed allowing non-invasive measurement of indocyanine green plasma disappearance rate (ICG – PDR). We tested the hypothesis that ICG – PDR value could be used as an early pronostic index factor in septic patients.

METHODS: ICG – PDR was measured daily using a transcutaneous system (LimonR, Pulsion Medical System, Munich, Germany) after the injection of 0.25 mg/kg of ICG (Pulsion) in 20 septic patients during the first 5 days after their ICU admission.

RESULTS: The mortality rate of the studied population was 45% (9/20). APACHE II score was somewhat higher in non-survivors (NS) than in survivor (S) (29 +/- 8 vs 23 +/- 5, respectively ; p = 0.07). The daily SOFA scores were also somewhat higher in the NS. The daily blood bilirubine concentrations (Bili, mg/dl) were similar in both groups. On Day 3 and Day 5, ICG – PDR (%/min) were higher in S group than in NS group (ANOVA : * p < 0.01).

	Day 1	Day 2	Day 3	Day 5
SOFA (S)	8 +/- 5	7 +/- 4	6 +/- 3	7 +/- 4
SOFA (NS)	11 +/- 5	10 +/- 3	10 +/- 4	9 +/- 3
Bili (S)	1.2 +/- 1.	1.4 +/- 2.	1.1 +/- 1.	1.1 +/- 1.
Bili (NS)	1.1 +/- 1.	1.2 +/- 1.	1.6 +/- 2.	1.6 +/- 1.
ICG-PDR (S)	18 +/-7	20 +/- 8	24 +/- 10*	22 +/- 5*
ICG-PDR (NS)	21 +/- 5	20 +/-4	13 +/- 3	14 +/- 3

CONCLUSION: Non - invasive ICG - PDR measurement as a marker of liver perfusion and function is a good predictor of survival in critically ill septic patients.

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RELATIONSHIP BETWEEN PRELOAD DEPENDENCY AND TISSUE PERFUSION DURING AORTIC SURGERY

Boulo M[1], Fleyfel M[1], Robin E[1], Lebuffe G[1], Lecoutre H[1], Onimus J[1], Tavernier B[1], Vallet B[1]
[1]Anesthesiology and Intensive Care Medicine, University Hospital, Lille, France

INTRODUCTION: Aortic surgery can be taken as a model of fluid and blood losses leading to volume status variation and hemodynamic impairment. These variations together with aortic clamping may compromise tissue perfusion. In intubated and ventilated operated patients, respiratory pulse pressure variation (ΔPP) reflects ventricular preload dependency (1). ΔPP is a good predicting marker of increase in stroke volume index (SVI) after a fluid challenge (FC) (2). The aim of this study was to evaluate whether preload dependency as assessed by ΔPP measurement was associated with impaired tissue perfusion.

METHODS: After approval from the local Ethics Committee, 15 patients undergoing aortic surgery were prospectively enrolled. Intraoperative hypovolemia was suspected when heart rate increased and/or systolic blood pressure dropped more than 20% from baseline. A 250 mL colloidal FC was then systematically performed. Automated gastric tonometry (Tonocap, Datex-Ohmeda, Finland) was used to assess $PgCO_2$-$PetCO_2$ before and after FC (CO_2gap-1,CO_2gap-2) . An increased CO_2 gap larger than 20 mmHg can be taken as a threshold value of decreased tissue perfusion. An increased SVI larger than 15% was identified as responder (R) and FC was repeated until SVI did not increase more than 15% again. An increase in SVI of less than 15% was identified as non-responder (NR). In total, 91 FC were performed. To study relationship between tissue perfusion and preload dependency, 36 FC were selected: 22 R and 14 NR. Results were expressed as median and interquartile interval. A test of Spearman for correlation analysis, and a test of Wilcoxon for comparison between CO_2gap-1 and CO_2gap-2 measurements were performed when necessary.

RESULTS: Median values were 11.69 [6.98-20.34], 17.38 [6.04-32.97], 46 [42.25-48.00], 14 [10.00-17.50], 14 [9.50-19.75] for ΔPP (%), SVI variation (%), $PgCO_2$ before FC (mmHg), CO_2gap-1 and CO_2gap-2 (mmHg) respectively. There was a significant correlation between ΔPP and SVI variation (rho= 0.761; p<0.0001) as described previously (1,2). There was no correlation between ΔPP and CO_2gap-1(rho= -0.08; p= 0.643) and no significant difference between CO2gap-1 and CO_2gap-2. Moreover, CO_2 gap didn't reach the 20 mmHg threshold value.

CONCLUSION: In patients undergoing aortic surgery, preload dependency may not be equivalent to decreased tissue perfusion.

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CHANGE OF THE ARTERIAL PRESSURE WAVEFORM DURING CONTINUOUS POSITIVE AIRWAY PRESSURE

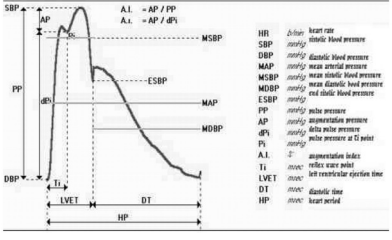
Graziani A[1], Salvi P[2], Morgagni F[1], Praticò B[1], Fanciulli A[1], Berzigotti A[3], Zelante A[2]
[1]Emergency Dpt. Medicina Urgenza, [2]Medicina Interna, Ospedale Maurizio Bufalini, Cesena, [3]Medicina Interna, Ospedale S.Orsola-Malpighi, Bologna, Italy

INTRODUCTION: The aim of this study was to assess the effects of nasal continuous positive airway pressure (CPAP) on arterial pressure wave

METHODS: Tonometry (Pulse-Pen system) was used to evaluate the carotid pressure wave of 16 healthy subjects (10 females - 6 males; age 43 +/- 111 yrs). The measured parameters were: Heart rate (HR), Hear period (HP), Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP), Pulse Pressure (PP), Left Ventricular Ejection Time (LVET), Diastolic Time (DT), Pulse Wave Velocity (PWV)(see also figure 1). Each subject was examined in a supine position at the basal condition, after resting for ten minutes on a bed and finally after ten minutes of CPAP delivered by nasal mask at 10 cmH2O (Respironics inc.). No oxygen was added to the circuit. Results are given as mean +/-SD. Data were evaluated by paired t test and p< 0,05 was considered statistically significant.

RESULTS: The application of CPAP was associated with a significant reduction of PP (43,6 +/- 8 vs 33,9 +/- 7,8 mmHg; - 26%; p<0,03), SBP (117,6 +/- 16,3 vs 106,5 +/- 12,6 mmHg; -9,1%; p<0,03), PWV (6,61 +/- 0,86 vs 1,27 +/- 1,5: p<0,05).

DT (548,6 +/- 44,8 vs 590,1 +/- 42,1 msec; p< 0,01) and HP (843, 9 +/- 57,4 vs 881,4 +/- 63,3 msec; p<0,001) were increased.



CONCLUSION: CPAP increases the intrathoracic pressure and in lesser extent the abdominal pressure. This condiction causes a reduction of Aortic transmural pressure and consequently could modify the vascular elastic property as well as the characteristics of pulse wave transmission. We demostrated a higher representation of the diastolic phase of the arterial pressure wave wich could indicate a possible great elasticity of the vessel. Further study is needed to determine the real impact of this result in patients who make daily use of CPAP for chronical diseases

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URGENT CORONARY ANGIOGRAPHY IN THE VERY ELDERLY PATIENTS

Fernandez R[1], Guia C[1], Navas A[1], Ochagavia A[1], Guillaumet E[2]
[1]Critical Care Department, [2]Cardiology, Hospital de Sabadell, Sabadell, Spain

INTRODUCTION: The invasive approach of coronary insufficiency is of proven value in the treatment of acute coronary events. Whether this statement remains true in the very elderly patients is under debate. Moreover, due to the improvement in the quality of life in the elderly, the proportion of them admitted to the Critical care services because of acute coronary insufficiency is growing. Our objective was to evaluate the size and impact of an urgent approach by coronary angiography in octogenarians is of any benefit in terms of mortality and ICU and hospital stay.

METHODS: Retrospective (2002-2003) study of cohorts of octogenarian patients admitted to our Critical Care Centre for high-risk coronary insufficiency. We recorded epidemiological features, cardiovascular risk factors, type of coronary events, complications, need for ventilatory and vasoactive support, performance of coronary angiography, ICU and hospital stay, and outcome.

RESULTS: In the selected 22 month-period, 698 patients were admitted due to high-risk coronary events, and 82 (12%) of them were octogenarians with a mean age of 83 ± 2.6 yr, being 49% women. Risk factors were present as hypertension (56%), diabetes (42%), hyperlipidemia (31%), and smoking (44%). Elevation of ST was present in 52%, and absent in 48%, and was the first manifestation of myocardial ischemia in 63%. Heart failure appeared in 38% and needed vasoactive drugs in 60% of them and ventilatory support in 62% of them. There was formal indication of urgent angiography in 48 (58%). Eighteen were excluded because of severe instability and/or poor quality of life. The remaining 30 patients received angiography (50%) or not (50%) based in the subjective decision of the attending physician. Angiography resulted in percutaneous angioplasty in 40 %, surgical revascularization in 7%, and were non suitable for revascularization in 53%. Post-angiography complications appeared in 7%. Invasive and conservative cohorts did not differ in median ICU stay (5 vs. 3 days), hospital stay (11 vs. 10 days), and mortality (7% vs. 7%).

CONCLUSION: High-risk coronary octogenarians are a significant amount of admissions in the ICU. The urgent invasive approach in these patients does not improve stay or survival.

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ECHO FINDINGS IN HYPERCAPNIC RESPIRATORY FAILURE. RELATIONSHIP WITH WEANING TIME AND OUTCOME

Matamis D[1], Tsagourias M[1], Vakalos A[1], Synefaki E[1], Kareklas M[1]
[1]ICU, Papageorgiou General Hospital, Thessaloniki, Greece

INTRODUCTION: COPD patients are often aged, smokers and may suffer from right ventricular (RV) failure. Moreover, they may have smoking and age - related diseases of the left heart, as ischemic heart disease or valvulopathies. Left ventricular (LV) failure may induce hypercapnic respiratory failure (HRF) and mimic the clinical picture of COPD, especially in patients with heavy smoking history. The aim of our study was to identify, in patients with HRF leading to mechanical ventilation (MV), the prevalence of RV, LV, or biventricular failure, the presence of severe valvulopathies and the impact of the targeted cardiac treatment (according to ECHO findings) on the MV days and mortality.

METHODS: Over a period of seven years 82 patients (58M and 24 F) with a mean age of 68±8 years and a mean APACHE score of 18±6 included in the study. Heart function was assessed with ECHO within the first 24 hours from intubation. Patients were divided in three groups (RV failure, LV failure and Normal Heart group) according to ECHO criteria. Cardiac treatment was given according to ECHO findings. Respiratory treatment and weaning process was identical in all patients. ANOVA and chi square test were used for statistical analysis.

RESULTS: The results of this study are given in table 1.

Severe valulopathies were detected in 24/82 (29%) of our patients

	Normal Heart	RV failure	LV failure	Statistics
No of Patients	19/82 (23%)	28/82 (34%)	35/82 (42%)	
Age (years)	68±6	65±10	68±5	N.S.
APACHE II	18,1±0,6	18±0,6	18±0,5	N.S.
PaO_2 (mmHg)	55±20	60±22	58±22	N.S.
$PaCO_2$ (mmHg)	86±21	94±24	88±35	N.S.
pH	7,2±0,1	7,2±0,1	7,15±0,1	N.S.
MV (days)	20,5±13	10,8±9	5,6±6	p<0,01
Mortality(%)	9/19 (47%)	11/28 (39%)	10/35 (28%)	N.S.

CONCLUSION: LV failure and severe valvulopathies are present in COPD patients. LV failure may be the main reason or a contributing factor to the HRF. Early detection of LV dysfunction shortens the MV days but does not affect mortality.

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GUT LUMINAL MICRODIALYSIS DETECTS GUT BARRIER DYSFUNCTION IN ELECTIVE CORONARY SURGERY

Solligård E[1], Wahba A [2], Bakkelund K [2], Juel IS [2], Grønbech JE [2], Stenseth R [1], Aadahl P [1]
[1]Dept. of Anesthesiology and Intensive Care, [2]Dept. of Surgery, St. Olav University Hospital, Trondheim, Norway

INTRODUCTION: The aim of the study was to evaluate the feasibility of gut luminal microdialysis to detect gut barrier dysfunction in patients undergoing elective coronary artery bypass grafting (CABG) with cardiopulmonary bypass.

METHODS: Luminal microdialysis was performed in nine patients (ASA 3-4) undergoing CABG with the use of cardiopulmonary bypass (CBP) (median bypass time 51 min (range 36-102)). A microdialysis catheter (CMA 62, membrane length 30 mm, flowrate 1µL/min) attached to a 16F tonometry catheter was introduced into the gut lumen close to the rectosigmoid junction (15-20 cm proximal to the anus) through a rectoscope 2 hrs prior to surgery. The microdialysate was sampled and analyzed for lactate and the CO2-gap was estimated every 30 min preoperatively, during CPB and postoperatively at 2 hourly intervals for up to 16 hrs.

RESULTS: Gut luminal lactate increased five-fold during the first 30 min of CPB and remained elevated during the rest of CPB, gradually declining early postoperatively. The CO2-gap remained unchanged both during and after CPB (see table). There were no complications associated to the insertion of the microdialysis or the tonometry catheters, and all patients had an uneventful perioperative course.

Gut luminal lactate and mucosal CO2-gap

	Baseline	CPB 30 min	CPB end of	30 min	Postop 60 min	360 min
Lactate (mmol/L	0.3(0.1)	1.4(0.5)*	2.0(0.6)*	1.5(0.6)*	1.1(0.4)	0.6(0.2)
CO2-gap (kPa)	0.7(0.5)	0.6(0.3)	0.7(0.4)	1.1(0.3)	0.6(0.2)	0.1(0.2)

*Mean (SEM), *P<0.05 compared to baseline (one-way ANOVA for repeated measurements)*

CONCLUSION: Increased production of gut wall lactate was previously shown to be associated with increased leakage of macromolecules across the gut wall due to gut barrier dysfunction (1). In this study we were able to show that even short and uncomplicated CPB leads to increased gut wall lactate detected by gut luminal microdialysis, indicating gut barrier dysfunction. Simultaneous tonometry proved to be insensitive to these changes. We propose that gut luminal microdialysis in the rectum may be a good method to estimate markers of metabolism and gut barrier dysfunction during surgery and in the critically ill patient.

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COMPARISON OF NONINVASIVE AND INVASIVE HEMODINAMIC METHODS AFTER AORTO-CORONARY BYPASS OPERATION

Czuczor S[1], Gyõrimolnár I[1], Melczer L[1], Papp L[1]
[1]University of Pécs, Heart Institute, Pécs, Hungary

INTRODUCTION: We have only a few data about the hemodinamic monitoring after coronary artery bypass grafting operation. Our aim was to measure hemodinamic changes in early postoperative periode simoultanusly either invasive both non invasive method. To evaluate the reliability of impedance cardiography (ICG) in comparison with termodilution method (pulse contour analysis, PiCCO).

METHODS: We measured 18 patients (12 male, 6 female). Average age was 58±7 years. Preoperative ejection fraction was 53±4%. All the patients were operated by coronary artery bypass. The average extracorporal bypass time was 58±18 min. The anesthesia was induced and maintained with sevoflurane.

Arriving to the postoperative care unit the narcotised and ventillated patients were measured simultanously every 15 minutes for 1 hour after extubation. All hemodinamic parameters were measured by double blind method. We compared cardiac index (CI), stroke volume index (SVI) and stroke volume resistance index (SVRI).

RESULTS: Results of measurements of PiCCO vs ICG: CI: 2,99±0,47 vs 2,73±0,39 l/min/m2, SVI: 34,6±6 vs 30±5 ml/m2, SVRI: 2132±532 vs 2712±653 dynseccm/m2. The regression coefficient of CI was 0,03, SVI: 0,05, SVRI: -0,0029.

CONCLUSION: The noninvasive hemodinamic measurement (ICG) has a good correlation with the invasive method (PiCCO) after the coronary bypass surgery.Therefore the impedance cardiography is a reliable and non invasive hemodynamic tools for the cardiovascular monitoring for the patients after cardiac surgery.

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THREE-DIMENSIONAL VISUALIZATION OF VALVE REGURGITANT JETS: NONINVASIVE IMAGING AVAILABLE IN THE ICU

Albers J[1], Unterhinninghofen R[1], Hosch W[2], Vahl C F[1]
[1]Abt. Herzchirurgie, ICU, [2]Abt. Radiodiagnostik, Chirurg. Universitätsklinik, Heidelberg, Germany

INTRODUCTION: The visualization of heart valve regurgitation is of high clinical importance. First, the morphology of the insufficient heart valve has to be assessed, and second, the three-dimensional (3D) shape of the insufficiency jet should give further insight into the pathoanatomical process. The purpose of the study was to visualize noninvasively valve insufficieny jets, and to compare the imaging modalities available in the ICU setting, three-dimensional echocardiography (3DE), and magnetic resonance imaging (MRI), in vivo.

METHODS: In anesthetized, meachanically ventilated domestic pigs (n=6, weight 30-35 kg), mitral valve insufficieny was induced „beating heart", producing chord rupture at the posterior mitral leaflet (P2). The animals received humane animal care set up in the statutes of the DFG (Deutsche Forschungsgemeinschaft). 3DE was carried out using the HP 2500 Live 3D device. At constant heart rate, MRI imaging was performed using the Siemens Vision (Symphony) MRI scanner. To acquire 3D velocity vectors, synchronous phase contrast imaging in all three dimensions was used (13 time frames per cardiac cycle). 3D reconstruction of the image data was performed using self-developed postprocessing software (Mediframe).

RESULTS: Noninvasive visualization of the induced insufficiency jets was feasible in vivo for both imaging modalities tested. 3D presentation of the cardiac cavities, mitral valve and valve apparatus were acceptable for clinical practice. The advantages of 3DE were availability at the bedside, display of both, cardiac morphology and velocity information. However, the Doppler information was not true three-dimensional due to the angular dependencies. MRI turned out to be true three-dimensional with the possibility of displaying the 3D jet in every desired direction. Velocity information together with morphology data of the heart could be visualized. However, MRI was time consuming (35 min), required a series of breathholds, and was not immediately available at the bedside. Both imaging modalities could visualize the shape of the regurgitant jet for semiquantification purposes.

CONCLUSION: 3D presentation of non-invasively acquired insufficiency jets enhance the clinical understanding of the underlying cardiovascular dynamics. In the near future, quantification tools of the 3D image data will provide the physiological basis for severity assessment. Moreover, true 3D heart models enable operation planning and outcome research of operation results at the computer monitor.

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A SIMPLE AND ENSAMBLE WAY OF ANALYZING EFFECTIVENESS AND EFFICIENCY IN THE CRITICAL CARE SETTING

Abizanda R[1], Reig R[1], Belenguer A[1], Cabre L[2], Perales y Rodríguez de Viguri N[3], Bisbal E[1], Mas S[1], Heras A[1], Costa A[1]
[1]ICU Department, Hospital Univesitario Asociado General de Castelló, Castelló, [2]ICU Department, Hospital de Barcelona SCIAS, Barcelona, [3]UCP, Hospital Universitario 12 de Octubre, Madrid, Spain

INTRODUCTION:. Effectiveness and efficiency are two quality characteristics often required for the analysis of new therapeutic approaches or for confirming actual ways of do. Nevertheless, up to now, it has not been available a simple and combined method for describing such analysis. The purpose of this paper is to describe a methodology (elsewhere published 1) for obtaining an easy to understand answer to that problem.

METHODS: The methodology will be presented in a step by step way. First you must have a file system including a mortality prognostic estimation and a nursing workload ccomputing; then: 1.Select the period of time to analyze; 2.Decide if your analysis will be on a specific diagnosis, or for all patients admitted during the period; 3.Calculate you standardized mortality ratio (SMR). This is your effectiveness; 4.Sum all the workload scores for all patients included in the analysis and divide it by the sum of ICU days. This is you standard ratio of workload per day; 5.Now compute the sum of workload scores and divide by all the ICU days of the specific group of patients; this is your ratio of workload per day; 6.- Now refer the result of step 5 to the result of step 4, this is your normalized workload per day, and it is equivalent to the efficiency you got in treating that group of patients.If everything is done correctly, both SMR and normalized workload (IE norm)will include the unit. Now display your results like they

CONCLUSION: NICE has developed an application that enables ICUs to perform analyses online, while privacy at patient and hospital level is guaranteed. Through NICE online individual ICUs are supported in analysing and improving their performance.

Grant acknowledgement: Dutch ministry of Health, Welfare and Sport

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COST-EFFECTIVENESS OF IGM ENRICHED IMMUNOGLOBULIN IN THE TREATMENT OF SEVERE SEPSIS AND SEPTIC SHOCK

Neilson A R[1], Schneider H[1], Burchardi H[2]
[1]HealthEcon AG, Steinentorstrasse 19, Postfach 1510, Basel, Switzerland, [2]Department of Anaesthesiology, Emergency and Intensive Care Medicine, University Hospital Gottingen, Robert-Koch-Strasse 40, 37070 Gottingen, Germany

INTRODUCTION: The objective of this study was to measure the cost-effectiveness of an IgM enriched immunoglobulin preparation in adult patients treated for severe sepsis and septic shock. We performed a meta-analysis followed by an economic analysis conducted from the hospital perspective in Germany.

METHODS: Effectiveness data from a meta-analysis of eight randomised trials (N=383) was used to assign probabilities in a decision model to estimate cost-effectiveness of IgM enriched immunoglobulin preparation and its comparator standard therapy. Analysis of effectiveness data used all cause hospital mortality as the primary outcome and intensive care (ICU) length of stay (LOS) as a secondary outcome. Benefit was expressed as lives saved (LS). Published ICU treatment cost data was applied to assess differences in treatment costs. Cost-effectiveness was calculated as the incremental cost per LS.

RESULTS: IgM enriched immunoglobulin preparation had a positive effect in reducing the risk of mortality ($p<0.001$) but had no effect on ICU LOS. A baseline risk of mortality of 0.4421; a relative risk reduction (RR) of 0.5505 (absolute risk reduction (ARR) = 0.1987; number needed to treat (NNT) = 5.03) increased ICU treatment costs with IgM enriched immunoglobulin preparation by 2,016 (22,706 vs. 24,722) resulting in cost per LS of 10,146. Sensitivity analyses on the baseline mortality risk (95% CI: 0.3425 to 0.5417) and RR (95% CI: 0.4101 to 0.7389) yielded a cost per LS range: 4,974 to 26,870 with a 61.7% probability of cost-effectiveness of less than or equal to 12,000.

CONCLUSION: Given the results of this analysis, based on current evidence, IgM enriched immunoglobulin preparation is considered cost-effective as an adjuvant therapy compared to standard sepsis therapy alone. There remains a continuing challenge to evaluate efficiency using other approaches.

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DATA COLLECTION IN THE ICU: MANAGEMENT TOOL TO PROMOTE ICU QUALITY?

Reper P A[1], Vandenen D[1]
[1]Critical Care Department, Queen Astrid Hospital, Brussels, Belgium

INTRODUCTION: ICU activities have to be continuously assessed to promote quality and lead to the development of better standards of care and organisation.
Therefore evaluations and management tools have to be developed.
Data collection of standard parameters represents an interesting management complement to classical scoring systems like TISS, Apache or other ICU scores.

METHODS: We develop a systematic data collection of all the admitted patients in our ICU through a home-made software and database leading to a broad description of the population and activities of the ICU during the last five years; this was correlated with the classical scoring systems of ICU patients. The system was utilisator friendly made by automatically generating hospitalisation ICU reports which guaranteed the use of the database and its completion. At the end of each year and after a data validation period standard reports were generated with classical parameters: mean age of the population, mean length of stay, mortality rate, readmission rate, daily repartition of all the ICU admissions ... and correlated with the severity of the ICU population.

RESULTS: The following observations were noted during this five years period: non significant elevation of the mean age and of the mean ICU length of stay, but significant reduction of the global mortality while the mean ICU scores remain stable. In the same period the number of ICU technical procedures (right catheterisation days, artificial ventilatory days, CVVHDF days...) was also significantly higher but without significant influence on nosocomial infection rate. Interesting management data were also available: more than thirty procent of the ICU patients were admitted during the night shifts (between 08 PM and 08 AM) which can be an important data to discuss the staffing problems (during the night shifts for example). The use of antibiotics was also significantly reduced during the same period.

CONCLUSION: A five years data collection period of standard ICU indicators correlated with the use of severity scores can be an interesting ICU management tool to promote quality of care (and communication procedures inside and outside the ICU) and to reduce mortality and morbidity in ICU populations. Further studies are necessary to confirm these interesting observations.

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NICE ONLINE: A SECURE INTERNET APPLICATION TO PRESENT AND COMPARE ICU'S POPULATION AND PERFORMANCE

Arts D G T[1], Bosman R J[2], Benner P M[3], van der Zwan E P A[4], de Jonge E[5]
[1]Intensive Care and Medical Informatics, Academic Medical Center, [2]Intensive Care, OLVG, Amsterdam, [3]Intensive Care, Kennemer Gasthuis, Haarlem, [4]Medical Informatics, [5]Intensive Care, Academic Medical Center, Amsterdam, Netherlands

INTRODUCTION: The National Intensive Care Evaluation (NICE) registry (www.stichting-nice.nl) aims to analyse and improve the quality of Dutch intensive care. The NICE registry contains 112 data items for each patient admitted to one of the 29 participating ICUs. To support the individual ICUs in comparing their population and performance to several standards NICE has introduced an internet application, NICE Online.

METHODS: Users of NICE online compose their own data analyses by selecting a)functions, b)split-elements, c)comparisons, d)subpopulations. Figure 1 (left side) shows an example of a request for a graph which presents the mean length of stay (function) for survivors and non-survivors (split-element) of the user's own ICU and of all participating ICUs together (comparison). Readmissions to the ICU are excluded (subpopulation). Results of analyses, presented in graphs or tables, can easily be copied, e.g. to management reports. Privacy of patients and of ICUs is ensured by 1)login and password, 2)encryption of transferred data, 3)using a copy of the original NICE database without patient- or ICU-identifying information, 4)disabling combinations of functions and comparisons which may lead to identifiable information.

RESULTS: In Figure 1 the (fictitious) result of the analysis is presented. The columns represent the mean length of stay for survivors and non-survivors, of the user's own hospital (columns 1 & 3) and of all ICUs together (columns 2 & 4).

CONCLUSION: NICE has developed an application that enables ICUs to perform analyses online, while privacy at patient and hospital level is guaranteed. Through NICE online individual ICUs are supported in analysing and improving their performance.

Grant acknowledgement: Dutch ministry of Health, Welfare and Sport

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PROSPECTIVE AUDIT OF COST OF SEDATION, ANALGESIA AND NEUROMUSCULAR BLOCKADE IN A LARGE BRITISH ICU

Al-Haddad M F[1], Hayward I[2], Walsh T S[1]
[1]Intensive Care Unit, [2]Anaesthetic Department, New Royal Infirmary of Edinburgh, Edinburgh, United Kingdom

INTRODUCTION: Sedation and analgesia are essential components of patient care in the Intensive Care Unit (ICU). "Bottom up" costing of intensive care is more accurate but more labour intensive and difficult to perform compared to "top down" costing (1). "Bottom up" cost of sedative, analgesic and neuromuscular blockade drugs have not been reported. We therefore performed an audit of the cost of these drugs in our ICU using the "bottom up" costing approach.

METHODS: Over a 3 month period, we prospectively recorded the daily amount of sedative, analgesic and neuromuscular blockade drugs administered to patients in a 12-bedded ICU and multiplied the amounts by the cost of drug per milligram using pharmacy costing figures. Patients were divided into 4 groups that corresponded, roughly, to the length of stay quartile marks.

RESULTS: Out of 178 patients admitted during the study period, data were collected for 155 (92%). We also collected data for 94% (990 days) of ICU patient days. Table 1 shows cost of sedation per group, patient and ICU day. Around 94% of the cost was on drugs administered to the 50% of patients who stayed in ICU for more than 48 hours. Propofol and alfentanil were the commonest drugs used (administered to 88% and 68% of patients respectively) and the most expensive (5,577and 11,502 respectively). Total cost was 21,342 which was 81% of the pharmacy ("top down") cost.

Cost of sedation per group.

Group	n(%)	Cost	Cost/day	IQR	Cost/patient	IQR
Grp 1 <1day	56 (36)	493	9	1-25	4	0-15
Grp 2 <2days	28 (18)	857	16	7-29	27	8-44
Grp 3 <7days	36 (23)	2697	14	8-32	66	38-103
Grp 4 >7days	35 (23)	17292	23	10-36	331	154-572
Total	155(100	21342	14	5-30	28	6-102

Costs in Euro. IQR=Interquartile Range

CONCLUSION: We described the "bottom up" cost of sedation in a large British ICU. Despite using propofol and alfentanil as the main sedative and analgesic respectively, the median cost per ICU patient day was 28 which is less than 2% of reported overall cost of care in ICU in Britain (1).

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INTRAHOSPITAL TRANSPORT OF ICU PATIENTS; INCIDENCE OF COMPLICATIONS AND INSTABILITY

Ramnarain D[1], Willems S H[1], Erp van C F M[1], Braams R[1], Leenen L P H[1]
[1]Surgery-Intensive Care, University Medical Center Utrecht, Utrecht, Netherlands

INTRODUCTION: Transport of the critically ill patient between hospitals or intrahospital remains an hazardous road trip where the patient is exposed to less controlled circumstances outside the ICU. To gain more insight in the incidence of complications, circulatory- and respiratory instability (CI/RI) related to intrahospital transport, we investigated transports from our surgical ICU.

METHODS: All data concerning transports from the surgical ICU to the department of Radiology from 2000-2003 were retrospectively reviewed. Clinical relevant circulatory instability (CI) was defined as the necessity to start vasoactive medication(VAM)or to change the existing dosage of VAM during or directly after transport to maintain a MAP ≥ 65. Clinically relevant respiratory instability (RI) was defined as the need to change the settings of the mechanical ventilator (FiO2, Peep, Minute volume) during or directly after transport. We also evaluated the administration Additional Opiates and Sedatives (AOS) prior to or during transport and the possible impact of i.v. administration of contrast fluid jopromide (Ultravist ®) on renal function.

RESULTS: A total of 235 transports in 148 patients (male:female 100:48) with the following medians were evaluated; age 55 (15-88), APACHE II 15(3-70), TISS 34(18-51). Three subgroups were defined; 1:CT brain n=54, 2:CT thorax/abdomen n=125, 3: 'Other' (i.e. placing post pyloric feeding tube, other CT scans) n=56. Instability in relation to type of transport is shown in the table. Of 108 transports with patients receiving VAM prior to transport, 36 developed CI in contrast to 7 of 122 transport without prior VAM. AOS was administered in 108 transports of which 57 CI and/or RI occurred while this was the case in 49 of 123 transports without AOS. In eight transports serious complications occurred (2,6%); n=3 dislocation of arterial lines, n=3 dislocation of infusion lines, n=2 dislocation of wound drains. In 84 patients (36%) creatinine levels were significantly higher the day after transport.

Instability in relation to transport.

	CT Brain (n=54)	CT Th/Ab (n=125)	'Other' (n=56)	Total (n=235)
CI	13	23	7	43(18%)
RI	23	42	18	83(35%)
CI and RI	5	13	2	20(8,5%)

CONCLUSION: The incidence of CI and RI during intrahospital transport of critically ill mechanically ventilated patients is 18 and 35 % respectively with an incidence of serious complications of 2,6%. Deterioration of renal function occured in 36% of the patients indicating a possible relationship with i.v. contrast administration.

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SURVEY AMONG RESIDENTS FOLLOWING THE IN ICU-ANESTHESIA TRAINING IN FRANCE

Beydon L[1], Gautier J[1], N'guyen J[1], Soltner C[1]
[1]Dept of Anesthesia, Hôpital Larrey, Angers, France

INTRODUCTION: Several medical specialities have conducted surveys among their residents during their training, in order obtain a feed back and assess possible improvement issues. At our knowledge, not such a survey has been conducted in Europe. In France, ICU specialisation can be obtained by two separate trainings: either specifically in medical ICUs or jointly to the anaesthesia training which is followed by the majority of future ICU practitioners. A shortage in ICU doctors is expected, urging raised efforts to make this training as attractive as possible. This inquiry was intended as a first step in this purpose.

METHODS: A 22 question questionnaire was mailed to the first year residents (Y1) whereas a 40 question one was sent to the forth year residents (Y4) registered to the joint ICU-anaesthesia training program (lasting 4 years) in France. Anonymity of answers was insured.

RESULTS: A total of 96 questionnaires were received (44%) for Y1 and 123 (77%) for Y4. Main Y1 answers were: age: 25 ± 1 year, (39% female). They chose ICU for good job opportunities (29%), a clinical (24%) and dynamic (15%) speciality. They had discovered ICU-anesthesia during medical studies (10%). Night shifts were: not disturbing (21%), are shared by many other specialities (23%), and are more interesting that non-specialised night wards (23%). A 53% of them hesitated before starting this specialisation. Half of them changed geographical region for specialisation. Medical English was spoken and red: 66%. A computer was owned personally: 56%. Main Y4 answers were: 29 ± 2 year, (40% female), their 4-year training was judged for theory: excellent (7%), good (66%), fair (32%); for practical teaching: excellent (19%), good (70%), fair (12%). Medical English was spoken and red: 82%. Only 30% had a position at the end of their training. They wished to join public institutions: 66%, private: 29%. Research was a professional issue for 5%. Future practice restricted to ICU was aimed by 28%, whereas 57% preferred anaesthesia and 15% emergency medicine and pain clinics. They had published in French at least once during training: 38%, in English: 15%. Additional degrees (mainly in infectiology and as sub-specialisation in some ICU techniques) were obtained by 48% during specialisation. Periods spent in non-academic hospitals (one year) were rated as excellent: 47%, good: 44%, fair: 8%; and medical supervision was judged excellent-good in 87%. They spent an average 726 euros/year for medical furniture (books, computer). A computer was owned personally: 56%. Finally, 96% did not regret choosing ICU (and anaesthesia) as a speciality.

CONCLUSION: Training in ICU (and anaesthesia) was judged as good especially for practical aspects by most of residents. About a third aimed at working exclusively in ICU. More efforts should be performed to improve formal job offer at the end of the training.

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EVALUATION OF LABORATORY TESTS USAGE AND COSTS IN A GREEK MULTIDISCIPLINARY ICU

Leftakis A[1], Myrianthefs P[2], Dafni U[3], Hondrokoukis G[4], Baltopoulos G[2].
[1]Infection Control Comittee, Sotiria Hospital, [2]ICU, KAT Hospital, [3]Dept of Public Health, Athens University, [4]Dept of Industrial Management, University of Pireaus, Greece

INTRODUCTION: Laboratory, imaging and other diagnostic tests constitute a significant amount (up to 25%) of hospitalization costs in critically ill patients and efforts have been focused on the improvement of tests use and the saving of financial resources. The purpose of this study was to evaluate the usage and calculate the costs of lab tests in a Greek ICU.

METHODS: The study sample included all patients admitted to 6-bed multidisciplinary ICU of a General Hospital for a period of 8 months. We prospectively collected the data from patients' daily charts, individual medical records and test results forms. Administrative and economic data were derived from the Hospital's Administrative/Financial Department. Prices used for the estimation of tests costs were based on Greek N.H.S. nominal prices. Demographic characteristics included age, gender, APACHE II scoring system, case mix, ICU length of stay (LOS) and mortality. Costs are reported in Euros (€). Values are expressed in means ± SEM.

RESULTS: We included 100 patients (66 males) of mean age, ICU LOS, hospital LOS and APACHE II score were 55.9 ± 2.1 yrs, 13.2 ± 1.6 days, 34.9 ± 4.8 days and 16.8 ± 0.7 respectively. The total correct classification rate of APACHE II scoring system was 73%. The actual and predicted mortality rate was 25% and 24.7% respectively and the standardized mortality ratio (SMR) was 1.01. During the study period 20.178 tests were carried out and their costs were 157.328,86 €. The mean number of tests performed per patient was 201.7, per day were 15.2 and per patient per day were 18.9 ± 0.82 tests. The mean tests costs per patient was 1.573,2 €, per day was 118.9 € and per patient per day was 146.1 ± 5.5 €. The mean number of ABG's performed per patient were 57.6 and per day were 4.3 tests and the mean cost per patient was 922.8 € and per day 69.7 €. There was a statistically significant correlation between the total number of tests and the total costs and the APACHE II score (number rs =0.279, p=0.043, cost rs = 0.316, p=0.021). The total number of tests per category and the total costs of diagnostic tests are shown the table.

Total number of tests and total costs

Tests	Total number	Total Costs
CBC	999	2873,13
Coagulation tests	1308	5297,24
Biochemistry tests	10799	48812,39
Imaging studies	1179	7524,22
ECG	134	542,68
ABG	5759	92279,2
Total	20178	157328,86

CONCLUSION: Diagnostic and imaging testing represents a significant amount of hospitalization costs in our ICU due to the high number of tests performed per patient per day and especially for ABG analysis. Thus, a better control of lab tests ordering will result in costs reduction and a cost containment policy is becoming mandatory.

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USE OF INFORMATION TECHNOLOGY TO INTRODUCE CARE BUNDLES AND IMPROVE QUALITY OF CARE

Watson D M[1]
[1]Intensive Care Unit, University Hospitals Coventry and Warwickshire NHS Trust, Coventry, United Kingdom

INTRODUCTION: Getting evidence into practice is a challenge to us all. The concept of carebundles to improve the quality of care provided to critically ill patients was first introduced at the IHI in Chicago in 2002. We have used the Quality Sentinel (QS) patient data management system to support the adoption of carebundles and to reinforce the change in clinical practice through iterative feedback at every bed space.

METHODS: Evidence supporting the four components of the care bundle was reviewed and local exclusion criteria agreed. A gap analysis was carried out. The QS was used to provide immediate iterative feedback to all staff as they logged on. Thus QS provided built in reminders and made the desired action of the carebundle element the default mode on the unit. The ventilator and euglycaemia carebundles were commenced in December 2002 and one year of care bundle data is compaired with the year prior to care bundles.

RESULTS: Initial gap analysis confirmed care bundle compliance of <50% Within 3 months compliance was >90% for all elements of the carebundles, this level of compliance was maintained through the year.The number of patients managed in the level 3 beds increased from 458 December 2001 to November 2002 to 499 December 2002 to November 2003. This represents a 9% increase in activity with no change in the number of beds available or alteration to admission criteria. In both time periods bed occupancy was >100%.Length of ICU stay decreased from a mean of 9.72 days to 7.13 days (p<0.01)and the length of ventilation decreased from 7.5 days to 5.3 days (p<0.01). This reduction was observed across all specialites excluding neurosurgery.

CONCLUSION: The use of information technology to provide iterative feed back has reinforced the adoption of the ventilator and euglycaemia carebundles making the desired elements of the care bundle the default mode within the intensive care unit. The culture of the ICU has changed enabling more reflective practice ready for the adoption of the sepsis care bundle and other packages of evidence based treatment.

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THE COST OF FUTILITY IN INTENSIVE CARE UNIT

Kanevetci B N a c i[1], Dosemeci L[1], Y?lmaz M[1], Cengiz M[1], Ramazanoglu A[1]
[1]Anesthesiology and Reanimation, Akdeniz University, Antalya, Turkey

INTRODUCTION: The common problem arising in the ICU's is the use of the beds for the patients who are expected not to benefit from ICU treatment. In this prospective study, we aimed to determine the proportion, costs, length of ICU stay and prognosis of those patients who were expected to die according to our clinical experiences.

METHODS: One hundred and forty five patients over 18 year of age admitted to our 24-bed ICU between March 2003 and February 2004 and expected not to benefit from ICU treatment according to the experiences of the physicians working in ICU. The APACHE II, SAPS II and GCS scores were noted and according to those scores, the estimated mortality rates were determined by the formulas. Also ICU stay, ICU beds occupied by those patients, ICU and hospital discharge mortality and morbidity and costs were determined. We didn't change the treatment strategies of those patients. The patients who had high risk of mortality but could possibly recover completely after given therapy were not included in the study.

RESULTS: The mean age was 55.9 ± 18.9. The most common underlying diseases were non-travmatic intracerebral hemorrhage (% 26.2), cerebrovascular accident (% 15.9), head injury (% 14.5), metastatic tumors and vascular diseases of gastro-intestinal tract (% 10.3), cardiac arrest (% 9.7), lung cancer and end-stage lung diseases (% 9.7) and the others (% 13.7). The mean GCS, APACHE II, SAPS II scores were 6.7 ± 3.6, 24.4 ± 6.1, 54.1 ± 13.2, respectively. Also the estimated and adjusted mortality rates according to APACHE II score were % 50.3 and % 49.4 and according to SAPS II score was % 53.2. The mean ICU stay was 18.3 ± 20.4 days. Overall 121 out of study patients (% 83.4) died in the ICU, 5 (% 3.4) died after the ICU discharge also during the hospital stay or at home. Eleven patients (% 7.6) were in vegetative state, seven (% 4.8) were in severe neurological state and one (% 0.7) was in moderate neurologic deficit when discharged from the hospital. The total ICU stay of those patients was 2665 days during the study period. The mean daily ICU cost of each patient was 534.5 ± 157.5 USD. During this period the patients those expected not to benefit from ICU treatment occupied % 33.1 of the ICU beds.

CONCLUSION: An important percentage (% 33.1) of the ICU beds had been occupied by the patients who were expected not to benefit from ICU treatment. Only one of the 145 patients included in the study had a moderate neurological deficit and stayed alive. The total ICU cost of those patients during the study period was 1,424,495 USD.

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COST REDUCTION BY USING SELF-PREPARED HEPARINIZED SYRINGES FOR ARTERIAL BLOOD GAS AND PH ANALYSIS

Papadopoulos A C[1], Karakoulas K K[1], Vassilakos D[1], Filippidou M[1], Skourtis C T h[1], Giala M M[1]
[1]Anaesthesiology and Intensive Care, AHEPA University Hospital, Aristotle University of Thessaloniki, Thessaloniki, Greece

INTRODUCTION: Proper heparinization is perhaps the most important aspect of sampling technique for arterial blood gas and pH analysis.(1) The aim of our study was to evaluate two sampling techniques for arterial blood gases and pH measurements and their possible cost implications.

METHODS: We obtained 103 paired samples from 20 postoperative spontaneously breathing patients in ICU having an indwelling arterial line. Body temperature and blood Hb of patients were within normal ranges. Commercially available preheparinized (QUIK A.B.G.TM, Marquest Medical Products, CO, USA) and self-prepared with liquid sodium heparin syringes were used.(2) The PaO2, PaCO2 and pH values were obtained from the same analyzer within 5 minutes of sampling. The cost of each sampling technique was also estimated. Data were analyzed by Bland and Altman analysis.

RESULTS: The mean differences (+/-SD) between the results of the sampling techniques were -2.56 (+/-12.4) mmHg for PaO2, 0.44 (+/-1.87) mmHg for PaCO2, and -0.003 (+/-0.012) for pH. The 95% confidence interval was 0.97-0.99 for PaO2, 0.78-0.89 for PaCO2, and 0.81-0.90 for pH. The correlation coeffiecient (r) between measurements from the two syringes was r=0.98 for PaO2, r=0.85 for PaCO2, and r=0.86 for pH. The cost of each sampling technique was 0.9 Euros for preheparinized and 0.104 Euros for self-prepared syringes, per sample.

CONCLUSION: Our data demonstrated a relationship between the results of the two sampling techniques, close enough, to justify the use of self-prepared heparinized syringes for arterial blood gas and pH measurements. A significant 9-fold cost reduction would result by the routine use of this latter technique.

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PERFORMANCE OF MEASURES THAT DECREASE MORBI-MORTALITY IN ICU:EFFICACY OF AN EDUCATIONAL INTERVENTION

Pino Sánchez F I[1], Martín López J I[1], Domínguez Jiménez R[1], Chavero Magro M J[1], Herrera Para L[1], Rivera Fernández R[1], Guerrero López F[1], Fernández Mondéjar E[1]
[1]Intensive Care Unit, Hospital Virgen de las Nieves, Granada, Spain

INTRODUCTION: To know the performance degree of therapeutics measures that have demonstrated decrease morbidity and mortality in patients admitted in ICU and analyse the efficacy of an educational intervention over the improvement of that performance

METHODS: We checked the performance degree of the following measures in two stages, pre and post intervention: prophylaxis of pulmonary embolism (PE), elevation of the head of the bed to >30 degrees, intensive insulin therapy, lower tidal volumes in acute lung injury, daily trial of spontaneous breathing, daily withdrawal of sedation, stress ulcer prophylaxis and use of nimodipine in subarachnoid hemorrhage.The intervention consisted in the handing over of written information and talk on the therapeutics measures to the medical staff and to the nursing.

RESULTS: 87 determinations were made of each measure. The percentages of non-observance of those measures, pre and post-intervention, are shown in the table 1

	Pre Intervention	Post Intervention	p
PE prophylaxis	41 %	16 %	< 0.05
Head of bed > 30 degrees	37 %	0 %	< 0.05
Insulin	40 %	68 %	< 0.05
Lower tidal Volumes	22 %	50 %	ns
Daily trial of spontaneus br.	13 %	5 %	ns
Sedation withdrawal	15 %	8 %	ns
Stress ulcer prophylaxis	0 %	0 %	ns
Nimodipine	0 %	0 %	ns

Non-observance degree

CONCLUSION: The application of an educational intervention is effective to improve the performance of measures that decrease morbidity and mortality in ICU. The validity of this intervention is showed mainly in those measures that depend of nursing and with a poor previous performance

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IMPACT OF MEDICAL RESIDENCY IN THE PERFORMANCE OF AN ICU

Dias F S[1], Nagel F[1], Wawrzeniak I[1], Fonseca C[1], Guerreiro M[1], Froemming J[1], Canabarro M[1]
[1]General ICU, Hospital São Lucas da PUCRS, Porto Alegre, Brazil

INTRODUCTION: There is no information regarding the impact of the resident in critical care medicine on the outcome of critically ill patients in our environment.

METHODS: We performed a comparative study between two periods in an ICU, the first without CCMSP (PI) and the second with CCMSP (PII). We collected prospectively the following data: gender, age, APACHE II and MODS in days 1 (D1), 3 (D3) and 7 (D7), prevalence of sepsis/septic shock, duration of mechanical ventilation (MV), use or renal replacement therapy and ICU survival.

RESULTS: Between January 1998 and June 2003, there were 2432 ICU admissions, of which 932 in the PI period (1998-1999) and 1500 in the PII (2000-2003). The distribution according with gender, mean age, APACHE II, MODS, sepsis, septic shock , use of MV, renal replacement therapy and ICU survival in periods PI and PII was respectively: male sex 490 vs. 800 (NS), female sex 446 vs. 736 (NS); 57.2 vs. 55.0 years (p=0.003), APACHE II 17.67 vs. 17.70 (NS), MOD score D1 3.8±3.1 vs. 4.3±3.5 (p=0.002), D3 4.1±3.4 vs. 4.3±3.4 (NS), D7 4.5±4.1 vs. 4.3±3.3 (NS), prevalence of sepsis 40% vs. 54% (p<0.0001), septic shock 27.5% vs. 34.3% (p=0.001), duration of MV 7.1 vs. 7.0 days (NS), use of renal replacement therapy 13% vs. 9.3% (p=0.031). The survival rate in the ICU was 47% and 60%, respectively (p<0.0001).

CONCLUSION: After the implementation of a CCMSP, despite an increase in organ dysfunction in D1 and in prevalence of sepsis/septic shock, there was a significant reduction in the utilization of renal replacement therapy and mortality. These findings suggest that, the participation of a CCMSP medical resident was an important factor in the support of septic patients, reduction in renal replacement therapy and mortality.

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APLICATION OF THE DRG IN THE ICU

Barrientos Vega R[1]
[1]ICU, Virgen de la Salud, TOLEDO, Spain

INTRODUCTION: In most of the sanitary administrations, the hospital product is identified by the DRG, which has an assigned weight, a cost. The assignment of the DRG is made when the patient leaves the hospital. Thefore no DRG is given to those whom leave the ICU to other medical units. Could the DRG serve to identify the patients of ICU? Material: The sample to study was: 500 patients as they consecutivly entered the midico-surgical ICU.

METHODS: All patients were codified when leaving the UCI, according to the CIE-9 MC, and all were grouped according to the AP-DRGS vs 14.0. Were compared the DRG of the patients who left the ICU, with the DRG obtained by those whom left the hospital.

RESULTS: 98,2% of the princípiales diagnoses, surgical procedures or other, occurred while the patient was in the ICU. But comparing the DRG assigned when leaving the ICU to those assigned when leaving the hospital shows that only 62,4% of them coincide. The obtained weights (costs) are inferior to those reached in other studies. The DRG-ICU 3.9±4.7, the DRG - hospital 3.1±3.3. The weight in Spain, year 2000: 1=1.505€. Most of the procedures of ICU, that could modify the weight of the DRG, are not valued, except for the mechanical ventilation and the temporary tracheotomy.

CONCLUSION: With only one diagnose, the system is unable to identifie the complex cases. The stay and most of the ICU procedures, do not interfere nor modify the weight of the DRG.

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PREVENTION OF CEREBRAL VASOSPASM BY SUBARACHNOIDAL SODIUM NITROPRUSSIDE

Pachl J[1], Haninec P[2], Tencer T[1], Tomas R[2], Mizner P[1]
[1]Anaesthesiology and CCM, [2]Dept. of Neurosurgery, Charles University, 3rd School of Medicine, Prague, Czech Republic

INTRODUCTION: Delayed cerebral ischemia due to vasospasm is a major cause of death and disability in patients after subarachnoidal hemorrhage (SAH). The outcomes of several experimental studies designed to investigate an effect of nitric oxide donors on the treatment and prevention of this life-threatening condition appear controversial [1,2]. The purpose of our study was: 1) to specify the influence of prophylactic subarachnoidal administration of sodium nitropruside (SNP) on the incidence of vasospasm 2) to determine the role of brain tissue monitoring-PbtiO2, PbtiCO2 and pHbti, measured in the area of high risk of vasospasm, for management of SNP administration.

METHODS: Prospective observational study on patients with non-traumatic SAH (Hunt-Hess grade I-IV) with secured ruptured aneurysma. In postoperative period all patients underwent triple-H protocol with calcium channel blocker. Subarachnoidal preventive SNP was administred in initial dose of 1mg by catheter which was inserted to basal cisterns during neurosurgical procedure. The timing of following dosage (period of 6 or 24 hrs) was directed by the changes of PbtiO2, PbtiCO2 and pHbti after SNP administration. SNP administration did not exceed a period of 12 postoperative days. The brain tissue respiratory values were estimated by Codman Neurotrend Multiparameter Sensor®. The blood flow velocity was simultaneously measured on circuit of Willis by transcranial Doppler sonography (TCD). In case of detected signs of vasospasm the dosage of SNP was increased and maintained by monitoring modalities (TCD and values of PbtiO2, PbtiCO2, pHbti).

RESULTS: 16 patients were enrolled. No brain infarction was developed in the studied group. All patients survived. The vasospasm was identified in two patients by TCD and simultaneously by changes of tissue respiratory values.These patients arrived at hospital with delay of several days from the beginning of symptoms. The overall outcome was good in 11 out of 16 patients including patients with vasospasm.

CONCLUSION: Preventive subarachnoidal administration of SNP controled by TCD and brain tissue multiparameter sensor might increase the effect of triple-H protocol with calcium channel blocker. Multimodal brain tissue monitoring could be the way to maintain titratable prophylactic SNP administration. The therapeutical intervention requires considerable raise in doses frequency and its effect cannot be evaluated until now.

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TOPIRAMATE AND STATUS EPILEPTICUS: CLINICAL AND ELECTROENCEPHALOGRAPHIC ANALYSIS

Basílio C[1], Rio E[2], Barbosa S[1], Paiva J[1], Mota A[1]
[1]Department of Anesthesiology and Critical Care, [2]Department of Neurology, Hospital S. João, Porto, Portugal

INTRODUCTION: The search for drugs to minimize neuronal lesions after prolonged seizures has been the goal of treatment of patients with status epilepticus. Topiramate is a new anticonvulsant with multiple mechanisms of action: potenciation of GABA, blockade of glutamate receptors (AMPA), inhibition of sodium and calcium channels. Recent studies state that topiramate is effective in treating refractory status epilepticus and may reduce post-status epilepticus neuronal lesions.

METHODS: Description of two clinical cases of patients, admitted in the ICU, with status epilepticus refractory to conventional therapy were treated with topiramate.

RESULTS: Case 1: Woman, 77 years old, with a history of alcohol abuse and psychiatric disease was admitted with encephalitis and tonic-clonic seizures. The patient was treated during 16 days with hidantin, valproate sodium and thiopental. Despite this, the EEG showed a periodic epileptiform activity. Topiramate (100 mg daily) was added to valproate with clinical improvement and an absence of ictal discharges on EEG after 4 days. Case 2: Male, 77 years old, admitted with hematemesis, shock and eventual cardiopulmonary arrest. Admitted in the ICU for postoperative care of duodenal ulcer surgery. Two days later, the patient developed partial status epilepticus. He was treated with midazolam, clonazepam and phenytoin. The EEG showed bilateral periodic epileptiform discharges with no recent cerebral lesions in the cerebral CT scan. Pentobarbital coma was induced for seven days. Status epilepticus persisted despite appropriate measures and on the 13th day topiramate (100 mg daily) was added to clonazepam. After 2 days, there was clinical improvement and EEG showed periodic generalized slow wave activity with motor response to painful stimulus wich was a prediction for a better outcome.

CONCLUSION: In both cases, topiramate was able to induce clinical improvement and disappearance of ictal discharges in the EEG in case 1. However, in case 2 the pattern of EEG persisted with signs of better prognostic.

It needs further investigation with larger prospective series to better confirm the results.

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COMPARISON OF COILING VERSUS CLIPPING OUTCOMES AT HOSPITAL DISCHARGE AFTER SUBARACHNOID HAEMORRHAGE

Dwivedi J[1], Verma B[1], Sunavala J D[1], Patel M H[1], Poncha F[2]
[1]Critical Care Medicine, [2]Neurology, Jaslok Hospital And Research Centre, Mumbai, India

INTRODUCTION: About 60% patients of ruptured cerebral aneurysm die or become debilitated despite advanced clinicalmanagement. Major treatments for SubarachnoidHaemorrhage (SAH) are Endovascular Coiling and Surgical Clipping. The purpose of this study was to compare coiling versus clipping in relation to functional outcome at hospital discharge.

METHODS: This was a prospective study design. All cases of SAH(n=15)of ages between 18 to 72years which were admitted over a period of thirteen monthswere included in this study. Aneurysm detection criterion was Digital Substraction Angiography or CT Angiography. Mean Hunt-Hess Grading in coiling group was 3, whereas in clipping group it was 4.16.Fisher Grade was >2 in all patients clipped and between 1-5 in patients coiled. Exclusion criteria included cases withA-V malformation, preexisting neurological deficit or where no intervention was done. Outcome analysis was done using Modified Rankins Scale (MRS) and World Federation of NeurologicalSurgeons GradingWFNS).Stastisticallyanalysed using Chi-square and Standard Error of difference between two Means-tests

RESULTS: 60% aneurysms (n=9) were coiled and 40%(n=6) were clipped. There were no significant differences in age race, gender, but there was a significant difference in the Hunt-Hess Grading (Mean=3in coiling vs.4.1in clipping)in the 2groups. FunctionalOutcome was significantly poorer in clipping. Complications suchas pneumonia, UTI, meningitis,hydrocephalus seizures were significantly higherinclippingp<0.005).Hospital stay and Mortality(p<0.05)were significantly higherin clipping.

Observations	Hunt-Hess av	Complications	MRS avg Gr	WFNS stay av	Length	Mortality
Coil	3	n=2	1	2	28.77 d	,n=0
Clip	4.16	n=6	4.33	3.75	73.5d	n=2

CONCLUSION: Poor outcome in clipping was due to higher HuntHess grading and due to location of max.clipped aneurysms in MCA(perfuse larger area of brain).Prolonged hospital stay was due to nosocomial infections as a result of poor GCS. It was seen that maximum aneurysms were in ACOM (33.3%)

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FLUID RESUSCITATION IN VASOSPASM AFTER SUBARACHNOID HAEMORRHAGE

Van Tulder L[1], Chioléro R[1], Regli L[2], Revelly J[1], Berger M[1]
[1]Surgical intensive care unit, [2]Neurosurgical, University - CHUV, Lausanne, Switzerland

INTRODUCTION: Hypovolemia is deleterious in patients developing a vasospasm after subarachnoid haemorrhage (SAH). Fluid resuscitation to induce hypervolemia is considered by many as the cornerstone of management. The efficacy of this approach is however not established.The aim was to assess the effect of fluid resuscitation on blood volume and fluid balance during the initial phase of ICU management for cerebral vasospasm after SAH

METHODS: Retrospective analysis of the database of a clinical information system (Metavision, iMD Soft). Patients with the diagnosis of vasospasm after SAH (angiography) were studied. Cardiac index (CI) and intra-thoracic blood volume (ITBV) measured with transthoracic thermodilution (PiCCO, Pulsion) were determined as part of the clinical management. Fluid supply consisted of isotonic saline. The value of mean arterial pressure (MAP), CI, ITBV, as well as fluid supply and fluid balance at time 0, 6, 12, and 24 hours were analysed (Presented as mean±SD). Comparisons between these time-points were performed with one-way analysis of variance for repeated measurements. P<0.05 was considered significant.

RESULTS: Ten patients were studied. Fluid supply amounted to 1.0±0.5 l at 6H, 2.7±1.0 at 12H, and 4.8±1.5 at 24H (p<0.05). Initial MAP was 110±12 mmHg, CI 3.5±0.7 l/min/m^2, and ITBV 863±295 ml/m^2. There was no significant change over time for these variables, although ITBV increased to 1102±290 at 6H, and decreased to 924±212 ml/m^2 at 24H. Cumulative fluid balance amounted to 0.3±0.5 l at 6H, 0.3±0.4 at 12H, and minus 0.3±0.7 at 24H (not significant), due to a diuresis.

CONCLUSION: Despite aggressive volume loading with normal saline, the fluid balance of patients with vasospasm was not significantly altered over the first 24 hours of ICU admission. These preliminary data suggest that, these patients may become rapidly resistant to fluid loading due to induced natriuresis. This escape phenomenon, may contribute to the absence of documented benefit of fluid expansion in vasospasm

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INFLUENCE OF CONTROLLED HYPOCAPNEA OVER THE INTRACRANIAL PRESSURE IN PATIENTS WITH HEAD INJURIES

Ajderian S Stepan[1], Petrov N[1]
[1]Department of Anesthesiology and ICU, Military Medical Academy, Sofia, Bulgaria

INTRODUCTION: Background: The modulation of the intracranial pressure in patients with head injuries is important precondition in the optimizing of the therapeutic management. The goal of the authors is to study the influence of the hypocapnea over intracranial pressure as a part of complex treatment of the head injuries

METHODS: : There are encompassed 12 patients with head injury CT-scan data for brain contusion and perifocal edema who assessed according Glasgow Comma Scale under 8 pct. All patients had ventricle drainage placed in one of the lateral brain ventricles in order to measure intracranial pressure and received standard therapy. The patients divided in two groups: I –in 6 patients we applied controlled hypocapnea with ????2 value between 30 –35 mm Hg and II group – 6 patients with ????2 values between 25-30 mm Hg. Statistical program was used – SD, t-criteria and p- value.

RESULTS: We received significantly dropping of the intracranial pressure in patients set at artificial ventilation with moderate hypocapnea. In first group the mean value of intracranial pressure was 22.16 mm Hg. In this group 3 (50 %) patients died.

Patients group	Intracranial pressure - mean	Mortality
PaO2 30-40mmHg	22.16 mmHg.	3 (50%)
PaO2 28-34 mmH	13.16 mmHg	2 (33.3%)

CONCLUSION: The analysis of obtained data concludes that moderate hypocapnea is immutable part of the complex treatment and decreases the mortality in head –injuried patients.

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PREVENTION OF ACUTE PANCREATITIS AND ACALCULUS CHOLECYSTITIS IN BRAIN INJURED ICU PATIENTS.

Botsis P[1], Litis D[1], Nikolopoulou I[1], Chatzivasiliadis H[1], Ioannidou H[1]
[1]ICU, KAT Hospital Athens Greece, Athens, Greece

INTRODUCTION: Acute pancreatitis and acute acalculus cholecystitis are frequent and serious complications in severely head traumatized patients. The aim of this study is to find if the early administration of somatostatin plays a role in the prevention of these complications.

METHODS: 50 brain injured ICU patients (35 men and 15 women), with no abdominal or thoracic trauma, were entered the study. Age 40 +/- 15, apache II score ≤ 10, GC5 8 +/- 2 on admission, with no signs of preexisting gallstones in the u/s of the upper abdomen. Surgical on conservative therapy for the brain injury, with drugs known not to interfere with the pancreatic and biliary system and early E.N. via nasogastric tube, was performed. After the admission in ICU they were divided into two groups: A) At Group A (25 patients) somatostatin (250 ?g/h) was added in the standard therapy for the next 10 days. B) At Group B (25 patients), the standard therapy was continued, as planned. Daily laboratory tests for: temperature, blood type, bilirubin, blood sugar, Ca, alkaline phosphatase, serum-urine amylase, serum-lipase and daily clinical examination as well for: pain and tenderness of the abdomen, vomiting, distention, decreased bowel sounds. Every second day an u/s of the upper abdomen was performed.

RESULTS: At 4 patients of Group B (8%) and at 1 patient of Group A (2%) acute pancreatitis was developed the 5th day-of-stay in ICU. At 8 patients of Group B (16%) and at 6 patients of Group A (12%) acute acalculus cholecystitis was developed as well at the same day. Diagnosis of both complications was based on clinical and laboratory findings.

CONCLUSION: Early administration of somatostatin in brain injured ICU patients diminishes the possibility of development of acute pancreatitis, but does not influence the development of acute acalculus cholecystitis in these patients.

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THE VALUE OF MAGNETIC RESONANCE (MRI) IN SEVERE TRAUMATIC BRAIN INJURY WITH DIFFUSE AXONAL LESIONS

Iglesias R[1], Misis M[1], Moreno J A[1], Gener J[1], Rovira C[1], Fabra M[1], Tomasa A[1]
[1]Intensive Care Unit, Hospital Universitario Germans Trias i Pujol, Badalona, Spain

INTRODUCTION: To evaluate the usefulness of magnetic resonance images (MRI) in patients suffering from severe brain injury, unfavourable clinical progress and Marshall brain scans types I and II.

METHODS: Fifteen patients with severe brain injury were retrospectively studied, considering their age, gender, initial GCS initial head scans and MRI upon admission to Intensive Cares Unit (ICU), their outcome (GOS) at discharge form ICU. MRI level I was defined as being when the subcortical white matter was affected, MRI level II being level I plus affectation of the corpus callosum, and MRI level III was defined as being MRI-II as well as damage to the brain stem and spinal cord. GOS was also evaluated, defining GOS I-II as positive and GOS III, IV and V as negative.

RESULTS: The average age of the patients studied was 24.8 years old. Nine (60%) were males and six (40%) were females. The average GCS on admission was 5.53.

Five patients (33%) had and initial Marshall scan type I and ten (66%) had Marshall scan type II. Two patients (13.3%) showed MRI-I, five (33%) MRI-II and eight (53.3%) MRI-III. In the two patients with MRI-I their initial GCS was 6.5 and both progressed favourably and were discharged from intensive care unit. The five patients with MRI-II had an initial GCS of 6. Three of these (60%) did not progress well. In the eight patients with MRI-III, the initial GCS was 5.2. Seven of these (82.5%) progressed unfavourably when discharged from intensive care.

CONCLUSION: Magnetic resonance images are related to the severity of head damage and have a high diagnostical and prognostical value for use with patients suffering from diffuse axonal lesions.

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INDUCED HYPOTHERMIA REDUCES INTRACRANIAL PRESSURE IN PATIENTS WITH SUBARACHNOID HAEMORRHAGE

Rijnsburger E R[1], Girbes A R[1], Spijkstra J J[1], Peerdeman S M[2], Polderman K H[1]
[1]Department of Intensive Care, [2]Department of Neurosurgery, VU university medical center, Amsterdam, Netherlands

INTRODUCTION: Hypothermia is widely used to improve neurological outcome in various types of neurological injury; however, this has not yet been well studied in patients with subarachnoid haemorrhage (SAH), where cooling has been used mainly to prevent or treat vasospasms [1]. Hypothermia has been used to treat refractory intracranial hypertension in patients with TBI and severe stroke; however, its potential to treat cerebral oedema in patients with SAH has not been well studied [1]. Only one small feasibility study dealing with this issue has been published, but here various interventions (such as induction of barbiturate coma and mild hypothermia) were applied simultaneously [2]. Thus it remains to be determined whether induction of hypothermia per se can decrease ICP in patients with SAH.

METHODS: 36 Patients admitted with SAH and refractory intracranial hypertension (ICP>25 mmHg lasting longer than 5 minutes despite prevention of hypovolemia or induction of hypervolemia, induction of hypertension, and treatment with nimodipine, mannitol and hypertonic saline, and following coiling or clipping of the cerebral aneurysm) were treated with induced hypothermia (32-35oC) according to a protocol guided by ICP.

RESULTS: Hypothermia was induced using cooling blankets and infusion of refrigerated fluids. Target temperatures were achieved within 82 (range 32-152) minutes. ICP decreased from 36.2±15.4 to 16.8±10.8 (normal value: <15mmHg). ICP<25mmHg was achieved in 34/36 patients; in 2/36 patients ICP decreased but remained at levels between 25-30. Hypothermia was maintained until normal ICP had been observed for 12 hours, after which patients were slowly re-warmed (again guided by ICP). Hypothermia was maintained for an average of 74±41 hours. No patients died during treatment with hypothermia. Two patients (5.6%) died in the ICU after hypothermia was discontinued; 7 (19.4%) died in the subsequent 3 months. Good functional outcome at 3 months (Glasgow Outcome Score 4-5) was achieved in 14 patients (38.8%). Previous studies had reported a high incidence of side effects such as pneumonia in patients treated with hypothermia. We observed no increase in infectious problems, perhaps because our patients were treated with SDD.

CONCLUSION: Induced hypothermia can be safely and effectively used to treat refractory intracranial hypertension in patients with SAH. Vasospasms and intracranial hypertension are thought to be the two key factors in the development of additional brain injury in SAH; however, it remains to be determined whether this treatment also improves neurological outcome and survival in these patients.

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THE RESULTS OF TREATMENT BASED ON MONITORING OF CPP AND SVJO2 IN PATIENTS WITH SEVERE BRAIN INJURY

Pakulski C[1], Badowicz B[1], Bak P[2], Kwiecień K[3], Mikulski K[3], Surudo T[3]
[1]Department of Emergency Medicine, Pomeranian Medical University, Szczecin, Poland, [2]Intensive Care Unit, Regional Hospital, Pasewalk, Germany, [3]TraumaCentre, Pomeranian Medical University, Szczecin, Poland

INTRODUCTION: The management of patients with severe head injury should include monitoring of mean arterial pressure (MAP) and intracranial pressure (ICP), cerebral perfusion pressure (CPP) and levels of jugular bulb oxygen saturation (SjO2). The aim of the study is to present the outcome in patients with severe central nervous system injuries treated in the TraumaCentre, Pomeranian Medical University.

METHODS: This retrospective study evaluates the methods of treatment in 103 patients with severe brain injury treated between July 1st, 2001 and December 31st, 2003 in the our TraumaCentre. These patients were admitted to our institution directly from the accident sites or from the referring hospitals during the first post-injury day. Glasgow Coma Score of 8 or less was the inclusion criterion. In all patients MAP and ICP values were monitored, CPP values were calculated, and additionally in 51 patients SjO2 values were measured. The initial treatment protocol was always the same: analgosedation (fentanyl, midazolam), normoventilation, osmotic diuretics (mannitol 0,5-1,0 g/kg/day in 6 doses and furosemide 0,05-0,1 mg/kg/dose in 6 doses), supine position. The protocol was modified with regard to MAP, ICP and SjO2 values (brain ischemia or brain hyperemia). The patients with increased ICP values resistant to osmotic diuresis were scheduled for unilateral or bilateral decompressive craniectomy. The results of treatment were evaluated with Glasgow Outcome Classification after 12 months following the injury.

RESULTS: The mortality in our ample was 34,95% - 36 deaths out of 103 treated patients. Isolated brain injury was the cause of death in 12 patients, and in 24 patients- multi-organ injury. Sixty seven (65,05%) patients were transferred from the Trauma ICU for further treatment to other wards. Out of the patients discharged from the Trauma ICU 10 patients died - GOC 1 (14,92%), none of the patients were in the neurovegetative state – GOC 2 (0%), 5 patients with persistent aphasia or hemiparesis were classified as GOC 3 (7,46%), 19 patients with mild neurological deficits that didn't impair their social life were classified as GOC 4 (28,37%), and finally 33 patients without any neurological sequelae were classified as GOC 5 (49,25%). Out of 51 patients with treatment modified according to SjO2 values 30 patients survived. Brain hyperemia was found in 14 non-survivors and severe brain ischemia was found in 7 non-survivors.

CONCLUSION: The outcomes in our patients treated with the protocol based on monitoring of CPP and SjO2 are encouraging. Monitoring of SjO2 is a significant element of the modern treatment protocol for patients with brain injury and the best method of diagnosing both hyperemic and ischemic episodes.

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STANDARD NEUROMONITORING: DOES IT AFFECT THE FUNCTIONAL OUTCOME OF PATIENTS WITH HEAD TRAUMA?

Anastasiou E[1], Tsaousi G[1], Giannakou M[1], Efthimiou K[1], Geka E[1], Sofianos E[1]
[1]ICU- Anaesthesiology, AHEPA University Hospital, Thessaloniki, Greece

INTRODUCTION: Intermittent clinical observations even under the best circumstances are discontinuous and subjective. Monitoring in the neuroscience intensive care unit extends our powers of observation in order to detect physiologic abnormalities at a reversible stage. The aim of the present study was to investigate whether standard neuromonitoring (ICP, CPP, SjvO2) can influence the functional outcome of patients with traumatic brain injury (TBI).

METHODS: Ninety eight patients with TBI admitted in our ICU the past three years were investigated for age, preadmission hypoxia and hypotension, severity of injury (GCS, pupil reactivity, CT-Scan grade, ISS), APACHE II-24h and GOS. The patients were divided in 2 groups whether standard neuromonitoring was applied [group A (n=48)] or not [group B (n=48)]. Statistical analysis was performed with independent T-test, Mann-Whitney test and Chi square test.

RESULTS: There was no statistically significant difference in terms of preadmission hypoxia and hypotension, time interval to intubation, pupil reactivity at the accident site, upon hospital arrival and ICU admission, CT-scan grade, ISS and APACHE II score between groups. Patients in group B were older but had a better GCS than patients in group A. Comparatively GCS remained better in group B even upon hospital arrival.

*mean±SD	group A (n:48)	group B (n:48)	p
Age (yrs) *	35.44±19	43.67±17.4	0,03
GCS site*	7.75±3.67	10.5±4.1	0,001
GCS hospital*	7.1±3.32	8.5±3.8	0,043
GOS 4-5	60.4%	39.58%	0,01

CONCLUSION: In our study institution of standard neuromonitoring, contributed, through goal directed therapy, in a positive way to the outcome of patients with a lower GCS. The better GCS proved to be misleading and resulted in a delay in decision making which finally led to a worse outcome.

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THE USE OF TRANSCRANIAL DOPPLER ULTRASONOGRAPHY (TCD) IN THE PREDICTION OF THE OUTCOME IN PATIENTS

Vakalos A[1], Doukelis P[1], Kareklas M[1], Setzis D[1], Matamis D[1]
[1]I.C.U, Papageorgiou General Hospital, Thessaloniki, Greece

INTRODUCTION: In patients with severe head injury the main complication is cerebral edema and intracranial hypertension that may cause cerebral ischemia, disability and in certain cases brain death. Transcranial Doppler (TCD) is a non-invasive, bedside technique which detects the blood flow velocities in the great intracranial arteries. The aim of our study was to investigate if there is a relationship between TCD findings and the outcome of patients with severe head injury.

METHODS: 59 patients with severe head injury (GCS<8) were included in our study. From these 59 patients 49 were males and 10 females. Their mean age was 36.8 years, with a range from 12 to 71 years. Among these 59 patients 20 died in the ICU (33.89%). In each TCD examination we measured the maximum, mean and the end diastolic velocity (Vmax, Vmean and Vmin respectively), and we calculated the pulsatility index (PI). The patient's outcome was recorded at the disharge from the ICU according the Glasgow Outcome Scale as following: Good recovery (GR), Moderate disability (MD), severe disability (SD), persistent vegetative state (PVS) and death. The patient's outcome was compared with the cerebral flow velocities and the PI index.

RESULTS: There was a statistically significant difference in the mean values of all velocities between the outcome categories of the patients. We found the stronger difference in the mean values of Vmax and Vmin between the death and the categories PVS and SD, and in the mean values of Vmean between the death and the categories PVS, SD and MD.

Multiple comparisons of theTCD values

	Vmax	Vmin	Vmean	PI
Death vs GR	p > 0.05	p > 0.05	p > 0.05	p > 0.05
Death vs MD	p > 0.05	p > 0.05	p < 0.05	p > 0.05
Death vs SD	p < 0.05	p < 0.05	p < 0.05	p > 0.05
Death vs PVS	p < 0.05	p < 0.01	p < 0.01	p > 0.05

CONCLUSION: Mean values of TCD velocities cannot be used as reliable prognostic factor between survival and death. However low Vmax, Vmin and Vmean values may be useful to predict death rather than another category of poor outcome (PVS, SD).

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COMPARAISON OF REGIONAL EFFECTS OF DOPAMINE AND NOREPINEPHRINE IN SEVERELY HEAD-INJURED PATIENTS

Albanèse J[1], Boyadjiev I[1], Chaabane W[1], Antonini F[1], Leone M[1], Martin C[1]
[1]Intensive Care and Trauma Center, Hopital NORD, Marseille, France

INTRODUCTION: In severely head-injured patients, it is often needed to add vasopressive amines to maintain adequate cerebral perfusion pressure (CPP). Norepinephrine (N) and Dopamine ((D) are proposed, but their vasoconstrictive effects may be deleterious for regional circulations.Objective is to compare the effects of D and N on cerebral, splanchnic, and renal circulations when used to raise CPP after severe head injury.

METHODS: Prospective, randomized, cross-over study including 15 patients with head trauma, requiring intracranial pressure (ICP) monitoring and vasopressor therapy. After 30 and 120 min of administration of D or N, were studied : systemic hemodynamics (mean arterial pressure (MAP), cardiac index (CI), central venous oxygen saturation (SvO2), cerebral circulation (ICP, CPP, transcranial Doppler : mean velocity in the middle cerebral arterey (Vmca)), splanchnic circulation (gastric intramucosal pH (phi)), renal circulation (urin flow (UF), creatinine clearance (Clcreat) and metabolic data (energy expenditure) (ES), oxygen consumption (VO2), and lactate (Lac)). The Wilcoxon Signe Test was used with p< 0.05 considered significant.

RESULTS: They are presented in table 1. No significant differences were observed in systemic hemodynamics when the two drugs were compared. None of the studied local circulation were altered with any of the studied drugs.

	Dopa 30min	Dopa 60 min	Dopa 120 min	Norepi 30 min	Norepi 60 min	Norepi 120 min
HR b/min	107±29	113±28	86±16	89±20	91±19	92±18
MAP mmHg	99±8	92±10	99±7	98±8	99±7	100±5
CI l/mn/m2	5.6±4	5.4±0.7	5.3±1.1	4.6±2.3	4.7±2.2	5.1±2.4
SvO2 %	81±7	81±6	82±9	79±7	80±4	83±5
VO2 ml/min	318±74	303±62	317±49	323±55	317±64	338±56
Phi	7.4±0.1	7.3±0.2	7.4±0.1	7.3±0.2	7.4±0.1	7.3±0.2
UF ml/h		231±159	173±17		120±60	177±10
Clcreat ml/mnm2		107±9		100±7		
Vmca cm/s	74±16	79±14	104±16	75±18	77±25	86±25
ICP mmHg	25±19	18±7	18±6	19±10*	20±9	21±9

** p < 0.05*

CONCLUSION: Both D and N were able to raise MAP and CPP. These goals were achieved without altering cerebral, splanchnic and renal circulations.

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DECOMPRESSIVE CRANIECTOMY FOR REFRACTORY BRAIN EDEMA: A SURVEY OF PRACTICE AND PERCEPTION

Limpar P[1], Ziai W[2], Gavaasuren A[1], Artru F[1]
[1]Anesthésie Réanimation, Hopital Neurologique Hospices Civils de Lyon, Lyon, France, [2]Department of Neurology, Johns Hopkins University School of Medicine, Baltimore, United States

INTRODUCTION: The aim of this survey was to assess the perception and to describe current opinion on the indications, practice and usefulness of decompressive craniectomy for non-tumor related hemispheric (supratentorial) refractory brain edema (primarily for stroke and traumatic brain injury) in three European countries.

METHODS: A three-page questionnaire was sent to 52 major neurosurgical and neurological referral centers in France, Belgium and Switzerland. 600 neurosurgeons, neurologists and neuroanesthesiologists were invited to provide information on ICU management of refractory brain edema. A web site was created (www.oedemecerebral.com) and the possibility of online completion of the questionnaire that contained 32 items was offered as well. Information was handled in a highly confidential way according to French and European privacy policies.

RESULTS: 124 completed questionnaires were returned. 85% of centers included in the mailing provided data. Most of the questionnaires were sent to large teaching hospitals with departments of neurosurgery, stroke neurology, and intensive care medicine. Only two academic centers did not produce information. 20% of responders completed the questionnaire online using our web site. 44% of responders believe that decompressive craniectomy can improve long-term functional outcome in patients who survive with massive hemispheric infarction, while 36% believe that the procedure is just life-saving. For patients who survive with traumatic brain injury, 65% of responders believe that decompressive craniectomy can improve long-term functional outcome. Neurosurgeons were more likely to predict a good functional outcome for these patients (74%). 86% of all centers performed less than 10 decompressive surgery for secondary brain edema during a 12-month period. The side of the lesion was not considered as an important prognostic factor by 59% of responders. Age was not a major factor in the clinical decision to recommend decompressive craniectomy. 53% of responders (in particular neurologists) would recommend this procedure for patients older than 60 years.

CONCLUSION: This survey suggests significant variations in the practice of decompressive craniectomy, and even more widely in the management of refractory brain edema between academic centers in France, Belgium and Switzerland. Our survey demonstrates a clear perception of usefulness of this technique, however, there is variation depending on primary specialization of responding physicians. The findings of this survey underscore the need for randomized clinical trials, as expressed by several responders.

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UNRESPONSIVE AUTONOMIC STORMS TREATED BY INTRATECAL BACLOFEN: A CASE REPORT

Messina M[1], Salis S S[2], Mandras M[2], Pala F[2]
[1]Anestesia e Rianimazione, Ospedale S.Giovanni di Dio ASL N°2, [2]Anestesia e Rianimazione, Ospedale S.Giovanni di Dio - ASL N°2, Olbia, Italy

INTRODUCTION: Some individuals suffering from severe brain injury involving brain stem, diencefalon, anterior hypotalamus and medulla, show spontaneous episodic exaggerated stress response, that are caracterized by increased postural tonus, dystonia, hypertension, hyperthermia, tachycardia, tachypnea, diaphoresis and agitation. This syndrome is defined autonomic storm. The storming can worsen the clinical status and outcome; storm episodes need to be avoided and quickly treated.
We report a case of autonomic storm syndrome treated by intrathecal baclofen after classical therapy failure.

METHODS: A child 14 year old was admitted to our ICU after a cardiac arrest. He showed a severe postanossic brain damage with spasticity. Five days after admission autonomic storms appeared, caracterized by hypertonia, dystonia, hypertension, tachycardia and diaphoresis. The frequency of crises increased throughout following days in spite of beta-blockers, sedatives and opiate agonists administration; enteral baclofen too was not effective. An intrathecal baclofen test (50 gamma bolus) improved immediately autonomic and hypertonic disfunction; a spinal catheter was then inserted in the mediothoracic region and infusion of baclofen 50 gamma daily was started. After titration, final daily dose of baclofen was 150 gamma and a Codman Archimedes pump was subcoutaneously implanted before discharge.

RESULTS: Intratecal baclofen stopped the autonomic storms and decreased the spasticity (evaluated by Ashwort scale). The patient was discharged in a rehabilitation center and two months after pump implant shows clinical stability.

CONCLUSION: Intratecally delivered baclofen was used firstly in severe spasticity of spinal and cerebral origin, later also in treatment of spasticity from traumatic brain injury, asphyxia and stroke. It seems to be also effective to control autonomic storms. Side effects described are rare and mainly not life-threatening. The implant of a subcoutaneous pump allows a constant drug delivery, is safe and comfortable for the patient and nurses. The continous intratecal baclofen can play a role to prevent and control otherwise unresponsive autonomic storms also in severe hypoxic brain injury in critical patients.

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MECHANICALLY VENTILATED PATIENTS 80 YEARS OF AGE AND OLDER; CHARACTERISTICS AND OUTCOME

Manolakoglou N D[1], Papadopoulou N N[1], Trigonis I A t h[1], Tsiata E A t h[1], Kioumis I P[1], Pitsiou G G[1], Mavrofridis E[1], Argyropoulou P[1], Kakavelas I P[1], Stanopoulos I T[1]
[1]RICU, Aristotle University, Thessaloniki, Greece

INTRODUCTION: The aim of the study was to follow the course and outcome of mechanically ventilated patients aged 80 and older (80+) and compare them with a group of younger patients.

METHODS: We prospectively studied 33 consecutive 80+ patients (group A) admitted in a University Respiratory Intensive Care Unit (RICU) during a period of 18 months. The control group (group B) consisted of 39 younger patients admitted in the RICU during the same period. All patients were mechanically ventilated because of hypoxic or hypercapnic respiratory failure. Patient characteristics included age, gender, APACHE II score on admission, days on mechanical ventilation (median), days in the RICU (median), and 30 days outcome. A subgroup of 20 patients 80+ years old with a history of chronic obstructive pulmonary disease (COPD) was separately compared to a subgroup of 22 of the control patients with a similar history, to evaluate any age influence on the outcome of mechanically ventilated COPD patients.

RESULTS: Group A consisted of 33 (17 male, 16 female) patients with a mean age of 84.2±3.2 SD years, while group B consisted of 39 (25 male, 14 female) patients with a mean age of 69.3±10 SD years. Difference in APACHE II score on admission was statistically significant between group A and group B (18.1±7.5 SD vs. 13.4±6.4 SD, respectively, p= 0.008). Median days in mechanical ventilation were no different between groups (group A: 9±3 SEM, group B: 12±1.3 SEM, p= 0.362), nor were the median days spent in the RICU (group A: 11±3 SEM, group B: 15±1.5, p= 0.055). In group A, 28 of the 33 (84.8%) patients were dead 30 days from admission, as were 32 of the 39 (82%) patients in group B (p= 1). Comparison between COPD patients 80+ and younger COPD controls showed no statistically significant difference in any parameter.

CONCLUSION: Mechanically ventilated patients 80 years of age and older, although admitted with a higher APACHE score in a Respiratory Intensive Care Unit, had no significant difference in ventilator and RICU days as well as in short term mortality compared with younger patients. Further studies are needed that assess long-term survival and functional recovery after treatment for respiratory failure so that elderly patients and their physicians can better decide whether or not to choose treatment with mechanical ventilation.

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ICU ADMISSION PROCEDURES IN PATIENTS OVER 80 YEARS AND ONE-YEAR OUTCOME AND QUALITY OF LIFE

Garrouste-Orgeas M M G O[1], Timsit J J F T[2], Montuclard L L M[3], Gattolliat O O G[4], Phillipard F F P[1], Rigal G G R[1], Misset B B M[1], Carlet J J C[1]
[1]Intensive care, Hôpital Saint Joseph, [2]Intensive care, Hôpital Bichat, [3]Ethical Department, Hôpital Necker, [4]Intenisve care, Hôpital Saint Joseph, Paris, France

INTRODUCTION: There is no study focused on ICU triage of patients (pts) over 80 years. The objective of the study was to assess the appropriateness of ICU triage decisions, the one-year outcome, autonomy and quality of life.

METHODS: Prospective study (01/03/02-31/11/03) in one single center. Age, underlying diseases (Knaus classification and McCabe score), admission diagnosis, Mortality Prediction Model (MPM0) score, ICU and hospital mortality was reported. Telephone interview was obtained one year after the decision to assess mortality, functional capacity by Katz's Activity of Daily Living (ADL) and quality of life by the modified perceived Patrick's Perceived Quality of Life and The Nottingham Health Profile scores.

RESULTS: 180 admissions decisions were analyzed. 48 (26.6%) were admitted. 132 (73.3%) were refused ICU admission. 51 pts were considered too well to benefit, 79 too sick to benefit and two families refused ICU admission. Factors significantly associated with refusal in the univariate analysis were: age, McCabe score, ADL, life in institution, physician ICU experience, beds availability. These variables were introduced in a multivariable analysis using forward logistic regression. At the last step, factors associated with ICU refusal were (OR, 95% CI): medical status (5.95, 1.26-28.2), age > 85 (4.16, 1.44-12.0), normal toileting (0.04, 0.01-0.21), ability for the triaging physician to examine the patient (5.75, 1.21-27.2) and no beds available (4.72, 1.37-16.3). The hospital mortality was respectively 56.3%, 72%, 19.6% for the admitted, too sick to benefit and too well to benefit. Of the 17 pts interviewed in 02/04 (76% of admitted pts), the one year functional capacity was not modified as opposed to a worse quality of life. 12/17 (70%) pts did not wanted ICU admission.

CONCLUSION: ICU refusal rate is high, mostly explained by patient-related factors. Worse quality of life described by the patient invited physicians to discuss patient's or surrogate preferences about ICU admission.

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DOES A DESIGNATED TRANSFER TEAM INFLUENCE INTENSIVISTS DECISIONS ON WHICH PATIENT TO TRANSFER?

Rooney K D[1], Gillies M[2], Scott C[1], Mukadum G[2]
[1]Department of Anaesthesia, Royal Alexandra Hospital, Paisley, [2]Department of Anaesthesia, Kings College Hospital, London, United Kingdom

INTRODUCTION: Inter-hospital transfers of the critically ill patient raises important medical and ethical dilemmas[1]. In 1999 a transfer questionnaire assessed the views of intensivists in Scotland, regarding the problem, that when no intensive care bed is available, is it ever acceptable to transfer an existing patient to another facility to create a bed for a new referral[2].7% of Scottish consultants would not transfer a stable patients to create space for a new patient under any circumstances. Reasons given included no intrinsic benefit to the current patient and that there was a designated transfer team who were experienced in transferring critically ill patients and providing critical care without walls.

METHODS: This time the questionnaire was repeated among intensivists in South Thames to determine any regional variation. The questionnaire was sent to 65 consultants in 15 intensive care units (ICUs). Consultants were asked if they would ever consider transfer of an existing patient to another hospital in order to admit a new referral and if so what would they consider the most compelling reasons for doing so.We also asked whether or not formal consent was sought prior to undertaking a transfer and what risks, if any, were explained to the patient and their family.

RESULTS: 26 (40%) of consultants replied. However, this accounted for all 15 of the ICUs. Several ICU's nominated one consultant to reply on their behalf. 100% (26) of our respondents would consider transferring an existing patient to make space for a new one, compared to 93% in Scotland. Only 8% (2) of respondents sought consent prior to transfer. 54% (14) informed patients of risks of transfer and 46% (12) explained the lack of any inherent benefit to the patient. 38% (10) felt that a designated transfer team might influence their opinions.

Reasons Given For Transfer	South-Thames Region	Scotland
New patient too unstable	96%	89.3%
Existing patient to return to base hospital	92%	84%
New patient requires continuity of care	69%	51%

CONCLUSION: In the West of Scotland, there is a designated transport team with the sole responsibility of transferring the critically ill. Perhaps, the presence of such a team in South Thames, would influence transfer practices, as there is evidence that designated transport teams improve patient outcome[1].

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WHAT DO CHRONIC OBSTRUCTIVE PULMONARY DISEASE PATIENTS KNOW ABOUT MECHANICAL VENTILATION?

Saralegui I[1], Corral E[1], Urturi J[1], Labaien F[1], Perez C[1], Martin A[1], Manzano A[1], Caminero J[2]
[1]Intensive Care Unit, [2]Respiratory, Hospital Santiago Apostol, Vitoria, Spain

INTRODUCTION: In the case of patients with acute exacerbations of Chronic Obstructive Pulmonary Disease (COPD), medical guidelines base the recommendations about mechanical ventilation (MV) on the patient´s preferences in view of the absence of reliable outcome index. Prior knowledge of their wishes regarding this form of therapy is essential in order to preserve their autonomy. Objective: to examine the knowledge of COPD patients related to the illness, about mechanical ventilation as a potential treatment and their wish to participate in the health care decision-making process and advanced care planning.

METHODS: a qualitative research of an intentional sampling of homogeneous subgroups with COPD outpatients (II and III by GOLD score) was performed between November 2003 and March 2004 in an ambulatory setting by means of semistructurated interviews and later content analysis with a sample size defined by saturation criteria.

RESULTS: 40 male outpatients with COPD were interviewed (age range from 48 to 85 years). They feel to be correctly informed and trust their respiratory physician or family doctor, but in most cases there have not been prior discussions with the health care team concerning MV as a potential treatment of their disease. They consider themselves to have a good quality of life although their health is not good. They are interested in participating in the health care decision-making process. In case of treatments and cares as MV or admittance to an Intensive Care Unit they accept any option that keeps their usual quality of life at the same level. This sample of COPD patients are in favour of advanced care planning and show the aim to shape their own specific advanced directives.

CONCLUSION: patients with COPD do not have enough information to take autonomous decisions. Although MV is a potential treatment for COPD patients with acute exacerbations, most of them were unaware of MV as a possible treatment option for them because discussions about this topic occur infrequently between physicians and patients. They are in favour of participating in health care decision-making with physicians and accepting any therapy that makes them able to keep their quality of life. The patients consider advanced directives as an opportunity to express their preferences in order to be considered when they are not able to communicate with the health care team.

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THE USE OF PHYSICAL RESTRAINT IN A UK CRITICAL CARE UNIT: A SURVEY OF ATTITUDES

Woodward L J[1], Knighton J[1]
[1]Department of Critical Care, Queen Alexandra Hospital, Portsmouth, United Kingdom

INTRODUCTION: Lower levels of pharmacological sedation in mechanically ventilated patients are associated with improved critical care outcomes such as duration of ventilation, length of ICU stay, hospital stay and monetary costs.(1,2). Some forms of physical restraint in conjunction with pharmacological sedation is commonly used outside the UK. The use of physical restraint in the critical care setting is not widespread in the UK, the reasons for which are not clear. This survey examines the views of staff working in a 15 bed UK general critical care unit admitting around 1000 admissions annually, with a mean APACHE II score of 19.

METHODS: An anonymous questionnaire including 16 questions was sent out to all staff mebers including medical staff, nurses and physiotherapists. Questions included potential benefits to staff and patients and concerns regarding the use of restraint.

RESULTS: Of the 135 questionnaires sent out, 63 were returned completed. Most respondents (60, 96%) felt that sedative drugs are used as a form of restraint in care of the patients. Most (59, 95%) thought there is a place for physical restraint in critical care and that it might benefit patients, 54 (87%) believed it might benefit staff but 36 (56%) of responders had concerns regarding the use of physical restraint. A majority (70%) stated that concerns would be answered if undertaken as part of a clear unit policy. 58 responders (93%) would be happy to use physical restraint with sedation to ensure patient's safety, but only 51 (82%) would agree to its use if they were a patient.

CONCLUSION: The majority of responders (93%) felt that some form of physical restraint may be appropriate. Practice should be re-examined and consideration given to the use of some physical restraint in addition to sedative drugs.

REFERENCES: 1 Kollef MH et al. The use of continuous i.v. sedation is associated with prolongation of mechanical ventilation. Chest 1998;114:541-8. 2 Kress JP et al. Daily interruption of sedative infusions in critically ill patients undergoing mechanical ventialtion. N Engl J Med 2000;342:1471-7.

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LIMITING LIFE SUSTAINING THERAPY IN ICU PATIENTS. HOW IS IT PERFORMED IN IRELAND?

Collins N C[1], Phelan D D[1], Marsh B B[1], Sprung C C L[2]
[1]Dept of Intensive Care Medicine, Mater Hospital, Dublin, Ireland, [2]Dept of Intensive Care Medicine, Hadassah Hospital, Jerusalem, Israel

INTRODUCTION: The frequency and manner of withholding(WH) and withdrawing(WD) life sustaining therapies in ICU patients is unknown in Ireland. This observational study examines the Irish data from the Ethicus study1 of European ICUs; it details Irish practice, factors influencing the decision making process, and documents therapies WH and WD.

METHODS: All the patients who died or had treatment limited at the Mater Hospital ICU (the one Irish participant) from 1/9/1999 to 30/6/2000 were included. Data were collected by senior staff for electronic transmission to the ethicus data centre. Paper copies were analysed for this study. Results are expressed using descriptive statistics.

RESULTS: There were 126 deaths (mortality 11%). Complete data were obtained for 122, these are the subjects of the study. An end of life treatment decision was made for 84/122 patients (69%). 44 patients (36%) had therapy WH, 40 (33%) had therapy WD, 26 (21%) had unsuccessful CPR and 12 (10%) were Brain Dead. Shortening the dying process (SDP) was not performed. The median time from ICU admission to death was 2.6 days. WH/WD were more common during the weekdays (46 decisions over 55 hours) than on call (38 decisions over 113 hours). Of 84 patients who had therapy limited, discussion on WH/WD was initiated by the ICU Dr in 59% of cases. 78% of patients had family involvement in the decision. Nursing staff were involved in 98% of decisions. No patient was mentally competent at the time but 28% had their wishes known via family. One had an advance directive. The primary reason for WH/WD was that the patient was unresponsive to maximum therapy (68%). 72% of charts had the treatment decision documented, 28% had no specific documentation. CPR was the main therapy WH (96% of patients), inotropes were the main therapy WD (19% patients). 22 patients had more than one treatment decision. Extubation was more common if a 2nd treatment decision was made (1st decision 2 patients, 2nd 7 patients). 8 patients had sedation increased.

CONCLUSION: WH/WD in Ireland is common (69%) and similar to European practice(72%). There was no SDP although the prevalence was 2% in Europe. The increased use of sedation (9%) in association with WD suggests an awareness of patient comfort. Despite only one advance directive, patient wishes were known in 28%. ICU physicians were the primary initiators of EOL discussion (59%) suggesting their important role in ICM practice. The majority (55% v 45%) of EOL decisions were taken during 'office hours'. This is finding warrants further study; it may represent the inexperience of on call personnel or may reflect the complexity of the decision. Despite popular opinion extubation is infrequent and comfort measures tend to be continued.

REFERENCE(S): Sprung C.L. et al: End-of-Life Practices in European ICUs: The Ethicus Study JAMA 2003; 290: 790-822

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WHAT IS THE DOSAGE OF NO RETURN WHEN USING VASOPRESSORS

Benbenishty J[1], Yisraeli M[2], Yisraeli M[2], Weissman C[2], Sprung C L[2]
[1]Intensive Care, [2]Intensive care, Hadassah Medical Organization, Jerusalem, Israel

INTRODUCTION: Patients receiving intensive care frequently need pharmacological support of their blood pressures because of shock.

In some patients shock is so severe that extremely high doses are needed to elevate their blood pressures. Studies show that 90% of ICU physicians withhold or withdraw vasopressor administration because patients did not respond to „maximal" therapy. However the „maximal" dosage of vasopressors is not defined so each physician has his/her own limit as to the highest dose of adrenaline or noradrenalin that he/she will administer to a patient. Many ICUs physicians order doses of up to 50mg of adrenaline or noreadrenalin per hour (1 mg/kg/hour) we hypothesize that this dose is futile.

METHODS: Following Helsinki approval, all intensive care charts from 2001 were reviewed (689 patient charts 3444 patient days) 72patients were found to have received a vasopressor. Demographic data as well as APACHE II scores, ICU days and total hospital days, biochemistry, liver functions, blood gases, diagnoses and secondary complications were recorded. Vasopressors, adrenaline and noradrenalin, maximal doses , initial dose, number of days/hours patient received all subsequent doses, and mortality were recorded.

RESULTS: The data showed that all patients who received more than 2 microgram per kilogram per minute of adrenaline or noradrenalin died. (p value < 0.0001). The length of time that the patients received vasopressors had no influence on survival. These data showed a direct correlation between the number of days a patient received vasopressors and the length of hospitalization. The length of time a patient received low dose of vasopressors had no significance on mortality, but the vasopressor dose had an indirect association with survival. There was no significance difference in age between survivors and non-survivors. The elderly (over 75 years of age) and the young had the same of survival rates when receiving vasopressors.

CONCLUSION: Patients who received more than 2 microgram per kilogram per minute of noreadrenaline or adrenaline died. It thus appears that therapy with such high doses is futile.

REFERENCE: ETHICUS JAMA 2003

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LOGISTIC ORGAN DYSFUNCTION (LOD) SCORE AND THERAPEUTIC LIMITATIONS

Ehrmann S[1], Mercier E[1], Bertrand P[2], Dequin P[1]
[1]Medical Intensive Care Unit, [2]Department of Biostatistics, Bretonneau University Hospital, Tours, France

INTRODUCTION: To carry on indefinite invasive treatments in the intensive care unit for patients with a high probability of death in the short term, is ethically objectionable. On the individual level it extends the agony and suffering of the patient and on the community level it consumes precious limited resources. As there is no tool that can objectively and reliably help the physician to make ethical decisions of therapeutic limitations, we examined whether the absolute change of the LOD score between the day of admission to the ICU and the third day of unlimited treatment could be predictive of death in the ICU.

METHODS: 154 consecutive patients admitted to the ICU were prospectively included during a three-month period. For all of these patients the Simplified Acute Physiologic Score II (SAPS II) and the LOD score (LOD1) were calculated on the day of admission. The LOD score was calculated again between the 72nd and the 96th hour in the ICU (LOD2) for the 93 remaining patients (52 patients left the ICU before the 72nd hour, 7 of whom died) without exclusion criterions (9 therapeutic limitations before the 72nd hour). The endpoint was death in the ICU. The performance of the DeltaLOD = LOD 2 - LOD1 index to predict death was examined through univariated and multivariated analysis and through calculation of the positive predictive value of death (PPV) for different cut-offs.

RESULTS: 16 patients died in the ICU after the 72nd hour. This group had a significantly higher SAPS II score than the survivors, (45.1 ± 12.8 vs 38.1 ± 14.4 ; p = 0.05), a higher LOD2 score (6.3 ± 4.2 vs 2.7 ± 2.2 ; p = 0.0005), a higher DeltaLOD score (0.2 ± 3.4 vs - 2.6 ± 3.0 ; p = 0.0046) and a higher LOD1 score but not significantly (6.1 ± 2.5 vs 5.4 ± 3.0). After logistic regression, a high DeltaLOD appeared to be associated to a high risk of death in the ICU independently of the initial severity of disease assessed by the SAPS II (OR = 1.41 [1.15-1.73] ; p = 0.0009) or LOD1 (OR = 1.52 [1.20-1.93] ; p = 0.0005). The PPV was 0.66 for a DeltaLOD >= 4 cut-off.

CONCLUSION: After 72 hours of unlimited treatment in the ICU, DeltaLOD appears to be a good predictor of death in the ICU, independent of the initial severity of disease. The PPV is not high enough even for high cut-offs to assist with making individual therapeutic limitation decisions. Accordingly to the Bayes theorem, the performance of DeltaLOD deserves to be evaluated in a population of patients exhibiting greater severity of disease.

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MEDICAL HUMANITIES IN A SURGICAL ICU

Louis-Curvoisier M[1], Ricou B[2]
[1]Bioethics Research & Teaching Unit, Health and Comunity Medicine, [2]Surgical Intensive Care, University Hospital, Geneva, Switzerland

INTRODUCTION: Since a decade, workshops of creative writing for health professionals developed as an answer to the stressful everyday practice. Indeed, in ICU, the caregivers are under a great pressure induced by several factors: the explicit urgency to act, the implicit burden to face patients and families in critical situations and the requirement of a high level of technicity. Such a creative workshop was set up for physicians and nurses in our unit, in order to give the opportunity to express the "unspoken", to share the experiences, explore the patient's perspectives.

METHODS: 2 sessions of 2 hours were planned. At the first session, the participants were proposed to imagine a situation starting from one of 2 pictures of ICU patient. They were invited to write as "I" or "you" in order to take the patient's or the relative's place through their imagination. The written texts were distributed to all participants and discussed at the second session. The workshop was organized and moderated by a senior specialist in intensive care medicine and the person in charge of the Medical Humanities teaching program. The participation to the workshop was optional.

RESULTS: 9 physicians (4M, 5F) and 11 nurses (all F) and 3 (1F,1M) medical students participated to 4 workshops. One month later, they answered a questionnaire. All participants gave a positive global appreciation and underlined the importance of the discussion which allowed the sharing of their experiences. 4 felt encouraged to adopt the patient's perspective, 3 were reassured about their feelings of their practice. The relevant themes of the texts were the behaviour of the caregivers, the abrupt change of worlds, a strange perception of time, the importance of noises in the ICU environment. Despite the similarity of the themes, the way the narrators shaped the story was very different. The author's selection of words, details, and literary devices confers the personal touch of his/her experience.

CONCLUSION: None of them considered the writing as an obstacle to their expression, even if they first felt difficult to step in the writing process. All of them were satisfied with the workshop and with the sharing of their experiences. The most important point reported was the awareness that the others, either physician or nurses, had the same preoccupations and feelings. The fact that this workshop did not give any concrete recipe for the resolution of problems induced some frustration among ICU caregivers.

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COMPARATIVE STUDY AMONG THREE EQUIPMENT SYSTEMS TO DETERMINE CAPILLARY GLUCOSE IN THE SEVERELY ILL

Morales I[1], Cordero O[1], Sánchez L[2], Noriega A[1]
[1]Intensive Care Medicine, Hospital Angeles Mocel, [2]Medical Investigation Unit in Hospital Epidemiology, 21st Century Nacional Medical Center,Mexican Social Security Institute, Mexico, D.F., Mexico

INTRODUCTION: To maintain strict glucose control between 80 and 110 mg/dL(1), the clinic must have equipment that determines trustworthy test results.Objetive.To compare the result of glucose from capillary and venous samples obtained at the patient´s bedside by means of three different electronic systems, with results of the venous sample reported by the Clinical Laboratory.

METHODS: We evaluated three systems: Ascensia Elite™,Precision Q·I·D® and SureStep™Plus.The Clinical Laboratory system was Vitros 250 Johnson-Johnson.We obtained capillary and venous blood samples from 25 patients every 6 hour from the first blood drawing sample.Venous samples were processed in the Laboratory within 30 min of blood drawing.Samples for each system were placed on the corresponding reactive strip at the patient´s bedside.During the study,hematocrit was determined daily in the morning.Statistical analysis consisted of descriptive statistics,inferential analysis comprised determination of r and r^2,and significance level was set at <0.05.Agreement analysis was carried out with the Bland and Altman test.

RESULTS: We obtained 500 samples from 25 patients;489 samples participated in the statistical analysis.Values of r and r^2 of capillary sample of SureStep™Plus,Ascensia Elite™ and Precision Q·I·D® systems were 0.943,0.910,0.902 and 0.889,0.828 y 0.814, respectively.For venous samples,values were 0.940,0.909,0.913 and 0.884,0.826 and 0.834 respectively, all with a value of p<0.001.Upper agreement limits for capillary samples with SureStep™Plus,Ascensia Elite™ and Precision Q·I·D® were 29.2,43.82 and 38.7,respectively.Lower limits were -48.0,-54.7 and -57.7.Venous samples upper limits were 30.0,42.4 and 33.1, respectively, and lower limits were -50.89,-54.1 and -57.2,respectively.

CONCLUSION: We recommend using patient bedside glucose measurement systems, a strategy that would have high economic and therapeutic value.Our results show that of the three systems evaluated,best performance was presented by the SureStep™Plus system.

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Grant acknowledgement: Material supported by LIFESCAN a Johnson-Johnson company.

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COMPARISON OF A NEW NON-INVASIVE CARDIAC OUTPUT (NICO) TECHNIQUE WITH INVASIVE BOLUS

Valencia E[1], Yepes D[1], Cardona A[1], Garcia M[1], Fuentes M[1], Jimenez M[1]
[1]Medical Intensive Care Unit, HUSVP, Medellin, Colombia

INTRODUCTION: There have been few studies to investigate how well the results obtained by CO2 rebreeding to assay cardiac output (CO) (1-3). A reliable non-invasive CO monitor could enhance patient safety and reduce risk. This study evaluates a NICO measurement and calculated derived parameters from CO. CO was based on differential from of the CO2 Fick equation.

METHODS: Twenty three CO measurements with derived parameters were obtained from 3 male patients admitted to a medical intensive care unit, St Vincent Hospital, Medellín, Colombia, 2003. The NICO monitor (Novametrix Medical Systems Inc) was connected between the ventilator circuit and tracheotomy tube. Previously, multilumen Swan-Ganz Thermodilution catheters, Edwards Labs were placed into the external jugular vein via an introducer sheath. CO was calculated from pulmonary blood flow by correcting for shunt. The difference between consecutive thermodilution and NICO measurements was calculated. Also, calculated derived parameters from S-G catheter such as CI, SVRI, LVSWI, RVSWI, and SVI were compared to measurements derived from NICO. On NICO measurements, central venous pressure replaces the value of PCWP. Correlation between the two methods was determined by Pearson´s correlation. A Bland-Altman analysis was used to compare the bias and precision of the two methods, and a difference > 30% was considered as a limit of accuracy. Significance was assessed at the 95% confidence interval.

RESULTS: Twenty-three matched pairs of consecutive changes in CO and calculated derived parameters measurements were recorded in three critically ill patients. With a mean (±SD) age of 30,6 y. Relationship between changes in thermodilution and NICO CO measurements was significant (r = 0.60, p = 0.002). None of calculated derived parameters (CI, SVRI, LVSWI, RVSWI, and SVI) were considered significant. Only CO and RVSWI showed difference between means to compare the degree of agreement measurements (CO 12.46% and RVSWI 19.8%% respectively).

CONCLUSION: The results of the current study agree with those from previous studies where is suggested that NICO monitor would provide a good alternative to invasive CO measurements on critically ill patients. However, NICO cannot be a substitute to get calculated derived parameters when pulmonary artery occlusion pressure is a necessary value.

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RELIABILITY OF LUNG WATER ESTIMATION IN CRITICALLY ILL PATIENTS BY TRANSPULMONARY THERMODILUTION

Hofmann D[1], Sakka S G[1]
[1]Anaesthesiology and Intensive Care Medicine, Friedrich Schiller University, Jena, Germany

INTRODUCTION: Patient management guided by extravascular lung water (EVLW) is associated with reduced mortality of patients with pulmonary edema [1]. Recently, single transpulmonary thermodilution (STD) has been demonstrated to be sufficiently accurate for estimation of intrathoracic blood volume (ITBV) and EVLW when compared with the clinical standard, i.e., transpulmonary thermo-dye dilution (TDD) [2]. In this study, we examined the reliability of STD for estimation of ITBV and EVLW with respect to several influencing factors.

METHODS: We retrospectively analyzed data of 174 critically ill patients patients (114 male, 60 female; age 10 - 88, mean 52 ± 20 years) who underwent extended hemodynamic monitoring by the transpulmonary thermo-dye dilution technique. The agreement between ITBVSTD/ ITBVTDD and EVLWSTD / EVLWTDD was determined as mean bias and standard deviation (SD) within different categories (level of PEEP, PaO2/FiO2 ratio and EVLW). Linear regression analysis was applied to compare overall bias between EVLWSTD and EVLWTDD with the different factors.

RESULTS: Mean bias ± SD within the different categories are shown in TABLE 1. Correlation coefficients between bias and influencing factors were: PaO2/FiO2 ratio (r= 0.12), PEEP (r= -0.26) and EVLW (r= -0.47), respectively.

	n	ITBVSTD – ITBVTDD [ml/m?]	EVLWSTD - EVLWTD
[ml/kg]			
overall	174	1 ± 58	0.0 ± 1.4
PaO2/FiO2 < 300 mmHg	118	4 ± 58	-0.1 ± 1.4
PaO2/FiO2 < 200 mmHg	50	13 ± 59	-0.3 ± 1.4
PEEP > 5 cmH2O	130	5 ± 62	-0.1 ± 1.5
EVLW > 7 ml/kg	105	20 ± 59	-0.5 ± 1.4
EVLW > 10 ml/kg	60	40 ± 64	-1.0 ± 1.5
EVLW > 15 ml/kg	22	46 ± 71	-1.1 ± 1.7

CONCLUSION: Estimation of ITBV and EVLW by single transpulmonary thermodilution is reliable and not negatively influenced by the level of PEEP, PaO2/FiO2 ratio and EVLW.

REFERENCES: 1. Mitchell JP. Am Rev Respir Dis 1992; 145: 990-998
2. Sakka SG. Intensive Care Med 2000; 26: 180-187

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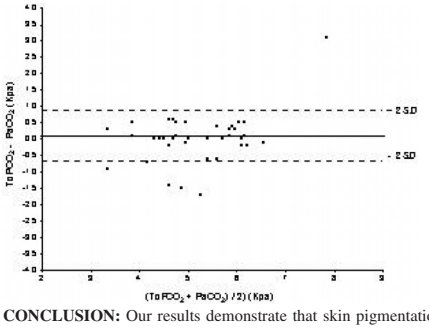
TRANSCUTANEOUS PACO2 MONITORING IN DARKER ETHNICS: EVALUATION OF A NEW PACO2- SPO2 SENSOR

Schütz N[1], Romand J A[1], Stotz M[1], Gerard I[1], Bendjelid K[1]
[1]APSIC, Geneva University Hospitals, Geneva-14, Switzerland

INTRODUCTION: We recently demonstrated the accuracy of a new miniaturized transcutaneous sensor (Tosca Monitor, Switzerland) to monitor non invasively $PaCO_2$ ($TcPCO_2$) in white skinned patients [1]. The objective of the present study is to analyse the same accuracy in a subgroup of dark skinned patients.

METHODS: Eight post operative patients (mean 37 ± 22) were included. $TcPCO_2$ sensor was applied at the ear lobe. The simultaneously obtained $TcPCO_2$ and $PaCO_2$ values (measured using a blood gas analyser) were compared by linear regression analysis. The difference between $PaCO_2$ and $TcPCO_2$ values were compared using the method of Bland and Altman.

RESULTS: 64 paired measurements were correlated. $TcPCO_2$ correlated with $PaCO_2$ (r^2=0.56, p<0.0001) in the $PaCO_2$ range 3.2 to 6.6 kPa. The mean bias between the two methods was 0.13 ± 0.38%.



CONCLUSION: Our results demonstrate that skin pigmentation affects slightly the accuracy of the sensor.

REFERENCE: 1: Bendjelid K, Romand JA (2003). Intensive Care Medicine 29:655

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ASSESSMENT OF CIRCULATING BLOOD VOLUME IN CRITICALLY ILL ICU PATIENTS

Ramnarain D[1], Erp van C F M[1], Vos A[1], Braams R[1], Leenen L P H[1]
[1]Surgery-Intensive Care, University Medical Center Utrecht, Utrecht, Netherlands

INTRODUCTION: The clinical judgement of an adequate volume status in critically ill patients remains a challenge. Current clinical parameters to assess the adequacy of resuscitation often do not adequately reflect the volume status of the patient. Therefore additional information about the adequacy of circulating blood volume in critically ill patients could be of great value.

METHODS: On 53 occasions in 28 critically ill patients on a surgical intensive care unit the adequacy of circulating blood volume (BV) was clinically judged by the parameters central venous pressure, mean arterial blood pressure, heart rate, and urine production. Clinically estimated blood volume was compared with measured blood volumes using pulse dye densitometry with Indocyanine Green (DDG-2001A/K, Nihon Kohden, Japan). Obtained BV measurements were categorized in low blood volume (LBV), normal blood volume (NBV), and high blood volume (HBV) using reference values for men and women 60-75 ml/kg and 55-65 ml/kg respectively(1).

RESULTS: Clinical judgements led to 9 hypovolemic (HV) versus 46 not hypovolemic (NHV) cases. There was no statically significant relation between the clinical judgement of volume status and measured BV. In HV patients no LBV was measured and in clinically NHV patients LBV as well as HBV were measured. No significant correlation between measured BV and calculated fluid balances was found.

CONCLUSION: There seems to be a discrepancy between the clinical judgement of circulating blood volume and the measured circulating blood volume in critically ill ICU patients. These results emphasize the difficulty of judging the volume status by current clinical parameters in critically ill patients.

REFERENCE: 1. Smetannikov Y, Hopkins D. Intraoperative bleeding: A mathematical model for minimizing haemoglobin loss. Transfusion 1996;36:832-835.

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BLOOD VOLUME IN RELATION TO CENTRAL VENOUS OXYGEN SATURATION AND CENTRAL VENOUS PRESSURE

Ramnarain D[1], Erp van C F M[1], Vos A[1], Braams R[1], Leenen L P H[1]
[1]Surgery-Intensive Care, University Medical Center Utrecht, Utrecht, Netherlands

INTRODUCTION: Intravascular volume depletion has been firmly established as a cause of symptomatic hypotension (1). In critically ill patients it is difficult to gain knowledge of the intravascular volume using the conventional clinical parameters such as mean arterial blood pressure, central venous pressure (CVP), heart rate and urine production. New insights in the assessment of hemodynamics such as central venous saturation (SvO2) and blood volume (BV) monitoring may give additional information of a patient's intravascular volume status.

METHODS: Blood volume measurements were performed in 28 critically ill ICU patients on 53 occasions using pulse dye densitometry with Indocyanine Green (ICG)(DDG-2001 A/K, Nihon Kohden, Japan). Blood volume measurements were compared with the parameters SvO2 and CVP in assessing the patient's intravascular volume status. Also the relation between BV and Albumine and Colloid Oncotic Pressure (COP) was investigated.

RESULTS: Measured BV was positively correlated with SvO2 (r= 0.34, p<0.05) and CVP(r=0.85, ns). Albumine en COP values correlated with BV (r=0.80, p=0.20 and r=0.69, p=0.25 respectively), however not significant.

CONCLUSION: High blood volumes were correlated with higher SvO2 and CVP values. Blood volume measurement and SvO2 determination have additional value in assessing intravascular volume in critically ill ICU patients.

REFERENCE: 1. Daurgidas JT. Dialysis hypotension: a hemodynamic analysis. Kidney Int 1991;39:233-246.

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RELIABILITY OF LUNG WATER ESTIMATION IN CRITICALLY ILL PATIENTS BY TRANSPULMONARY THERMODILUTION

Hofmann D[1], Sakka S G[1]
[1]Anesthesiology and Intensive Care Medicine, Friedrich Schiller University, Jena, Germany

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METHODS: We retrospectively analyzed data of 174 critically ill patients patients (114 male, 60 female; age 10 - 88, mean 52 ± 20 years) who underwent extended hemodynamic monitoring by the transpulmonary thermo-dye dilution technique. The agreement between $ITBV_{STD}$/ $ITBV_{TDD}$ and $EVLW_{STD}$ / $EVLW_{TDD}$ was determined as mean bias and standard deviation (SD) within different categories (level of PEEP, PaO_2/FiO_2 ratio and EVLW). Linear regression analysis was applied to compare overall bias between $EVLW_{STD}$ and $EVLW_{TDD}$ with the different factors.

RESULTS: Mean bias ± SD within the different categories are shown in TABLE 1. Correlation coefficients between bias and influencing factors were: PaO_2/FiO_2 ratio (r= 0.12), PEEP (r= -0.26) and EVLW (r= -0.47), respectively.

	n	$ITBV_{STD}$ - $ITBV_{TDD}$ [ml/m²]	$EVLW_{STD}$ - $EVLW_{TDD}$ [ml/kg]
overall	174	1 ± 58	0.0 ± 1.4
PaO2/FiO2 < 300	118	4 ± 58	-0.1 ± 1.4
PaO2/FiO2 < 200	50	13 ± 59	-0.3 ± 1.4
PEEP > 5 cmH2O	130	5 ± 62	-0.1 ± 1.5
EVLW > 7 ml/kg	105	20 ± 59	-0.5 ± 1.4
EVLW > 10 ml/kg	60	40 ± 64	-1.0 ± 1.5
EVLW > 15 ml/kg	22	46 ± 71	-1.1 ± 1.7

CONCLUSION: Estimation of ITBV and EVLW by single transpulmonary thermodilution is reliable in severe pulmonary dysfunction as it is not negatively influenced by the level of PEEP, PaO_2/FiO_2 ratio and EVLW.

REFERENCES: [1] Mitchell JP. Am Rev Respir Dis 1992; 145: 990-998. [2] Sakka SG. Intensive Care Med 2000; 26: 180-187

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MONITORING OF AIR DISTRIBUTION DURING CONTROLLED VENTILATION BY ELECTRICAL IMPEDANCE TOMOGRAPHY

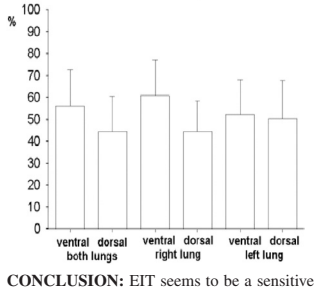
Pulletz S[1], Van Genderingen H R[2], Schädler D[1], Tonner P H[1], Scholz J[1], Weiler N[1]
[1]Anaesthesiology and Intensive Care Medicine, University Hospital Schleswig Holstein Campus Kiel, Kiel, Germany, [2]Physics and Medical Technology, VU medical center, Amsterdam, Netherlands

INTRODUCTION: Electrical impedance tomography (EIT) is a promising technique to assess continuously respiratory function with high temporal resolution1. Changes in thoracic gas volume lead to corresponding changes in thoracic impedance. The aim of this study was to evaluate air distribution during volume controlled mechanical ventilation.

METHODS: Five adult patients undergoing elective thoracic surgery with single lung ventilation were included. EIT data were collected during ventilation of both lungs (tidal volume (tv): 800 ml), left lung (tv: 400 ml), and right lung (tv: 400 ml), respectively. EIT was performed using 16 electrodes placed around the thorax. Data are presented as percent of impedance change of both lungs (normalized electrical impedance (nei)).

RESULTS: During one lung ventilation nei was reduced to 47.7 ± 18.5 in right lung and 49.6 ± 13.4 in left lung compared with both lungs with a clear separation between ventilated and non-ventilated lung. In addition we found an imbalance of distribution of ventilation along the vertical axis in favor of the ventral part of the lungs (Fig.1).

Fig. 1: Regional distribution of normalized electrical impedance



CONCLUSION: EIT seems to be a sensitive non-invasive method for monitoring distribution of ventilation.

REFERENCE: 1. Am J Respir Crit Care Med 169 2004 791-800

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OPERATIONAL CHARACTERISTICS OF MARS TREATMENT IN THE ICU SETTING

Herrera Gutierrez M E[1], Seller Perez G[1], Jimenez M[2], Lebron Gallardo M[1], Moreno J M[2], Quesada Garcia G[1]
[1]ICU, [2]Hepatology, Hospital Carlos Haya, Malaga, Spain

INTRODUCTION: MARS albumin dialysis seems an effective treatment for acute (ALF) and acute-on-chronic (AoC) liver failure but data on the use of this procedure is yet scarce. We communicate our experience after centralizing all the procedures of our centre in the ICU

METHODS: Data of all treatments performed in our centre (liver transplant program; ICU with continuous renal replacement therapies -CRRT- experience; a unique protocol for surgery, hepatology and ICU patients and a prospective registry). ALF patients stay in the ICU but AoC patients are admitted every other day for the procedure. MARS is performed with a Prisma monitor and sessions are aimed for a length of al least 15 hours if feasible (in ALF continuously with 24h changes). We analysed clearance, metabolic control, tolerability and technical and clinical complications. We used Pearson correlation coefficient and linear regression analyses to detect relation between hours of treatment and clearance capabilities

RESULTS: 50 MARS sessions in 24 patients (aged 48.6±13, 6 women) 7 acute (1 liver surgery, 1 primary graft failure, 5 ALF) and 17 AoC (5 patients awaiting transplant, 7 after transplantation, 3 alcoholic and 2 other cirrhoses), with a total of 674 hours of treatment. Sessions= 1.9±1/patient, 13.5±4,9 hours each, 2.9±0.7 L/h hemodiafiltration dosis, 172±36 mL/h albumin flow. Anticoagulant was heparine in 46%, epoprosterenol in 32%, mixed in 6% and no drugs in 16%. Bicarbonate buffered solutions in all cases. Clearance= 34.3±18.8% urea decrease, 38.6±21% creatinine, 31.7±16.6% total bilirubin, 35.8±13.2% direct bilirubin decrease. The clearance was significant even with long lasting sessions with a linear relationship in all cases: decrease from 4 hours until the end was 13.8±19% (Pearson coefficient 0.53, $p<0.001$) for urea, 12.8±12.4% (0.4, $p<0.05$)) for total bilirubin and 14.8±18% (0.3, $p<0.05$) for direct bilirubin. In regression analysis length of session was statistically related to bilirubin, urea and creatinine clearance. Complications= 13 sessions (26%) problems with flow in access with ending of treatment in 1 session. One episode of hypotension because pump failure. In 2/23 (9%) of heparine and 1/16 (6%) epoprosterenol sessions minor bleeding (puncture locations). One epoprosterenol patient an hematoma in catheter insertion

CONCLUSION: MARS treatment with CRRT monitors provides effective dosage (treatments lasting up to 24 hours maintain bilirubin clearance) and is a safe procedure even in critically ill patients. When used in the ICU is available at any time and can be controlled by ICU staff with CRRT training

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THROMBOTIC MICROANGIOPATHIES (TMA) TREATED BY PLASMA EXCHANGE THERAPY (PET): PREDICTIVE FACTORS OF MORTALITY

Klouche K[1], Federici L[1], Massanet P[1], Amigues L[1], Rossi J F[2], Beraud J J[1]
[1]Intensive Care Unit, [2]Hematologic Unit, Lapeyronie Univeristy Hospital, Montpellier, France

INTRODUCTION: The use of PET in adults with TMA has dramatically improved outcome. Resistance to PET, which is observed in 1/3 of such patients and may affect mortality, remains however incompletely understood. We retrospectively studied 25 adults with TMA treated by PET in our unit to evaluate the short and long term outcome and to identify predictive factors of mortality and of resistance to PET.

METHODS: All records of adults with TMA treated by PET between 1999 and 2003 were reviewed. TMA associated with bone marrow transplantation were excluded from the study. Age, sex, cause of TMA were collected. Glasgow and SOFA scores were estimated at the admission. Clinical data including: neuroligical or pulmonary disorders with mechanical ventilation (MV), renal failure, and therapeutic delay (TD) to PET; biological data including: hemoglobinemia, platelet count, and LDH; plasmatic volume exchange per procedure and number of plasmapheresis sessions were also collected. Mortality was assessed at one month and at one year follow-up. All data were analyzed and compared between survived/deceaded and between responders/non-responders (R/nR) patients.

RESULTS: 19 females and 6 males were included. Mean age: 46.8±16.3 yo, mean Glasgow coma score: 11±3 , mean SOFA score: 5.8±2.8. Etiologies of TMA: post-immunologic 4, post-infectious 4, post-neoplastic 4, drugs associated 4, idiopathic 9. Two patients were in MV, 3 underwent hemodialysis and 10 had at least two organ dysfunction. The mean TD for PET was 2.7±5.2 days and the mean plasmatic volume exchange per procedure was 35.9±8.6 ml/kg. 19 patients (76%) partially or fully responded to PET. 20 patients (80%) survived after one month and 19 (76%) after one year follw-up. The comparison between survived and deceaded patients showed that response to PET (18/20 vs 1/5 responders respectively) was the only significant determinant parameter. The comparison between R and nR showed that a longest TD (2.5±1.8 vs 3.3±2.0) and neoplastic cause of TMA (3/19 vs 3/6) were significantly discriminant for a non-response to PET. Almost all of the R patients (95%) exhibited a positive response to PET before the tenth plasmapheresis session. In a median follow-up period of 23,6 (1-48) months, relapses episodes occured in 7 patients (35 %).

CONCLUSION: Adults with TMA, characterized by a mild to important severity, treated by PET have a relatively good outcome since survival reached 80% at 1 month and was maintained at 76% after 1 year follow-up. Among the parameters studied, lack of response to PET was the only predictive factor of mortality. Two factors were predictive of resistance to PET: neoplastic etiology of TMA and a longer TD to PET. Adult with TMA non-responding to PET after the tenth plasmapheresis session could be considered as totally non-responder and should benefit shortly from another therapy.

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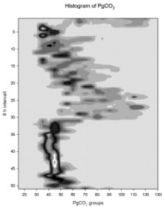
PATHOLOGICAL PATTERNS OF GASTRIC-CO2-TONOMETRY VALUES AND CORRELATING CLINICAL EVENTS

Wiesner E[1], Saager L[1], Pestel G[2], Rothhammer A[1]
[1]Institut für Anaesthesiologie und Intensivmedizin, Leopoldina Krankenhaus, Schweinfurt, Germany, [2]Dept. of Anesthesiology, Washington University School of Medicine, St. Louis, United States

INTRODUCTION: Tissue-oxygenation in the splanchnic region can easily be monitored by gastric-CO2-tonometry (1,2). Additional in-formation can be gained by visual conditioning of large data sets. We report a novel approach on data inter-pretation by visualizing the gastric tonometry values in a case of necrotizing pancreatitis and septic shock and the correlating clinical events ((38y., male, APACHE II Score 24, 8308 measurements, 58 days running).

METHODS: PgCO2 was measured every 10 min. with a gastric tube (TRIP, NGS catheter) and an automatic gas analyzer (Tonocap, Finland). We recorded these values continuously and calculated the frequency distribution in an 8h interval and in an area between 20 and 130 mmHg (increment 5). This histogram was displayed as a contour-plot. In that kind of visualization the frequency is displayed as colour in the area and not as third axis in a graph.

RESULTS: Our form of data processing provides additional information on pathological patterns at an early stage. In context with other parameters, this can be helpful in guiding treatment, e.g. volume substitution, catecholamines or blood transfusion. In this case we can see episodes of normal tonometric values as well as periods of pathological patterns like periods of septic shock (T1, T2), daily abdominal lavage in a period of severe sepsis (T3), major abdominal surgery (T4), unsuccessful trials of enteral feeding (T5), successful enteral feeding (T6), weaning period and



CONCLUSION: The graphical presentation of the frequency distribution of a large number of data easily allows to conceive the information of the data. The aim of future activities has to be the development of a real-time bedside display of the progress of changes in the measurement of PgCO2-values.

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BLOOD POLYMORPHONUCLEAR LEUKOCYTE MIGRATION, REACTIVE OXYGEN RELEASE AND ACTIN REMODELLING IN CARDIOGENIC SHOCK

Mitterhammer H[1]
[1]Department of Internal Medicine, University Hospital, Graz, Austria

INTRODUCTION: Objective: Shock can trigger polymorphonuclear leukocyte (PMN) dysfunction often resulting in severe organ damage. We investigated the PMN functions migration, reactive oxygen species (ROS) release and F-actin formation in patients after cardiogenic shock.

METHODS: Ten male and five female patients, age 69 ±10.5 years, who suffered cardiogenic shock after myocardial infarction (M.I.) and underwent mechanical ventilation and vasopressor support. All patients developed infections and were treated with antibiotics. Measurements started on the first day after M.I. and were performed daily until day ten. All PMN functions were measured in fresh whole blood: PMN migration with a membrane filter method under FMLP stimulation; ROS release with luminol-enhanced chemiluminescence under PMA stimulation; F-actin formation, as a factor crucial for PMN viscosity, with FITC-phalloidin staining after FMLP stimulation (Virchows Arch 2001, 438: 394). Severity of illness was assessed by the APACHE III score.

RESULTS: PMN migration dropped to a minimum on day five after M.I. and developed a second minimum on day nine. Conversely, ROS release increased progressively, reached high values on days four and five, and decreased thereafter. Migration and ROS release correlated negatively (Pearson r = -0.7348, p = 0.024). F-actin formation increased until days eight and nine and correlated negatively with migration (Pearson r = -0.8000, p = 0.005). None of the three PMN functional parameters correlated significantly with the APACHE III score.

CONCLUSION: Cardiogenic shock triggers blood PMN dysfunctions known to favour capillary plugging, blood no-reflow and self-damage of the organism, whereby the risk factors low migratory capacity versus high cell viscosity and ROS release are linked. The alterations in PMN reactivity do not correspond with the severity of illness.

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TNF ALPHA MESSENGER RNA - AN INDICATOR OF SYSTEMIC INFLAMMATION IS UPREGULATED AFTER CARDIAC SURGERY

Duggan E[1], Caraher E[2], Gately C[2], Mitchell S[2], McGovern E[3], Kelleher D[2], McGovern R[2], Ryan T[1]
[1]Department of Anaesthesia and Intensive Care Medicine, St James's Hospital, [2]Department of Clinical Medicine and Dublin Molecular Medicine Centre, Trinity Centre for Health Sciences, [3]Department of Cardiothoracic Surgery, St James Hospital, Dublin, Ireland

INTRODUCTION: Cardiac surgery is known to induce systemic inflammation[1]. When excessive or uncontrolled, systemic inflammation may be associated with adverse outcomes. TNF alpha is the primary mediator of systemic inflammation. Changes in TNF alpha mRNA are more sensitive than protein levels in activation of gene expression. The aim of our study was to determine the relationship between TNF alpha gene expression in circulating mononuclear cells and manifestations of systemic inflammation in patients undergoing cardiac surgery.

METHODS: Our study population consisted of patients undergoing elective cardiac surgery (n=38). Blood samples for TNF alpha mRNA were taken preoperatively (baseline), 1hr and 6hrs postoperatively. Total RNA was extracted from purified peripheral blood mononuclear cells (RNeasy, Qiagen). We utilised real time RT-PCR to quantify TNF alpha gene expression after cardiac surgery using ABI PRISM 7000 Sequence Detection System and normalised against an endogenous reference GAPDH. The patients were divided into two groups: **Group A:** Eighteen patients who developed complications post surgery as defined by i) hypotension requiring inotropes (n=15) ± intra-aortic balloon pump counterpulsation (n=1) and /or ii) lactate > 4mmol/l (n=12).
Group B: Control group of patients with an uneventful postoperative course (n=20).
Statistical analysis was performed using the Kruskal-Wallis test.

RESULTS: Timed samples were expressed as an n-fold change in TNF alpha relative to the preoperative level (baseline =1). TNF alpha mRNA was upregulated in Group A at 1hr (p=0.0078, median 1.3, interquartile range 0.61-2.37). By contrast, downregulation of TNF alpha occurred at 1hr in group B (median 0.44, interquartile range 0.3-0.83). However at 6hrs, TNF alpha gene expression was down regulated below baseline in Group A (median 0.36, 0.29-1.44), with no significant change in Group B (median 0.43, 0.21-0.7) from the 1hr time point.

CONCLUSION: TNF alpha gene expression is rapidly upregulated in patients that develop signs of systemic inflammation after cardiac surgery. TNF alpha mRNA may serve as an early indicator of impending systemic inflammation. In selected individuals undergoing elective cardiac surgery, modification of the systemic inflammation with monoclonal antibodies to TNF alpha may be a therapeutic target.

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Grant acknowledgement: This project was supported by the Royal City Hospital (Baggot Street) Fund

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COLONIC MUCOSAL INJURY FOLLOWING 'ON' AND 'OFF' PUMP CORONARY ARTERY BYPASS GRAFT SURGERY

Khwaja N[1], Ghosh J[1], Howarth V[2], Murphy M O[1], McMahon R F[2], Eddleston J[3], Keenan D J[4], Walker M G[1]
[1]Vascular Surgery, [2]Histopathology, [3]Intensive care, [4]Cardiothoracic surgery, Manchester Royal Infirmary, Manchester, United Kingdom

INTRODUCTION: Ischaemia of the colon is a recognised but infrequent complication following cardiac surgery. Colonic ischaemia is thought to lead to a disruption in the intestinal barrier and this has been implicated in the progression to the systemic inflammatory response syndrome (SIRS) with some patients going on to develop multi-organ dysfunction syndrome (MODS). Little is known of the early pathophysiological processes occurring in the colon during cardiac surgery. Thus, the aim of this study was to investigate the early histological changes within colonic mucosa and cytokine release during CABG surgery.

METHODS: 20 patients undergoing coronary artery bypass surgery (10 on-pump, 10 off-pump) were prospectively recruited. Mucosal biopsies of the sigmoid colon were obtained after induction of anaesthesia and immediately at the end of the procedure. Microscopic examination was performed using Haematoxylin and Eosin staining. Peripheral blood was assayed intraoperatively for cytokines IL-6 and IL-10 and for up to 48 hours post-operatively.

RESULTS: On-pump surgery produced a 2.5-fold increase in columnar epithelium apoptosis. No other histological changes occurred. There was a 15-fold rise in IL-6 in both two groups intra-operatively. Post-operatively, IL-6 continued to rise to 30-times baseline levels in contrast with the off-pump group which remained at intra-operative levels. IL-10 did not change significantly in the off-pump group. In the on-pump group there was a 22 fold increase in IL-10 associated with initiation of cardiopulmonary bypass ($p<0.05$ Student's t-test). Post-operatively, IL-10 levels returned to baseline levels.

CONCLUSION: Apoptosis of colonic mucosa occurs during on-pump CABG but not in off-pump CABG. This precedes the inflammatory process. Thus, we identify apoptosis, rather than necrosis, as the principal mode of cell death following on pump CABG surgery. Further elucidation of this process may identify targets for pharmaceutical prevention colonic mucosal apoptosis.

Poster Sessions
Acute respiratory failure – 405-413

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CONGESTIVE HEART FAILURE DURING THE LIBERATION FROM MECHANICAL VENTILATION

CABELLO B[1], Rubio O[1], Delgado M[1], Vera P[1], Mancebo J[1]
[1]intensive Care, Hospital Sant Pau, Barcelona, Spain

INTRODUCTION: Liberation from mechanical ventilation can be interfered by the development of congestive heart failure (CHF). This issue has been poorly studied as a cause of weaning failure. We designed a clinical-physiologic study to analize the mangnitude of the problem and its physiological characteristics.

METHODS: During a two months period we daily screened all the intubated mechanically ventilated patients in our 16-bed ICU looking for those who meet usual weaning criteria. These patients went on a t-piece trial (SB) during 30 minutes. Patients who presented respiratory distress were studied with esophageal-gastric balloon and a Swan-Ganz catheter. Hemodynamic and respiratory measurements were collected in Assist Control Ventilation (ACV), Pressure support (PS) of 7 cm H20 with PEEP of 5 and again SB. We defined CHF when the pulmonary wedge pressure (PCWP)was normal during ACV and above 18 mm Hg during SB.

RESULTS: From total of 39 patients 12 failed SB. The mean PCWP in ACV was 14,2±2,91 mmHg, a PCWP > 18 mm Hg was observed in 7 of the 12 patients during SB.

Hemodynamic and respiratory variables (n=9

	Mean B Press.	Heart Rate	PCPW	pCO2	PTPdi Rate	Resp Volume	Tidal
ACV	74±14	94±16	14±3	41±7	121±81	20±4	443
PS7 PEEP 5	84±16	96±17	19±5	46±9	173±13	22±10	480
SB	103±14	104±14	26±9	49±10	378±14	28±7	319
P	<0,001	<0,002	<0,001	<0,001	<0,002	<0,023	=0,244

CONCLUSION: CHF during discontinuation of mechanical ventilation occurs in significant number of patients complicating this process. Low PS levels and SB elicit different physiological responses

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RESPONSE FROM ALBUMIN INFUSION IN PATIENTS WITH ACUTE RESPIRATORY FAILURE

Serebriysky I I[1], Galstian G M[1], Gorodetsky V M[1].
[1]Intensive Care Unit, National Centre of Hematology, Moscow, Russian Federation

INTRODUCTION: Acute respiratory failure (ARF) is the most frequent and serious complication in patients (pts) with hematological malignancies. Respiratory insufficiency in this group of patients can be caused by a combination of increased vascular permeability, heart failure and liquid overload. The aim of this study was to analyze the effects of colloid replacement therapy in pts with hematological malignancies and ARF.

METHODS: We examined 9 pts with acute leukemia, complicated by sepsis and ARF (bilateral radiographic infiltrates, $PaO_2/FiO_2 = 200 \pm 60$). Three of them had PAWP>18 mmHg, respectively 19, 22 and 33 mmHg. All the patients received infusions of 20% albumin (A.). The first Infusion of 150ml was carried out during 45 minutes, later the speed was 50 ml/30 min. We measured extravascular lung water index (ELWI), pulmonary vascular permeability index (PVPI) by PICCO-plus (Pulsion, Germany), central hemodynamics parameters by Swan-Ganz catheter.

RESULTS: In the first group that received A. in doses of 2.5 ml/kg (6 pts) there were no significant changes in CI, PAWP, ELWI, PVPI, apart from 1 pt (1st pt, see table), in whose case there was an increase of PAWP from 16 to 22 mmHg and ELWI from 26 to 30 ml/kg both. The second group, consisting of three pts received A. in doses of 3.3, 3.8 and 4.3 ml/kg. Their levels of ELWI were 30, 13 and 13ml/kg, and those of PAWP were 33, 22 and 16 mmHg respectively. After the infusions, at the first case (2nd pt, see table) ELWI was increased to 46 ml/kg, and PAWP did not change, at the second (3rd pt, see table) and third case ELWT not changed, PAWP increased to 33 and 20 mmHg respectively.

Parameters befor and after A. infusion

	A. doses ml/kg	PAWP mmHg	ELWI ml/kg	PVPI
1st pt before		16	26	6.5
1st pt after	2.7	22	30	8.3
2nd pt before		33	30	3.4
2nd pt after	3.3	31	46	6.3
3rd pt before		22	13	2.6
3rd pt after	3.8	33	14	2.6

CONCLUSION: 1) Pts with a combination of high PAWP and ELWI are at the highest risk of developing pulmonary edema. 2) In cases of a combined increase of vascular permeability with liquid overload PVPI does not characterize vascular permeability of the lung and can not be used to predict the response from albumin infusion. 3) Changes in PVPI after albumin infusion can reflect the character of vascular permeability.

REFERENCE(S): Schuster D.P, Identifying patients with ARDS: time for a different approach. Intensive Care Med. 1997; 23: 1197-103.

Grant acknowledgement: Fund of Assistance to the Russian Medicine

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NEGATIVE EXPIRATORY PRESSURE AND P0.1 IN POST EXTUBATION PERIOD OF COPD PATIENTS

Vargas F[1], Gruson D[1], Bui N H[1], Herbland A[1], Guenard H[2], Gbikpi-Benissan G[1], Hilbert G[1]
[1]Réanimation Médicale, Hopital Pellegrin-Tripode, [2]Laboratoire de physiologie EA 518, Université de Bordeaux 2, Bordeaux, France

INTRODUCTION: Unsuccessful extubation in COPD patients is associated with increased morbidity and hospital mortality, and accurate prediction of post-extubation acute respiratory failure (ARF) is potentially important. Our hypothesis was that two parameters i.e., 1 the airway occlusion pressure at 0.1s (P0.1) and 2 the expiratory flow limitation (EFL) determined by applying a negative expiratory pressure (NEP) during tidal breathing, both recorded repeatedly after extubation, could be good indicators of postextubation ARF in COPD patients.

METHODS: COPD patients were included prospectively after extubation. A specially devised system (Micro 5000; Medisoft , Dinan, Belgium) was used to measure EFL and P0.1. Each patient was placed in half sitting position and breathed spontaneously. After stabilization of the patient, a NEP of –5 cm H2O was applied at the beginning of expiration and maintained throughout the ensuing expiration. The test breath was the breath during which the NEP was applied, and the preceding expiration served as control. Five test breath separated by periods of quiet breathing were recorded. The expiratory flow-volume loops generated with NEP were compared by superimposition with those obtained during the immediately preceding breaths. The portion of the tidal expiration over which there was no appreciable change in flow with NEP was considered as flow-limited and was expressed as a percentage of the expired control tidal volume (%VT). The module of NEP was replaced by that allowing to measure the P0.1. Five measurements of P0.1 were made, spaced by at least 15 seconds. Gas exchange, P0.1 and EFL under NEP were measured at the 1st , 6th, 24th and 48th hour following extubation. If a limitation of flow was evidenced at a given time, the subsequent measurements were not carried out.
Post-extubation ARF was defined by a respiratory rate of more than 25 per min, a respiratory acidosis with a PaCO2 > 45.2 mmHg and a pH lower than 7.35 without metabolic acidosis.

RESULTS: To date, 25 patients have been included. Heighteen of them (72%) presented a ELF at 8 ± 10 hours following extubation. Nine patients presented an ARF at 54 ± 17 hours in post extubation. These 9 patients had a ELF and a P0.1 significantly higher than those without post-extubation ARF (respectively 80.2 ± 8.4 % vs. 49.7 ± 12.1 %; and 5.2 ± 0.6 cm H2O vs. 2.0 ± 0.6 cm H2O; $p < 0,05$). Seven patients (28%) did not have ELF and did not present ARF in post extubation.

CONCLUSION: ELF by NEP and P0.1 are easily measured in the period following extubation in COPD patients. This preliminary report seems to demonstrate that P0.1 and EFL, measured precociously then repeatedly after extubation, could be good indicators of postextubation ARF in COPD patients.

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EFFECT OF CRITICAL ILLNESS POLYNEUROPATHY ON THE WITHDRAWAL FROM MECHANICAL VENTILATION

Amaya-Villar R[1], Garnacho-Montero J[1], Madrazo-Osuna J[2], García-Garmendia J[3], Ortiz-Leyba C[1]
[1]Intensive Care Unit, [2]Department of Clinical Neurophysiology, Hospital Universitario Virgen del Rocío, [3]Intensive Care Unit, Hospital San Juan de Dios del Aljarafe, Sevilla, Spain

INTRODUCTION: Should critical illness polyneuropathy (CIP) itself prolongs mechanical ventilation or whether this prolongation is the effect of concurrent risk factors for weaning failure is a matter of debate. Our primary objective was to evaluate the impact of CIP on the length of mechanical ventilation after controlling for coexisting risk factors for weaning failure. We also set out to assess the impact of CIP on the length of the stay as well as to determine the costs associated with this neurological complication.

METHODS: A prospective cohort study. Setting: ICU of a tertiary hospital. Patients: All patients with severe sepsis or septic shock that required mechanical ventilation for at least 7 days who were considered ready to discontinue mechanical ventilation. Patients underwent a neurophysiologic evaluation at onset of weaning from mechanical ventilation.

RESULTS: Sixty-four critically ill septic patients were enrolled and 34 developed CIP (53.1%[95% confidence interval [CI] 40.2-65.7%]). Length of mechanical ventilation was significantly higher in patients who had developed CIP [median 34 days vs. 14 days; p<0.001]. The duration of the weaning period was also significantly greater in patients with CIP [median 15 days vs. 2 days; p<0.001] despite that factors suspected to influence the weaning process did not differ between these two groups. Using multiple logistic regression analysis, CIP was the only risk factor independently associated with weaning failure: OR 15.4 (95% CI 4.55,52.3; p<0.001). Lengths of ICU and hospital stays were significantly higher in patients with CIP. The extra charges (the sum of additional costs in the ICU plus the additional costs in the general ward) for a patient with CIP compared with a patient without CIP were $40,305.4

CONCLUSION: CIP significantly increases the duration of mechanical ventilation, prolongs the lengths of ICU and hospital stays. The estimation of the cost of this complication exceeds $ 40,000.

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EXTUBATION FAILURE: CAUSES AND RISK-FACTORS

Gianesello L[1], Pavoni V[1], Paparella L[1], Gritti G[1]
[1]Dept. of Critical-Medical Surgical Area, Section of Anaesthesia and Intensive Care, Florence, Italy

INTRODUCTION: Extubation failure (EF) has an important effect on length of ICU and hospital stay,ICU and hospital mortality(1).EF can occur secondary to upper airway obstruction or to an inability to manage respiratory secretions a cause of laryngeal dysfunction (LD) and ineffective cough.LD can result from depressed mental status or local trauma after intubation.Pre-admission functional status can also delay post-estubation swallowing impairment in critically ill elderly patients(2).

METHODS: Over a 12-month period patients who needed reintubation after successful trial of weaning and planned extubation, in a polyvalent intensive care unit (ICU) were identified.Data including clinical features (age, sex, SAPS II on admission, Glasgow Coma Score (GCS) on day of extubation, type of patient, length of intubation and mechanical ventilation (MV) before extubation, length of ICU stay (LOS), ICU and hospital mortality) were collected.Moreover we considered two parameters that asses airway patency and protection like predictors of EF:cough strength and suctioning frequency after extubation.Cough strength on command was measured with a semiobjective scale of 0 to 5 (0= weak cough, 5= strong cough).

RESULTS: During study period, 665 patients were admitted to the ICU; 511 of them (76.8%) underwent intubation and MV. Twenty-three of them (4.5%) (17 male and 6 female) were reintubated;their mean of age, SAPS II and GCS were: 72.2±10.8, 45±12.7, 13.8±3.1,respectively.Length of MV was 11±15.8.Types of patients with EF were: scheduled surgery (30.5%), emergency surgery(30.5%), medical(35%), trauma(4.3%).Causes of EF were: inability to manage respiratory secretions (9/23)(39.1%),surgical complications (9/23)(39.1%),severe alteration in consciousness (3/23)(13.2%), pulmonary embolism(1/23)(4.3%)and severe sepsis(1/23)(4.3%).Seven of patients who received reintubation a cause of defective airway manage needed at least one suctioning every two hours; moreover the same patients and other three with alteration in neurological function had weak cough (grade 0 to 2).The LOS of EF patients was 23±24.3 days, their ICU and hospital mortality were 39.1% and 47.8%, respectively, both higher when compared with not reintubated patients.Results of logistic regression showed that SAPS II is the only independent risk-factor of reintubation (odds ratio 1.056, sig. 0.004),while age, type of admission,length of intubation and GCS seem to do not influence EF.Data were analysed using the SPSS 11.0 for Windows.

CONCLUSION: EF can depend from defective airway protective mechanisms due to alteration in consciousness or glottic incompetence.This event influences negatively LOS and outcome.Severity of illness is the only independent risk-factor.

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SEPSIS RELATED PULMONARY OEDEMA ASSOCIATED WITH REDUCED EPITHELIAL SODIUM TRANSPORT

Eisenhut M[1], Barton P[2], Newland P[2], Southern K[1]
[1]Institute of Child Health, University of Liverpool, [2]Department of Biochemistry, Royal Liverpool Children's Hospital, Liverpool, United Kingdom

INTRODUCTION: We previously observed increased sweat sodium levels associated with meningococcal septicaemia which normalized on recovery and where significantly higher in patients ventilated with pulmonary oedema [1]. Impaired epithelial sodium transport has previously been associated with elevated sweat sodium and reduced alveolar fluid clearance [2]. Our objectives were to investigate whether the finding of impaired sodium transport in the sweat gland in septicaemia is reproducible, whether potassium transport is equally affected, whether it applies to renal electrolyte transport and is more pronounced in patients with pulmonary oedema.

METHODS: We conducted a prospective observational study in patients ventilated on the Paediatric Intensive Care Unit with sepsis and radiological evidence of pulmonary oedema and controls ventilated for other reasons with normal lungs on chest radiograph. We compared renal fractional sodium and potassium excretion and sweat sodium and potassium levels (sweat obtained by pilocarpine iontophoresis) measured as soon as possible after admission.

RESULTS: 16 patients have been enrolled. Age (median, range) was 8.5 (0.4 to 14.6) years. Cases were 5 patients with pulmonary oedema secondary to meningococcal disease. Controls were 11 patients ventilated after major surgery (7), meningococcal septicaemia without pulmonary oedema (2), head injury (1) and upper airway obstruction (1). There was no significant difference between cases and controls for age and gender. Patients with pulmonary oedema had a significantly higher ($p<0.05$, t-test) fractional renal sodium excretion (mean (SD): 1.24 (0.4) % versus 0.62 (0.52)%) and sweat sodium levels (mean (SD) 41 (18) versus 22 (12) mmol/l). Sweat sodium levels correlated significantly with fractional renal sodium excretion (Pearson's correlation coefficient $r = 0.63$). Fractional renal potassium excretion and sweat potassium levels were not significantly different between cases and controls.

CONCLUSION: Sepsis related pulmonary oedema is associated with a reduced absorption of sodium in kidney and sweat gland. These data suggest a systemic impairment in epithelial sodium transport, which may be involved in the pathogenesis of septicaemia related pulmonary oedema.

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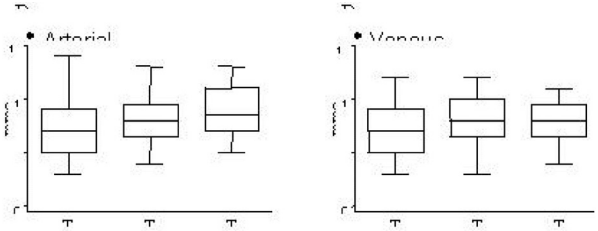
TRANSPULMONARY LACTATE GRADIENT AFTER HYPOTHERMIC CARDIOPULMONARY BYPASS

Bendjelid K[1], Treggiari M M[1], Romand JA[1]
[1]APSIC, Geneva University Hospitals, Geneva-14, Switzerland

INTRODUCTION: Several studies demonstrated that the lungs could produce lactate in patients with acute lung injury (ALI). Because after cardiopulmonary bypass (CPB) some patients develop ALI, the effect of CPB on pulmonary lactate release was investigated.

METHODS: 16 deeply sedated, ventilated and post cardiac surgery patients, all equipped with a pulmonary artery catheter. Lactate concentration was measured using a lactate analyser in simultaneously drawn arterial (A) and mixed venous (V) blood samples. Three measurements per patients were taken at 30 minute interval. Concomitantly, measurements of cardiac output were also obtained. Pulmonary lactate release was calculated as the product of transpulmonary A-V lactate and cardiac index.

RESULTS: The mean cardiopulmonary bypass duration was 100 ± 44 min (SD), and the aortic cross-clamping time was 71 ± 33 min. After CPB, lactate release was 0.136 ± 0.210 mmol/min/m2. These values were not correlated with cardiopulmonary bypass duration.



CONCLUSION: The present study shows that in patients receiving mechanical ventilation after CPB, the lung is a source of lactate production. This pulmonary release was not dependent on cardiopulmonary bypass duration.

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LIFE-THREATENING SYNDROMES AT THE BEGINNING OF HEMATOLOGY MALIGNANCIES (HM)

Keselman S A[1], Galstian G M[1], Shulutko E M[1], Gorodetsky V M[1], Pivnik A V[2], Savchenko V G[3]
[1]ICU, National Center for Hematology, [2]Internal Medicine, Moscow AIDS Center, [3]Bone Marrow Transplantation Department, National Center for Hematology, Moscow, Russian Federation

INTRODUCTION: The beginning of HM is complicated frequently by development of critical life-threatening syndromes. These patients (pts) require simultaneously realization of antitumor therapy and intensive therapy of critical syndromes. Aims of study were 1) to evaluate the structure of critical syndromes at the beginning of HM 2) to estimate an opportunity of performance of antitumor therapy simultaneously with treatment of life-threatening syndromes.

METHODS: 42 pts with HM were enrolled in study. 19 pts suffered from acute leukemia, 17 - advanced stage of lymphomas, 4 - multiple myeloma (MM), 2 - chronic myeloid leukemia. All pts had at least one of life-threatening complications: acute respiratory failure (ARF), sepsis, renal failure, coma. At all pts critical syndromes were developed in a debut of HM. All pts alongside with intensive therapy received antineoplastic therapy.

RESULTS: Main critical syndromes were: ARF (86% pts), sepsis (36% pts), acute renal failure (31% pts), injury of central nervous system (24%), congestive heart failure (14%). 17% of the pts with ARF had tracheal obstruction by mediastinal bulky tumor. 78% pts had parenchymal lung damage. Among them only 18% pts had pneumonia and 60% pts had non-infectious component of lung injury (pulmonary leukemic infiltration (10),cytolytic syndrome (4), retinoic acid syndrome (9). In 2 cases ARF was conditioned by tumor tracheal obstruction and pneumonia. Renal failure complicated disease course in 13 pts. The reasons of renal failure were leukemic kidney infiltration (6), myeloma nephropathy (3), sepsis (4). The reasons of central nervous system injury were neuroleukemia and intratumor (4), plasma hyperviscosity in pts with MM (3), hemorrhagic stroke(3). Combination of 2 and more critical syndromes was revealed in 15 of 42 pts. Technical support included conventional and non-invasive lung ventilation, leukapheresis, plasmapheresis, hemodialyisis, inotrope and vasopressor therapy.Two patients with intracranial hemorrhage were executed of surgical intervention. During treatment all patients simultaneously received intensive chemotherapy. 26 of 42 pts survived and discharged from ICU. All of them had tumor susceptibility to chemotherapy. None pts with tumor resistance did not survived.

CONCLUSION: ARF is the most frequent critical syndrome at the beginning of HM. In many cases critical syndrome development is conditioned by tumor infiltration. These patients require antitumor treatment and intensive therapy of critical syndrome simultaneously. Tumor susceptibility to chemotherapy and intensive care are crucial for successful treatment critical ill pts with hematology malignancies.

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BEDSIDE OPEN LUNG BIOPSY IN VENTILATED PATIENTS: A SAFE AND USEFUL PROCEDURE

Clavel M[1], Phan C[2], François B[1], Pesteil F[3], Normand S[1], Pichon N[1], Gastinne H[1], Vignon P[1].
[1]Medical-surgical ICU, [2]Pulmonary Department, [3]Cardiothoracic Surgery, Dupuytren Teaching Hospital, Limoges, France

INTRODUCTION: Open lung biopsy (OLB) is considered the gold standard diagnostic technique for diffuse infiltrative lung disease (DILD). Due to the threat of complications related to this invasive procedure, indications of OLB remain controversial in mechanically ventilated patients. The purpose of this study was to evaluate the morbidity of OLB when performed at bedside in ventilated patients with DILD. In addition, the clinical diagnosis was compared to chest CT scan and histological findings.

METHODS: In all patients, the immune status, the PaO2/FiO2 ratio before and 24 hours after OLB, the duration of chest tube drainage, the OLB results, and biopsy-related morbidity were collected. The OLB was performed at bedside under general anesthesia using an anterior mini-thoracotomy. Chest CT scan and biopsy specimens were independently interpreted by two experienced radiologists and pathologists, respectively.

RESULTS: Over a 5 year-period, 16 patients with DILD (12 males; age: 62±18 years; SAPS II: 41±7) were retrospectively studied. Among them, 9 patients were immunocompromised and 4 patients sustained complications attributable to the procedure: airleak (n=3), pneumothorax (n=1). The median duration of the chest tube drainage was 7±6 days (range: 1 to 25 days). Both the PaO2/FiO2 ratio and mean level of PEEP were comparable before and 24 hours after the OLB (Table 1). No patient died in the perioperative period. OLB allowed to establish a diagnosis in 14 patients (87%). In 11 patients (70%), the DILD was idiopathic (Table 2). In 3 patients, histologic diagnoses obtained from OLB were not suspected clinically or by radiological investigations: invasive pulmonary aspergillosis, diffuse amyloidosis, methotrexate lung toxicity.

OLB and respiratory parameters

	Before OLB	After OLB
PaO2/FiO2 (mmHg)	178 ± 94	173 ± 102
PEEP level (cm H2O)	10 ± 4	9 ± 5

Idiopathic interstitial pneumonia

Diagnosis	UIP	AIP*	BOOP
N. of patients	3	3	5

**: Acute interstitial pneumonia (ARDS)*

CONCLUSION: In ventilated patients, OLB can be performed with acceptable morbidity at bedside in the ICU. In this study, OLB established a definite diagnosis in 87% of patients and corrected the clinical and radiological diagnosis in 44% of the cases.

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HOW DOES DIRECT HEMOPERFUSION WITH A POLYMYXIN B IMMOBILIZED COLUMN IMPROVE SEPTIC ARDS?

Nunomiya S[1], Momose K[1], Ohtake K[1]
[1]Division of Intensive Care, Dept of Anesthesiology and Intensive Care Med, Jichi Medical School, Minamikawachi, Japan

INTRODUCTION: Several clinical and experimental studies have reported recently that direct hemoperfusion using a polymyxin B immobilized fiber column (PMX-DPH) is effective for septic ARDS and improves pulmonary oxygenation. Unfortunately, however, little is known about the exact mechanism in such effects. Therefore, we studied the role of circulating leukocytes activities in endotoxemic pigs undergoing PMX-DPH.

METHODS: Eleven anesthetized pigs were received endotoxin infusion (ETX) to develop ARDS state and submitted to either PMX-DPH group or CTRL group. ARDS state was defined when PaO2/FIO2 ratio decreased to the level less than 70% compared to the point before ETX. Extracorporeal circulations (ECC) were done for 2 hours in both groups. Blood samples were obtained at 4 points; the time before ETX (T-1), ARDS state (T0), 1hour (T1) and 2 hours (T2) after the start of ECC. Leukocyte activities were measured as the abilities of oxygen radical productions from leukocytes using chemiluminescence assay.

RESULTS: One was dead within 1 hour and another was dead within 2 hours after the start of ECC in CTRL group, whereas no animals were dead in PMX-DPH group during the study period. Time courses of PaO2/FIO2 ratio and leukocyte activities in both groups are shown in Tables.

Changes in P/F ratio compared to T-1

	T-1	T0	T1	T2
CTRL	100	55.5±6.7	35.2±9.3	29.8±4.2
PMX-DPH	100	59.8±6.5	64.0±7.8	60.4±11.6

mean±SE

Changes in leukocyte activities

	T-1	T0	T1	T2
CTRL	237±117	945±333	1270±619	1198±463
PMX-DPH	234±213	825±468	379±91	585±249

mean±SE

CONCLUSION: Attenuation of leukocyte activities may play some part of the role in improving oxygenation by PMX-DPH in septic ARDS.

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TAILORING HIGH POROSITY POLYSULFONE MEMBRANE FOR CLINICAL APPLICATION IN SEPTIC ACUTE RENAL FAILURE

Fonsato V[1], Mariano F[2], Triolo G[2], Camussi G[1], Nederlof B[3], Tetta C[3]
[1]Laboratory of Renal Immunopathology, University of Turin, [2]Unit of Nephrology and Dialysis, CTO Hospital, Turin, Italy, [3]Department of Research, Fresenius Medical Care, Bad Homburg, Germany

INTRODUCTION: High porosity membranes may enhance cytokine elimination by convection and also diffusion. However, there is need to balance the high permeability between cytokine removal and a clinically acceptable loss of plasma proteins. Here,we studied the sieving coefficients (SC)and clearances of different cytokines (TNFa; IL-1b;, IL-6, IL-8, IL-1ra) and protein permeability profile (albumin, cystatin C, IgG)in an ex vivo hemofiltration (HF), hemodiafiltration (HDF)and hemodialysis (HD)circuit of nanostructured high porosity polysulfone membranes with different albumin permeabilities of 5%(Type A)and 13%(Type B).

METHODS: Three hundred ml of fresh normal human blood was incubated with endotoxin (1 mg, E. Coli, Sigma, 37°C, 4 hr and overnight at room temperature). We set up the three circuits under the following conditions: I) post dilutional HF, at three different blood flow rates (100, 150 or 200 ml/min) and with a fixed (20%) ultrafiltration rate (UFR: 1.2, 1.8 and 2.4 L/hour, respectively). The circuit operated at zero balance. Samples for SCs and Clearances were obtained conventionally at 10, 30, 60, 120, 240, 360 and 480 min; II) HD, at a dialysate flow rate of 3 L/h and 5 L/h; III) HDF, dialysate flow rate of 3 L/h and 5 L/h included 0.5 L/h of ultrafiltrate. Both HD and HDF were conducted always at blood flow rate of 150 ml/min. Cytokines were determined by commercially available kits, albumin, Cystacin C and IgG by nephelometry (Beckman).

RESULTS: Median SC was nearly up to 1 for IL-1b and IL-1ra, at about 0.6 for IL-6, 0.4 for IL-8 and 0.7 for TNFa (Type A vs B, p >0.05). Despite similar high cytokine clearance (15 and 30 mil/min), permeability profile showed a higher SC for albumin, cystacin C and IgG for Type B than for Type A (p<0.001). SC for all cytokines was significantly reduced in HD (at both 3L/hr and 5 L/hr) as compared with HF and HDF. It was of interest that in HDF SC of IL-6 and IL-8 at 3 L/h were overlapping those obtained in HF. However, SC of IL-1b, IL1-ra and TNFa in HDF were about half of those obtained with HF. In addition, increasing dialysate flow (from 3 L/h up to 5 L/h) in HD and HDF at a constant blood flow of 150 ml/min led to decrease SC of IL-6, IL-8, TNFa and albumin. Albumin clearance was 1.22±0.43 and 0.57±0.02 ml/min in HDF and HD, respectively.

CONCLUSION: Our data show that high cut-off polysulfone membrane are associated with high clearances of cytokines independently from blood flow rate and UFR. Tailoring membrane porosity on the basis not only of cytokine clearances but also on ex vivo plasma protein permeability was instructive to formulate their clinical application in mixed convective-diffusive treatments rather than in pure convective or diffusive modes.

Grant acknowledgement: Fresenius Medical Care,Bad Homburg, Germany

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EFFECTS OF DIFFERENT N-3/N-6 FATTY ACID RATIOS ON INFLAMMATORY RESPONSE OF HUMAN LUNG CELL CULTURE

Cotogni P[1], Muzio G[2], Trombetta A[2], Canuto R[2], Trompeo A[1], Viale A[1], Ranieri M[1]
[1]Anestesia e Rianimazione, [2]Patologia Generale, University of Turin, Turin, Italy

INTRODUCTION: In the early phase of ARDS, intense inflammatory reactions occur in the alveolar space. In this setting, the balance between pro- and anti-inflammatory cytokines may be a critical component for prognosis. Evidence is accumulating that n-3/n-6 polyunsaturated fatty acids (PUFA) ratio may influence inflammation, since the eicosanoids formed from n-3 PUFA and those developed from n-6 PUFA have opposite effects upon inflammatory mediators production. In standard artificial nutrition - both in parenteral and in enteral formulas - n-3/n-6 PUFA ratio is quite low (between 1:5 and 1:7), since most nutrients are richer in n-6 than in n-3 PUFA. Though, the most favourable n-3/n-6 PUFA ratio is not yet defined. Our study tested the hypothesis that n-3/n-6 PUFA ratio may modulate inflammatory cytokines production in a cell culture of human pneumocytes exposed to lipopolysaccharide (LPS).

METHODS: A549 cells, a human pulmonary cell line with type II pneumocyte properties, were cultured (30000/cm2) in HAM F-12K medium. In all cultures but in controls, LPS was added 24 hours after seeding, to obtain a final concentration of 400 mug/ml. Three hours after LPS, PUFA were added as docosahexaenoic acid (DHA) (n-3) and arachidonic acid (AA) (n-6) in different n-3/n-6 ratios. Four hours later, all culture supernatants were collected to determine the release of TNFalpha, IL-6, IL-8, and IL-10 (ELISA).

RESULTS: Pro-inflammatory cytokines production was significantly reduced by a 1:1 ratio of n-3/n-6 PUFA, but increased by a 1:4 ratio. A higher ratio (3:1) was not associated with further cytokines reduction (Table 1).

	Control	LPS	LPS+* ratio1:4	LPS+* ratio1:1	LPS+* ratio3:1
TNF alpha	9.1	277.4	317.5	52.2	103.3
IL-6	1373.8	2794.8	5025.1	1434	1807
IL-8	3972.6	25251.7	39108	10758	19052.3
IL-10	<1	8.7	10.2	20.4	43.9

**n-3/n-6*

CONCLUSION: In a human pulmonary cell culture stimulated with LPS, inflammation can be modulated by PUFA, through appropriate changes of n-3/n-6 ratio.

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AT VERY HIGH LEVEL SELENIUM TOXICITY INCREASE IN LIPOPOLYSACCHARIDE RAT MODEL

Forceville X[1], Chancerelle Y[2], Agay D[2], Ducros V[3], Laporte F[4]
[1]Réanimation Polyvalente, Centre Hospitalier de Meaux, Meaux, [2]Departement de radiobiologie et de radiopathologie, Centre de Recherche du Service de Santé des Armées, [3]Laboratoire NVMC, Université Joseph Fourier, [4]Laboratoire NVMC, Centre de Recherche du Service de Santé des Armées, Grenoble, France

INTRODUCTION: High doses of selenium could be a promising way for septic shock treatment. However, selenium (Se) toxicity is supposed to be related to oxidative stress through a reaction with thiols. In the situation of an oxidative stress such as severe sepsis, it is to be feared that selenium toxicity could be increase, despite the fact that preliminary results are in favor of two different pathways for lipopolysaccharide (LPS) and Se toxicity.

METHODS: After approval by the CRSSA ethical committee, 110 wistar male rats were studied. Rats were quarantined for 8 days. Then, Lipopolysaccharide (LPS) followed one hour later by selenium, as sodium selenite (LPS-Se group) or Se alone, as sodium selenite, (Se group) were administered intraperitoneally. In ten rat LPS-Se groups, LPS were administered at the dose of 26 mg/kg followed by Se at increasing doses from 0.014 to 3 mg/kg. In ten rat Se groups, Se was administered with increasing doses from 0.35 to 4.5 mg/kg. Mortality rate was observed at 48 hours. Surviving animals were sacrificed under anesthesia by halothane. Blood samples were taken on two surviving rats of each group. Plasma selenium concentration was measured using Electrothermal Atomic Absorption.

RESULTS: Mortality related to Se appears for lower doses in LPS-Se groups than in rats receiving Se alone.
Mortality rate of rats receiving 26 mg/Kg LPS alone was 65% (13/20). For doses of more than 0.35, septic rats died in respiratory distress in less than one day. For LPS alone or followed by Se at the dose of 0.014 mg/Kg, rats were rapidly sick. They rolled up into a ball. Their fur was dull, and stood on end. They were asthenic and had diarrhea. Se rats developed an encephalopathy the first day and later recovered, except 4 rats with extremely high doses of Se, according to the literature on selenium acute toxicity.

Mortality related to Se (mg/Kg)

mg/Kg	0.014	0.35	0.8	1	3	4.5
LPS-Se	7/10	8/10	10/10	10/10	10/10	Not Do
Se	0/10	0/10	0/10	0/10	0/10	4/10

CONCLUSION: In a 70% mortality non reanimated LPS rat model, mortality related to selenium administration appears at lower doses those administred in healthy rats. Mortality was related to respiratory distress in LPS followed by Se rats. Doses of 0.014 mg/Kg, presently considered as the maximum selenium level administration, seems not to modify the spontaneous evolution of sepsis in this model.

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AT MODERATLY HIGH LEVEL SODIUM SELENITE SEEMS TO DECREASE MORTALITY IN LIPOPOLYSACCHARIDE RAT MODEL

Forceville X[1], Chancerelle Y[2], Agay D[2], Ducros V[3], Laporte F[4]
[1]Réanimation Polyvalente, Réanimation Polyvalente, Meaux, [2]Departement de radiobiologie et de radiopathologie, Centre de Recherche du Service de Santé des Armées, [3]Laboratoire NVMC, Université Joseph Fourier, [4]Laboratoire NVMC, Centre de Recherche du Service de Santé des Armées, Grenoble, France

INTRODUCTION: High dose of selenium (Se) could be a promising way for septic shock treatment. However, selenium toxicity is supposed to be related to oxidative stress through a reaction with thiols. In the situation of an oxidative stress such as severe sepsis, it is to be feared that selenium toxicity could be increased. Presently human administration of sodium selenite of more than 700 µg per dose must be avoided, outside carefully conducted study. However preliminary results are in favor of two different pathways for lipopolysaccharide (LPS) and Se toxicity, which leads to think that selenium, especially as sodium selenite, could be a new way of treatment.

METHODS: After approval by the CRSSA ethical committee, 64 Wistar rats were studied. Rats were quarantined for 8 days. Sixty four rats received 26 mg/Kg of LPS intraperitoneally, followed one hour later by 3 milliliters of saline water (placebo) (n =20), or 0.014 mg/Kg selenium as sodium selenite (n=10) corresponding to around 1mg for a 80 Kg man, or 0.25 mg/Kg selenium as sodium selenite (n=34). Mortality rate was observed at 24 hours. Videos were performed during the 24-hour course. Surviving animals were sacrificed under anesthesia by halothane. Blood samples were taken on two surviving rats of each group.

RESULTS: There is a tendency of the mortality decrease in this post-treatment septic rat model. Moreover, rats receiving LPS alone or supplemented by 0.014 mg/Kg sodium selenite were rapidly sick. They rolled up into a ball. Their fur was dull, and stood on end. They were asthenic and had diarrhea. LPS non-surviving rats died in an asthenic syndrome, and surviving LPS alone rats remain very asthenic at 24 hours. On opposite, surviving LPS followed by Se rats were much more dynamic, even quite normal.

Mortality in a LPS rat model with selenium

LPS Groups	LPS	+ Se 0.014	+ Se 0.25
Nb of rats	20	10	34
Mortality	13	7	18
rate	65 %	70 %	53 %

CONCLUSION: At doses largely above the 0.014 mg/Kg, presently considered as toxic level, when the intrinsic oxidative effect of sodium selenite is present, sodium selenite seems to reduce mortality, and improve outcome in a LPS rat model.

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INFLUENCE OF SELENIUM ON THE INFLAMMATORY RESPONSE IN MONONUCLEAR BLOOD CELLS SEPTIC PATIENTS

Zimmermann T[1]
[1]Department of Visceral-, Thoracic- and Vascular Surgery, Technical University Dresden, Dresden, Germany

INTRODUCTION: Selenium plays a dual role in the regulation of the inflammatory response in mononuclear blood cells. First, selenium enzymes (Gpx 4, TRR) are essentiel for the physiological regulation of the redoxsensitive transcription factor NF-kB (key role in inflammation). Second, selenium is capable to inhibit the activity of NF kB. Another transcription factor (AP-1) is being specific activated via the subunits (c-jun,c-fos) by means of selenium. The authors investigated 28 patients with severe sepsis within the SIC-Study (Selenium in Intensive Care).

METHODS: Mononuclear blood cells: NF-kB- and AP-1 binding activity, p50/p65 (NF-kB)–protein concentration in the nucleus and cytoplasm. mRNA-expression of IkB, TNF, tissue factor, MIF, Gpx-4 and TRR (selenoenzymes), intracellular synthesis of MIF and IkB. ROS in whole blood. Blood was taken on the 1.,3., 7., 14., 21., 28. day of sepsis.

RESULTS: Septic patients with supplementation of selenium showed a increase of the NF-kB- and a strong increase of the AP-1 binding activity during the course of the sepsis. In the same time a rigorous reduction of the mRNA-expression of IkB (inactivator of NF-kB) and MIF could be observed. The mRNA-expression of the tissue factor and TNF was not influenced. Supplementation of selenium lead to a amplified translocation of p50/p65 (NF-kB) within the nucleus, whereas in the placebo group this effect was not shown. In contrary to septic patients, only the NF-kB bindung activity was strongly suppressed in healthy controls.

CONCLUSION: Selenium seems to possess a regulatory role in der inflammatory response of mononuclear blood cells. The positive effect of selenium in septic patients could be dependent on the time point of the supplementation, within the inflammatory (anti- or hyperinflammatory) response. This could be one explanation of „non-responders“ of selenium supplementation.

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SELENIUM REPLACEMENT, HLA-DR EXPRESSION AND OUTCOME IN SEPTIC ICU PATIENTS

Mishra V[1], Perry S[2], Baines M[1], McLaughlin J[2], Carson J[3], Wenstone R[3], Shenkin A[1], Mostafa S M[3]
[1]Clinical Chemistry, [2]Immunology, [3]Intensive Care, Royal Liverpool University Hospital, Liverpool, United Kingdom

INTRODUCTION: Septic patients with low HLA-DR expression are reported to have increased mortality [1, 2]. Trace elements such as selenium [Se] may be depleted in critically ill patients. They are required for cell-mediated & humoral immunity [3] and have been shown to reduce pulmonary infections post-burns [4]. This study was undertaken to ascertain the effect of supplementation with Se critically ill septic patient on HLA-DR expression and survival in ICU.

METHODS: This is a prospective double-blind controlled trial of patients stratified randomly into 2 groups to receive daily iv high dose of Se [6, 4 & 2 ?mol consecutive dosages each dose for 3 days periods, group A] or a standard dose of 0.4 ?mol of Se [group B] during their treatment in an adult ICU. All consented septic patients with APACHE II score >15, clinical suspicion of infection and >1 organ dysfunction were included. Patients with chronic renal failure, alcoholic liver disease or immuno-deficiency were excluded. Blood samples were taken for measurements of HLA-DR expression on monocytes & plasma Se pre-supplementation [day 0], and day 3, 7 and 14 thereafter. Mortality at 28 days was noted.

RESULTS: Mortality in Group A was 44% [8/18 patients] versus 50% [11/22] in Group B. Plasma Se in both groups was below normal on day 0. It became significantly higher in Group A than B on days 3 & 7 [p<0.0001]. HLA-DR expression on day 0 was significantly lower in Group A than B [p=0.007] but not on days 3, 7 or 14,table.

	Day 0 A	Day 0 B	Day 3 A	Day 3 B
Se (SD) mcMol	0.6 (0.27)	0.7 (0.22)	1.6 (0.42)	0.8 (0.28)
HLA (SD) %	21 (22.3)	49 (33.7)	38 (30.6)	39.2 (27.6)

	Day 7 A	Day 7 B	Day 14 A	Day 14 B
Se (SD) mcMol	1.6 (0.34)	0.9 (0.26)	1.4 (0.35)	1.1 (0.37)
HLA (SD) %	32 (18.8)	42 (34.3)	48 (25.6)	58 (26.1)

CONCLUSION: Selenium appears to increase HLA-DR expression in septic patients. Further studies are warranted.

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PENTOXYFILINE IN ADULTS WITH BACTERIAL SEPSIS AND PURULENT MENINGOENCEPHALITIS - PRELIMINARY STUDY

Kepa L[1], Oczko-Grzesik B[1]
[1]Department of Infectious Diseases, Silesian University Medical School, Bytom, Poland

INTRODUCTION: Cytokines and neutrophiles play an important role in pathogenesis of bacterial sepsis with purulent meningoencephalitis (bs-pme). Experimental studies in animals revealed that pentoxyfiline (PF) exerted inhibitory influence of cytokines on these cells with beneficial outcome of the disease. The aim of the presented study was the estimation of PF influence on clinical course and outcome of bs-pme in adults.

METHODS: Between 2000-2003 bs-pme was recognized in 18 patients treated in our centre. Neisseria meningitidis and Streptococcus pneumoniae were etiological agents in subsequently 39% and 11% of cases. In the remaining 50% of subjects the etiology was not elucidated. All patients were divided at random way into two groups: I - 8 patients (mean age 39yrs.) treated with antibiotics, symptomatic drugs and PF (3mg/kg/day) beginning from the first day of treatment, II - 10 patients (mean age 41 yrs.) treated only with antibiotics and symptomatic drugs. Cerebrospinal fluid (CSF) samples were taken on the 1st, 4th and 14th day of therapy with estimation of pleocytosis and protein, glucose, lactic acid, TNF-alpha, IL-1beta and CRP concentrations.

RESULTS: Mean periods of consciousness impairment, fever persisting as well as hospitalization were comparable in both groups of patients. Faster normalization of CSF protein, glucose, lactic acid and CRP concentrations were recorded in patients of group I, who survived, compared to subjects of group II, but the differences were not statistically significant. CSF parameters remained abnormal in fatal cases. Most frequent sequeles of bs-pme were: partial deafness, deafness, paresis and paralysis. Side efects of PF were not observed.

	Recovery	Death	Sequels
Group I	4 (50%)	2 (25%)	2 (25%)
Group II	5 (50%)	3 (30%)	2 (20%)

CONCLUSION: Pentoxyfiline used as adjunctive therapy in adult patients with bacterial sepsis and purulent meningoencephalitis did not reveal evident beneficial influence on clinical course and outcome of the disease.

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EFFECTS OF LORNOXICAM ON THE PHYSIOLOGY AND SURVIVAL OF SEVERE SEPSIS

Memis D[1], Karamanlioglu B[1], Turan A[1], Koyuncu O[1], Pamukcu Z[1]
[1]Department of Anaesthesiology, Trakya University Medical Faculty, Edirne, Turkey

INTRODUCTION: The purpose of the present study was to evaluate the effects of intravenous lornoxicam on hemodynamic and biochemical parameters, serum cytokine levels, patients' outcome in humans suffering from severe sepsis

METHODS: 40 patients were included to the study. After applying, lornoxicam 8 mg was administered intravenously every 12 hrs for six doses vs placebo. Hemodynamic parameters (heart rate,mean arterial pressure), nasopharyngeal body temperature, arterial blood gas changes (pH, PO2, PCO2), plasma cytokin levels (interleukin 1-b, interleukin 2-R, interleukin 6, interleukin 8, tumor necrosis factor-a), biochemical parameters (lactat, leucocyt, trombocyt, creatinin, total billirubin, serum glutamat oxalat transaminase), staying time in the intensive care unit, time of mechanical ventilation support, mortality, with the control group were recorded. All measurements were obtained at baseline (before start of the study) and were repeated immediately at 24th , 48th and 72 th h. after lornoxicam.

RESULTS: No differences were found differences in major cytokines, duration of ventilation and ICU stay, and Fi02/ Pa02 intravenous lornoxicam vs placebo (p>0.05).

CONCLUSION: We found that the effect of intravenously lornoxicam did not effect hemodynamic and biochemical parameters, or cytokine levels or in patients' outcome in severe sepsis in humans. Because of the limited number of patients in our study and the short period of observation, our findings need to be confirmed by larger clinical trials of intravenously lornoxicam in a dose-titrated manner

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RENAL RESCUE THERAPY IN EARLY STAGE OF SEVERE SEPSIS: A CASE STUDY APPROACH

Zahorec R[1], Setvak D[1], Cintula D[1], Blaskova A[1], Belovicova C[1]
[1]Of Anesthesia and ICU, St. Elizabeths Cancer Institute, Bratislava, Slovakia

INTRODUCTION: Sepsis is a common cause of acute renal failure (ARF). ARF in early phase of severe sepsis occurred in 36-60% septic patients and is associated with significant influence on sepsis mortality. The aim of this observational study was to measure the incidence of ARF syndrome and to evaluate the efficacy of noradrenaline and furosemide infusion (Martin et al.1990, 2000) for the treatment ARF in early phase of severe sepsis.

METHODS: An observational study of 17 consecutive critically ill cancer patients with severe sepsis (8) and septic shock(9). Acute renal injury/ARF syndrome was detected according Bellomo et al (2001) criteria. The surrogate markers of renal dysfunction involve serum urea, serum creatinine and urine output (diuresis per hour). We measured creatinine clearance and excretion fraction of sodium from collected urine.The severity of severe sepsis was measured by APACHE II and SOFA score during the first 24-48 hrs of ICU stay. We monitored in all pts invasive sAP,MAP,CVP,temperature, pulse oximetry, urine flow per hour and per day.Blood sampling were done every 12 hrs for WBC counts, platelets count, procalcitonin, CRP, urea, creatinine and lactate.

RESULTS: 17 severe septic patients with MODS (initial SOFA score were 9,1 and 8,7 p., and APACHE II score 20,4 and 17,2)received full intensive therapy. Severe sepsis was documented by proven infection and high serum levels of procalcitonin (mean 69,8 ng/ml) and CRP(mean 210 mg/L). Acute renal injury (6 pts) and ARF(8 pts) syndrome was detected in 14 patients (82%) out of 17 septic cancer pts. We used the combination of noradrenaline infusion (0,1-0,12 mcg/kg/min) and furosemide infusion(10-30 mg/hr) for hemodynamic and renal support. We induced polyuria and reverse ARI/ARF to nonoliguric ARF in 11 pts (79%) from 14 severe septic pts. We used no renal replacement therapy.We recorded 35 % hospital mortality.

CONCLUSION: Acute renal injury and acute renal failure syndrome occurred in 82% of severe septic patients. Criteria for ARI/ARF syndrome diagnosis are very simple and useful in early detection of renal dysfunction. Renal rescue protocol (combination of noradrenaline and furosemide infusion) seems to be very effective modality in the treatment for ARI/ARF syndrome in early phase of severe sepsis, when it is instituted very early with low/moderate dosage of noradrenaline and furosemide.

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CONTINUOUS VENO-VENOUS HEMOFILTRATION IN TREATMENT OF SEVERE SIRS AFTER CARDIAC SURGERY

Bubenek-Turconi S S t[1], Sefu F[1], Stelian E[1], Boros C[1], Miclea I[1], Timofiev L[1], Moldovan H[2], Iliescu V[2]
[1]1st Cardiovascular Anaesthesia and Intensive Care Dept., [2]1st Cardiac Surgery Dept., Institute of Cardiovascular Diseases C. C. Iliescu, Bucharest, Romania

INTRODUCTION: Severe systemic inflammation with a vasodilatory syndrome occurs in about one third of all patients after cardiac surgery with cardio-pulmonary bypass (CPB). We studied the effects of early continuous veno-venous hemofiltration (CVVH) on the course and outcome of the patients with severe systemic inflammatory response syndrome (SIRS) after cardiac surgery.

METHODS: A group of 40 patients with severe SIRS [fulfilling the criteria of ACCP/SCCM Consensus Committee (1)] in early postoperative period after cardiac surgery with CPB was divided in two subgroups: A – 21 patients receiving conventional therapy and B – 19 patients who received CVVH for a period of 24 h. Criteria for receiving CVVH was a severe cardiovascular dysfunction (catcholamine support required in large amounts, norepinephfrine or epinephrine > 0.1 ?g x kg-1 x min-1, for maintaining a MAP > 70 mm Hg or a SVR > 800 dyne x sec x cm-5). Of those 19 patients 6 had also a severe respiratory dysfunction with PaO2/FiO2 < 200.

RESULTS: There were no significant diferences regarding demographic data and type of surgery between the two groups. The patients from group B had a dramatic improvment of the cardiovascular function, the catecholamine support being tapered off faster than in group A even the initial dose was very much higher in group B. Also the patients with respiratory dysfunction from group B were extubated earlier than those from group A, with the same amendament regarding the severity of the dysfunction. The result are sumarized in the following table:

	Group A	Group B	p Value
Norepinephrine duration, hrs	48 (24/96)	30 (20/48)	0.03
Ventilation hrs	30 (16/48)	18 (12/24)	0.01
LOS-ICU days	4 (2/7)	3 (2/4)	0.01

CONCLUSION: CVVH has a major impact on the course of severe SIRS occurred after cardiac surgery with cardio-pulmonary bypass. CVVH therapy significantly reduces the period and amounts of catecholamine support required, the period of mechanical ventilation and the length of stay in the ICU.

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PLASMA APOPTOTIC PATTERN IN SEPTIC PATIENTS IS REDUCED BY HIGH VOLUME HEMOFILTRATION

Ricci Z[1], Salvatori G[1], Bordoni V[1], Bonello M[1], Ratanarat R[1], D'Intini V[1], Ronco C[1]
[1]Nephrology Dialysis and Transplantation, Ospedale Civile S.Bortolo, Vicenza, Italy

INTRODUCTION: Sepsis and MODS are associated with a disruption of normal homeostasis and alteration of biological systems. The accumulation of pro-apoptotic factors in plasma may contribute to organ dysfunction. Removal of such factors by extracorporeal blood purification techniques may help to re-establish homeostasis and cell function. We investigated the effect of treatment dose comparing standard and high volume hemofiltration.

METHODS: In a prospective, randomised, cross over study two hemofiltration regimes in two consecutive days were administered to 6 anuric septic patients: we studied 5 hours high volume hemofiltration (HVHF:4L/h) followed by 5 hours standard hemofiltration (CVVH:2L/h) and vice-versa. Replacement solution was administered pre filter and performed by 2 m^2 polysulfone membranes. Blood flow rate was 250 ml/min. Routine laboratory and clinical data were collected including illness severity scores. Prefilter plasma and ultrafiltrate were collected at treatment start, at 1 hour, at 5 hour, for each hemofiltration regimen. Plasma samples and ultrafiltrate were frozen at – 80°C. Samples were close labelled. Samples from normal human blood were used as control. Samples were studied for apoptosis using a U937 monocyte cell line. A quantitative analysis of the apoptotic U937 cells in culture was carried out by fluorescence microscopy at 96hours. U937 cells were also assayed for caspase 3, 8 activation.

RESULTS: During the sequence HVHF/CVVH cell apoptosis significantly decreased after 1 hour of 4L/h treatment start ($p<0,01$); after 5 hours of 4L/h treatment apoptosis rate continued to decrease significantly ($p<0,05$). After passing to 2L/h regime the percentage of apoptosis remained constant. The fold-increase of caspase-3 measured at 96 hr correlated with the above findings ($r=0,92$). Similarly when the inverse sequence (CVVH/HVHF) was studied cell apoptosis did not show a decrement in the first 5 hours, while after switching hemofiltration dose to 4L/h apoptosis was significantly decreased either at the first and at the fifth hour ($p<0,05$; correlation between apoptosis and caspase-3 fold increase: $r=0,98$). The results where independent from the administration sequence.

CONCLUSION: High hemofiltration rates seem to correlate with a decrease in plasma apoptotic pattern during CRRT in anuric septic patients. The clinical relevance of such findings may contribute to explore new therapeutic options in septic patients.

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THERAPEUTIC APPLICATION OF MARS THERAPY IN VARIOUS PATHOGENIC SIRS/MODS PATIENTS

Wang M[1], Luo H[2], Guo L[3], Wu M[4]
[1]Therapeutic Blood Purification Research Center, University of Rostock, Germany, Shanghai, [2]Department of Infectious Diseases, The First People¡¯s Hospital of Foshan, Foshan, [3]ICU and Artificial Liver Support Center, Beijing DiTan Hospital, Beijing, [4]ITU and Blood Purification Center, The First People¡¯s Hospital of Foshan, Foshan, China

INTRODUCTION: Molecular Adsorbents Recirculating System(MARS) is a new promising artificial liver support therapy, the aim of this study was to assess the effectiveness of MARS in 39 patients with MODS.

METHODS: This study was performed between May 2001 and May 2003, 110 single MARS treatments were performed. The average patient age was 50(range from 18-80), 27 from serious hepatitis, 3 from septicemia, 1 from serious burn, 1 from SARS, 28 complicated renal failure or HRS, 7 complicated DIC, 39 suffered liver dysfunction, 22 suffered Hepatic encephalopathy above grade II, 6 suffered cerebral edema, 21 complicated congestive heart failure, and 19 suffered respiratory failure. They were evaluated biochemically and clinically with the prognostic scoring systems before and after the treatment, the laboratoray variables were detected.

RESULTS: The MARS therapy was associated with a significant removal of NO and certain cytokines such as TNF-a, IL-2, IL-6, IL-8, and LBP, together with marked reduction of albumin bound toxins and water soluble toxins, these were associated with a improvement of the patients' clinical conditions including hepatic encephalopathy, deranged hemodynamic situation as well as renal and respiratory function, thus resulted into marked decrease of Sequential Organ Failure Assessment(SOFA) score and improved outcome: 16 patients were able to be discharged from the hospital or bridged to successful liver transplantation, the overall survival of 39 patients was 41%.

CONCLUSION: We confirmed that these newer liver support strategies would be applied for the MODS patients with various underlying diseases.

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MORTALITY FOLLOWING VASOPRESSOR TREATMENT OF SEPTIC SHOCK

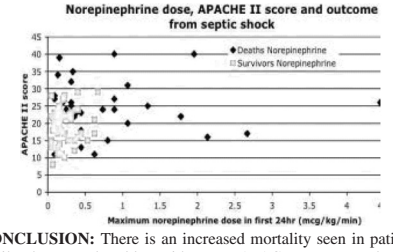
Haji-Michael P[1], Balasubramanian K[2], Marchant A[1]
[1]Acute Block Intensive Care unit, Wythenshawe Hospital, [2]High Dependancy Unit, Christies Hospital, Manchester, United Kingdom

INTRODUCTION: Although there are data to support the use of Norepinephrine over high dose Dopamine, there is little to guide the clinician choosing between Norepinephrine (NE) and Epinephrine (E). We conducted a casenote review of patients with septic shock.

METHODS: The unit ICNARC/MIDAS database was searched for all patients admitted over a two year period with septic shock. The ICU notes and charts were then retrieved and data found on physiology, choice and dose of catecholamine given.

RESULTS: 109 patients were identified, of whom 92 were treated with NE and 28 with E. There were notable differences in outcome between the two vasopressors commonly used. Patients receiving either drug were seen to have an increased mortality in association with higher doses used. No patient survived to hospital discharge who was treated with a dose of E above 4.6 micrograms/ kg/ min or NE above 5.8 micrograms / kg/ min.

	Epinephrine	Norepinephrine
Age (mean, years)	60.5	56.4
Length of ICU stay (mean, days)	6.3	10.7
APACHE 2 score (mean)	25.1	21.3
UK APACHE 2 risk (mean, % mortality)	49.3%	38.6%
Lactate (mean, mmol/l)	4.6	2.4



CONCLUSION: There is an increased mortality seen in patients with septic shock receiving E. Whilst they may be older, with worse APACHE scores and calculated risk of death; this doesn't explain the degree of the problem. Some of the answer may lie in their worse glucose metabolism. There was also an increasing mortality seen with increasing dose of vasopressor given. This was independant of APACHE 2 score and as such may repesent a drug effect rather than a marker of illness severity.

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DETECTION OF LUNG COLLAPSE BY CONTINUOUS MONITORING OF DYNAMIC COMPLIANCE

Suarez Sipmann F[1], Böhm S H[2], Tusman G[3], Pesch T[2], Reissmann H[2], Thamm O[2], Hedenstierna G[4].
[1]Intensive Care Medicine, Fundación Jiménez Díaz, Madrid, Spain, [2]Anesthesiology, University Hospital Hamburg-Eppendorf, Hamburg, Germany, [3]Anesthesiology, Hospital Privado de Comunidad, Mar del Plata, Argentina, [4]Clinical Physiology, University Hospital Uppsala, Uppsala, Sweden

INTRODUCTION: Lung recruitment has been introduced in the ventilatory management of ARDS to avoid the injurious effects of lung collapse. Once recruited the early detection of lung re-collapse is essential to find the level of PEEP that is sufficient to keep the lung open (PEEP open). In this study we investigated whether monitoring of dynamic lung compliance (Cdyn) could detect lung collapse during a decremental PEEP trial (DPT). Arterial blood gases and CT scans were taken simultaneously.

METHODS: 16 pigs (24,8+-2,1kg)after lung-lavage induced ARDS were studied. After baseline ventilation(VCV:Vt 6 mL/kg,RR 30 bpm,PEEP =6 cmH2O,FiO2 =1)lungs were fully recruited and submitted to a DPT during which PEEP levels were stepwise reduced in 2 cmH2O steps from 20 to baseline levels. PO2 was measured online and Cdyn on a breath to breath basis.A lung CT was obtained in 8 animals. Data were collected after 10 min of stabilization at each PEEP level. During the DPT, lung collapse was defined by 1)as the maximum Cdyn value after which the first significant fall occurred,2) a fall in PO2 ≥10% from its previous maximum value. These criteria were compared with the changes in the % of non-aerated tissue (%NAT= -100 to +100 HU) on the CT scan.PEEP open was defined as the level prior to the detection of lung collapse

RESULTS: Collapse according to Cdyn and PO2 occurred both at PEEP 14cmH2O. In the animals studied by CT the first significant increase in %NAT also occurred at PEEP 14cmH2O ($p<0.05$).Further decreases in PEEP showed a rapid and continuous decrease in PO2 and Cdyn and an increase in %NAT.Values at selected PEEP levels are shown in Table 1(mean ± SD)

	Baseline	Post RM	PEEPopen	Collapse	post Col
PEEP cmH2O	6	20	16	14	12
Cdyn mL/cmH2O	10,3±1,8	16,1±3.0	21,2±3,5	22,4±3,9	21,6±4,8
PO2 mmHg	99±61	565±27	533±41	497±68	427±111
%NAT	38±1,5	2,4±1,5	2,7±2,3	4,4±3,7*	7,2 ±5,4

*$p< 0.05$

CONCLUSION: After lung recruitment, early lung collapse could be identified by changes of Cdyn during a gradual PEEP reduction in this experimental model of ARDS. Cdyn showed a good agreement with changes in PaO2 and with the re-appearance of atelectasis on CT. In the treatment of early stages of ARDS a breathwise monitoring of Cdyn could be useful for identifying the level of PEEP needed to keep the lungs open

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THE EFFECT OF INSPIRATORY TIME ON VENTILATOR INDUCED LUNG INJURY

Ozcan P E[1], Vatansever S[1], Akinci O I[1], Tugrul S[1], Altan A[1], Kaya M[1], Esen F[1], Cakar N[1]
[1]Anesthesiology and Intensive Care Department, Istanbul University, Istanbul Medical Faculty, Istanbul, Turkey

INTRODUCTION: Mechanical ventilation with high alveolar opening pressures or tidal volumes can cause ventilator induced lung injury (VILI).But positive end expiratory pressure with or without low tidal volume is protective against lung injury. In this study we investigated the effect of different inspiratory times on VILI.

METHODS: 42 Sprague Dawley rats were used. All were started to ventilate on pressure controlled ventilation mode, after anesthetized and tracheostomized, with the parameters of 14 cmH2O peak inspiratory pressure (PIP), 0 cmH2O PEEP, FiO2:1.0, 30 breaths/min and I/E:1/2. After 15 minutes stabilization period baseline blood samples were taken for blood gas and cytokine analysis, then the rats were randomized into 7 groups due to their peak inspiratory pressure, PEEP and inspiratory/expiratory ratios as follows:

	cmH2O PIP	cmH2O PEEP	I/E
Low pressure 1/2 group (LP 1/2)	14	0	1/2
High pressure 1/2 group (HP1/2)	30	0	1/2
HP 2/1 group	30	0	2/
HP 3/1 group	30	0	3/1
High pressure PEEP 1/2 group (HPP1/2)	30	10	1/2
HPP 2/1	30	10	2/1
HPP 3/1	30	10	3/1

Other ventilator settings were kept as baseline values. The rats were ventilated with these parameters for two hours. At the end of experiment before sacrification of rats, blood samples were obtained for blood gas and cytokine analysis. Then the lungs were taken out and the left lung was used for measurement of wet weight/dry weight ratio (WW/DW).

RESULTS: There were no differences in baseline pH, PaO2, PaCO2, MAP values among groups. As compared to baseline values PaO2 decreased in LP1/2, HP1/2, 2/1, 3/1 groups and HPP 2/1,3/1 groups but significant differences was found only in HP1/2 group(p=0.001). At the end of experiment MAP decreased in all HP groups and HPP3/1 group. WW/DW ratio was found lower in HPP groups when compared to HP groups (p<0.001). IL-6 level was found higher in HP groups than LP and HPP groups at end of experiment.

CONCLUSION: High PIP caused lung injury with deterioration of oxygenation and increase in WW/DW ratio. While application of PEEP was protecting lungs from VILI changing inspiration expiration ratio did not.

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EFFECTS OF PEEP ON ESOPHAGEAL PRESSURE DURING INTRA-ABDOMINAL HYPERTENSION

Valenza F[1], Porro G A[1], Tedesco C[1], Maffioletti M[1], Irace M[1], Aletti G[1], Fossali T[1], Gattinoni L[1].
[1]Istituto di Anestesia e Rianimazione, Università degli Studi di Milano, Ospedale Maggiore di Milano-IRCCS, Milano, Italy

INTRODUCTION: Clinicians are paying more and more attention on respiratory mechanics during intra-abdominal hypertension (IAH)(1). However, the effects of IAH on esophageal pressure (Pes) may differ according to the clinical scenario (2). Aim of this study was to investigate the changes of Pes during IAH at different PEEP levels.

METHODS: 15 Sprague-Dawley rats were anaesthetized, paralyzed and mechanically ventilated. Rats were ventilated similarly (Vt=10 ml/Kg, RR=20 bpm, FiO2 0.5), but were randomized to PEEP 0, 3 or 8 cmH2O (n=5 per group). The abdomen was then inflated stepwise with helium up to 10 mmHg of abdominal pressure (IAP, intra-peritoneal direct measurement). Airway pressure (Paw), esophageal (Pes) and gastric (Pga) pressure were also measured, together with invasive blood pressure. Data were simultaneously recorded and digitally stored for subsequent analysis. This allowed to consider end-expiratory (Pes exp), mean (Pes m) values of Pes and the difference between Pes at end-inspiration and end-expiration (DPes). Data are presented as mean±SD.

RESULTS: Indipendently on PEEP, helium insufflation into the abdomen caused IAP to increase on average up to 9.8±0.3 mmHg (P<0.001, P=0.975 between group). Pga rose from 4.7±2.3 mmHg to 14.1±6.2 (P<0.001). Peak airway pressure significantly increased with IAH (P<0.001), while blood pressure and heart rate did not change. Pes m increased on average from 3.85±1.5 cmH2O to 6.99±2.9 (P<0.001). However, at IAP of 10 mmHg, Pes m was significantly higher at higher PEEP levels (4.12±1.5 cmH2O, 6.81±1.8, 10.06±1.5 at PEEP 0, 3 and 8 respectively, P<0.001). As shown in the table, Pes exp increased with IAP (P<0.001 within PEEP groups); absolute values were higher with greater PEEP levels. Moreover, even if there was only a trend towards greater values of D Pes with higher levels of PEEP (P=0.078), the greater the IAP the grater D Pes during PEEP (PEEP 3: R2=0.625, PEEP 8: R2=0.696, both P<0.001).

	basal	IAP 2.5	IAP 5	IAP 10
PEEP 0	2.6±1.6	2.8±1.4	2.9±1.5	3.5±1.5
PEEP 3	3.7±1.5	5.2±2.3	5.3±1.7	5.3±1.5
PEEP 8	4.6±1.0	7.0±1.3*	8.0±2.5*#	8.4±2.0*#

** P<0.05 vs PEEP0; # P<0.05 vs PEEP3*

CONCLUSION: During IAH, Pes m changes are greater when PEEP levels are higher. This is in part due to the smaller changes of Pes exp at PEEP 0, possibly due to the fact that the lung is free to retract under the cephalic shift of the diaphragm. Moreover, at higher PEEP levels the changes of Pes occurring during tidal volume (D Pes) contribute more to increase Pes m. These minor differences may become relevant when dealing with respiratory mechanics during IAH.

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EFFECT OF HYPOTHERMIA AND HYPERTHERMIA ON VENTILATOR INDUCED LUNG INJURY (VILI)

Dragazis I[1], Mariatou V[1], Kopteridis P[1], Kapetanakis T h[1], Karidis N[1], Balanika M[1], Michalia M[1], Armaganidis A[1]
[1]2nd Critical Care Department, Athens University Medical School, Athens, Greece

INTRODUCTION: Our purpose was to investigate whether temperature modulates ventilator-induced lung injury (VILI).

METHODS: We perfused (constant flow 300 ml/min) 48 isolated sets of normal rabbit lungs and ventilated them using 3 different perfusate temperatures and two different ventilatory settings (6 groups). After initial stabilization all preparations were ventilated for 20 min using pressure controlled ventilation [PCV] with PEEP 3 cm H2O and PCV 12 cm H2O above PEEP. Following the results of randomisation the necessary adjustments were made during this period to obtain in the perfusate: 1) a pH 7.40 with a partial pressure of CO2 40 mm Hg and 2) a perfusate temperature of 33 oC, 37 oC or 40,5oC. Two groups of preparations were tested at each temperature level: a control or Low Pressure (LP) group ventilated with PEEP 3 cm H2O and PCV 12 cm H2O above PEEP for 60 min and a High Pressure (HP) group, in which a PCV = 22 cm H2O above PEEP (=3 cm H2O) was applied for 60 min. The weight gain (deltaWG in g/min) observed in each group during this period, as well as changes in ultrafiltration coefficient (Kf in gr/min/ cm H2O/100g) were used to assess VILI (indexes of pulmonary edema and of vascular permeability respectively).

RESULTS: Our results are summarized in Table 1. DeltaWG in hyperthermic isolated, perfused lungs was significantly higher than deltaWG in any other group. Significant Kf changes were observed only in HP groups, with a significantly higher deltaKf in the HP_40.5 group (p=0.035). There were no important differences between normothermic and hypothermic preparations.

	LP33	LP37	LP40.5	HP33	HP37	HP40.5
deltaWG	0.004	0.016	0.037	0.113	0.112	0.373 *
p (*)	<0.0001	<0.0001	<0.0001	0.0015	0.0015	
Kf before	0.097	0.135	0.090	0.072	0.087	0.110
Kf after	0.064	0.079	-0.024	0.192	0.187	0.433
p (#)	0.93	0.93	0.85	0.003	0.03	0.003

CONCLUSION: We conclude that hyperthermia increases VILI, while moderate hypothermia has no apparent beneficial effect compared to normothermia.

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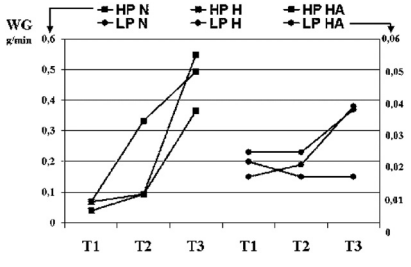
EFFECTS OF HYPERCAPNIC ACIDOSIS AND OF BUFFERED HYPERCAPNIA ON VENTILATOR INDUCED LUNG INJURY (VILI)

Tsolakidis G[1], Dragazis I[1], Giokas G[1], Theodorakopoulou M[1], Karidis N[1], Mariatou V[1], Kapetanakis T h[1], Armaganidis A[1]
[1]2nd Critical Care Department, Athens University Medical School, Athens, Greece

INTRODUCTION: Our purpose was to investigate whether hypercapnia per se or respiratory acidosis modulates VILI.

METHODS: We perfused (constant flow) 48 isolated sets of normal rabbit lungs randomised in six groups. After initial stabilization and randomisation all preparations were ventilated for 20 min using pressure controlled ventilation [PCV] (PEEP 3 cm H2O and PCV 12 cm H2O above PEEP) and the pH and the partial pressure of CO2 of the perfusate were adjusted to obtain: 1) Normocapnia (N) = pCO2 40 mm Hg and pH = 7.40, 2) Hypercapnic Acidosis (HA) induced by an increase of pCO2 to 80–100 mm Hg and 3) Hypercapnia (H) with the same pCO2 but with a perfusate buffered with bicarbonates to maintain pH = 7.40. Two groups of preparations were tested under each condition: a control or Low Pressure (LP) group ventilated with PEEP 3 cm H2O and PCV 12 cm H2O above PEEP for three consecutive 20-min periods (T1, T2, T3) and a High Pressure (HP) group, in which PCV was increased progressively from 17 (T1), to 22 (T2) and then to 27 cm H2O (T3 period) above PEEP (=3 cm H2O). The weight gain (deltaWG in g/min) observed during each period, as well as changes in ultrafiltration coefficient (deltaKf in gr/min/ cm H2O/100g) were used to assess VILI (indexes of pulmonary edema and of vascular permeability respectively).

RESULTS: Between groups differences in deltaKf did not reach statistical significance. As indicated in Figure 1, deltaWG increased significantly at the end of T3 period in LP-N and LP-H groups. In HP groups, deltaWG increased more rapidly in the HP-H group (p< 0.05).



CONCLUSION: We conclude that respiratory acidosis reduces lung injury in lungs ventilated with LP, while buffering of acidosis accelerates VILI in HP groups.

Grant acknowledgement: „THORAX" Research Institute

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PULMONARY NO AND PROTEIN METABOLISM DURING ARGININE SUPPLEMENTATION

Poeze M[1], Bruins MJ[1], Lamers WH[2], Deutz NEP[1].
[1]Department of Surgery, University Hospital Maastricht, [2]Department of Anatomy and Embryology, University of Maastricht, Maastricht, Netherlands

INTRODUCTION: The lungs play an important role in the metabolic response during sepsis. During sepsis a catabolic reaction is induced in the lungs. Arginine is known for its modulating effects during this metabolic response. No data are available concerning pulmonary arginine and protein metabolism during arginine supplementation in porcine endotoxemia. The hypothesis was that arginine supplementation increases arginine metabolism in the lung during endotoxemia and thereby reduces the catabolic response.

METHODS: In a randomized controlled trial, chronically instrumented female pigs (20-25 kg) received 3 µg/kg/h lipopolysaccharide (LPS) intravenously and saline resuscitation. L-arginine (3 mg/kg/h or saline was administered intravenously starting 12h prior to a LPS infusion and continued for 24h after stopping the endotoxin infusion. Whole-body appearance rates, and pulmonary fluxes of arginine, citrulline, NO and arginine de novo synthesis were determined using a primed, stable isotope infusion of 15N2-arginine and 13C-2H2-citrulline. Protein metabolism was measured using 2H5-Phenylalanine and 2H2-Tyrosine stable isotope infusion. Pulmonary blood flow and oxygen consumption (VO2) were determined using a primed-continuous infusion of para-aminohippuric acid and blood gasses and pressures were assessed by a Swan-Ganz catheter.

RESULTS: During arginine treatment a significant higher plasma flow in the pulmonary artery were found coinciding with a decreased pulmonary artery pressure. A significant lower protein breakdown and synthesis from the lungs during endotoxemia were found. A significant higher whole-body arginine de novo synthesis prior to endotoxemia remaining increased during endotoxemia when supplementing arginine. This coincided prior to and during endotoxemia with a significantly higher lung uptake of glutamine and a significant higher lung arginine consumption and production in the lung, and a significant higher lung NO synthesis at t=8 h during endotoxemia in arginine supplemented group.

CONCLUSION: Arginine supplementation during endotoxemia increases lung arginine-NO metabolism. This increased arginine synthesis was coincided with a decreased catabolic response in the lungs during sepsis. Arginine supplementation may be used to reduce pulmonary organ failure during sepsis

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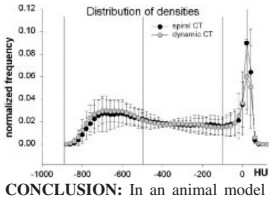
METHODOLOGICAL ASPECTS OF DENSITOMETRY FROM STATIC AND DYNAMIC THORACIC COMPUTED TOMOGRAPHY

Zinserling J[1], Wrigge H[1], Neumann P[2], Magnusson A[3], Hedenstierna G[4], Putensen C[1].
[1]Department of Anesthesiology and ICU, University of Bonn, Bonn, [2]Department of Anesthesiology and ICU, University of Göttingen, Göttingen, Germany, [3]Department of Radiology, [4]Department of Clinical Physiology, University of Uppsala, Sweden

INTRODUCTION: In acute lung injury, thoracic computed tomography (CT) is used to gain information about lung aeration and consolidation [1]. This can be done either during breath holding by spiral CT scanning of the entire lung or dynamically by scanning lung slices without interrupting ventilation. We hypothesized that densitometries during mechanical ventilation with and without additional spontaneous breathing are dependent on static or dynamic scanning techniques. We also studied if densitometry is dependent on exact anatomical position.

METHODS: 22 pigs with oleic acid-induced lung injury were randomly assigned to receive pressure controlled mechanical ventilation with or without additional spontaneous breathing. Transversal dynamic CT scans of the chest were performed in apical and juxtadiaphragmatic regions and end-expiratory and end-inspiratory slices were selected. In addition, after clamping the tube at end-expiration and end-inspiration, respectively, spiral CT's were performed. Guided by morphologic structures, spiral CT slices matching the dynamic scan slice and three additional neighbored slices above the diaphragm were selected. Distributions of radiological densities were calculated and summarized in ranges for comparison.

RESULTS: Neither a significant difference in densities was found between the two scanning methods nor an interaction with the factors ventilation mode, ventilation phase and density range. Additionally, densitometries of four neighbored juxtadiaphragmatic slices from the spiral CT did not differ statistically. The distribution of densities for the scanning methods is shown for pressure controlled ventilation at end-expiration in the juxtadiaphragmatic region.



CONCLUSION: In an animal model of oleic acid-induced lung injury, analyses of transverse thoracic slices based on dynamic or static CT scanning showed comparable distributions of radiological densities. Densitometries of neighbored juxtadiaphragmatic slices were also not different.

REFERENCE: 1. Wrigge et al., Anesthesiology. 2003 Aug;99(2):376-84

Grant acknowledgement: Swedish Medical Research Council (no 5315), Stockholm, Sweden, and the Swedish Heart-Lung-Foundation, Stockholm, Sweden.

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EFFECTS OF ALVEOLAR OVERDISTENSION DURING 30 AND 240 MINUTES IN AN EXPERIMENTAL NORMAL LUNG MODEL

Garcia-Delgado M[1], Navarrete-Sanchez I[1], Colmenero-Ruiz M[1], Aguilar-Alonso E[1], De la Chica-Ruiz R[1], Hassan-Montero L[2], Esquivias Lopez-Cuervo J[3], Fernández-Mondéjar E[1]
[1]Intensive Care Unit, [2]Experimental Unit, [3]Pathology Department, Virgen de las Nieves Universitary Hospital, Granada, Spain

INTRODUCTION: Our objective is to study the effects of two alveolar overdistension maneuvers in a porcine model of normal lungs, throught the analysis of respiratory and hystologic parameters and inflammatory markers.

METHODS: Experimental study in mixed-breed pigs, divided in three groups: control group (n=5); High volume tidal during 30 minutes (H30) (n=5); High volume tidal during 240 minutes (H240). Initially they were anesthetized and ventilated with Vt=10 ml/kg, fr=18 bpm y FiO_2=1. The two overdistension groups were ventilated with Vt=50 ml/kg and fr=8 during 30 or 240 minutes. Measurements of airway pressures, arterial gas exchange and extravascular lung water (EVLW) by transpulmonary thermodilution (PICCO®) were made at 0, 30, 60 and 240 minutes. Levels in blood and bronchoalveolar lavage (BAL) of IL-2, IL-4, IL-6, IL-10, TNF-alpha and ITF-gamma were determined at 0, 60 and 240 min by flow citometry. Lungs were fixed with formol at 10% and analysed. Results are expressed as mean±standard deviation. The ANOVA test was used to compare measurements between the three groups.

RESULTS: At 30 min, airway pressures and oxygenation of H30 and H240 groups were higher than control group [Ppeak: 53.8±2.6 and 48.4±6.7 vs 19.8±2.6 (p<0.001); Pplateau: 39.2±5.6 and 33.0±5.1 vs 12.2±1.3 (p<0.001); PaO2:443.8±55 and 430.6±34 vs 194.4±77 (p<0.001)]. In H240 group, these parameters were also higher than the other two groups in the following measurements. There were no differences among the groups in EVLW values. The biomarkers were not detected in blood and BAL in all of the groups. The hystologic analysis did not show any changes suggestive of acute lung injury.

CONCLUSION: In this animal model, lung injury is not produced neither by an alveolar overdistension maneuvre lasting 30 minutes nor lasting 240 minutes.

Grant acknowledgement: Red GIRA (G03/063) and FIS project 01/1287

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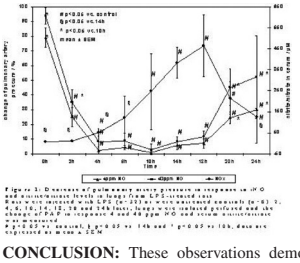
TIME DEPENDENT MODULATION OF RESPONSIVENESS TO INHALED NO BY ENDOTOXEMIA

Bopp C[1], Graf B M[1], Gust R[1], Martin E[1], Klein A[1]
[1]Anesthesiology, University of Heidelberg, Heidelberg, Germany

INTRODUCTION: In acute lung injury associated with pulmonary hypertension, pulmonary vasoreactivity to inhaled nitric oxide (iNO) varies among and within patients. In rats challenged with endotoxin/lipopolysaccharide (LPS), response to iNO is decreased. Here, we hypothesized that duration of endotoxemia modulates responsiveness to inhaled NO.

METHODS: Adult Sprague-Dawley rats (300-350 gm BW) were injected intraperitoneally with (n=32) or without (n=6) 0.5 mg/kg E.coli 0111:B4 LPS. Two, 4, 6, 10, 14, 18, 20, and 24 hours after LPS-injection, lungs were isolated, perfused, and ventilated in situ using a modified Hanks´s balanced salt solution containing 5% dextran, 5% bovine albumine, and 30 M indomethacin. Then, pulmonary artery pressure (PAP) was elevated by 6-8 mmHg using thromboxane analogue U46619. Change of pulmonary artery pressure in response to 4 and 40ppm iNO and nitrite/nitrate levels in serum were measured.

RESULTS: In rats treated with LPS, responsiveness to iNO decreased after 2h for up to 18h compared to untreated controls (p<0.05). 20 to 24h after LPS-injection, responsiveness to iNO increased compared to that observed in lungs from rats treated with LPS 10h earlier (p<0.05). Development of hyporesponsiveness to iNO was associated with a delayed increase of nitrite/nitrate levels in serum. However, decline of nitrite/nitrate levels to baseline values was parallel to the improvement of NO responsiveness.



CONCLUSION: These observations demonstrate that in isolated-perfused lungs from LPS-challenged rats responsiveness to iNO decreases as early as 2h for up to 18h. In the early phase, decreased responsiveness to iNO appears to be independent to nitrite/nitrate levels. Decline of nitrite/nitrate levels, however, appears to contribute to improvement of NO-responsiveness.

REFERENCE: 1) Holzmann A. Am J Physiol 271: L981-L986, 1996

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INFLATION LUNG MECHANICS DETERIORATE MARKEDLY AFTER NON-BRONCHOSCOPIC BAL IN VENTILATED PIGLETS

Cunha-Goncalves D[1], Perez-de-Sa V[2], Ingimarsson J[3], Curstedt T[4], Johansson J[5], Robertson B[6], Tonnesen E[7], Werner O[2], Larsson A[8]
[1]Thorax Anesth, [2]Ped Anesth, USIL, Lund, [3]Anesth, MAS, Malmo, [4]Clin Chem, [5]Med Bioch, [6]Exp Pathol, KS, Stockholm, Sweden, [7]Anesth, AKH, Arhus, [8]ICU, Aalborg, Aalborg, Denmark

INTRODUCTION: Although diagnostic NB-BAL in infants and children undergoing mechanical ventilation is usually well-tolerated, reductions in oxygenation and lung mechanics occur (1). The aim of this study was to assess lung mechanics by obtaining full pressure-volume (PV) loops before and after NB-BAL (2) in mechanically ventilated healthy piglets.

METHODS: In 9 anesthetised and mechanically ventilated (VT 8 ml kg-1, PEEP 5 cmH2O) piglets (5.7-7.0 kg), 5 ml saline was given twice endotracheally and immediately removed by suctioning (retrieval of 3-5 ml). Before and after this procedure, PV-loops (slow interrupted -every 0.16 s- insufflation to 40 cmH2O, with 5 sec hold, followed by slow interrupted exsufflation) were obtained in duplicates. The PV-loops were analysed to determine the inflation´s lower inflexion point (LIP), the deflation´s upper inflexion point (UIPd, i.e. the point of maximal curvature of the deflation limb of the PV-loop), inspiratory capacity (IC), maximum compliance of the deflation limb of the loop (Crs max), and hysteresis (difference in volume between the inflation and deflation limbs of the loop) at 15 and 35 cmH2O.

RESULTS: NB-BAL produced a marked change of the inflation limb of the loop as LIP moved from 2.3 ± 0.8 cmH2O to 21 ± 1.5 cmH2O (mean ± SD) , hysteresis increased from 12 ± 1.6 to 25 ± 2.2 mL/kg at 15 cmH2O, and from 5.6 ± 0.6 to 7.7 ± 1.8 mL/kg at 35 cmH2O respectively. IC (before NB-BAL 47.4 ± 8.4 and after NB-BAL 47.4 ± 6.8 mL/kg), Crs max (3.1 ± 0.4 and 3.1 ± 0.5 mL/cmH2O/kg, respectively), and the deflation limb of the loop (UIPd 14.3 ± 0.6 and 14.4 ± 0.8 cmH2O, respectively) were unchanged.

CONCLUSION: The expiratory limb of the P-V curve was thus unaffected after NB-BAL, while opening pressures seemed to increase markedly. We think that this could be due to occlusion of small airways by saline. Our findings suggest that a lung recruitment maneuver and adequate PEEP should be used after NB-BAL.

REFERENCES: 1. How safe is NB-BAL in critically ill mechanically ventilated children? Burmester et al, Intensive Care Med. 2001 Apr;27(4):716-21. 2. Brochoalveolar lavage in children. ERS Task Force on bronchoalveolar Lavage in children. Eur Respir J 2000 Jan;15(1):217-31

Grant acknowledgement: Supported by the Danish Medical Research Council (DRC) grant no 22-03-0299

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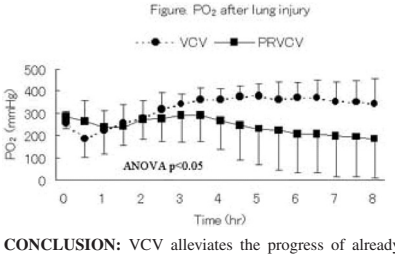
THE EFFECT OF VENTILATORY MODE ON THE PROGRESS OF ACUTE LUNG INJURY IN A RABBIT MODEL

Fujita Y[1], Fujino Y[1], Maeda Y[1], Uchiyama A[1], Mashimo T[1], Nishimura M[2]
[1]Intensive care unit, Osaka university hospital, Osaka, [2]Emergency and Critical Care Medicine, The University of Tokushima Graduate School, Tokushima, Japan

INTRODUCTION: It is not well known if ventilatory mode influences the progress of lung injury or not. The aim of this study is to compare the effect of two different ventilatory modes on acute lung injury model in a rabbit model.

METHODS: At first, twenty male rabbits (2712 ± 99 g) were anesthetized and lung injury was established by ventilating until PO_2 reduced less than 300 mmHg with pressure control ventilation, F_IO_2 = 1.0, peak inspiratory pressure 25 cmH_2O, respiratory rate (RR) 20 breaths/min, inspiratory to expiratory (I:E) ratio 1:4, positive end-expiratory pressure (PEEP) 0 cmH_2O, and then they were randomized into two groups: Volume control ventilation (VCV) group (n = 10) and pressure regulated volume control ventilation (PRVCV) group (n = 10). Animals in both groups were then ventilated with F_IO_2 1.0, tidal volume 20mL/kg, PEEP 5cmH_2O, RR 20/min and I:E ratio 1:4 for 8 hours. Wet to dry (W/D) ratio was evaluated with right lung and histological lung injury score was evaluated with left lung after the experiment in each animal. Acute ling injury was scored according to the following four items: 1) alveolar congestion, 2) hemorrhage, 3) infiltration or aggregation of neutrophils in airspace or the vessel wall, and 4) thickness of the alveolar wall/hyaline membrane formation.

RESULTS: The PaO_2 of VCV group were significantly higher than that of PRVCV group from 6.5 hours to the end of experiment after the establishment of acute lung injury (figure, p<0.05). The W/D ratios of PRVCV group were significantly higher than that of VCV group (7.8 ± 0.9 vs. 7.1 ± 0.4, p<0.05). The lung injury score of PRVCV group was significantly higher than that of VCV group in upper robe (median 3.5 vs. 2.0, p<0.05).



CONCLUSION: VCV alleviates the progress of already established lung injury compared to PRVCV in a rabbit model.

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ACUTE LUNG INJURY FOLLOWING PANCREAS ISCHEMIA-REPERFUSION: ROLE OF XANTHINE OXIDASE

Weinbroum A A[1]
[1]Post-Anesthesia Care Unit, Tel Aviv Sourasky Medical Center, Tel Aviv, Israel

INTRODUCTION: Acute pancreatitis can lead to pulmonary increased vascular permeability and respiratory failure. Oxidants (and their generator xanthine oxidase [XO]) play an important role in damaging the structural integrity of the pulmonary epithelium and endothelium. However, their importance in inducing acute lung injury following pancreas ischemia-reperfusion (IR) has not been defined.

METHODS: Rats (n=96) received normal or tungsten (oxidoreductase inhibitor)-enriched diet for 14 days; their isolated pancreas was then either perfused or made ischemic for 40min. Followed in-series pancreas-normal isolated lung reperfusion for 15min. Lungs only were subsequently perfused with the 15min-accumulated effluents for 45min.

RESULTS: Injury was induced in all IR pancreases as expressed by reperfusion pressure, wet to dry ratio and amylase and lipase concentrations, compared to controls'. Tissue XO activity was low and reduced glutathione pool was normal in the only tungsten-treated IR pancreas group. Plateau pressure increased by 46% and final PO2/FiO2 decreased by 24%; capillary pressure and weight rose 2-4-folds when lungs were paired with IR non-treated pancreases. Two-fold increase in bronchoalveolar lavage volume and contents, including XO, were also recorded in this group of lungs. Lungs exposed to tungsten-treated ischemic pancreases effluents were minimally damaged and tissue XO was low compared to controls.

CONCLUSION: Ex-vivo acute pancreatitis induces ALI via oxidants/ antioxidants misbalance, which may be prevented by attenuating pancreas oxidative stress.

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NOSOCOMIAL PNEUMONIA MORTALITY ACCORDING TO ANTIBIOTIC RESISTANCE OF MICROORGANISM RESPONSIBLE.

Lorente L[1], Villegas J[1], Martín M M[1], Galván R[1], Mora M L[1]
[1]Intensive Care, Hospital Universitario de Canarias, La Laguna, Spain

INTRODUCTION: To analyze the mortality of ventilator-asociated pneumonia (VAP) produced by a potential multirresistant microorganism (PMRM) according to antibiotic resistance of microorganism responsible.

METHODS: It is a prospective study of patients admitted in a 24-beds ICU of a 650-beds university hospital, from 1-5-2000 to 31-12-2003 and who developed VAP produced by PMRM (Staphylococcus aureus, Pseudomonas aeruginosa, Stenotrophomona maltophilia, Acinetobacter). Infections were diagnosed according to the criteria of the CDC. The statistical analysis was performed using SPSS 11.0 program. Mortality rate comparison were performed by Fisher exact test and we taken values p<0.05 to considere a significant difference.

RESULTS: In study period were admitted 2234 patients. Were documented 122 VAP caused by PMRM. VAP mortality for MSSA versus MRSA was 23.68% (9/38) and 19.23% (5/26) (p=0.76). VAP mortality for a gramnegative bacilli PMRP was analyzed according to 4 antibiotic resistances (piperacillin-tazobactam, ceftazidime, imipenem and ciprofloxacin). VAP mortality for Pseudomonas aeruginosa with 0-1 antibiotic resistances versus 2-4 antibiotic resistances were 6/31 (19.35%) and 6/12 (50%) (p=0.06). VAP mortality for Stenotrophomona maltophilia with 0-2 antibiotic resistances versus 3-4 antibiotic resistances were 0/5 (0%) and 3/3 (100%) (p=0.18). VAP mortality for Acinetobacter with 0-1 antibiotic resistances versus 2-4 antibiotic resistances were 1/5 (20%) and 1/2 (50%) (p=0.99).

CONCLUSION: In our serie, the VAP mortality for Pseudomonas aeruginosa was different according to antibiotic resistances, but not when was due to Staphylococcus aureus, Stenotrophomona maltophilia and Acinetobacter.

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VENTILATOR-ASSOCIATED PNEUMONIA WITH A CLOSED VERSUS AN OPEN ENDOTRACHEAL SUCTION SYSTEM

Lorente L[1], Villegas J[1], Alvarez F[1], Plasencia J[1], Alvarez S[1], Venazco C[1], Martín A[1]
[1]Intensive Care, Hospital Universitario de Canarias, La Laguna, Spain

INTRODUCTION: The aim of this study was to analyze the incidence of ventilator-associated pneumonia (VAP) using a closed tracheal suction system (CTSS) versus an open system (OTSS).

METHODS: It is a prospective study of patients admitted at a 24 bed medical-surgical ICU, during a 15 months period (from 1-10-2002 to 31-12-2003). Patients who required mechanical ventilation (MV) for 24 hours or more were included. At admission to the ICU patients were randomized in 2 groups: one group was suctioned with CTSS, and another group with OTSS. A throat swab on admission and afterwards twice weekly were taken. Infections were diagnosed according to CDC criteria and classified bassed on throat flora in endogenous and exogenous. The statistical analysis was realized by Chi-square test and t-Student test, and we taken values 0,05 to considere a significant difference.<p

RESULTS: A total of 443 patients (210 with CTSS and 233 with OTSS) were included. There were not significant differences between both groups of patients in age, sex, diagnosis groups, mortality, number of aspirations per day and APACHE-II. No significant differences were found in the percentage of patients who developed VAP (20.47% vs. 18.02%) neither in the number of VAP per 1000 MV-days (17.59 vs. 15.84). At the same time we did not find any differences in the incidence of exogenous VAP (0.95% vs 0.86% patients developed exogenous VAP; and had 0.76 vs 0.67 exogenous VAP per 1000 MV-days). Patient cost per day for the open suction 2.25 $,±1.12 $ vs.11.11±was less expensive than the closed suction system (2,50 p<0.001).

CONCLUSION: We conclude that in our study study the closed tracheal suctioning system did not decrease the incidence of ventilator-associated pneumonia, not even the exogenous pneumonias. We believe that the respiratory secretions suction may be done with guarantee with an open tracheal suctioning system if it is performed with suitable asepsis measures. And we think also that it is not necessary the high cost that the routine use of a closed tracheal suctioning system represents. However the closed tracheal suctioning system may be recommended in patients with severe impairment of gaseous exchange.

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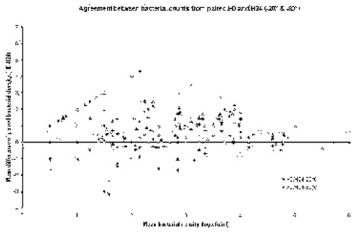
ACCURACY OF 24H DELAYED CULTURES OF FROZEN BAL SAMPLES FOR DIAGNOSING BACTERIAL PNEUMONIA

De Lassence A[1], Hidri N[2], Chevrel G[1], Ricard J[1], Barnaud G[2], Roux D[1], Le Miere E[1], Joly-Guillou M[2], Dreyfuss D[1]
[1]ICU, [2]Microbiology, Hôpial Louis Mourier, Colombes, France

INTRODUCTION: Pulmonary specimens are not always suitable 24 hours per day for immediate bacteriologic cultures before initiation of antibiotherapy (AB).

METHODS: In order to avoid decrease in bacterial count due to empiric AB before sampling, we evaluated the feasability of delaying the cultures of Broncho-Alveolar Lavage (BAL) frozen at -20°C et –80°C for 24 hours. The results from these 2 delayed processing were compared with those from immediate ones. A total of 115 BALs were performed on 90 ICU patients suspected of nosocomial or community-acquired bacterial pneumonia. Each sample was divided in three, one for immediate culture (H0), the 2nd and 3rd for a delayed processing after storage at -20°C and –80°C for 24 hours (H24) respectively.

RESULTS: All negative H0 samples (n=38) were also negative at H24 except for one sample that yielded 10 and 40 cfu/ml of Streptococcus sp on –20° and –80° H24 culturing respectively. Seventy seven BALs yielded one or more microorganisms, with a total of 160 microorganisms in one or both samples. H0 and H24 (-20° & -80°) cultures were concordant in 184 and 185/198 (93%) cases (Kappa coef. value: 0.60) with a 104 cfu/ml threshlod. The bias calculated as the mean difference Log)DLog) and 0.591 ± 1.88 (Dbetween paired culture results was 0.560 ± 2.03 (after –20° and –80°C storage respectively.



CONCLUSION: Agreement between immediate and delayed culturing of frozen BAL is less accurate than with previously reported results using refrigerated storage (1,2).Moreover, 50% of pathogens identified over the 104 cfu/ml threshlod on immediate culturing crossed down the threshold on delayed frozen cultures. This procedure could not be advised as an alternative procedure to diagnose pneumonia if immediate culturing is not possible.

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PREDICTION OF ANTIBIOTIC RESISTANCE IN BACTEREMIC NOSOCOMIAL PNEUMONIA BY SURVEILLANCE CULTURES

Depuydt P O[1], Blot S[1], Benoit D[1], Claeys G[2], Verschraegen G[2], Vandewoude K[1], Decruyenaere J[1], Colardyn F[1]
[1]Department of Intensive Care, [2]Department of Microbiology, Ghent University Hospital, Ghent, Belgium

INTRODUCTION: Nosocomial pneumonia is the most frequent source of infection at the intensive care unit (ICU). Institution of early appropriate antibiotic therapy is associated with improved survival but is challenged by the high occurrence of antibiotic resistant organisms. Knowledge of risk factors for potential antimicrobial resistance is important to optimize empiric antibiotic prescription.

METHODS: From 1992 through 2001, we prospectively registered all episodes of bacteremic nosocomial pneumonia (BNP)in our 54-bed, mixed medical-surgical ICU. At our ICU, surveillance cultures (SC) are taken routinely as thrice weekly urinary cultures and oral swabs, once weekly anal swabs and thrice weekly tracheal aspirates in intubated patients. We assessed factors associated with the occurrence of antibiotic resistance in BNP in univariate and multivariate regression analysis.

RESULTS: Out of 105 episodes of BNP, 46 (43%) were caused by an antimicrobial resistant pathogen: methicillin-resistant Staphylococcus aureus in 17, multidrug-resistant (MDR) Enterobacteriaceae in 12 and MDR nonfermenting Gram-negative bacilli in 17. Factors associated with the occurrence of antibiotic resistance in blood culture isolates in univariate analysis are shown in table 1. In an multivariate analysis, only the presence of a antimicrobial resistant pathogen at any site was independently associated with antimicrobial resistance in blood culture isolates (OR 8.2; 95% CI 3.0-22.8).

	Antibiotic resistance	no antibiotic resistance	p value
prior hospital stay	22 days	13 days	0.023
prior ICU stay	15 days	9 days	0.004
resistance in SC (any site)	43/50 (86%)	27/66 (41%)	<0.001
APACHE II	23	24	0.9
Postoperative patient	24/51 (42%)	46/72 (59%)	0.07
septic shock	51/54 (94%)	63/79 (80%)	0.02
antibiotic use 1 week prior	39/46 (85%)	52/65 (80%)	0.6

CONCLUSION: In bacteremic nosocomial pneumonia, antimicrobial resistance is strongly predicted by previous isolation of an antimicrobial resistant pathogen in surveillance cultures from any site.

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EXCESS OF MORTALITY ATTRIBUTED TO VENTILATOR-ASSOCIATED PNEUMONIA

Pobo A[1], García-Esquirol O[1], Vallés J[1], Mariscal D[2], Fernández R[1], Real J[3]
[1]Critical Care Center, [2]Microbiology, [3]Epidemiology, Hospital Sabadell, Sabadell, Spain

INTRODUCTION: Ventilator-associated pneumonia (VAP) has been implicitly accused of increasing mortality. However, it is not certain that pneumonia is responsible for death or wether fatal outcome is caused by other risk factors for death that exist before the onset of pneumonia. The aim of this study was to evaluate the excess of mortality attributed to ventilator-associated pneumonia (VAP).

METHODS: Prospective cohort study was performed in a 16-bed medical-surgical Intensive Care Unit (ICU) of a teaching hospital. All patients admitted in the ICU between 1st of January 2001 and 31st of December 2002 and mechanically ventilated >72 hours were included. Patients who developed VAP were defined as cases (n = 40). Patients included in the control group (n = 61) were selected according to age, gender, type of diagnosis at admission, severity of disease and mortality risk at admission according to SAPS II. Microbiological diagnosis of VAP was based on protected brush specimen, bronchoalveolar lavage or quantitative tracheal aspirate. We defined early or late onset VAP when the infection appeared before or after 4 days of mechanical ventilation (MV) respectively. Crude mortality and ratio between crude and predicted mortality according to SAPS II were analyzed in both groups. We also analyzed attributed mortality and excess of ICU stay in the case group, distinguishing between early and late onset VAP. Student t and Mann-Whitney tests were used for the comparison of means and Chi square and Fisher's exact tests were used for the comparison of proportions.

RESULTS: Crude mortality in VAP group was 45% and predicted mortality was 26.5% ($p < 0.001$), being the attributed mortality 18.5%. The ratio between crude and predicted mortality was 1.7 ($p < 0.001$) in the VAP group and 1.01 (p = NS) in the control group. This ratio in the early onset VAP group was 1.05 (p = NS) and in the late onset VAP group was 1.9 (p = 0.001). Empiric antibiotic treatment was appropriated in 77.5% of cases and the ratio between crude and predicted mortality in this group was 1.64 (p = 0.001). Mean stay in ICU in the VAP group 12 days. Mean of MV were± 23 days, and in the control group was 14 ±was 33 11 days in the VAP group and in the control group± 20 days and 10.5 ±25.5 respectively.

CONCLUSION: In our ICU, VAP has an excess of mortality of 18.5% exclusively due to late onset VAP, even though when an adequate empiric antibiotic treatment was used. Likewise, VAP is associated to a greater time of MV and stay in ICU.

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META ANALYSIS OF LEVOFLOXACIN TREATMENT IN PATIENTS WITH HOSPITAL-ACQUIRED PNEUMONIA (HAP)

Welte T[1], Nowicki J[2]
[1]Pneumology, Medizinische Hochschule Hannover, Hannover, [2]Medical Department, Aventis Pharma Deutschland GmbH, Bad Soden, Germany

INTRODUCTION: Hospital-acquired pneumonia (HAP) has a serious prognosis even today. As immediate initial treatment is usually intended without verification of pathogens, a broad range of antibiotic efficacy is required. Due to its broad spectrum against gram-negative and gram-positive bacteria and atypical respiratory pathogens levofloxacin is an adequate treatment of HAP, being investigated in this meta analysis.

METHODS: This meta analysis includes data of two post authorizational surveys including 1172 hospitalized patients being treated with levofloxacin. In 128 of these patients the infection occurred at least 3 days after hospitalization indicating a hospital-acquired pneumonia (HAP). 63% of these patients were male and 36% female (median age 68.1 years).

RESULTS: At treatment start microbiological diagnostics were performed in 82 patients. At least one pathogen was found in 56 of these patients and in 26 patients no pathogen was documented. The most frequent pathogens were Pseudomonas spp. (18%) and S. aureus (16%). In 46 patients no microbiological diagnostics were documented at treatment start. 78% of the patients were treated with levofloxacin as initial treatment and 22% were pretreated with other antibiotics. In 79% of these patients (17% overall), the antibiotic pretreatment was documented as therapy failure. No reason for treatment change was available for the remaining pretreated patients (5%). In 65% levofloxacin was administered as antibiotic monotherapy and initially used as iv infusion in 91%. The initial levofloxacin dosage was 500 mg/d in 34% and 1000 mg/d in 60% of the patients. 8 patients (6%) received other initial levofloxacin dosages. The mean duration of treatment was 9 days. Clinical symptoms (cough, breathing difficulties, sputum purulence and pathological auscultation sounds) showed a statistically significant improvement during the course of treatment (each p £.001). Initially increased leucocytes and CRP decreased clearly during treatment. At the end of observation the clinical outcome was rated as cured in 60% and as improved in 27% of the patients. Adverse drug reactions were reported in two patients (1.56%), one case of abnormal liver function test and one case of superinfection.

CONCLUSION: The combined data sets from two post authorizational surveys demonstrate the efficacy and safety of levofloxacin in the treatment of HAP. As clinical symptoms clearly improved during treatment and 87% of the patients were rated as cured or improved, treatment with levofloxacin appears to be a successful initial antibiotic treatment even in patients with HAP. Further studies with levofloxacin in nosocomial pneumonia are in progress.

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ACTIVE IMMUNIZATION IN NOSOCOMIAL PNEUMONIA PROPHYLAXIS

Tsarenko S V[1], Krylov V V[1], Petrikov S S[1], Zinkin V J[1], Guseinova K T[1], Gukova E V[1]
[1]Neurosurgery ICU, Scientific institute of emergency medicine named after N.V.Sklifosovskiy, Moscow, Russian Federation

INTRODUCTION: We investigated the influence of immunization by staphylococcus-proteus-pseudomonas vaccine on nosocomial pneumonia development in the neurosurgical intensive care unit.

METHODS: 145 patients with a head injury, arterial aneurysm rupture and hemorrhagic stroke enrolled in the study. 19 patients (group 1) were onetime vaccinated by staphylococcus-proteus-pseudomonas vaccine on admission. 126 patients (group 2) were not vaccinated. Patients were randomized according to their age, sex, type of the disease and the protocol of intensive care. Most patients of both groups had Glasgo Coma Scale lower than 9 on admission.

RESULTS: Nosocomial pneumonia rates were: 36,8% in group 1 and 46,1% in group 2 (?=0,61). Pneumonia developed on the (M±?) 6±2,2 day after admission in group 1 and on the 9,3±4,2 day after admission in group 2 (?<0,0001). Higher titers of IgA and lower titers of Ig? were found on admission in group 2 (IgA: 2,2±1 g/l vs 1,6±1 g/l in group 1 (?=0,034); Ig?: 1,2±0,5 g/l vs 1,6±0,6 g/l in group 1 (?=0,01)). IgA titers in the first group increased by the third week after admission (2,5±0,6 g/l vs 2,6±1,1 g/l in group 2). The highest titers of Ig? in group 1 were noticed during the second week after admission (2,1±0,8 g/l vs 1,4±0,6 g/l in group 2 (?<0,0001)). Titers of IgG increased by the third week after admission in both groups. No marked changes in cell and phagocyte immunity were found.

CONCLUSION: Active immunization by *staphylococcus-proteus-pseudomonas* vaccine is a perspective method of nosocomial pneumonia prophylaxis in the neurosurgical intensive care unit.

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THE IMPACT OF VENTILATOR-ASSOCIATED PNEUMONIA ON ICU-LENGTH OF STAY AND MORTALITY IN CRITICALLY ILL

Olaechea P M[1], Álvarez-Lerma F[2], Palomar M[3], Insausti J[4], Cerdá E[5], Maraví-Poma E[6], ENVIN-Group [7]
[1]Intensive Care Medicine, Hospital Galdakao, Galdakao, [2]Intensive Care Medicine, H. del Mar, [3]Intensive Care Medicine, H. Vall d´Hebron, Barcelona, [4]Intensive Care Medicine, H. de Navarra, Pamplona, [5]Intensive Care Medicine, H. de Getafe, Madrid, [6]Intensive Care Medicine, H. Virgen del Camino, Pamplona, [7]ICU-infection, Nosocomial, Study Group, Spain

INTRODUCTION: The objective of this study is to evaluate the influence of the etiology of ventilator-associated pneumonia (VAP) on the ICU length of stay and crude mortality.

METHODS: A retrospective analysis of the data collected in the context of the Spanish intensive care surveillance study ENVIN-UCI, was carried out from 1997 to 2002 in more than 70 intensive care units (ICU). For each patient was registered the severity at admission in the ICU (APACHE II score), the acquired nosocomial infections registered in the ENVIN study, the length of stay (LOS) since the patient was admitted until the onset of VAP, the condition at the time of ICU discharge, and the ICU-LOS. The VAP was diagnosed according to the CDC criteria. The median days of stay are presented. The Kruskall-Wallis test and the chi-square test were used.

RESULTS: We controlled 28,840 patients. 1,631 patients developed VAP, of whom 997 had only one episode of VAP without other nosocomial infection and they became our sample under study. From these patients, one respiratory pathogen was isolated in 542 cases (54.4 %) and more than one pathogen in 246 cases (24.7 %), nevertheless the etiologic diagnosis was not reach in 209 cases (20.9 %). Regarding to the etiology, there were no statistically significant differences in the APACHE II score. The LOS since the ICU admission to the onset of VAP was shorter ($p<0.001$) in patients with VAP because of H. influenzae (n=44; 2 days), S. pneumoniae (n=23; 3 days) and S. aureus (MSSA) (n=86; 4 days) than patients with VAP because of Acinetobacter spp. (n= 60; 9 days), methicillin-resistant S. aureus (MRSA) (n=35; 8 days) and P. aeruginosa (n=146; 7.5 days). The duration of the prior stay to VAP was intermediate for patients with polymicrobial VAP (5 days), VAP without etiology (5 days) or which cause was other gramnegative bacilli (n=135; 6 days). The difference in ICU-LOS after VAP was only significant ($p<0.001$) for patients with VAP caused by P. aeruginosa (10 days) and polymicrobial (11 days) in comparison with patients not etiologically diagnosed VAP (7 days). Although differences were found in the crude mortality among some groups (MSSA: 25.6 %; MRSA: 48.6 %; $p<0.01$) it was not found global differences within patients with VAP according to the etiology ($p=0.072$).

CONCLUSION: The etiology of VAP has only little influence in the ICU-length of stay after the infection. The whole length of stay depends on the length of stay before the VAP. The evaluation of the crude mortality does not allow appreciate the impact of the VAP according to the etiology.

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INHALATION OF NITRIC OXIDE MAY DO MORE THAN IMPROVEMENT OXYGENATION IN THE TREATMENT OF SARS

Chen L[1], Peng L[2], Gao H[3], Shun B[4], Wang F[2], Zhu Y[5], Hedenstierna G[1], Wang C[4]
[1]MS, Uppsala university hospital, uppsala, Sweden, [2]C S, China-Japan Friendship Hospital, [3]PM, General Airforce Hospital of China, [4]PM, Beijing Chao-yang Hospital, [5]PM, Peking Union Medical College Hospital, Beijing, China

INTRODUCTION: Acute inflammatory process, hypoximia are common task in the patients with severe acute respiratory syndrome (SARS). Whether inhalation of nitric oxide (INO) improves oxygenation in the adult SARS patients, and weather NO could be deliver through oxygen mask or nose cannel in adults have not been proved. NO also has anti-virus and anti-inflammatory effect. This study investigated the response of INO in intubated and non-intubated SARS patients in two ICU in Beijing. Due to the dramatic response to INO therapy has been found in SARS patients, an animal study was followed to investigate anti-inflammatory effect of a combination of inhaled NO and steroid in Sweden.

METHODS: Fourteen patients (19-63 years old) with severe SARS (in two ICU units) were studied. Six patients received INO (30-10 ppm, 3-7 days), and eight patients served as controls.All patients under routing therapy for SARS include steroid. Oxygen saturation, Hemodynamic index, inspired oxygen fraction, and chest x-rays were studied. A 4-week follow up was made. Histology changes, expression of glucocorticoid receptor, and inflammatory markers were investigated in animals exposed to endotoxin (E), E+INO, E+INO, E+steroid.

RESULTS: In the INO group, oxygen index (PaO2/FiO2) increased from 94 till 250 mmHg, CPAP/BiPAP could be discontinued during INO in all four patients, and PEEP lowered in the intubated patient with no decrease of oxygenation. The effects were remained after INO was discontinued, and chest x-ray showed reduced lung infiltrates in all patients but one. Four weeks after INO, one patients remained in the ICU and one died. In the controls, no improvement was seen over a similar study period. Four weeks later, four patients remained in the ICU and two patients had died. There is a additive anti-inflammatory effect by combination of inhaled NO and steroid by i.v., and INO up-regulated the expression of lung glucocorticoid receptor in endotoxin model.

CONCLUSION: INO improved oxygenation both in intubated and non-intubated SARS patients. The possibility to leave ventilators pressure support may reduce the risk for lung damage, and also reduce exposure of SARS virus to the nursing staff. The improvement in chest X-ray and the remaining in the effect after INO withdrawal can hardly be explained by the vasorelaxant properties of INO. This suggest also a direct effect of NO on the SARS Corona virus, and may also link to interaction between INO and steroid.

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SARS OUTBREAK. A CLUSTER OF 39 PATIENTS IN HANOÏ, VIET-NAM

Clement C[1], Leitmeyer K[2], Thu V[3], Popinet S[3]
[1]Intensive care unit, Polyclinique du parc, Toulouse, France, [2]CSR, W.H.O, Geneva, Switzerland, [3]Department of Radiology, Hanoi French Hospital, Hanoi, Viet Nam

INTRODUCTION: In 2003,an outbreak of atypical pneumonia,the Severe Acute Respiratory Syndrome(SARS)started in asian countries then spread worldwide.We report the clinical,laboratory,radiological findings of 39 cases of SARS during an hospital outbreak in Hanoï,Viet Nam.

METHODS: Clinical, laboratory, radiological characteristics of 39 patients consecutively admitted with suspected SARS at the Hanoï French Hospital are described and analyzed.Main characteristics and outcome are compared with findings which were reported in other publications.

RESULTS: During the SARS outbreak,69 patients in Viet Nam have presented the symptoms of the illness.39 were admitted at the Hanoï French Hospital,35 of them were health care workers in this hospital.All patients were infected after a contact with the „index case"who came from Hong Kong.At the time of admission,the most frequent symptoms were fever(in 100 percent),headache(in 56 percent),myalgia(in 36 percent).Cough,dyspnea,thoracic pain were less common at the time of admission,but appeared later in more than 50 percent of the patients.These clinical findings are similar to those which were reported in Hong Kong(1)or Toronto(2).Lymphopenia was common(82 percent),as in the other clusters,but also thrombopenia(41 percent),which is not so frequently reported.Chest radiography was considered as „normal" in 64 percent of the cases at the time of admission,but 100 percent became abnormal at a later stage of the illness.64 percent of patients have required an intensive respiratory care,6 patients with ARDS died.As in other reports,therapy included most commonly broad spectrum antibiotics,oseltamivir,ribavirin,corticosteroids.We can not conclude for any significant benefit due to these therapies.

CONCLUSION: SARS is an acute atypical pneumonia due to a novel Coronavirus.In our cohort of 39 patients who were admitted at the Hanoï French Hospital,the illness led to a significant mortality and morbidity.These findings are similar to those which were reported in other places.

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ENDOTOXEMIA PROTECTS BALB/C MICE FROM SECONDARY STAPHYLOCOCCAL INFECTION OF LUNGS

Holub M[1], Lawrence D A[2], Mondal T K[2], Beran O[2]
[1]3rd Dept. of Infectious Diseases, First Faculty of Medicine, Charles University in Prague, Praha 8, Czech Republic, [2]Clinical and Experimental Immunology and Endocrinology, NYS DOH, Wadsworth Center, Albany, United States

INTRODUCTION: Nosocomial pneumonia represents a significant cause of morbidity and mortality in intensive care units (ICU). The high incidence of nosocomial pneumonia among ICU patients can be attributable to dysregulation of lung immune responses elicited by systemic inflammation. In a previous study with endotoxin-challenged mice, defects of lung adaptive immunity were heralded by reduced numbers of lung-resident CD4+ T-lymphocytes. The depletion of CD4+ T-lymphocytes was associated with a higher susceptibility to lung infection caused by Staphylococcus aureus in some clinical and experimental studies. The aim of our study was to evaluate the mechanism by which endotoxemia reduces the number of lung-resident CD4+ T-lymphocytes and increases susceptibility to S. aureus in the lungs.

METHODS: Experimental systemic inflammation was initiated in BALB/c mice (n=6) with 10 \mug of endotoxin (LPS) given intraperitoneally; 24 hrs after this challenge, the animals were anesthetized and $5x10^6$ CFU of S. aureus (S.a.) were administered into the trachea. For the control group, mice were challenged only with S. aureus (n=6). Mice were sacrificed 72 hrs after the challenge with S. aureus. Lung-resident lymphocyte subsets were obtained by enzymatic digestion of lung tissue. Lung-derived and circulating total T- (CD3+) and B-(CD19+) lymphocytes, CD4+ and CD8+ T-lymphocytes as well as NK cells were enumerated with monoclonal antibodies, single platform method and cytometric analysis. Colony forming units (CFU) of S. aureus were obtained from lung tissue homogenates using a plate dilution method. The differences between groups of animals were evaluated by one-way ANOVA with a level of significance P<0.05. Data are presented as mean standard ± error.

RESULTS: Results are shown in the table 1 (number of cells is expressed as cells$x10^3$/ml for the blood and cells$x10^3$lobe for the lung).

Parameters	S.aureus Blood	S.aureus Lung	LPS+S.a. Blood	LPS+S.a. Lung
Total T-cells	151 ± 29	377 ± 35*	121 ± 18	165 ± 30
CD4+ T-cells	76 ± 18	306 ± 44*	56 ± 16	139 ± 27
CFU of *S aureus*	n.d.	191 ± 10*	n.d.	8 ± 1

*n.d. = not determined; *p < 0.05;*

CONCLUSION: Our results demonstrate that mice challenged with endotoxin and S. aureus have reduced recruitment of CD4+ T-lymphocytes to the lungs when compared to animals infected only with S. aureus. Despite this finding, the susceptibility to secondary lung infection due to S. aureus was significantly decreased after endotoxin challenge indicating its protective effect against staphylococcal infection.

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LATE-ONSET VAP. ANY DIFFERENCE CONSIDERING THE 5th OR 7th DAY?

Palomar M[1], Alvarez Lerma F[2], Olaechea P[3], Insausti J[4], Cerda E[5], Martinez Pellus A[6], Bermejo B[7], Alonso G[8].
[1]ICU, H Vall Hebron, [2]ICU, H Mar, Barcelona, [3]ICU, H Galdakano, Bilbao, [4]ICU, H Navarra, Pamplona, [5]ICU, H Getafe, Getafe, [6]ICU, H Arreixaca, Murcia, [7]Preventive Medicine, H Virgen del Camino, Pamplona, [8]ICU, H Reina Sofia, Cordova, Spain

INTRODUCTION: The timing of ventilator associated pneumonia (VAP) development determines variations in aetiology and resistances. The most common definition of late-onset VAP includes those developing after 4th day from hospital admission, but several authors consider the 7th day. The objective of our study was to asses the differences in aetiology of VAP depending on the time of occurrence.

METHODS: Multicenter (64 ICUs) cohort study carried out during 2 months on 2003. All patients admitted to ICU >24 hours were followed. VAP was diagnosed according CDC´s criteria modified for ICU. VAP were classified in 3 groups, G1: VAP occurring within 4 days of ICU admission, G2: VAP occurring within 5 to 7 days and G3: VAP occurring >7days. The aetiology of the 3 groups was compared. Statistical analysis: Chi-square test

RESULTS: Among 5023 patients admitted to ICU during the study period, 296 developed 343 episodes of VAP. A total of 404 microorganisms (MO) were isolated. The most frequent MO were S aureus 22%, P aeruginosa 20,5%, A baumannii 8,6%, H influenzae 5,4%, E coli 5,4%, S pneumoniae 3,4%, others 33,3%. The proportion was significantly different between the 3 groups (p<0.0001), G2 and G3 (p=0.0001) but with no difference between G1 and G2 (p=0.06) except for P aeruginosa. Data in Figure 1. Meticilline resistance was found in 31/90 S aureus (34,4%), with a significantly different proportion between the 3 groups: 12,1%, 19,6% and 58,8% (p<0.0005) due to the difference between G1 and G3 (p=0.000094).

	All 404 MO	G1 113 MO n (%)	G2 84MO n (%)	G3 157MO n (%)
S aureus	90 (22,2)	33 (25,7)	23 (27,3)	34 (17,6)
P aer*,+**	83 (20,5)	9 (7)	16 (19)	58 (30,2)
A baum+**	35 (8,6)	4 (3,1)	2 (2,3)	29 (15,1)
H influen+	22 (5,4)	15 (11,7)	5 (5,9)	2 (1)
E coli	22 (5,4)	7 (5,4)	6 (7,1)	9 (4,6)
S pneum+	15 (3,7)	10 (7,8)	4 (4,7)	1 (0.5)
Others+**	137 (33,9)	35 (30,9)	28 (33,3)	24 (15,2)

**p=0.02 G1/ G2; **p<0.05 G2/G3,+All groups*

CONCLUSION: In our country, Late-onset VAP showed important variations in aetiology considering 5th and 7th days and that should influence antimicrobial prescribing practices.

Grant acknowledgement: Aventis

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INCIDENCE OF PNEUMOTHORAX /BAROTRAUMA IN SARS PATIENTS: OUR EXPERIENCE

Bhaskar B[1], Tai D[1], Soon Keng G[1], Earnest A[2]
[1]medical Intensive Care Unit, Tan Tock Seng Hospital, [2]clinical Research Unit, TTSH, Singapore, Singapore

INTRODUCTION: Acute respiratory syndrome (SARS)is a new disease ,in Singapore ,Tan Tock Seng Hospital was designated as the national SARS hospital. 96.6% (199/206) of all the patients in Singapore was treated in our hospital. Hence we had the unique opportunity to review the clinical features and outcomes of critically ill probable SARS patients in a designated national SARS ICU. This is a study to present the data of incidence of pneumothorax/barotraumas in our SARS patients and to document the outcome and determine prognostic factors in these patients

METHODS: Observational cohort study involving retrospective analysis of demographic, clinical, laboratory and radiological data. The patients were recruited from 1st march 2003 to July 13 2003, when the last SARS patient was discharged from TTSH. All the ICU patients were divided into two groups one with pneumothorax and the other without.

RESULTS: Of the 46 (23%) patients admitted to ICU 8 (17.3%)developed Pneumothorax. Of the 8 patients 7 (87.5%) patients had barotraumas and one had spontaneous pneumothorax. Length of mechanical ventilation was significantly prolonged in patients who developed barotraumas (median of 25 days as compared to 15 in patients without barotraumas) we also looked into the various data like ventilatory settings, significant lab investigations, different presentations, mortality, APACHE scores, co morbidities, other complications in each group. The serial X ray and CT findings were also included.

CONCLUSION: Pneumothorax (17.4%) was 5th in the list of ICU complications in our ICU patients following Secondary pneumonia (52.2%)septicemia (34.9%)DVT (23.9%)ARF (19.6%). It significantly increased morbidity and mortality (87.5%)and days of mechanical ventilation and high incidence of barotraumas (7/32)in mechanically ventilated patients. In comparison 7/27 mechanically ventilated patients in Hong kong developed barotraumas (25.9%).

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A SIMPLE PROGRAM TO REDUCE THE INCIDENCE OF VAP IN A BRAZILIAN ICU

Souza P C P[1], Rodejan C[1], Lugarinho M[1], Martinez A[1], Carmo N E[1]
[1]ICU, Hospital de Clínicas de Niterói and Hospital de Clínicas Mário Lioni, Rio de Janeiro, Brazil

INTRODUCTION: VAP (ventilator-associated pneumonia) is the most frequent infection in ventilated patients. There are many actions (more or less 23) wich could reduce the incidence of VAP, but it is very difficult and expensive to put in practice many of them

METHODS: To evaluate the eficacy of only one simple measure, the semi-recumbent position, in the incidence of VAP. Our ICU has 12 adult-beds. The period of the study was the year 2003. We standartized the semi-recumbent position in 45° in all patients under mechanical ventilation. Nothing more has changed. We compare the incidence of VAP in 2003 with the data from 2001 and 2002

RESULTS: The patients were similar by age, sex and Apache II. The incidence of VAP was 28 and 22 / 1000 patient-day of mechanical ventilation in 2001 and 2002. The incidence in 2003 was 10,7, almost 50% less than 2001/2002. No other measure was done, except semi-recumbent position. In a study we had done in 2002 in our ICU, we identified in 80% of opportunities, the patients under mechanical ventilation were with the trunk below 45°

CONCLUSION: To keep the patient under mechanical ventilation in a semi-recumbent position is not difficult. Unfortunatly our doctors, nurses and respiratory therapists were not awareness with this practice, although all of them know the rationale and advantages. With this simple and inexpensive measure, we could reduce significantly the incidence of VAP. In our study the reduction was around 50%. We must continue the study, with many cases, to confirm the results

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VITAL CAPACITY MANEUVERS REDUCE LEFT VENTRICULAR VOLUME AND CARDIAC OUTPUT AFTER CARDIAC SURGERY

Nielsen J[1], Østergaard M[1], Kjærgaard J[2], Tingleff J[3], Berthelsen P G[1], Larsson A[4]
[1]Anaesthesia and intensive care, [2]Cardiology, [3]Thoracic surgery, Gentofte University Hospital, Hellerup, [4]Anaesthesia and intensive care, Aalborg university hospital, Aalborg, Denmark

INTRODUCTION: Lung collapse is a major reason for impaired pulmonary function after cardiopulmonary bypass (CPB). Vital capacity maneuvers (VCM) combined with PEEP improve PaO2 and lung volume effectively in this condition (1), but might due to increased intrathoracic pressure impede cardiac function and the circulation. We hypothesized that a short VCM would be less cardiodepressive and therefore examined central hemodynamics before, during and after VCMs of two different durations in patients after CPB.

METHODS: 10 patients operated with CABG under CPB were randomized to two orders of VCM (40 cmH2O airway pressure for 10 s and 20 s or vice versa with 5 min interval) done immediately after surgery. The patients were ventilated with VCV (VT 8 ml/kg, ZEEP, FiO2 1.0). Trans-esophageal echocardiography (left ventricular short axis view) and pulse contour cardiac output (CO) were obtained continuously. Before and after each VCM, systemic and pulmonary arterial gases were sampled for calculation of intrapulmonary shunt.

RESULTS: Fractional shortening of the left ventricle was unchanged by the VCMs, while the left ventricular end-diastolic diameter decreased by 0,9±0,8 cm ($p<0.006$) (mean±SD; Wilcoxon) and 1,3±0,9 cm ($p<0.004$), during the 10 and 20 s VCM, respectively. CO was 5,6 ± 0,8 L/min at baseline and decreased by 3.0 ± 1,1 L/min ($p<0.002$) and 3,6 ± 1,2 L/min ($p<0.002$) by the VCMs of 10 and 20 s, respectively (NS difference between the two durations). Shunt decreased from 20±5 % to 15±6 % ($p<0,01$) after the first VCM and from 15±6 % to 12±5 % ($p<0,002$) after the second VCM (NS difference between the two durations).

CONCLUSION: In patients after cardiac surgery a VCM (40 cmH20, 10 or 20 s) reduced CO and left ventricular diastolic volume importantly, suggesting that such maneuvers should be carried out with great caution in this patient category. However, a 10 s VCM improved shunt as effectively as a 20s VCM but tended to affect cardiac function less.

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DOES HYPERGLYCAEMIA INCREASE ICU MORBIDITY AND LENGTH OF STAY AFTER CARDIAC SURGERY?

Maglioni E[1], Biagioli B[1], Pietrini I[1], Rossi I[1], Giomarelli P[1], Scolletta S[1]
[1]Cardiothoracic Surgery, University of Siena, Siena, Italy

INTRODUCTION: Hyperglycaemia and insulin resistance are common in the critically ill patients, even if not diabetics. Several studies report that pronounced hyperglycaemia may lead to complications in such patients. Also during cardiac surgery, disturbance in blood glucose homeostasis may cause organ dysfunction. Besides, anaesthesia, surgery, and hypotermia are considered the major stress factors in the metabolic and hormonal responses. Our objective has been to assess the relationship between perioperative hyperglycaemia and postoperative outcome of cardiac surgical patients.

METHODS: 344 coronary artery bypass grafting (CABG) patients, undergoing surgery from January 2003 to December 2003 were retrospectively analyzed. We also enrolled a subgroup of 58 (17%) diabetic (type 1 or type 2) patients. Several perioperative risk factors were considered for the statistical analysis. The higher blood glucose levels were evaluated at two observation times: 1) in the operating room (T1, the glycaemia peak during surgery), and 2) on the first postoperative day (T2, the glycaemia peak in the intensive care unit, ICU). A multivariate logistic regression analysis was performed with the primary end-points focused on "ICU-morbidity" and "prolonged ICU length of stay" (PLOS, ≥5 ICU days).

RESULTS: The overall ICU-morbidity rate was 36.3%, the ICU-mortality 1.17%. At the multivariate analysis, while glycaemia at T1 was not related to postoperative outcome, the higher peak of glycaemia at T2 resulted an independent risk factor for the ICU-morbidity ($p<0,05$), in association with the preoperative creatinine ($p<0,02$), age ($p<0,05$), preoperative hematocrit value ($p<0,001$), time of aortic clamp ($p<0,001$), major vascular preoperative disease ($p<0,05$). The higher blood glucose value at T2 also was an independent risk factor for PLOS, prolonged mechanical ventilation, and renal dysfunction (creatinine >2,5 mg/dl). At the logistic regression analysis all these variables, except for the vascular disease, also resulted as independent risk factors for the diabetic subgroup.

CONCLUSION: Some authors suggest that an intensive insulin therapy, to maintain blood glucose <110 mg/dl, reduces postoperative morbidity and mortality in critically ill patients. Our results agree with previous published papers, and confirm that high blood glucose levels are related to postoperative complications and PLOS of CABG patients. In conclusion, since uncontrolled hyperglycaemia is detrimental for cardiac surgical patients, a timely glucose insulin-controlled therapy may result in a reduction of postoperative complications and may improve postoperative cardiac surgical outcome.

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CLINICAL AND GENETIC DETERMINANTS OF BLEEDING IN OPEN CARDIAC SURGERY PATIENTS

Jiménez J J[1], Revuelta P[1], Iribarren J L[1], Villegas J[1], De Vera A M[2], Milena A[2], Lorenzo J M[1], Naranjo C[1]
[1]Intensive Care Unit, [2]Hematology and Laboratory Department, Hospital Universitario de Canarias, La Laguna, Spain

INTRODUCTION: Excessive postoperative bleeding (>1 L.) and transfusion requirements for major cardiac surgical interventions vary between 10% and 70%.[1] Genetic and cardiopulmonary bypass (CPB) related factors, play a central role in the bleeding process.[2] We investigated the clinical and genetic predictors of exccesive bleeding, and its association with morbidity.

METHODS: Fifty cardiac surgery patients,27 male and 23 female and a mean age of 64.5 ± 1.4 years. Coronary bypass grafting was performed in 25, prothestic valve replacement in 17 and mixed surgery in 6. All admitted to a 20-bed medical-surgical ICU from a tertiary center. Polymorphisms investigated: angiotensin-converting enzyme (ACE) gene, Factor V gene, prothrombin gene, plasminogen activator inhibitor type I (PAI-1), tissue plasminogen activator (tPA) gene and tumor necrosis factor beta (TNFB) gene. The associations of excessive bleeding with demographic, clinical and genetic factors were assessed. Statistical analysis was made by using Pearson's chi^2 and Fisher's exact tests, one way ANOVA and non parametric Mann-Whitney U or Kruskal-Wallis tests as appropriate. MANOVA techniques were applied to study sequential changes of different markers over time.

RESULTS: The frequency of excessive bleeding was 28% (14 cases). Male gender (p 0.004), and the following polymorphisms: ACE gene (p 0.010), TNFB gene (p 0.039) and PAI-1 gene (p 0.037), were associated with excessive bleeding. Presurgical levels of C1-inhibitor (p 0.034), leptine (p 0.020), and other coagulation and fibrinolysis tests such as INR (p 0.038), prothrombin activity (p 0.027), and PAI-1 (p 0.030) levels, were predictors of excessive bleeding. Admission levels of lactic acid (p 0.010), creatinphosphokinase (CPK) enzymes (p 0.001), MB isoenzymes (p 0.003) and leptine levels (p <0.0005, INR (p 0.002), D-dimer (p 0.005) and PAI-1 levels (p 0.008) were also associated to exccesive losses. Bleeding was also associated with hemodynamic (cardiac index and vascular resistance), hematologic (hemoglobin and neutrophils), fibrinolysis (D-dimer), CPK enzymes (CPK), leptines and serum levels of soluble TNF receptors (s-TNF) over time.

CONCLUSION: Excessive bleeding is present in 28% of cardiac surgical patients after CPB.Polymorphisms for ACE gene, TNFB gene and PAI-1 gene are associated with this postoperative complication. Several biochemical, coagulation and fibrinolysis markers performed as predictors of postCPB bleeding as well as evolutive markers.

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PROPENSITY SCORE ANALYSIS OF ON VS OFF-PUMP CABG IN ELDERLY: POSTOPERATIVE RESULTS

Meco M[1], Casselman F[2], Babbini M[3], Marotta A[3], Caratti A[3], Bellisario A[4], Cirri S[3]
[1]Cardiovascular surgery, Sant'Ambrogio Hospital, Milan, Italy, [2]Cardiovascolar surgery, Olv clinic, Aalst, Belgium, [3]Cardiovascular surgery, Sant'Ambrogio Hospital, Milan, [4]Cardiovascular surgery, N.c.c. Alessandra, Alessandria, Italy

INTRODUCTION: Bypass surgery in the elderly (age >75 years) results in increased mortality and morbidity, which may be related to the cardiopulmonary bypass system. Avoid CPB may be very usefull in this class of patients. We used propensity score analysis to eliminate differences between groups.

METHODS: Between January 1999 and January 2001, 255 patients over 75 years of age, underwent either isolated CPB-CABG (n=154) or OPCABG (n=101) at our institution. Using the propensity score analysis, we have selected two homogenous groups: 41 patients underwent CPB-CABG (Group A) and 78 underwent OPCABG (Group B).

RESULTS: Patients operated with CPB had higher in-hospital mortality. (12.2% vs. 1.3% p<0.01 O.R. 9.51 C.I. 95% 1.14- 78.73). Multivariate logistic regression analysis of hospital mortality shows as independent protecting factor avoidance of CPB. The incidence of the major post-operative complications was significantly higher in CPB-CABG group. Patients receiving OPCABG had lower rates of perioperative myocardial infarction (2.6% OPCABG versus 14.6% CPB-CABG), postoperative cardiac failure (5.1% versus 26.8%), postoperative renal failure (0% versus 12.2%), postoperative respiratory insufficiency (2.6% versus 14.6%), stroke (0% versus 4.9%). Avoiding CPB use was an independent protecting factor.

preoperative characteristics	cpb-cabg	opcabg	p value
males	29	62	0,2
Age (years)	76.07 ± 0.20	75.86 ± 0.17	0.43
LVEF	46.46 ± 14.03	50.43 ± 10.70	0.10
CCS class IV	5 (12.2%)	10 (12.8%)	0.85
creatinine>2	5 (12.2%)	8 (10.3%)	0.74
Left main dis.	11 (26.8%)	18 (23.1%)	0.15
COPD	6 (14.6%)	8 (10.3%)	0.10
Parsonnet sco.	17.49 ± 4.84	17.06 ± 4.04	0.50
postoperative complications	**cpb-cabg**	**opcabg**	**p value**
heart failure	11 (26.8%)	4 (5.1%)	0.001
A.M.I.	6 (14.6%)	2 (2.6%)	0.01
renal fail.	5 (12.2%)	0 (0%)	0.001
resp. fail.	6 (14.6%)	2 (2.6%)	0.01
stroke	2 (4.9%)	0 (0%)	0.05
hosp death	5 (12.2%)	1 (1.3%)	0.01
Intubat. time	27.05±77.06	19.28±22.79	0.04
atr. fibril.	11 (26.8%)	17 (21.8%)	n.s.

CONCLUSION: OPCABG is safe in the elderly population and significantly reduces postoperative mortality and morbidity.

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WHEN DOES POSTOPERATIVE SIRS AND SIRS WITH HYPOTENSION START?

Du Q[1], Hiesmayr M J[2], Burgmann H[3], Schuh C[1].
[1]Department of Medical Computersciences, [2]Department of Cardiac- Thoracic- Vascular Anaesthesia and Intensive Care, [3]Department for Infectious Diseases and Chemotherapy, Medical University Vienna, Vienna, Austria

INTRODUCTION: After major surgery many patients develop signs and symptoms of generalised inflammation. The syndrome of generalised inflammation is defined as „systemic inflammatory reaction syndrome" (SIRS) or severe SIRS if hypotension is present simultaneously. Clinicians are facing the challenge to differentiate between postoperative inflammation a condition considered to be benign and early signs of infection. The aim of our study was to define the timecourse of SIRS and severe SIRS after cardiac and thoracic surgery.

METHODS: We utilised a structured data mining process to the prospectively collected data within the Patient-Data-Management-System (PICIS Caresuite V. 6.3) from the Cardiothoracic ICU of a University Hospital between January 1999 and May 2003. Data from all monitoring device are collected in intervals of 10 minutes, laboratory data and blood gas analysis was done according to institutional standards. In this data mining process we determined in a first step the fulfillment of each individual item of the SIRS criteria (ACCP/SCCM Consensus Conference) during a minimum of one hour. In the second step we identified the first occurrence of simultaneous fullfillmment of at least 2 criteria as the starting point for SIRS. Severe SIRS was defined as SIRS with at least two criteria for organ dysfunction as defined in the SOFA score. We used three categories SIRS, SIRS with low blood pressure (SIRS low BP) and severe SIRS with additinal organ dysfunction (SIRS severe).

RESULTS: A total of 1629 patients were admitted during the observation period. SIRS was present in 1001 (61.4%), SIRS with hypotension in 877 (53.8%) and SIRS with additional signs of organ dysfunction in 461(28%). The timepoints of first fullfillment are given in the table. The timeprofile with very early fullfillemtn was not changed by censoring the first hours after admission since the identified state persistent for a prolonged period. Timepoint of first SIRS fullfillment:

Postoperative timepoint	SIRS n (% of all)	SIRS low BP	SIRS severe
< 6 hours	890 (55%)	682 (42%)	421 (26%)
6-12 hours	47 (2.9%)	92 (5.6%)	16 (1%)
12-18 hours	32 (2%)	34 (2.1%)	12 (0.7%)
18-24 hours	13 (0.8%)	26 (1.6%)	5 (0.3%)
24-72 hours	19 (1.2%)	43 (2.6%)	7 (0.4%)
Total	1001 (61%)	877 (54%)	461 (28%)

CONCLUSION: In this large cohort of patients after cardaic and thoracic surgery we found dystinct profiles for SIRS with additional signs of organ dysfunction. In the majority of the patients the three different SIRS categories occurred within the first 6 hours. Further research is necessary to determine whether any of these categories are indicative of a changed outcome depending on the starting point.

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THROMBELASTOGRAPHY IN PERIOPERATIVE MONITORING OF PATIENTS UNDERGOING CARDIAC SURGERY

Hájek R[1], Nìmec P[1], Zezula R[1], Fluger I[1], Rù?ièková J[1]
[1]Cardiac Surgery, University Hospital, Olomouc, Czech Republic

INTRODUCTION: Thrombelastography (TEG)is a method frequently used in perioperative assessment of haemostasis in cardiac surgery. This bedside examination can reveal some specific disorders of haemostasis especially hypercoagulation and fibrinolysis.

METHODS: One hundred fourteen consecutive patients with acquired heart desease were assessed. All the patients were operated electively and the cardiopulmonary bypass was used. Standard laboratory perioperative assessment of coagulation was performed. These results were compared with TEG performed afer indtroduction of anaesthesia, after 30 minutes of CPB and immediately after admission on ICU after operation. Preoperative anticoagulation therapy, blood loss and the necessity of transfusion were evaluated.

RESULTS: Only 29 patients nad no anticoagulation medication preoperatively. In laboratory assessment all the patients had normal results preoperatively, 12 patients had coagulation disorder and 14 patients thrombocytopenia postoperatively.

TEG examination revealed hypercoagulation status in 70 patients and hypocoagulation in 13 patients preoperatively. During operation increased fibrinolysis was found out in 28,9% patients (11,4% during operation, 13,1% after operation and 4,4% both during and after operation), only in 25% of them aprotinin was used because of increased bleeding. Thrombocytopatia was revealed in 16,7% patient and only in 1 of them thrombocyte infusion was required. In 5 patients the residual high level of heparin was confirmed. The average blood loss during operation was 350 ml and during first 24 hours was 693 ml. No patient was reoperated because of bleeding. Correction of hypocoagulation was made with FFP in average dose 2 TU (4 case with normal postoperative TEG tracings versus 9 cases with pathological TEG).

CONCLUSION: TEG revealed hypercoagulation status in many patient preoperatively, which was not confirmed by standard laboratory tests. During operation mainly fibrinolysis and thrombocytes dysfunction was present but any specific therapy was usually not necessary. The use of blood products depends more on clinical status of the patient than on the TEG results.

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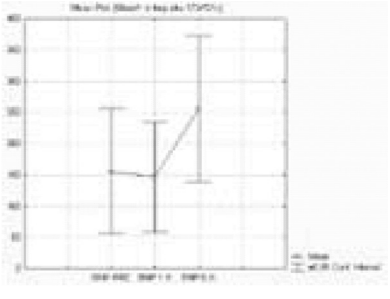
POSTOPERATIVE PERIOD OF CARDIAC SURGERY: ANALYSIS OF THE KINETICS OF B ATRIAL NATRIURETIC PEPTIDE

Rouge A F[1], Gomes R V[1], Aranha F G[1], Fernandes M A O[1], Nogueira P M M[1], Tura B R[1], Campos L A A[1], Dohmann H F R[1]
[1]Surgical Intensive Care Unit, Hospital Pró-Cardíaco - PROCEP, Rio de Janeiro, Brazil

INTRODUCTION: An increasing number of studies has confirmed the importance of type B brain natriuretic peptide (BNP). The objective this study is assess the kinetics of BNP in the postoperative (PO) period, and to compare it with the preoperative (Pre) BNP level.

METHODS: A classical cohort was carried out with 22 pts, who were selected from August 2003 to January 2004. The mean age of the pts was 65.7±8.18 years, and 3 were females (13.6%). BNP level was measured in the preoperative period (Pre BNP) and in the first (BNP1) and sixth (BNP6) PO hours, and hemodynamic and laboratory data were collected. BNP was quantitatively measured using immunofluorescence (Biosite Triage BNP Test). The results underwent statistical analysis by using the Wilcoxon Signed Rank Test.

RESULTS: The mean BNP levels found were as follows: Pre BNP=155.2±219.2 pg/mL (MED=75.2); BNP1=146.2±194.4 (MED=79.5); and BNP6=255.4±257.6 (MED=201.0). After the analysis, no statistically significant difference was observed between Pre BNP and BNP1 (P=0.84); however, a significant difference was observed between Pre BNP and BNP6 (P=0.0004).



CONCLUSION: A significant difference was found between Pre BNP and BNP6, but not between Pre BNP and BNP1, establishing a kinetic curve of BNP in the PO of CS.

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SERUM LACTATE LEVELS AS A PREDICTOR OF MORTALITY AND MORBIDITY FOLLOWING CORONARY ARTERY BYPASS GRAFT

Samalavicius R[1], Misiurine I[1], Norkiene I[1], Juozaitis M[1], Urbonas K[1], Bubulis R[1], Baublys A[1]
[1]Anaesthesiology and intensive care, Vilnius University Hospital Santariskiu Clinics, Vilnius, Lithuania

INTRODUCTION: Preoperative risk stratification for predicting mortality and morbidity is widely used in cardiac surgery. The goal of this study was to assess the value of serum lactate level in predicting mortality and morbidity following coronary artery bypass grafting (CABG) procedures.

METHODS: 600 consecutive CABG patients, operated on from 2003.01.01 to 2003.12.30, were included in this prospective observational study. All patients were operated using cardiopulmonary bypass. Serume lactate levels were measured before cardiopulmonary bypass, before declamping of the aorta, after heparin neutralisation and at the ICU admission.

RESULTS: Lactate level greater than 5 mmol/l was found in 2.5% of patients during cardiopulmonary bypass, in 6.7% of patients shortly after weaning from CPB and in 10.8% of patients at ICU admission. Mortality rate of patients, with hyperlactemia at ICU admission was 19.3% and morbidity 59.6%. Mortality rate of patients without hyperlactemia was 3.2% and mobidity - 10.3 %. Lactate levels on ICU admission were raised in non survivors (median 4.9 +/- 3.45, range 0.9-12.0 mmol/l)compared with survivors (median 2.5 +/- 1.76, range 0.3-13.5).

CONCLUSION: Increased serum lactate levels following coronary artery bypass grafting allows to identify a group of patients with increased risk of postoperative mortality and morbidity.

REFERENCE(S): „Frequency, Risk factors, and Outcome of Hyperlactatemia After Cardiac Surgery“ Jean-Michael Maillet, MD; Paul Besnerais MD; Manuel Cantoni, MD; CHEST 2003;123: 1361-1366.

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AGREEMENT BETWEEN STANDARD THERMODILUTION CARDIAC INDEX AND TRANSPULMONARY THERMODILUTION INDEX

Pérez-Vela J[1], Renes E[1], Escribá A[1], Alonso M[1], Corres M[1], García A[1], Perales N[1]
[1]Intensive Care Unit, Hospital 12 de Octubre, Spain, Spain

INTRODUCTION: Vital parameters monitorization is an usual practice in the management of critically ill patients. Cardiac index (CI) is one of more important perfusion parameters used. PiCCO system is a device that offer the quantification of intermittent CI by transpulmonary thermodilution (CITP) and in a continuous manner by arterial pulse contour analysis. Objective: To compare the agreement between the standard thermodilution monitorization system (CITD) with the transpulmonary system. Also, we analysed the complications secondary to the PiCCO system.

METHODS: Prospective study, in patients in the immediate postoperative period after cardiac surgery with cardiopulmonary bypass. CI by standard themodilution was measured with pulmonary artery catheter Abott OptiQ SvO2/CCOâ. We made a transpulmonary thermodilution with 15 ml physiologic fluid injection with a temperature less than 15 celsius degrees, through a central venous line, and we analysed the thermodilution in the femoral artery catheter thermistor (a 4-Fr gauge, 20 cm long arterial with a thermistor embedded in its wall: pulsiocath PV2014L) using the PiCCO system from Pulsion Medical System (Munich; Germany). We calculated CI (both methods) after inserting the PiCCO system, one hour later and then, every two hours. Also we measured parameters when staff considered appropriate to value the results of a therapeutic attitude. Results between techniques were compared by lineal regression analysis and the Bland-Altman method.

RESULTS: We analysed a total of 126 pair of data obtained in 18 patients, 7 male and 11 female, in the immediate postoperative period of 9 valvular replacements (5 mitral, 3 aortic and one both), 2 aortic grafts, 5 myocardial revascularizations, 1 mixoma and 1 pericardiectomy. Mean age: 67±8.4 years, mean CITD 2.75±0.67 and CITP 2.75±0.69 l/m. The range of measured CI: 1.3 a 4.2 l/m/m2. In comparison we obtained a r= 0.88 and a bias of –0.027±0.662. In tables we have the realised statistic analysis. We did not have complications attributed to the system.

CONCLUSION: Both CI measurement methods are comparable, showing a good agreement between systems, indicating that CITP is as reliable and precise as standard thermodilution. This suggests that PiCCO is a monitorization system applicable to clinical routine in critically ill patients. We did not observe complications attributed to the system.

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„RIO SCORE- PRÉ“: PREDICTIVE SCORE OF MORTALITY IN PATIENTS UNDERGOING CARDIAC SURGERY

Gomes R V[1], Rouge A[1], Nogueira P M M[1], Fernandes M A O[1], Tura B R[2], Alves L M[2], Campos L A A[1], Dohmann H F R[1]
[1]Surgical Intensive Care Unit, Hospital Pró-Cardíaco - PROCEP, [2]Surgical Intensive Care Unit, Instituto Nacional Cardiologia Laranjeiras, Rio de Janeiro, Brazil

INTRODUCTION: Since the year 2000, we have been studying prognosis in cardiac surgery (CS) and noticed the lack of models with similar populations in the literature. The objective this study is create a predictive score (Rio Score-Pre) of in-hospital mortality in patients (pts) undergoing CS based on preoperative variables.

METHODS: Classical cohort with data of 1458 pts, 437 of whom undergoing valvular surgery (VS) and admitted to 2 intensive care units (ICU), public and private, consecutively selected between June 2000 and February 2003. All 19 variables were previously defined. The data underwent univariate analysis with the chi-square, Student t, Mann-Whitney, and Pearson tests, followed by logistic regression, and stepwise (likelihood ratio), with the chi-square linear tendency test and a classification table.

RESULTS: The score created (appendix) allows the following prediction: from 0 to 4 - low risk; from 5 to 9 - medium risk; and from 10 to 15 - high risk. It showed significance and linear tendency (P<0.0001), and accuracy of 93.72%.

95% CI for OR

Variable	OR	Lower	Upper	Score
Age 65-75	2.071	1.177	3.642	1
Age>75	4.674	2.589	8.438	2
LAD>45	2.850	1.724	4.711	1
Cr>2	6.313	2.639	15.10	3
Emergency	2.183	1.118	4.263	1
Vascular disease	2.039	1.236	3.362	1
Active endocarditis	4.428	1.470	13.33	3
Complex CS	2.29	1,024	5.159	2

CONCLUSION: The Rio Score-Pre shows the power of some variables, such as left atrial diameter (LAD) and active endocarditis (in this sample with 30% of VS), and the impact of complex CS and other classical variables.

Grant acknowledgement: Vegni R.,Santos M.,Xavier R., Brito JO, Barbosa O., Sabino J., Aranha FG, Pontes A. and Dohmann HJ.

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A NEW PROGNOSTIC MARKER IN CARDIAC SURGERY: LEFT ATRIAL DIAMETER

Gomes R V[1], Rouge A[1], Nogueira P M M[1], Fernandes M A O[1], Olival S A[2], Campos L A A[1], Dohmann H F R[1], Santos M[1]
[1]Surgical Intensive Care Unit, Hospital Pró-Cardíaco - PROCEP, [2]Surgical Intensive Care Unit, Instituto Nacional Cardiologia Laranjeiras, Rio de Janeiro, Brazil

INTRODUCTION: The Left Ventricular Ejection Fraction (LVEF) has been extensively studied as a prognostic marker in cardiac surgery (CS); our group, however, has found a correlation between Left Atrial Diameter (LAD) and several outcomes in CS. The objectives this study is show the importance of LAD as a prognostic marker by assessing the following outcomes: In-Hospital Mortality (HM), Surgical Intensive Care Unit Length of Stay (SICULOS), Pneumonia (PN), and Need for Hemodialysis (NHD).

METHODS: Compilation of data collected in the databank of several cohorts with 2211 patients (pts) of 2 SICU from June/00 to February/04. The 46 variables studied underwent uni- and multivariate statistical analysis.

RESULTS: The table below shows the results of 1458 pts, 437 of whom underwent valvular CS.

Number	Outcome	Statist	OR	Author	Meeting
1458 pts PO CS	death	R Log	2.58	RGomes	CCM 2003
437 pts PO VS	death	R Log	2.68	RGomes	SBC 2003
437 pts VS	SICULOS	CART		BTura	SBC 2003
1458 pts PO CS	bleeding	R Ling	————	ARouge	CCM 2003
437 pts VS	death	CART	————	RGomes	SBC 2003
1158 pts CS	VAP	CART	————	MSantos	SBC 2003
1458 pts Pre CS	death	R Log	2.85	RGomes	submit
770 pts CS	NHD	R Log	0.9	FAranha	submit

VAP: Pneumoniae ; NHD: Hemodialysis

CONCLUSION: Few reports exist about LAD on echocardiography as a risk marker for CS; in our studies, however, LAD has reached greater significance than the subjective analysis of LV function. The great prevalence of valvular surgery (VS - 30%) might be another possibility. These findings should be validated in a cohort with other centers.

Grant acknowledgement: Omena W., Alves LM., Sabino J., Aranha FG, Vegni R., Tura B. and Dohmann HJ.

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HEMODIALYSIS IN THE CARDIAC SURGERY POSTOPERATORY: INCIDENCE AND MORTALITY IN A TERTIARY HOSPITAL

Aranha F G[1], Rouge A[1], Gomes R V[1], Dessen M[1], Nogueira P M M[1], Fernandes M A O[1], Campos L A A[1], Dohmann H F R[1]
[1]Surgical Intensive Care Unit, Hospital Pró-Cardíaco - PROCEP, Rio de Janeiro, Brazil

INTRODUCTION: The need for dialytic support (HD) in the PO period of CS relates to a significant increase in costs and length of hospitalization, in addition to high rates of morbidity and mortality.The objective this study is assess the incidence of HD and its association with mortality in adult patients (pts) undergoing CS.

METHODS: Historical cohort with data of 770 pts undergoing CS collected from June/00 to January/04. The pts were divided into 2 groups as follows: 1) group I, 716 pts who did not undergo HD; and group II, 54 pts who required HD, accounting for 7.01% of the sample. Their mean age was 65.27 years, 68.3% were males, 24.6% were diabetic, and 55% of the CS were elective. The mean AHA mortality score was 4.8±3.5, and the mean Euroscore was 5.27±3.82. Analysis of frequency and the chi-square test were used for comparing mortality.

RESULTS: Fifty-six (7.27%) pts died in the hospital, 29 (4.05%) in group I, and 27 (50%) in group II. Thirty-nine (5.06%) pts died within 30 days, of whom 16 (29.6%) were in group II. An important statistical significance (P<0.00001) was observed between both groups. The PO intensive care unit length of stay was significantly longer in group II, in which 75% of the pts remained hospitalized for more than 7 days (P<0.00001).

CONCLUSION: The PO intensive care unit length of stay and mortality were significantly greater in the group of pts undergoing HD in the PO period of CS. A high percentage of patients underwent HD (7.01% of the sample), which may be explained by the profile of the population studied. In group II, in-hospital mortality was 50%, and mortality in 30 days was 29.6%. In the entire sample, these indices were 7.27% and 5.05%, respectively, and the Euroscore predicted a mortality rate greater than 11.5%.

Grant acknowledgement: Pinto JE., Tura BR., Sabino J., Filho D.,Barbirato G., De Carvalho LP. and Dohmann HJ.

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VALUE OF HEMODYNAMIC PARAMETERS AND BLOOD GASES TO PREDICT ANAEROBIC METABOLISM EARLY AFTER CARDIAC SURGERY

Durand M[1], Gardelin M[1], Bertet M[1], Tessier Gonthier-Maurin Y[1], Bouzat P[1], Girardet P[1]
[1]Anaesthesia, CHU de Grenoble, grenoble, France

INTRODUCTION: Global tissue hypoxia is associated with a poor outcome after cardiac surgery [1]. The best predictor of anaerobic metabolism in septic patient seemed to be the ratio of venoarterial CO2 difference (dPCO2)/arteriovenous O2 (Ca-vO2) content [2]. The aim of the present study was to verify if this ratio had the same predictive value after cardiac surgery.

METHODS: We performed a retrospective analysis of 95 patients with simultaneous 271 measurements of arterial and venous blood gases and arterial lactate levels during the first 24 hours after surgery. We tested the predictive value of heart rate (HR), cardiac index (IC), mixed venous oxygen saturation (SvO2), dPCO2, Ca-vO2, dPCO2/Ca-vO2 and oxygen consumption (VO2) to predict anaerobic metabolism (lactate > 2 mmol/L). The area under ROC curves was calculated for the main parameters. Results are expressed as mean +/- SD.

RESULTS: 172 results of lactate were below 2 mmo/L (Gr 1), 99 were above (Gr 2). dPCO2 (kPa) was significantly higher in Gr2 than in Gr 1 (table). Only poor correlation was found between the different parameters and lactate levels. Area under ROC curves were 0.65 for dPCO2, 0.62 for IC, 0.61 for dPCO2/Ca-vO2 and 0.57 for SvO2.

	Gr 1	Gr 2	p
HR	79+/-16	86+/-13	0.0014
Hg (g/l)	103+/-15	109+/-18	0.0024
MAP (mmHg)	83+/-15	83+/-13	0.076
CI (l/min/m2)	2.4+/-0.6	2.2+/-0.5	0.037
SvO2	64+/-7	63+/-8	0.35
dPCO2 (kPa)	0.83+/-0.44	0.95+/-0.44	0.04
dPCO2/Ca-v O2	0.018+/-0.009	0.019+/-0.008	0.49
Lactate (mmol/l)	1.5+/-0.3	2.8+/-0.6	<0.0001

CONCLUSION: Unlike septic patient, only an increase of dPCO2 was predictive of anaerobic metabolism earlier after cardiac surgery.

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ENDOVASCULAR TREATMENT OF TYPE B AORTIC DISSECTION: PRELIMINARY RESULTS IN ICU

Del Moral R M G[1], Soto J M[1], Pomares J E[1], Pedrosa D[1], Salmerón L M[2], Ros E[2], Torres Ruiz J M[1]
[1]Intensive Care Unit, [2]Vascular Surgery Service, Hospital Clìnico San Cecilio, Granada, Spain

INTRODUCTION: The conventional choice for type-B aortic dissection has been medical treatment. Surgical repair has been kept for cases presenting complications. Both treatments are associated with high mortality rates. Endovascular stent-graft placement opens up new perspectives in the controversial treatment of thoracic aorta dissections.
The objective of this paper is to describe our experience in the post-operative handling of type B aortic dissections treated with endovascular stent grafting.

METHODS: Twelve patients admitted to an all-purpose ICU from January 2001 to March 2004 treated with endovascular stent grafting. Ten patients with acute type B dissection and one patient with traumatic rupture of thoracic aorta. The pre-operative study included transesophagic ecography and CT to evaluate the extent of the dissection, the relation with the left subclavian exit, true and false lumen size, and vascular complications.

RESULTS: Placement of the endovascular stent-graft (TALENT type) was successful in all cases. Three patients died within the first 30 days, two of them in the ICU, with a mortality rate of 25%. Complications: one patient had retroperitoneal hematoma, and another presented perioperative AMI. Two cases were observed of paraplegia, and one case of perioperative acute cerebellar ischemia in relation with type A retrograde dissection of the thoracic aorta. The mean stay in the ICU was 8.5 days. Mean mechanical ventilation time was 2.95 days. Five patients (45%) presented nosocomial infection: four infections by catheter (66%), one episode of urine infection (16%) and one episode of pneumonia associated with mechanical ventilation (16%). Four patients presented acute kidney collapse (36%), without the need for hemodialisis in any case.

CONCLUSION: Endovascular stent-graft placement can be an alternative to open surgery in the treatment of type B aortic dissection. Preliminary results on post-operative morbimortality are promising. Randomized and controlled studies are needed to assess the therapeutic potential.

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BENEFICIAL EFFECTS OF L-ARGININE ON HEPATOSPLANCHNIC NO METABOLISM AND PERFUSION DURING SEPSIS

Poeze M[1], Bruins M J[1], Lamers W H[2], Greve JWM[1], Ramsay G[1], Deutz NEP[1]
[1]Department of Surgery, University Hospital Maastricht, [2]Department of Anatomy and Embryology, University of Maastricht, Maastricht, Netherlands

INTRODUCTION: The effects of L-arginine treatment on whole-body and hepatosplanchnic nitric oxide (NO) production and perfusion were studied prior to, and after endotoxemia in the pig.

METHODS: In a randomized controlled trial, chronically instrumented female pigs (20-25 kg) received 3 µg/kg/h lipopolysaccharide (LPS) intravenously and saline resuscitation. L-arginine (3 mg/kg/h or saline was administered intravenously starting 12h prior to a LPS infusion and continued for 24h after stopping the endotoxin infusion. Whole-body appearance rates, and portal-drained viscera (PDV) and liver fluxes of arginine, citrulline, NO and whole-body arginine de novo synthesis were determined using a primed, stable isotope infusion of 15N2-arginine and 13C-2H2-citrulline. Hepatosplanchnic blood flow and oxygen consumption (VO2) was determined using a primed-continuous infusion of para-aminohippuric acid and intestinal intramucosal pCO2, respectively.

RESULTS: Arginine supplementation per se did not affect blood flow in the aorta and hepatic artery, but increased that in the portal vein. Furthermore, it increased NO production at the whole-body level (6 versus 2 mmol/kg/min in controls, p= 0.02) and PDV, but not in the liver. Arginine supplementation during subsequent exposure to LPS decreased peripheral resistance, increased cardiac output, reduced the intestinal intramucosal pCO2 and prevented an increase in PAP and glycolytic energy production.(lactate 1.60 ± 2.68 vs. 0.16 ± 0.14, p=0.02). These beneficial effects of arginine supplementation were accompanied by an increased NO synthesis at the whole-body level and in the liver during endotoxemia, together with a temporarily decreased NO synthesis in the PDV (1 mmol/kg/min compared to baseline 2 mmol/kg/min, p= 0.0001).

CONCLUSION: Arginine treatment starting prior to endotoxemia appears to be beneficial, because it enhances NO synthesis during endotoxemia and improves hepatosplanchnic perfusion and oxygenation without deleterious systemic side effects.

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URINARY LACTATE IS INCREASED DURING EXPERIMENTAL SEPTICEMIA IN THE ISOLATED PERFUSED RAT KIDNEY

Heringlake M[1], Haeubling C[1], Bahlmann L[1], Klaus S[1], Gosch U[1], Ocker H[1], Pagel H[2]
[1]Anesthesiology, [2]Physiology, University of Luebeck, Luebeck, Germany

INTRODUCTION: Research in intensive care nephrology is currently limited by the fact that most tests used for the monitoring of renal injury are not available as a bedside procedure in the clinical setting. No data are available if the lactate concentration in urine – a parameter readily accessible in most ICUs - is reflective of variations in kidney function.

METHODS: We studied renal function parameters and the lactate concentration in the perfusion solution (PL) and urine (UL) in isolated rat kidneys perfused for 180 min with a constant perfusion pressure of 100 mmHg. Four groups were studied: a control group (CON; n=6), a group perfused with a uropathogenic E. coli strain (536/21 WT; [1]) (E.coli; n=4), and a group perfused with E.coli and 10µg urodilatin (E.coli+URO; n = 3).

RESULTS: Renal functional parameters and the lactate concentration in the perfusion medium and urine are given in table 1.

Table 1:

	UV [µl/(min*g)]	RBF [ml/min]	GFR [µl/(min*g)]	$U_{Na}V$ [µmol/(min*g)]	U_P [mmol/l]	U_L [mmol/l]
Con:	124±16	19±1	675±27	15.8±2.8	2.1±0.2	1.4±0.2
E.coli:	8±2*	6±1*	102±16*	1.1±0.2*	2.3±0.1	4.8±0.6*
E.coli+URO:	29±5*	7±1*	286±50*	3.2±0.6*	2.1±0.1	3.1±0.5*

Data are mean±SEM. UV: urine flow; RBF: renal blood flow; GFR: glomerular filtration rate; $U_{Na}V$: renal sodium excretion; U_P: lactate perfusate; U_L: lactate urine. *: p<0.05 in comparison with the Con-group (unpaired t-test + Bonferoni-correction).

CONCLUSION: Urinary and perfusate concentrations of lactate during experimental septicemia are markedly different. Changes in urinary lactate during septicemia and treatment with a natriuretic peptide are reflective of variations in kidney function; suggesting that this parameter may indeed be an adjunct for the diagnosis and monitoring of septic renal injury. Further studies will have to reveal the course of urinary lactate during other types of injury, i.e. renal ischemia and exposure to nephrotoxins, and if this parameter may be used for the rapid detection of kidney injury in the clinical setting.

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NONRADIOLOGIC EXPRESS METHOD ASSESSMENT OF ENTERAL (POSTPYLORIC) FEEDING TUBE POSITION

Litmanovitch M[1], Isakovich B[1], Shoabi O[1]
[1]General ICU, Hillel Yaffe Medical center, Hadera, Israel

INTRODUCTION: Numerous prospective, randomized studies in critically ill patients indicated that enteral feeding is superior to parenteral feeding and that early enteral feeding, compared with delayed enteral feeding, improves patient outcome as measured by length of stay or complication rates. Ideally, tube insertion would be inexpensive and would require minimal time and technical expertise. We inspected a simple bedside technique for positioning the feeding tube.

METHODS: All 40 included patients received a polyurethane feeding tube with a flexible wire stylet (20-9431 silk enteral feeding tube, Corpack, Wheeling, IL).One size 103 cm – 10Fr of feeding tubes was used in this study. Feeding tube position was confirmed by an abdominal radiograph. Each radiograph was reviewed by a radiologist. Equipment to measure Ph and Bilirubin consisted of color – coded paper (Multistic 10sc Bauer Corp.USA), Amylase and Bilirubin (second test) were measured in the central clinical laboratory.

RESULTS: Successful aspiration of duodenal fluid was performed in 36(91%) patients. Median time for perform bilirubin and Ph by color – coded paper (Multistic 10sc Bauer Corp.USA) – up to 20 seconds. Median time for perform bilirubin and amylase analysis in duodenal fluid in central laboratory was 3.2 (+ 1.5) hours.

Parameter specif	Sensitivity(%)	Specificity(%) predict value	Positive predict value	Negative
clear yellow color	85% (84 - 90)	90% (81 – 94)	84% (75 – 96)	95% (93 – 98)
pH > 5 (express test)	86% (91 – 90)	71% (62 – 85)	75% (65 – 85)	97% (93 – 100)
bilirubin > 5 mg	81% (73 – 87)	97% (92 – 100)	94% (87 – 100)	90% (81 – 100)
bilirubin (express test)	87% (82 – 96)	91% (89 – 100)	88% (84 – 93)	81% (75 – 92)
Amylase>500 un/m	92%(90 – 99)	96% (94 –99)	94% (96 –99)	99% (97-100)

CONCLUSION: Amylase level > 500un/ml and bilirubin concentration of 5 mg/dL in duodenal aspirated fluid has a high positive predictive value. Position of the feeding tube within the gastrointestinal tract can be determined objectively by using simple pH and bilirubin reagent strips.

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POTASSIUM ADMINISTRATION BY NURSE DIRECTED PROTOCOL IN THE ICU

Meynaar I[1], Ulenkate H J L M[2], Dawson L[1], Salm E[1]
[1]Intensive Care Unit, [2]Clinical Chemistry, Reinier de Graaf Hospital, Delft, Netherlands

INTRODUCTION: Serum potassium (K) is frequently measured in intensive care patients. Abnormal K levels can provoke arrhythmia and muscle weakness. Therefore normal levels of K are aimed for. Potassium administration is normally ordered by intensivists depending on measured serum K levels. The object of this study was to develop and evaluate a protocol for nurse directed potassium administration in intensive care patients.

METHODS: The ICU is a 10 bed closed format mixed medical and surgical unit. The study compared K levels in intensive care patients during two periods. From August 1st, 2002 until November 1st, 2002, the pre-protocol period, physicians ordered K supplementation in each patient individually. From December 1st 2002 until March 1st 2003, the protocol period, the potassium protocol was used by nurses. Normal range for K in our hospital is 3.5-5.0 mmol/L. Patients with serum creatinin > 150 umol/L or urine output < 500 ml/day were excluded from analysis. The protocol required serum K to be measured at admission to the ICU and at least daily. Instructions in the protocol are stated below: K <2.5: Give 4 g (53.6 mmol) KCl in 4 hours, notify physician, repeat serum K in 4 hours. K 2.5-3.1: Give 4 g KCl in 4 hours, repeat serum K in 4 hours. K 3.2-3.5: Give 4 g KCl in 12 hours, repeat K in 12 hours, if no rise give 6 g KCl in 12 hours. K 3.6-5.0: Give 6 g (80.4 mmol) KCl in 6 hours, repeat serum K in 24 hours. K 5.1-6.0: Stop KCl administration, repeat serum K in 12 hours. K >6.0: Stop KCl administration, notify physician.

RESULTS: Results are presented in Table 1.

	All patients	Pre-protocol	Protocol
Number (Nr) of patients	251	134	117
Number of K measured	1853	998	855
Mean K	4.04	4.00*	4.10*
Nr of K <3.5 or K>5.0	331 (17.9%)	173 (17.3%)**	158 (18.5%)**
Nr of K <2.5 or K>6.0	11	9	2

**p<0.001, T test; **p=0.52, Chi sq NS*

CONCLUSION: In ICU patients with normal renal function a nurse directed protocol for potassium administration is feasible and as effective and save as tailor made potassium prescription by physicians.

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DISCORDANT RESPONSE TO ACTH STIMULATION IN PATIENTS WITH SEPTIC SHOCK

Webb I[1], Gibbs T[1], Beale R[1], Jones A[1].
[1]Department of Intensive Care Medicine, Guy's and St Thomas' Hospital, London, United Kingdom

INTRODUCTION: Septic shock may be accompanied by dysfunction of the hypothalamic-pituitary-adrenal axis (HPA). In a recent multi-center randomized controlled clinical trial, treatment with hydrocortisone and fludrocortisone significantly reduced the risk of death in patients with septic shock and relative adrenal insufficiency (as determined by ACTH stimulation) but not in patients with an adequate adrenal response (1). Subsequently it has become accepted practice to start corticosteroid replacement in patients with septic shock following an ACTH stimulation test to determine the presence (non-responder-NR) or absence (responder-R) of „adrenal insufficiency". In those patients with "adequate" adrenal function, corticosteroids are withheld or withdrawn. It is known that in patients who recover, this „adrenal insufficiency" is temporary. However, less is known about the temporal changes in HPA function within the period of critical illness.

METHODS: Our clinical information system (CareVue, Philips Medical Systems, UK) was interrogated to find all patients with septic shock who underwent repeated ACTH stimulation (1\mug) testing in an 12 month period. Baseline cortisol, NR/R status (\deltacortisol <9 \mug/dl), vasopressor requirements and use of hydrocortisone were identified.

RESULTS: We identified 8 patients who underwent repeated ACTH stimulation testing within a single episode of septic shock, who received no or limited steroid replacement therapy. In 3 subjects (6,7,8 **Table 1**), there were discordant results, the initial test showing responder status and subsequent testing non-responder status.

Subject	1st test (\delta cortisol (\mug/dl)	2nd test (\delta cortisol \mug/dl)	Interval (days)
1	11.5	16.4	7
2	1.1	1.4	2
3	8.5	5.8	5
4	10.7	10.6	2
5	16.4	13.5	3
6	14.1	8.0	7
7	10.1	5.5	4
8	9.7	7.5	6

CONCLUSION: The recognition that HPA abnormalities exist in sepsis and that exogenous steroids are beneficial in some individuals has changed practice over recent years. However, the best indicator of which patients would benefit from corticosteroid replacement remains unclear. In addition, this preliminary data suggests that an individual patient's response to ACTH stimulation may change during an episode of septic shock. Of particular concern are patients who are initially „responders" who would not recieve beneficial therapy if only single estimates of adrenal dysfunction are used.

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CHARACTERISTICS OF LIVER DYSFUNCTION IN CRITICALLY ILL ICU PATIENTS

Koulenti D[1], Mis M[1], Myrianthefs P[1], Tsigou E[1], Ioannidis C[1], Gavala A[1], Grigoriou P[1], Baltopoulos G[1]
[1]ICU, KAT Hospital, Athens, Greece

INTRODUCTION: Liver dysfunction is very common in critically ill patients due to a variety of reasons including trauma, sepsis, congestive heart failure, gall stones, hemorrhagic shock, transfusions, and drug hepatotoxicity. The purpose of the study was to investigate the characteristics of liver dysfunction in ICU patients.

METHODS: We prospectively collected data concerning demographic characteristics and liver biochemistry in critically ill patients for a total period of 6 months. Liver dysfunction was defined as an increase in liver enzymes by twofold times including SGOT, SGPT, Alkaline phosphatase, gamma-GT, and bilirubin.

RESULTS: During the study period, 88 patients were admitted in our ICU. Mean age was 54.9±2.6, SAPS II was 45.3±2.1, APACHE II was 17.8±0.9 and MODS was 5.5±0.4. ICU LOS was 13.6±2.3. Forty-five patients (51.1%) developed liver dysfunction. Five of them (11.1%) had more than one episodes of liver dysfunction. Mean peak values of liver enzymes in patients developing liver dysfunction were SGOT 480.8±205.0, SGPT 305.6±83.7, ALP 133.4±15.3, gamma-GT 283.6±38.6, total bilirubin 2.5±0.6, and direct bilirubin 1.2±0.3. Mean duration of liver dysfunction was 6.1±0.7 days. Mean day of liver dysfunction developed was on 5.5±0.8 day. Confirmed aetiology of liver dysfunction included sepsis (10 pts), trauma-rhabdomyolysis (10 pts), cholestasis (3 pts) and drugs (3 pts). We found statistically significant differences ($p<0.005$) between the patients developing liver dysfunction and those who did not concerning LOS (17.9±3.5 vs.9.0±2.8 days), SAPS II score (51.4±2.4 vs.39.1±2.9), APACHE II 21.16±1.1 vs. 14.36±1.3 and MODS score 6.8±0.5 vs.4.1±0.5. Mortality was also significantly higher in patients developing liver dysfunction (35.6 vs. 16.3%).

CONCLUSION: Half of the critically ill patients may develop liver dysfunction during ICU hospitalization due to a variety of reasons which may be related to increased LOS, increased illness severity and other organs dysfunction and worst outcomes.

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SEVERE ACUTE PANCREATITIS: EVALUATION OF PRONOSTIC INDICATORS

Caballero Zirena A[1], Cortés Díaz S[2], Álvarez Terrero A[2]
[1]Intensive Care Unit, Hospital Virgen de la Concha, [2]Intensive Care Unit, „Virgen de la Concha“ Hospital., Zamora, Spain

INTRODUCTION: Acute pancreatitis is an “acute inflamatory process of the pancreas with variable involvement of other regional tissues or remote organ systems”. The definitions of severe pancreatitis accepted generally are: Acute Physiology and Chronic Health Evaluation (APACHE II) score greater than 8, three or more Ranson´s criteria and CT Grading System of Balthazar. Predicting severity of pancreatitis early in the course of disease is very important to prevent and minimize organ dysfunction and complications.

METHODS: From 1999 to 2003 a total of 521 patients were hospitalized with the diagnosis of acute pancreatitis. Of these, 27 patients (5%) were admitted to the Intensive Care Unit. The aim of this study was to compare APACHE II score, Ranson´s criteria and CT Grading system of Balthazar for predicting severity and fatal outcome in severe pancreatitis.

RESULTS: 27 patients were identified. There were 17 men and 10 women. The mean age was 63 years (range 32-83). The most common cause of severe acute pancreatitis were gallstones (66%) and alcoholism (18%). The mean of APACHE II score at the admission was 18,8 (range 9-33). Most of the patients had higher CT score. All of them had more than three Ranson´s criteria. The overall mortality was 48% (13 patients). The intensive care unit length of stay ranged from 1 to 57 days (mean 7 days).

CONCLUSION: High APACHE II or Ranson´score at admission significantly determined survival. Ranson criterium has the disadvantage of delay. APACHE II score is useful in organ failure prediction. Balthazar score is superior in predicting pancreatitic necrosis. None of the parameters tested achieved sufficient predictability when used alone.

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FONDAPARINUX SODIUM IN HEPARIN-INDUCED THROMBOCYTOPENIA

Hoeksema M[1], Wester JP [1], Bosman RJ [1], Oudemans-van Straten HM [1], Van der Spoel JI [1], Haak EAF [2], Leyte A [3], Zandstra DF [1]
[1]Intensive Care Unit, [2]Clinical Pharmacy, [3]Clinical Chemistry, OLVG, Amsterdam, Netherlands

INTRODUCTION: In critically ill patients with multiple organ dysfunction (MODS), thrombocytopenia is frequently observed. Heparin-induced thrombocytopenia (HIT) accounts for 6-11% of all causes of thrombocytopenia. As HIT may be complicated by arterial and venous thrombosis (HITT), alternative anticoagulation is indicated. Fondaparinux sodium (Arixtra®) is a newly developed synthetic pentasaccharide and acts by selective antithrombin-mediated indirect factor Xa inhibition resulting in subsequent thrombin inhibition. Fondaparinux sodium has no cross-reactivity to heparin and has not induced an immune-mediated thrombocytopenia in non-ICU patients. The elimination is almost exclusively renal. Its major drawback is the increased risk of bleeding, to which patients with MODS are prone. Data on treatment schedules in critically ill patients are non-existent. We describe our experience with fondaparinux anticoagulation in the treatment of HIT.

METHODS: We have treated 3 patients with MODS and laboratory-proven HIT with fondaparinux sodium between December 2003 and February 2004. Treatment with unfractionated heparin or nadroparin calcium was stopped and laboratory tests for HIT were performed with the HIT-antibody ELISA test. Awaiting the test results, fondaparinux sodium (Arixtra®, Sanofi-Synthelabo, The Netherlands) was administered as a once daily subcutaneously injection or a continuous infusion of 1.25-2.5 mg/day without loading dose. Study endpoints were increase of platelet counts, thrombo-embolic and bleeding complications, and need of transfusion.

RESULTS: One female and two male patients, aged between 69 and 82 years, with APACHE II scores between 26 and 33, were diagnosed of HIT due to concomitant nadroparin calcium anticoagulation. Minimum platelet counts varied from 45 to 92 G/l. HIT-antibodies were present in all patients. All patients suffered acute renal failure and were treated with continuous venovenous hemofiltration. Treatment with fondaparinux sodium varied from 5 to 28 days. Platelet counts improved during fondaparinux sodium. One patient died and autopsy revealed a new myocardial infarction. In another patient recurrent major bleeding resulting in acute tamponade and hematothorax occurred under treatment of both unfractionated heparin and nadroparin as well as under fondaparinux. The third patient suffered a minor bleeding complication. Totally, 16 units of erythrocyte concentrates, 3 units of plasma, and 3 units of platelet concentrates were transfused during 45 treatment days.

CONCLUSION: Treatment with low-dose fondaparinux sodium in patients with MODS and HIT may be an alternative to treatment with direct thrombin inhibitors. The efficacy and safety need to be determined.

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PROGNOSTIC FACTORS FOR RED PACK CELL TRANSFUSION AFTER ICU

Claessens Y E[1], Marque S[2], Chiche J D[2], Mira J P[2], Dhainaut J F[3], Cariou A[2]
[1]Emergency Medicine, [2]ICU, [3]ICU and Emergency Medicine, Cochin Hospital, Paris, France

INTRODUCTION: Saving red pack cell (RPC) transfusion is an important goal in critical care management. The need for RPC transfusion after ICU discharge has never been evaluated.

METHODS: Prospective monocentric study in critically ill patients admitted between July and December 2003 in the medical ICU of a teaching hospital. Data collected: demographics; SAPS2 and LOD (d0 & discharge) ; comorbidity; diagnosis, treatments, ICU and hospital lenght of stay ; Hb level at ICU admission and discharge ; RPC transfusion in ICU and during the 8 days following ICU discharge with Hb threshold and active haemorrhage. Information letter was given to patients and families

RESULTS: Population: 550 consecutive pts (52 (19) yrs, SAPS2 40(21), (med(SD)). ICU mortality 22%. Hb at admission 11.4(2.5) g/dl. 17.6% needed RPC transfusion, threshold 7.13 (1.15) g/dl) ; 42% mortality among RPC transfused pts.

428 survivors :RPC tranfusion = 20% in ICU, 9% within 8 days after ICU discharge. Risk factors for RPC transfusion after multivariate analysis (RR(IC95%)) : age (1.06/yr (1.02-1.12)), female (5.5(1.2-24.9)), cancer (32.6(3.8-280.1)), admission for sepsis (341(20-5734)), LOD (1.45/point(1.12-1.87)) and Hb (0.02/g/dl (0.007-0.09)) at discharge. The need of RPC transfusion after ICU is associated with an increased hospital lenght of stay (23,6(13,1) vs 15,6(13,3) P 0,025). Medical history of hematological malignancy or chronic renal failure does not increases the risk of RPC transfusion at discharge.

CONCLUSION: We determined risk factors for patients that are more likely to be transfused with RPC at ICU discharge. Future strategy for saving blood transfusion should specifically evaluate these populations in ICU and after discharge.

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LEVOSIMENDAN PRESERVES PLASMA LEVELS OF ACTH AND CORTISOL IN AWAKE AND ANESTHETIZED DOGS

Scheeren T W L .[1], Picker O[1], Bornstein S R[2], Schwarte L A[1]
[1]Klinik für Anaesthesiologie, [2]Klinik für Endokrinologie, Universitätsklinikum Düsseldorf, Duesseldorf, Germany

INTRODUCTION: Levosimendan (LEVO) is a promising novel inotrope [1], however, with unknown impact on the pituitary-glucocorticoid axis (key mediators: ACTH / cortisol, affected key metabolite: serum glucose). Both, the ACTH / cortisol system [2] and blood glucose levels [3] are increasingly regarded important in intensive care medicine. Since the effects of LEVO on this system may depend on the state of consciousness, we studied respective endocrine effect of LEVO both in the awake and anesthetized state. We compared respective effects of LEVO with those of established inotropes, MILrinone and DOButamine.

METHODS: Awake and anesthetized (1.5 MAC sevoflurane, ventilated) dogs (total: 36 experiments) randomly received LEVO (10µg/kg plus 3 steps:0.125-0.5µg/kg/min), MIL (5.0µg/kg plus 1.25-5µg/kg/min) or DOB (2.5–10µg/kg/min). Under steady state conditions (each dose: 30 min) we measured arterial ACTH-, cortisol- and glucose-levels. Statistics: Data presented as mean±sem, Wilcoxon test, $p<0.05$, alpha-adjusted for multiple testing.

RESULTS: LEVO preserved the levels of ACTH both in the awake state (2.9±0.7 vs. 2.9±0.6pg/ml, baseline and highest drug dose) and during anesthesia (4.3±0.6 to 6.5±2.2pg/ml). LEVO dose-dependently -but insignificantly- increased cortisol under both conditions (awake state: 6±3, 7±4, 15±5 and 19±6ng/ml; anesthesia: 14±5, 22±8, 20±9 and 31±11ng/ml). LEVO preserved (as did MIL and DOB) arterial glucose at ~100-120mg/dl under all conditions. MIL maintained ACTH in the awake state (2.2±0.4 to 2.1±0.5pg/ml) and during anesthesia (3.2±0.4 to 2.5±1.0pg/ml), also cortisol (5±4 to 6±5; 22±7 to 29±6ng/ml). DOB maintained ACTH in the awake (2.5±1 to 2.3±1pg/ml) and anesthetized state (2.9±0.7 to 4.3±1.1pg/ml), and caused insignificant increases in cortisol (10±8 to 19±16; 18±5 to 36±11ng/ml).

CONCLUSION: LEVO under all conditions maintained ACTH, cortisol and glucose levels. The slightly increased cortisol-levels remained in ranges also observed during MIL- and DOB-treatment. LEVO, thus, evoked a similar endocrine response as the established inotropes MIL and DOB. If our findings apply to the clinical setting, LEVO (1.) does not suppress the ACTH/cortisol system, and (2.) exerts similar endocrine effects than MIL and DOB.

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HUMAN GLIOMAS CONTAIN ENDOGENOUS MORPHINE

Olsen P[1], Rasmussen M[1], Tønnesen E[1], Zhu W[2], Stefano G[2]
[1]Deptartment of Anaesthesia, Århus University Hospital, Århus, Denmark, [2]Neuroscience Research Institute, State University of New York, New York, United States

INTRODUCTION: Exogenously administered morphine has immune modulating effects. The discovery of endogenously synthesised morphine and increased synthesis in response to surgical stress (1,2) and endotoxin infusion imparts a role to endogenous morphine in the immune response. Morphine may also affect cancer progression. However, in vitro and xenograft experimental studies illuminating morphine's role in carcinogenesis show conflicting results.
The aim of the present study was to analyse human gliomas for the content of endogenous morphine.

METHODS: The study was approved by the Regional Ethical Committee on Human Research.Twelve gliomas were extracted during craniotomy and frozen instantaneously in liquid hydrogen. Patients did not receive morphine intra- or postoperatively.
Pathological analyses confirmed the diagnoses glioma. Upon preparation samples were analysed for morphine content with radioimmunoassay (RIA) and specificity was confirmed with mass spectrometry.

RESULTS: All tumours contained endogenous morphine with concentrations ranging from 2,01 ng/g – 169,92 ng/g. The identity of morphine was subsequently confirmed by mass spectrometry.

CONCLUSION: The demonstration of endogenous morphine in gliomas suggests its potentially role in carcinogenesis either as an inherent protective measure or as a result of neoplastic transformation. However, it remains to be clarified where the endogenous morphine production takes place. It is also unknown whether the presence of morphine is a pan-cerebral phenomenon or specific to cancerous tissue. The present study revealed a high content of endogenous morphine in human gliomas, providing further support to the idea of potential influence of endogenous morphine in cancer growth.

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HFOV IN PEDIATRIC PATIENTS

Plotz F B[1], Wijffels F Y A M[1], Van de Vaart K[1], Markhorst D G[1]
[1]Pediatric Intensive Care, VU medical center, Amsterdam, Netherlands

INTRODUCTION: HFOV is an ideal method of ventilation to minimize VILI. However, there is limited data regarding outcome in children treated with HFOV. We therefore report our experience with HFOV at our PICU.

METHODS: We retrospectively analysed the chartrecords of all children treated with HFOV after failure on CMV between 2001-2004. The following were recorded: demografic variables, admission diagnosis, PIM II scores, and OI and AaDO2 at several timepoints before and after transition to HFOV. End points included survival at 28 days post-admission to PICU and total number of ventilation days (CMV and HFOV).

RESULTS: Twenty-four children aged 1 day to 6.5 years were treated with HFO. Seven died and seventeen children survived. Non-survivors had a significant higher PIM score (25.8 vs 6.6), shorter duration of pre-CMV (22 vs 108 h). The OI and AaDO2 between non-survivors and survivors were 15.5 vs 21.1 and 355 vs 480, respectively. Both OI and AaDO2 did not decrease over time in the non-survivors. Total ventilation days were lower in the non-survivors (89 vs 156 h).

CONCLUSION: HFOV was associated with a high survival percentage (71%)in a selected group of children were CMV failed.

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INFECTIOUS MORBIDITY AND MORTALITY IN CHILDREN WITH CONGENITAL DIAPHRAGMATIC HERNIA REQUIRING PICU

Reid F F A[1], Taylor N[1], Kerr S[2], Losty P D[3], van Saene H K F[1]
[1]Medical Microbiology, University of Liverpool, [2]Paediatric Intensive Care, Alder Hey Hospital, [3]Paediatric Surgery, University of Liverpool, Liverpool, United Kingdom

INTRODUCTION: To evaluate five endpoints [i] infection rate; [ii] site of infection; [iii] causative micro-organisms; [iv] pathogenesis; and [v] mortality

METHODS: Surveillance swabs of throat and rectum were taken on admission and then twice weekly, diagnostic samples on clinical indication [1]. Enteral polymyxin, tobramycin and amphotericin B was started as part of selective digestive decontamination [SDD] [2] following identification of the abnormal carrier state of aerobic Gram-negative bacilli [AGNB].

RESULTS: 26 children with CDH requiring >=4 days of ventilation, accounting for 34 admissions to the PICU, were enrolled in this prospective, observational cohort study over 4 years. The median paediatric index of mortality was 0.139 [IQR 0.060 to 0.162], and the actual mortality in this subset was 3.8% [1 child out of 26]. The median length of PICU stay was 11 days [IQR 6.5 to 15]. Seven children had 14 infectious episodes, an overall infection rate of 26.9%. The median day of infection onset was 7days [IQR 4 to 13]. The most common site of infection was the bloodstream, with 12 episodes of septicaemia [86%]. The low level pathogen Staphylococcus epidermidis caused 60% of all infections [8 of the 14]. The majority of infections were exogenous, i.e., the bacterium was introduced into a normally sterile organ, directly from the PICU environment. One quarter of the infections were primary endogenous, i.e., the child developed an infection due to a micro-organism present in the admission flora. The death of one child was unrelated to infection.

CONCLUSION: This study shows an infection and mortality rate of 27% and 4%, respectively. Low level pathogens caused practically all infections which were mainly exogenous following breaches of hygiene. SDD was effective as endogenous infection due to AGNB was controlled.

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CHILDREN VENTILATED FOR SEVERE RSV BRONCHIOLITIS REQUIRE ANTIBIOTIC PROPHYLAXIS

Thorburn K[1], Puthi V R[1], Harigopal S[1], Taylor N[2], Van Saene H[2]
[1]Paediatric Intensive Care, Royal Liverpool Children's Hospital - Alder Hey, [2]Medical Microbiology, University of Liverpool, Liverpool, United Kingdom

INTRODUCTION: The use of antibiotics in RSV bronchiolitis has long been debated. There are no studies to date on the incidence of bacterial co-infection of the lower airways in severe RSV bronchiolitis. OBJECTIVES: 1) To determine the incidence of bacterial co-infection of the lower airways in RSV patients admitted to a tertiary paediatric intensive care unit (PICU). 2) To study the impact of the co-infection in this patient group.

METHODS: Prospective microbiological analysis of endotracheal aspirates on all RSV positive bronchiolitis patients on admission to the PICU.

RESULTS: A total of 124 patients were studied with a median age 2.6 months [IQR 1.2 – 11.3]. All were ventilated for a median of 6.0 days [IQR 4.0 – 8.0]. Median paediatric index of mortality (PIM) was 0.08 [IQR 0.04 – 0.14]. 47 (38%) children had endotracheal aspirates positive for bacteria on admission to the PICU - 30 (24%) children were infected and 17 (14%) colonized. 54% received antibiotics before admission, started by the referring hospital. 22/47 (47%) had co-morbidities (congenital heart disease, chronic lung disease, immunodeficiencies, abnormality of large airways), as compared to 29/77 (38%) in the RSV only group. H. influenzae (13), S. aureus (8), M. catarrhalis (6), S. pneumoniae (4) and P. aeruginosa (5) were most commonly identified, followed by S. pyogenes (2), B. pertussis (1), S. agalactiae (1), C. cloacae and E. freundii (1). Those with bacterial co-infection/colonization required ventilatory support for a similar period of time to those with only RSV ($p = 0.27$). Admission white cell count, neutrophil count and CRP did not differentiate between the groups. Both groups were of the same age ($p = 0.45$). Children older than 1 year of age were more likely to have bacterial co-infection than infants less than 1 year old (55% vs. 33%). There were ten deaths (8%), but only 4 were RSV-related (3.2%). Deaths were not higher in the co-infection group.

CONCLUSION: Antecedent antibiotics may have converted some of the "co-infected" patients into the "colonized" group, or even prevented bacterial growth entirely. Up to 40% of patients admitted to the PICU with severe RSV bronchiolitis were infected/colonized with bacteria in their lower airways. This finding supports the use of prophylactic antibiotics immediately on admission to PICU in this cohort of severe RSV disease.

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SURVEILLANCE CULTURES AND SELECTIVE DECONTAMINATION CONTROL S. AUREUS CARRIAGE AND INFECTION IN PICU

Ramos B M[1], Taylor N[1], Selby A[2], De la Cal M A[3], Van Saene H K F[1]
[1]Clinical Microbiology Infection Control, University of Liverpool, [2]Paediatric Intensive Care, Alder Hey Hospital, Liverpool, United Kingdom, [3]Intensive Care, University Hospital Getafe, Madrid, Spain

INTRODUCTION: To evaluate six endpoints 1) staphylococcal carriage rate, 2) rate of carriers with overgrowth, 3) infection rate, 4) correlation between overgrowth and infection, 5) impact of parenteral and enteral antibiotics on carriage and infection, 6) mortality.

METHODS: Surveillance swabs of throat and rectum were taken on admission and twice weekly afterwards. Diagnostic samples were taken on clinical indication. All samples were processed using standard bacteriological techniques. Overgrowth was defined as over 3+ or 105 staphylococcal cells/ml of saliva and/or g of faeces. Carriage index is the ratio of the sum of all semi-quantitative densities of positive surveillance swabs divided by the total number of swabs positive for Staphylococcus aureus on a particular sampling day.

RESULTS: 353 patients requiring more than 4 days ventilation were enrolled in this one year observational prospective study. The median paediatric index of mortality was 0.067 [IQR 0.029 to 0.148] and the actual mortality was 8.5%. The median length of stay was 8 days [IQR 5 to 12]. Carriage rate was 45.6%, 84.4% in the oropharynx and 55.2% in the rectal cavity. 21.1% of the carriers had S. aureus overgrowth. 16 patients [4.5%] developed a total of 25 infections. The median onset of infection was 13 days [IQR 2 to 83]. 12 patients had 19 endogenous infections [15 primary and 4 secondary endogenous]. Primary endogenous infections occurred at a median of 3 days [IQR 2 to 112]. There were 5 exogenous infections in 4 patients [i.e. they did not carry *Staphylococcus aureus*]. The pathogenesis of one infection was unknown. Tracheobronchitis was predominant [68%], followed by conjunctivitis [12%], wound infections [8%], septicaemia [8%] and osteomyelitis [4%]. The carriage index reduced steadily after the commencement of SDD [from 2.7 to 0.5]. Mortality in the carriers, in the carriers with overgrowth, and in the infected patients was 6.2%, 8.8% and 12.5% [2 of 16] respectively.

CONCLUSION: This paediatric ICU study shows a S. aureus carriage rate of 45.6% and an infection rate of 4.5%. More than 60% of all infections were due to S. aureus present in the admission flora and those infections developed early on day three of admission. Parenteral and enteral antibiotics significantly reduced the carriage index after one week. Mortality was low.

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SURVEILLANCE CULTURES AND ENTERAL ANTIMICROBIALS CONTROL PSEUDOMONAL INFECTION IN PICU

Rajendra B[1], Taylor N[2], Thorburn K[1], van Saene H K F[2]
[1]Paediatric Intensive Care, Alder Hey Children's Hospital, [2]Medical Microbiology, University of Liverpool, Liverpool, United Kingdom

INTRODUCTION: To evaluate six endpoints [i] pseudomonal carriage rate, [ii] number of carriers with overgrowth; [iii] infection rate, [iv] correlation between overgrowth and infection, [v] impact of enteral polymyxin and tobramycin on carriage and infection, [iv] mortality.

METHODS: Surveillance swabs of throat and rectum were taken on admission and then twice weekly, diagnostic samples on clinical indication. Oral polymyxin and tobramycin was started following identification of the pseudomonal carrier state. Overgrowth, defined as >=3+ pseudomonal cells/ml of saliva and/or gram of faeces. Carriage index is the ratio of the sum of all semi-quantitative densities of positive surveillance swabs divided by the total number of Pseudomonas positive swabs on a particular sampling day.

RESULTS: 671 children requiring >=4 days ventilation were enrolled in this two year study. Median PIM was 0.07 [IQR 0.03 to 0.15]; actual mortality was 10%. Median length of stay was 8 days [IQR 5 to 13]. Enteral polymyxin and tobramycin as part of SDD were administered to half of the study population [53%]. Carriage rate was 10.3%. 62% of the carriers had pseudomonal overgrowth. 39 patients [5.1%] developed infections. Median onset of infection was 10.5 days [IQR 6 to 21.5]. 28 patients had 35 endogenous infections [25 primary and 10 secondary]. Primary and secondary endogenous infections occurred at a median of 6 days [IQR 2.5 to 10.5] and 14 days [IQR 9 to 28] respectively. There were 20 exogenous infections in 14 patients [i.e. they did not carry Pseudomonas]. Lower airway infections [30%] were predominant, followed by wound infections [23%] and septicaemia [21%]. 60.7% [17/28] of patients had overgrowth at the time of their 21 endogenous infections. Enteral polymyxin and tobramycin reduced the carriage index below the threshold of overgrowth after one week of SDD. 16 children who were pseudomonal carriers died. Mortality rate in the carriers with overgrowth was 25.6 % [11/43]. Mortality rate of infected patients was 28.2% [11/39].

CONCLUSION: This study shows a pseudomonal carriage rate of 10% and an infection rate of 5%. Primary endogenous infections developed within the first week in the presence of overgrowth. Enteral polymyxin and tobramycin reduced carriage in overgrowth after one week. Mortality in infected children [28%] and carriers with overgrowth [26%] was high.

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GENDER DIFFERENCE IN PICU MORTALITY

Baines P[1], Parkins K[1], Griffin J[1]
[1]PICU, Royal Liverpool Children's Hospital, Liverpool, United Kingdom

INTRODUCTION: Gender affects mortality, with males having a higher standardised mortality overall and for most diseases. We describe mortality in patients admitted to a tertiary paediatric intensive care unit.

METHODS: Anonymous review of prospectively collected ICU audit database, from a tertiary paediatric hospital in Liverpool UK over the period 1st Jan 1999 to 31st October 2002, with approval of Caldicott guardian. Statistical tests by Stata version 4 (Stata Corp Texas).

RESULTS: Over the 3 year 10 month period, 3732 children were admitted to the PICU:2094 males 1638 females. Overall mortality was 202 (5.4%). 98 males died (4.7%) and 104 females died (6.3%). The difference in mortality rate was statistically significant ($p = 0.029$ by Fishers exact test). Neither the median nor the mean PIM score was significantly different when males and females were compared, but they were lower in females. SMR was 0.888 for females and 0.632 for males. A similar proportion of admissions were ventilated (78.6% of females and 78.1% of males, Fisher's exact test $p= 0.689$). The age distribution of the children was the same (50% under one year, 25% 1-5 years and 25% > 5years old). When the individual years were analysed separately, the mortality rate was consistently higher in females in each year. When admissions were separated into elective and emergency admissions, mortality was higher in emergency admissions than elective admissions, but again was consistently higher in females in both groups. When children were separated into diagnostic groups (cardiac, medical and surgical) mortality was highest in medical admissions, and was higher still in females. Only in those admitted with surgical conditions was the mortality lower in girls than boys.

CONCLUSION: In our PICU population, although fewer girls are admitted than boys, the absolute death rate and standardised mortality is higher in females than males. The cause is uncertain and warrants further investigation.

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SEVERE VARICELLA REQUIRING PEDIATRIC INTENSIVE CARE

Ujhelyi E[1], Krivácsy P[1]
[1]Pediatric Intensive Care Unit, Szt. László Hospital, Budapest, Hungary

INTRODUCTION: In Hungary the vaccination rate against varicella is low. The knowledge of chickenpox complications may help better evaluation of varicella immunization's benefits. Our aim was to determine the incidence of varicella and its complications in the pediatric intensive care unit (PICU) of Hungary's largest hospital for infectious diseases.

METHODS: Retrospective analysis of medical records of children admitted to our PICU with varicella diagnosis between February 1993 and December 2003.

RESULTS: During the study period 81 patients were admitted with varicella (3,1% of all admissions). The mean age of the patients (44 boys, 37 girls) was 46.5 (3-182) months. None had previous varicella vaccination. Sixteen patients were excluded from the further investigation because the primary reason for admission was unrelated to complications of varicella. In these cases the varicella had a normal course. Sixty-five patients required intensive care due to varicella related complications. Among them 51 (78%) was previously healthy, 7 (11%) unhealthy but immunocompetent and 7 (11%) immunocompromised. Twenty patients (31%) required mechanical ventilation. The most common complications were pulmonary and musculoskeletal. The pulmonary complications were: pneumonitis (5), bacterial pneumonia and pleuropneumonia (28). In this group 10 patients required thoracic drainage because of pleural fluid or pneumothorax. ARDS (acute respiratory distress syndrome) developed with 5 septic patients. Among the musculoskeletal complications there were osteomyelitis (3), phlegmone (12), cellulitis (1) and necrotizing fasciitis (1). Surgical intervention was necessary in eleven patients: drainage for osteomyelitis (3), abscessus drainage (7), debridement and plastic surgery (4). Eight patients had varicella encephalitis. Hematologic complications were thrombosis (4 cases) and immun-thrombocytopenia (ITP) in 5 patients. Sepsis was diagnosed in 23 patients. Group- A beta-hemolytic streptococcus was isolated in 10 patients and S.pneumoniae in 6 cases. The other pathogens were Staphylococcus aureus (2), E. coli (1) and fungi (3 patients). Three immunocompromised patients – 2 with acute lymphoblastic leukemia on chemotherapy - died due to sepsis. Five patients suffered long term damage due to varicella complications.

CONCLUSION: Varicella complications requiring intensive care are due to mainly to bacterial infections and they affect immunocompetent toddlers. These complications can be severe and even fatal. Vaccination is safe and useful in preventing varicella related complications.

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MORTALITY AND MORBITIDY TWO YEARS AFTER PEDIATRIC INTENSIVE CARE

Volakli EA[1], Sdouga M[1], Tamiolaki M[1], Antoniades A[2], Reizoglou M[3], Giala MM[4].
[1]PICU, [2]Organ Transrlantation Unit, Aristotle's University of Thessaloniki, Hippokration General Hospital, [3]Departement of Anesthesiology, Aristotle's University of Thessaloniki, Gennimatas General Hospital, [4]Departement of Anesthesiology, Aristotle's University of Thessaloniki, Ahepa University Hospital, Thessaloniki, Greece

INTRODUCTION: Mortality at discharge isn't a realistic index of PICU outcome as it excludes late deaths and ignores the morbidity of pediatric intensive care patients (pts). We examined the mortality and Pediatric Cerebral Performance Category (PCPC) and Pediatric Overall Performance Category (POPC) scales at known intervals during a two years period after PICU discharge.

METHODS: Prospective examination of 120 multidisciplinary PICU pts, 70M/50F, aged 1mo to 17y. Data collected: Demographics, Pediatric Risk of Mortality Score (PRISM III 24h), Mechanical Ventilation days (MV), Length of Stay (LOS), Hospital Stay (HS). Mortality at discharge, hospital, 3mo, 6mo, 1y and 2y. PCPC and POPC scales at admission and in the former intervals. Values are mean ± SD.

RESULTS: The mean age of our pts was 54.7 ± 53 mo, PRISM III 24h 9.2 ± 8.9. 80 pts (66.6%) needed MV for 8.6 ± 8.49 d, LOS 9.7 ± 19.7 d, HS 21.03 ± 25.1 d. Discarge mortality was 12.5%, hospital 15.9%, 3mo 18.5%, 6mo 20.35%, 1y 23%, 2y 23%. Alterations on PCPC and POPC scales, ranking from good health status (1) to death (6), are shown in tables 1 and 2.

Alterations in PCPC scale (%)	Admis	Disch	Hospit	3mo	6mo	1y	2y
PCPC 1	74.2%	40.8%	56.5%	64%	67.5%	70.7%	73.4%
PCPC 2	10%	27.5%	21.7%	16.9%	16.9%	13.4%	13.9%
PCPC 3	3.3%	5%	5.4%	6.7%	7.2%	9.8%	10.1%
PCPC 4	8.3%	10%	8.6%	6.7%	2.5%	1.2%	1.3%
PCPC 5	4.2%	4.2%	4.34%	1.7%	1.7%	1.2%	1.3%
PCPC 6		12.5%	2.65%	2.65%	1.76%	2.65%	

Alterations in POPC scale (%)	Admis	Disch	Hospit	3 mo	6 mo	1 y	2 y
POPC 1	60%	0.8%	25%	39%	43%	45%	49%
POPC 2	15.5%	55.8%	39%	30%	34.5%	33%	33%
POPC 3	9.2%	15%	17%	17%	13%	13%	11%
POPC 4	11.7%	11.7%	11%	85%	3.4%	3.7%	5%
POPC 5	4.2%	4.2%	4.3%	2%	2.4%	1.2%	1.3%
POPC 6		12.5%	2.65%	2.65%	1.76%	2.65%	

CONCLUSION: Picu mortality was relative high, partly due to high PRISM scores and the high proportion of MV pts. Mortality continues to increase up to 1y and stayed the same thereafter. The majority of our pts reached their preadmission cognitive status (PCPC) at two y. On the other hand they didn't reach their overall functional status (POPC) even after two y mainly due to the high proportion of pts with mild disability, POPC 2, which is however compatible with near normal and independent life.

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CONTINOUS PARAVERTEBRAL BLOCK IMPROVES OUTCOME OF INTENSIVE CARE AFTER THORACOTOMY IN NEONATES

Sarhan T M A[1]
[1]Anesthesia and Intensive Care, Faculty of Medecine Alexandria University, Alexandria, Egypt

INTRODUCTION: Regional analgesia for thoracotomy during tracheoesophageal fistula (TOF) repair in neonates has several advantges; it reduces the need for systemic opioids with less post operative respiratory depression, it lessens the need for deeper depth of anesthesia and allows rapid recovery and provides haemodynaemic stability.
The aim of the present study was to evaluate the effect of continous paravertebral block for analgesia during TOF repair on the outcome from neonatal intensive care unit (NICU).

METHODS: Twenty four neonates with TOF were divided into two groups after getting parents consent and local ethical commitee approval into two groups (12 each);
Group I : after general anaesthesia they had continous thoracic paravertebral block with a catheter placed at right fifth space with continous infusion of 0.75 ml/kg of 0.375% ropivacaine every 90 minutes to be maintained post operatively in NICU this.
Group II :had balanced general anesthesia. Measurements: 1- Number of neonates required post operative ventillatory support in both groups. 2-Mean total dose of opioids required for analgesia in both groups. 3-Days of stay in NICU in both groups. 4- Mortality in both groups

RESULTS: 1-There was statistically significant less need for ventilatory support in group I (16%) in comparison to group II (41 %). 2- Mean total dose of opioid analgesia was higher in group II 3-More days of stay in group II. 4- Three cases of mortality in group II ,while one case of mortality in group I.

% of ventillatory support and mortality

	Group I	Group II
Ventillatory support	16%	41%
Mortality	25%	8%

CONCLUSION: Continous thoracic paravertebralblock for thoracotomy during tracheoesophageal fistula repair in neonates decrease the need for post operative respiratory support, decrease the amount of opioid required, decresae the period of stay and improves the outcome from neonatal intensive care unit

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AXILLARY APPROACH TO CENTRAL VENOUS CATHETER INSERTION IN PAEDIATRIC PATIENTS

Loh T[1]
[1]Departement of Paediatric Medicine, KK Hospital, SIN, Singapore

INTRODUCTION: A common approach for insertion of central venous catheter is to access the subclavian vein via subclavian approach. This approach is associated with arterial puncture and air leak(1,2). Local pressure is difficult to apply as the vein runs under the clavicle. We describe an axillary approach to access the subclavian vein in paediatric patients.

METHODS: Patients were selected for this approach when conventional approaches for central venous access were exhausted or contraindicated. The patient's arm is kept abducted with slight external rotation perpendicular to the thorax with the dorsum of the palm flat to the bed. Head is truned to the contralateral side. The axillary artery is palpated in the brachial groove and followed as it inserts into the apex of the axilla lateral to the teres minor when it becomes the subclavian artery. The axilla vein runs medial to the artery becoming anterior to the artery as it enters the axilla apex to become the subclavian vein(3). A puncture is made medial to the artery at the base of axilla and directed towards the axilla apex. The needle is punctured 10-15 degrees to the skin and limited to the apex of the axilla. Confirmation of venous access is made by free flow of blood. The catheter is inserted using the Seldinger technique and secured. The arm is returned to nursing position and chest XR done to confirm catheter placement. Routine nursing limb assessments were made.

RESULTS: A total of 5 paediatric patients were selected for this approach. Arterial puncture was made in one patient and hemostasis secured with direct local pressure and subsequent insertion was successful. Access was gained after a mean of 2.2 attempts. One patient hand was noted to be swollen 6 days after the line inserted and Doppler study did not reveal any venous thrombosis and the line left in situ. Routine limb neuromuscular and vascular assessments were otherwise made without any deviation. No malposition or air leak was noted in the chest film. No local or line related infections were documented. All catheters were removed after 8.3 days when central access was not indicated. The patients were followed up for a mean of 2 weeks after the catheter was removed. Hand power and movement were assessed to be normal in all patients.

CONCLUSION: Axillary approach maybe a novel alternative to central venous catheter insertion in paediatric patients when conventional approaches are not possible.

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INFUSION SOLUTION REFORTAN 6% INFLUENCE ON HEMOSTASIS SYSTEM IN PAEDIATRIC NEUROSURGICAL PATIENTS

Savvina I A[1], Novikov V Y u[1]
[1]Anaesthesiology and Intensive Care Department, Russian Polenov's Neurosurgical Institute, St.Petersburg, Russian Federation

INTRODUCTION: Quality and safety of hemostasis in the cerebral operative wound are determined by hemostatic blood potential.We studied Refortan 6%(200/0,5) hydroxyaethylstarch solution influence on hemostasis system in paediatrics during brain tumour removing.

METHODS: Refortan infusion rate was 5-10 ml/kg/h. Infusion therapy was carried out under hemodynamic indices and intraoperative hematocrit and hemoglobin control. 15 paediatrics (control group) received 0,9% NaCl solution.Hemostasis system indices were investigated 3times:before Refortan 6% infusion;immediately after infusion ending;in 12-18 hours after infusion ending.Thrombocytes,agregational thrombocyte function estimation were calculated with agregation analysator.Coagulation hemostasis was studied:activiting partial thromboplastin time (APTT), prothrombin time (PT), thrombin time (TT),fibrinogen plasma concentration, antithrombin III activity, XIIa-depending euglobulin lysis, D-dimer concentration.

RESULTS: During infusion thrombocytes decreased moderately because hemodilution.Trustworthy distinctions between investigation groups were absent.The functional thrombocyte activity was decreased. These changes were more marked during Refortan infusion from it's antithrombocyte effect.In 12-18 hours after infusion the thrombocyte number was stable and the agregation activity was restorated. We didn't observe raise of tissue hemorragic diathesis in the operative wound. Analysis of coagulation hemostasis dynamics found the developed hypocoagulation changes after Refortan infusion:PT was prolonged from 16,4 to 17,3 s;fibrinogen level was decreased on 12,5%. There were no exposed reliable differences between investigative and control groups.APTT wasn't changed essentialy.Simultaneously decrease of antithrombin III function and blood fibrinolytic activity was observed. The shortening of TT from 14,1 to 13,6 s was marked what characterized acceleration of fibrinogen transformation into fibrin and would reflect Refortan influence on fibrin-monomers polymerization.Shortening of APTT, PT, TT, fibrinogen concentration reliable increasing (p<0,01) were observed. There were also marked fibrinolytic activity lowering and AT III level increase so in basic as in control groups.

CONCLUSION: Intraoperative Refortan 6% use in therapeutic doses renders the moderate influence on thrombocytic and coagulative components of hemostasis. Developing changes don't reach the degree of clinical manifestation and don't increase hemorragic complications quantity during neurosurgical operation and after it in paediatrics.

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PROPOFOL INFUSION SYNDROME IN A PATIENT WITH SEVERE MULTIPLE TRAUMA

Lewejohann J C[1], Hansen M[1], Zimmermann C[1], Muhl E[1], Bruch H P[1]
[1]Surgery-ICU, Universitätsklinikum Schleswig-Holstein-Campus Lübeck, Lübeck, Germany

INTRODUCTION: Propofol infusion syndrome (PRIS) is a very rare and often fatal syndrome in critically ill patients undergoing long-term propofol infusion at high doses. Until today 14 cases of PRIS in adults have been described in the literature and 12 of them died. The aim of our representation is to demonstrate the clinical course of a patient with severe rhabdomyolysis subsequent to a multiple trauma and sedation with propofol and to make obvious the importance of this life-threatening syndrome.

METHODS: A 27 year old multiple trauma patient of about 90kg bodyweight was admitted to our surgical-ICU at a university hospital. He had a severe head trauma, a fracture of the cervical vertebra, an ARDS, multiple rip fractures, severe lower leg fractures with severe vascular damage and the nead of amputation 24h after admission, fractures of the femora, pericardial effusion and hematoma of the spleen. He received from the beginning on high doses of catecholamnies (norepinephrine, epinephrine), hemofiltration because of renal failure. After resection of his right lower leg one day after admission he received propofol 2% in a dose range between 10 to 25 ml/h over a time period of 7 days. An initial Myoglobin level of 6937µg/l as a result of the multiple trauma on admission decreased to 3865µg/l when the propofol infusion was started with 14ml/h at first. Myoglobin level decreased to 398µg/l after 73h. Propofol infusion then was increased to 20ml/h and after 105h to 25ml/h. In the following 70h we saw a dramatic increase of the myoglobin level to a peak level of 17414µg/l. The propofol infusion was stopped then because of the severe rhabdomyolysis and because we thougt about the recently publihed review about the propofol infusion syndrome. Soon after removal of propofol myoglobin level decreased rapidly and the patient survived later on.

RESULTS: The propofol infusion syndrome is a very rare complication subsequent to propofol use. Our patient was severe head injured and received high doses of catecholamines as triggering factors like the patients described in literature. Rhabdomyolysis decreased rapidly after stopping the propofol infusion.

CONCLUSION: Think about the propofol infusion syndrome in patients with severe rhabdomyolysis receiving high dose propofol long-term sedation and consider alternative sedative agents.

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EVOLUTION OF 215 SEVERE TRAUMATIC BRAIN INJURED PATIENTS

Corral Ansa L[1], Perez Fdez X[2], Farre Llado O[2], Herrero Messeguer I[2], Ventura Farre J[2]
[1]Intensive Medicine, University Hospital of Bellvitge, Barcelona, [2]Intensive Medicine, Hospitalet de Llobregat, Spain

INTRODUCTION: Explain our observational, retrospective (1998 and 1999) and prospective (2002 and 2003) study of clinical outcome and monitoring of severe traumatic brain injured (TBI) patients (defined as presenting Glasgow coma scale < 9) admitted at our hospital center.

METHODS: n=125 consecutive severe traumatic brain injured patients admitted to critical care units (ICU) at Bellvitge's universitary hospital (third level center with 1000 beds), during 1998,1999,2002 and 2003.Studied variables were:age,sex,traumatic mechanism,Glasgow coma scale (GCS),hypotension (systolic blood pressure < 90 mmHg) and hypoxia (cyanosis or pulse oximetry <90%)on admission, other traumatisms, head computed tomography (CT) based on Marshall's classification (TCDB), intracranial pressure (ICP) monitoring,jugular bulb oxygen saturation (SjO2), transcranial doppler (TCD), intracranial hypertension (HTIC) defined as ICP>20 mmHg.Brain edema treatment,length of stay in critical care unit (ICU) and hospital,GCS at ICU and hospital discharge, and mortality. We also studied hemodinamic and respiratory (PaO2/FiO2<200) complications, fever (axilar temperature >38,5ºC) and electrolytic disorders (sodium <130 mmol/L or >150 mmol/L).

RESULTS: n=215;mean age=40.13 (15-86);84.2% were male;primary mechanisms of injury were: motor collisions in 66.5%,falls in 25%,agression in 2%,gun shot in 1% and other mechanisms in 5.5% of our patients.Pupil disorders were present in 34% of our patients.Long bone fractures in 57% of studied patients. Patients were treated based on clinical practice guidelines (with the exception of cerebrospinal fluid drainage, and as second level therapy only barbiturate coma was used). Overall mortality was 33%. Mortality was increased in TBI with:GCS 3,4 and 5 (46.5%);GCS 6,7 and 8 (22%);TCDB CT type III (42.3%),type IV (60.7%)and mass lesion not operated (66.7%);pupils disorders (44.6%);HTIC (54.4%);hypoxia (39.3%)and hypotension (41.7%). Extraneurological complications: vasopressor drugs were used in 69.3% of our patients; severe respiratory failure (PaO2/FiO2<200)was present in 40.5% of our patients;fever appeared in 76.3% of our patients and electrolytic disorders in 1.4% of our patients. Mean length stay in ICU=18.84 days (0-88) and hospital mean length stay=33.47 days (0-219).

Evolution of monitoring	ICP	SjO2	TCD
1998	72%	13,6%	3,4%
1999	69%	10,8%	7,7%
2002	71%	25%	11,1%
2003	78%	36,4%	27,3%

CONCLUSION: Poor outcome variables are similar to the ones described in literature. Monitoring with SjO2 and TCD has increased but without improvement in overall mortality. Length stay at critical units and hospital keeps being long and extraneurological complications often appear.

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AN AUDIT OF THE CRITICAL CARE MANAGEMENT OF SEVERE TRAUMATIC BRAIN INJURY IN NORTHERN IRELAND

Mullan B A[1], McCarroll C P[1], McCloskey B V[1], Cooke S[2]
[1]Regional Intensive Care Unit, [2]Department of Neurosurgery, Royal Victoria Hospital, Belfast, United Kingdom

INTRODUCTION: In Northern Ireland the process of co-ordinating appropriate and timely therapeutic intervention for severe traumatic brain injury (STBI) is somewhat fragmented. The objectives of the audit were to obtain baseline epidemiological data for STBI in Northern Ireland and to review current regional critical care management.

METHODS: This was a 6 month prospective audit. STBI patients were identified for inclusion through referrals made to the Regional Neurosurgical Unit (RNSU).

RESULTS: During the audit period 195 adult patients were referred to the RNSU. 53 patients were admitted to the Regional ICU (RICU). 79% of these patients were male and mostly in the 20-39 year age group. 42% of the injuries were due to falls, 33.5% road traffic accidents and 24.5% assaults. Alcohol was detected in 43% of the patients. ICP monitoring was utilised in 85% of cases, and on day 1 of admission intracranial hypertension (ICP >20mmHg) was diagnosed in 45%. This figure fell to 8% by day 7. Muscle relaxants were used for ICP control in 70% of patients on day 1 and in 15% on day 7. Over 50% of individuals developed a ventilator-associated pneumonia (VAP) during their RICU stay. This significantly increased the length of stay, but did not increase individual mortality. 45% of patients required a tracheostomy prior to discharge.

CONCLUSION: There was a high incidence of VAP in STBI patients in Northern Ireland. This may be related to the increased frequency of alcohol intoxication in these patients. Heavy reliance on muscle relaxants for ICP control may be a further contributing factor. In light of these findings new critical care management guidelines for STBI are being considered.

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PREDICTIVE FACTORS FOR ICU ADMISSION OF PATIENTS WITH HEAD INJURIES

Markogiannakis H[1], Sanidas E[2], Giannopoulos A[3], Messaris E[1], Koutentakis D[3], Tsiftsis D[4]
[1]1st Department of Propaedeutic Surgery, Hippokration Hospital, University of Athens, Athens, [2]Department of Surgical Oncology, University Hospital of Heraklion, Department of Surgical Oncology,, University of Crete, [3]Department of Neurosurgery, University Hospital of Heraklion, [4]Department of Surgical Oncology, University Hospital of Heraklion, University of Crete, Heraklion, Greece

INTRODUCTION: Criteria for the admission in the intensive care unit (ICU) of patients suffering from head injuries have not been established. The aim of this study is to identify predictive factors for the admission of head trauma patients in the ICU.

METHODS: The records of 364 patients that were admitted in a Level I Trauma Center with the diagnosis of head trauma were reviewed. All patients were consecutive admissions over a 4-year period and had sustained head trauma after a vehicle accident. Data recorded in each patient were the kinetics of the accident, heart rate, arterial pressure, glascow coma scale, tracheal intubation and the Injury Severity Score (ISS). Data analysis was made using a multivariate regression model.

RESULTS: Patients of older age (p=0.04), with tachycardia (p=0.04) and low systolic pressure (p=0.04) were admitted in the ICU. Additionally, head trauma patients that were intubated (p=0.04) and had high ISS (p=0.0001) were hospitalized in ICU's. On the other hand, the trauma kinetics, the patients' sex, and diastolic arterial pressure failed to identify the admission in the ICU.

CONCLUSION: In head trauma, the patients' age, heart rate, systolic arterial pressure, need for endotracheal intubation and total severity of injury were found to safely predict the necessity for admission in the ICU.

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INJURY SEVERITY SCORE (ISS) IN ELDERLY ICU PATIENTS

Pedonomos M[1], Psoma G[1], Katsarelis N[1], Tsirantonaki M[1], Stranomiti I[1], Pedonomou M[1], Mazarakis D[1], Karabinis A[1]
[1]ICU, Athens General Hospital., Athens, Greece

INTRODUCTION: The injury Severity Score (ISS) is related to length of hospitalization, morbidity and mortality in multiple trauma (MT) patients (pts).The aim of this clinical trial is to study the prognostic value of ISS in elderly ICU MT pts and determine any characteristics in this population.

METHODS: We studied retrospectively 303 MT pts, 245 men (80.9%) – 58 women (19.1%) who entered the ICU after a traffic accident 285 (94.1%) or fall on the ground from a high level 18 (5.9%). Mean age: 43.4±22.8 years (16-87). Mean stay: 21.9±8.8 days. Mean ISS: 29.2±12.9. All pts underwent mechanical ventilation (MV) and were divided in 2 groups according to their age: Group A 230 (75.9%) ≤ 65 years old and group B 73 (24.1%) > 65 years. We analyzed several parameters, complications observed, number of surgical procedures and CT scans performed and mortality rates.

RESULTS: In groups A and B respectively: mean age 34.4±24.8 and 71.8±5.1 years. Mean stay 20.8±9.2 and 25.3±8.6 days. Mean ISS 30.6±14.0 and 24.8±14.3. Mean duration of MV 17.2±9.0 and 21.9±8.4 days. Complications observed: Infections in 213 (92.6%) and 50 (68.5%). Sepsis in 102 (44.3%) and 41 (56.2%). Severe cardiac arrhythmias in 19 (8.3%) and 37 (50.7%). Mean number of surgical procedures performed per pt 3.5±1.2 and 2.4±1.0. Mean number of CT scans performed per pt (including the initial ones on admission after traumatisme) 6.7±1.6 and 5.9±1.7. Mortality rates 73/230 (31.7%) and 20/73 (27.4%). Global mortality rates: 93/303 (30.7%).

CONCLUSION: 1) In elderly ISS was related to longer stay ($p<0.05$), longer duration of MV ($p<0.05$), more frequent occurrence of severe cardiac arrhythmias ($p<0.001$) and more difficult weaning. 2) ISS was related to higher mortality rates in elderly; probably age is an independent risk factor that has to be co-estimated besides ISS, especially in MT pts with head injury. 3) Contrary, nosocomial infection was observed more rarely in elderly ($p<0.05$), but among pts with infection, elderly developed more frequently sepsis ($p<0.05$). The more severe cases of sepsis were noticed in pts with intra-abdominal infection, especially in those with liver rupture. 4) The mean number of surgical procedures and CT scans performed were related to ISS in both groups, but they were independent of age.

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TRAUMATIC DISSECTION OF THE INTERNAL CAROTID ARTERY: RARE INJURY OR A DIAGNOSTIC PROBLEM?

Stepanek Z[1], Fiedler J[2], Priban V[2], Sterba L[3], Tesarik R[1]
[1]Anaesthesiology and Intensive Care, [2]Department of Neurosurgery, [3]Department of Radiology, Hospital Ceske Budejovice, Ceske Budejovice, Czech Republic

INTRODUCTION: Traumatic dissection of the internal carotid artery (ICA), resulting in occlusion or distal embolism is rare (?) and difficult to diagnose condition. In conscious patients, the first manifestations include neurological symptoms corresponding to ischemic stroke, in unconscious patients the manifestations emerge frequently no sooner than as ischemia of the ICA territory is diagnosed by cranial CT or MRI. Possible combination with craniocerebral trauma further complicates by itself difficult diagnosis and treatment of this condition.

METHODS: Traumatic dissection of the ICA is most frequently caused by rotation and hyperextension of the neck, ICA compression between the mandible angle and upper transversal vertebral processes, direct trauma during head and neck injury, and strangulation. The main mechanism is an injury disintegrating continuity of the tunica intima with its subsequent dissection, pseudoaneurysm or thrombus formation, and potential embolism into the ICA branches. In 2003, our ICU hospitalized 160 patients with diagnosis of severe craniocerebral trauma. In three patients, we have diagnosed and by angiography confirmed a dissection to the ICA. One patient was treated with ICA stenting and selective thrombolysis of the MCA with alteplase, the second patient received systemic heparinization, and the third patient did not receive any specific therapy due to already developed extensive ischemia in the ICA territory.

RESULTS: The patient treated with the stent and selective thrombolysis achieved full revascularization in the MCA watershed (TIBI 1) as seen by angiography and TCD, and substantial improvement in presenting neurological deficit. The patient was able to return to his occupation. The patient that was treated with continuous heparinization recovered with resulting right-sided hemiparesis, and the third patient died day 3 after the trauma due to brain edema caused by expansive ischemia of the right brain hemisphere.

CONCLUSION: The available early investigation capable of detecting intracranial portion ICA and its branches occlusion is TCD. Conventional ultrasonography visualizes extracranial portion of the ICA. Angiography confirms the diagnosis. CT angiography or MR angiography have reported selectivity around 85 – 95 %, however, these methods may not be readily available. The therapeutical modalities include selective thrombolysis, continuous heparinization, or stent implantation, while respecting general contraindications of such interventions.

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TRAUMA "GOLDEN HOUR": THREE YEARS EXPERIENCE

Ferreira C[1], Bento F[1], Lufinha A[1], Barros F[1], Febra C[1], Armada C[1], Camões A[1], Catorze N[1]
[1]VMER, HSFX SA, Lisboa, Portugal

INTRODUCTION: Evaluate the prehospital team's procedures towards a multiple injured patient during the first hour after the accident.

METHODS: In this retrospective study between the 1st of January 2001 and 31st of December 2003 a sample of 1854 patients has been studied, corresponding to 28% of the total calls received. Mean patient age, type of trauma mechanisms, time of arrival and spent in the scene, identified trauma pathologies, medical procedures were all object of analysis.

RESULTS: Patient mean age was 37 years and the most frequent event was motor vehicle accident, with head injury the most recurrent trauma. On average, the time of arrival to the scene was 7,6 minutes and the time spent on the scene was 32,6 minutes. Multiple medical procedures have been used accordingly to the patient needs including pharmacotherapy, patent airway, fluid challenge and skeletal immobilizations. The most frequently used hospitals were trauma centres of level II.

CONCLUSION: The coordination of the prehospital system with the receiving hospital maximizes the probability of survival and decreases the risks of sequelas within the survivors. Our trauma patients were evaluated and treated in the scene and during transportation to the trauma centre respecting the "golden hour" concept.

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EARLY HEMODYNAMIC OPTIMISATION IN MULTIPLE TRAUMA PATIENTS BY TRANSESOPHAGEAL DOPPLER

Pradl R[1], Chytra I[1], Kasal E[1], Bosman R[1], ?idková A[1], ?tepán M[1]
[1]Dept. of Anaesthesia and Intensive Care Medicine, Charles University Hospital, Plzen, Czech Republic

INTRODUCTION: Transesophageal Doppler was confirmed as useful non-invasive tool for hemodynamic optimisation in group of elective surgery patients. The aim of prospective randomized study was to evaluate the efficacy of early hemodynamic optimisation in multiple trauma patients using transesophageal Doppler in comparison with traditionally used basic hemodynamic monitoring (arterial blood pressure, heart rate, central venous pressure).

METHODS: Patients with multiple trauma and expected blood loss more than 2000 ml admitted and mechanically ventilated on interdisciplinary ICU of University hospital in 2003 were randomized in protocol group (Doppler) and control group (Control). Hemodynamics of Doppler group patients were immediately after admission to ICU managed according to the protocol based on data obtained by transesophageal Doppler. Hemodynamics of control group patients was aimed at generally used resuscitation endpoints - mean arterial pressure (MAP), central venous pressure, heart rate (HR), urine output and skin perfusion. The age, the APACHE II score and Injury Severity Score (ISS) were assessed. MAP, HR and blood lactate level (Lact) were evaluated at the time of ICU admission (MAP-1, HR-1, Lact-1) and after 24 hours of ICU stay (MAP-2, HR-2, Lact-2). Mann-Whitney, Wilcoxon, unpaired and paired t-test were used accordingly; p<0,05 was considered statistically significant.

RESULTS: A total of 35 patients (28 men and 7 women) were enrolled and randomized in Doppler (n=16) and Control (n=19) group. No differences between Doppler and Control group in age (40,6 ± 20,2 vs 28,1 ± 15,7), APACHE II score (26,0 ± 4,9 vs 21,9 ± 5,8) and ISS (27,6 ± 7,7 vs 27,0 ± 13,7) were found. No differences between both groups in MAP-1, MAP-2, HR-1, HR-2, Lact-1 and Lact-2 were detected, however significant differences between MAP and blood lactate level at the admission to ICU and after 24 hours of ICU stay were observed in Doppler group (see table).

	MAP-1 mm Hg	MAP-2 mm Hg	p	Lact-1 mmol/l	Lact-2 mmol/l	p
Doppler	69,8 ± 8,4	87,5 ± 6,2	*	3,6 ± 1,3	1,9 ± 0,7	*
Control	85,1 ± 8,2	86,1 ± 8,1	n.s.	3,7 ± 1,9	3,3 ± 2,3	n.s.

*n.s. - non-significant, * - p < 0,05*

CONCLUSION: We conclude that early hemodynamic optimisation by transesophageal Doppler in multiple trauma patients can contribute to better tissue perfusion and elimination of oxygen debt.

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ENDOBRONCHIAL BLOCKADE FOR LOBE ISOLATION IN SEVERE THORACIC TRAUMA

Waibel H A[1], Byhahn C[1], Bingold T M[1], Halbig S[1], Wissing H[1], Zwissler B[1]
[1]Department of Anesthesiology, J.W.Goethe University Medical School, Frankfurt am Main, Germany

INTRODUCTION: Endobronchial blockade represents an alternative to a double-lumen tube (DLT)(1). The wire-guided Arndt Endobronchial Blocker (WEB, Cook Inc) can be coupled to a fiberscope and directed as a unit through an endotracheal tube into the area to be blocked. This is of particular interest in patients with a difficult airway in whom intubation with a DLT is contraindicated(2). In contrast to a DLT, that results in complete blockade of either the left or right lung, the WEB can be positioned in almost any portion of the airway, thereby allowing to isolate a single lobe. We report on the use of the WEB in a patient with bronchopleural fistula and pulmonary hemorrhage.

METHODS: A 17yr-old male was admitted after being hit by a truck. Orotracheal intubation had been performed at the scene. CT scan revealed fractured ribs, severe bilateral lung contusion, bilateral pneumothorax, pneumomediastinum and -percardium. Chest tubes placed in the right thoracic cavity were suggestive of bronchopleural fistula. Bronchoscopy revealed a tear in the right lower lobe bronchus and significant bleeding into the airway. Due to massive leakage, selective ventilation of the left lung was decided. Because of severe mediastinal emphysema, the risk of airway loss during tube exchange seemed high. We decided to perform selective blockade using the WEB. The WEB was inserted through the endotracheal tube together with the fiberscope and endoscopically directed into the right lower lobe bronchus with its cuff proximal to the bronchial tear. Once the cuff was inflated, the bronchopleural fistula closed, and ventilation improved to normal within minutes. The WEB was left in place for 24hrs, and the fistula did not reccur thereafter. The patient's trachea was extubated on day 10, and he was transferred to a peripheral ward on day 12 in good condition.

RESULTS: The WEB for use in single-lung ventilation with single-lumen intubation proved to be an appropriate tool in an emergency situation caused by severe bronchopleural fistula. Intubation with a DLT was considered a high-risk maneuver because of severe mediastinal emphysema and difficult airway. With the WEB inserted through the endotracheal tube it was possible to isolate the injured right lower lobe from ventilation, to prevent spread of hemorrhage, and to avoid the risk of airway loss during tube exchange. Because the WEB is fixed to the fiberscope with a wire loop, both fiberscope and blocker can be navigated through the tracheobronchial tree as one unit, the WEB released as soon as in place.

CONCLUSION: Our expercience with the WEB prompts us to recommend this device as a highly practicable alternative to a DLT whenever one-lung ventilation or lobe isolation is required.

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ETIOLOGIES AND EARLY PROGNOSIS OF LOSS OF CONSCIOUSNESS

Fotouhi Ghiam A[1], Abootalebi S[1], Tavana R[2]
[1]Neurology Unit, Internal Medicine Department, Al-Zahra Hospital, Bushehr University of Medical Sciences, Bushehr, [2]Shiraz University of Medical Sciences, Shiraz ,Iran

INTRODUCTION: Awareness of the relative prevalence of diseases causing loss of consciousness (LOC) in a particular geographic locality could greatly facilitate the approach to patient management. So this study has established to determine the etiologies responsible for non-traumatic LOC and hospital outcome in an emergency ward (EW).

METHODS: 483 patients older than twelve years old who present with LOC were enrolled in this cross sectional study during the 12-month period in the EW of the Al-Zahra teaching hospital. LOC was defined as a clinical state manifested by any decrease in level of consciousness ranging from confusion to deep coma.

RESULTS: These numbers of patients (accounting for 7% of the EW patient volume) were identified with a mean age of 49.9 years (54.8% men). Etiology was metabolic in 42.9% , structural in 40.1% and infective in 6% of patients. It remained unknown in 11% despite extensive investigation. The most prevalent causes in subgroups were cerebrovascular accidents (30.6%) , drug intoxication (22.35%), and hypoxic-anoxic conditions (11.7%) respectively. The history taking and physical examination were most useful in diagnosis. Computed Tomography (CT) scan plays an important role in diagnosis of structural causes. Lateralizing signs (25%) and Nausea/Vomiting (16.6%) were particularly evident in the presenting symptoms. Prognosis is highly dependent on etiology. The admission Glasgow Coma Scale significantly correlated with outcome (P < 0.001). Overall series hospital mortality was 24.7%. Most of the patients have been referred to center in less than 6 hours after LOC onset.

CONCLUSION: Metabolic causes were the commonest overall etiology. The number of undiagnosed cases are significantly higher than other similar domestic and foreign (USA , Europe , Asia , Africa) studies, so emphasis on educating the medical staff to approach to LOC and establish CPR committee in EW should be considered. Poor outcome was associated with low GCS score.

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RECOMBINANT ACTIVATED FVII IN THE MANAGEMENT OF MASSIVE OBSTETRIC BLEEDING

Chaparro M[1], Prieto M[1], Aragonés R[1], Muñoz J[1], Curiel E[1], Arias D[1], Delgado M[1], Ruíz M[1].
[1]Intensive Care Unit, Hospital Materno-Infantil, Málaga, Spain

INTRODUCTION: Postpartum haemorrhage is one of the most common causes of maternal morbidity and the primary cause of maternal mortality. Only a few case reports have shown that recombinant activated FVII (rFVIIa) successfully controlled intractable obstetric bleeding (1). Three obstetric patients with massive bleeding and clinical and analytical repercussion, without previous coagulopathy are presented.

METHODS: The use of rFVIIa in three consecutive obstetric patients with unresponsive life-threatening haemorrhage admitted to our intensive care unit within the last six months is reported. Demographic data, rFVIIa doses, timing of treatment and diagnosis, among other variables are presented in the Table 1. Table 1. C: Case. Preg. week: week of gestation. Diag: Diagnostic. Deliv: Delivery. IFD: Intrauterine fetal death. CS: Caesarea section. Eutoc: Eutocic. D: Number of doses. Timing(h): Hours passed from the initiation of the bleeding until the administration of rFVIIa. Case1: Bleeding after a caesarean section. An hysterectomy and a ligature of the hypogastric arteries were performed before the administration of rFVIIa. Case2: Postpartum bleeding due to uterine atonia. Case3: rFVIIa was administered during the caesarean section owing to massive bleeding.

RESULTS: Transfusion requirements and laboratory measures of coagulation pre/postadministration of rFVIIa, among other data, are shown in the table 2. Table 2. PT:prothrombin time in seconds (normal value 10.7-13). APTT:activated partial thromboplastin time in seconds (normal value: 18-30). RBC: red blood cells in litres. FFP:fresh frozen plasma in litres. Plat: platelets in litres. Pr/Po:pre and postadministration of rFVIIa. Adv Ef: Adverse Effects. Outc: Outcome. (*): In all three cases, clinical stability was achieved and the bleeding was stopped after rFVIIa administration. The death of Case1 was due to sepsis and multiorgan failure 27 days after admission.

Method	Age	Preg. Week	Diag.	Deliv.	rFVIIa \mug/kg	rFVIIa D	Timing (h)
C-1	35	36	IFD	C S	35	1	17
C-2	30	29	IFD	Eutoc	35	1	3
C-3	30	30	IFD	C S	90	1	5.5

Results	PT Pr/Po	TPTA Pr/Po	RBC Pr/Po	FFP Pr/Po	Plat Pr/Po	Adv Ef	Outc*
C-1	19/11	60/37	9/1.2	3.4/0	0.7/0	None	Dead
C-2	125/16	120/53	2.4/0	1.4/0	0.45/0	None	Alive
C-3	48/12	50/41	2/1	0.9/0	0/0	None	Alive

CONCLUSION: Our observations suggest rFVIIa in obstetric patients with unresponsive life-threatening haemorrhage improves laboratory measures of coagulation, reduces the requirements for transfusion of blood components, and may also be life-saving. Randomised, double-blind, placebo-controlled trials must be conducted to assess its efficacy.

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MANAGEMENT OF LIFE-THREATENING BLEEDING WITH RECOMBINANT FACTOR VII ACTIVATED

Aragonés R[1], Chaparro M[1], Prieto M[1], Muñoz J[1], Delgado M[1], Curiel E[1], De Rojas P[1], Arias D[1]
[1]Intensive Care Unit, Hospital Regional Universitario Carlos Haya, Málaga, Spain

INTRODUCTION: Accumulating reports and data from small studies suggest the potential of recombinant factor VII activated (rFactor VIIa) as a valuable general haemostatic agent for massive bleeding episodes beyond its current indications of haemophilia. (1) They include bleeding episodes associated with liver disease, upper gastrointestinal bleeding, intracerebral haemorrhage, diffuse bleeding triggered by surgery or trauma (2) We analyse the use of rFactor VIIa in life-threatening bleeding of several origin.

METHODS: 9 consecutive patients with untreatable haemorrhage were analysed (Oct 2002-Feb 2004), and were administered rFVIIa. The following data were gathered: age, sex, etiology, dosage, duration of administration, haemoderivatives (cc), pre and post administration coagulation times, mortality in the first month. The data are expressed in median, percentages, mean ± typical deviation the Wilcoxon test was used to compare averages.

RESULTS: Average age 34.89 ± 16.65 years. Women 70%. Cardiovascular surgery 20%, puerperal period 30%, lower digestive tract haemorrhage 20%, acute haemophthisis 10%, multi trauma 20%. Median administration time 12h (range 2hrs-48hrs). Dosage 90 \mug/kg. One patient died. No side effects were detected. The data analysed pre and post rFVIIa administration were respectively: Red blood cell count (ml) 3688 ± 3271 vs 400 ± 497; Plasma (ml) 1844 ± 1471 vs 66 ± 200; Platelets (ml) 422 ± 512 vs 0; INR 2,89 ± 3,71 vs 1 ± 0,18; TPTA (secs.) 93 ± 92 vs 41 ± 8,1. P<0,05.

CONCLUSION: Our observations are consistent with a growing body of evidence suggesting a role of rFVIIa for the management of bleeding in patients with life-threatening haemorrhage unresponsive to conventional haemostatic measures, although further studies ought to be carried out.

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ON-JOB-TRAINING OF SURGEONS FOR INITIAL CARE OF TRAUMA IN JAPANESE EMERGENCY CENTER

Moriwaki Y[1], Sugiyama M[1], Toyoda H[1], Fujita S[1], Yamagishi S[1], Kanaya K[1], Hasegawa S[1], Kosuge T[1]
[1]Critical Care and Emergency Center, Yokohama City University Medical Center, Yokohama, Japan

INTRODUCTION: Recently, most of trauma patients can be non-operatively treated. One of the most important issues is a few chances of experience of surgery for trauma patients (on-job-training). Many training courses (off-job-training) for initial trauma care are held frequently, which training course obtain good results in many country. However, it is obvious that on-job-training is more effective training method. The objective of this study is to clarify the hourly incidence of trauma patients and surgery for them in one typical urban emergency center and how surgeons are effectively trained for initial care of trauma patients in this center in the education of surgical specialty.

METHODS: Our city Yokohama is one of the biggest city in Japan and has 4 of third level emergency center, including our center, for 3400,000 people. We examined 1,384 of trauma patients treated mainly by surgeons (neck-chest-abdominal trauma cases and polytrauma cases) in our emergency department (ED) including 270 cardiopulmonary arrest (CPA) patients, and 495 of them including 270 CPA who underwent emergency operation. The planning of training in the education of surgical specialty was discussed from a viewpoint of an hourly incidence of trauma patients and surgery for them.

RESULTS: Trauma patients were mainly transferred during the night shift: 14.9 of non-CPA trauma patients (26.7%) were transferred during the day shift and 40.8 during the night shift per 3 months. Surgeries for them were also performed mainly during the night shift: 3.0 of non-CPA patients (26.2%) and 7.0 of all trauma patients (including CPA) underwent surgery during the day shift and 8.3 and 17.8 patients, respectively, during the night shift per 3 months.

CONCLUSION: We conclude that trainee for surgeon in Japan can have adequate opportunity of the initial care and surgery for trauma patients if they belong to the emergency center as an exclusive staff and are on frequent night duty.

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COMPARISON OF MICRO DIALYSIS AND ICP TO MONITOR CEREBRAL ISCHEMIA EDEMA IN CNS TRAUMA

Floros J[1], Maratheftis N[2], KolliasS[1], Vletsas C[1], Roussos C[1]
[1]ICU, [2]Neurosurgery, Evangelismos, Athens, Greece

INTRODUCTION: Cerebral microdialysis is a relatively new technique for measuring the levels of brain extracellular chemicals, which to date has predominantly been used as a research tool. There are many reports which emphasize the importance microdialysis to monitor patients with head injury.

METHODS: We describe a significant relation lactate/pyruvate ratio and ICP in ten severely head injured patients admitted in the ICU in the perioperative period. Microdialysis catheters inserted via a bolt fixation device together with the ICP catheter. The catheters implanted into the brain to reflect changes in the penumbra of a lesion under computed tomographic control. We used the standardized equipment (CMA Microdialysis OMA600).

RESULTS: The lactate/pyruvate ratio is a better marker of ischemia in these patients. There is a strong difference between the values (repeated measured ANOVA) L/P ($p<0.001$) and ICP ($p<0.5$) in tracking secondary ischaemic and edema events. The lactate/pyruvate ratio was increased in all ten patients 12-18 hours before any change in the CT scan. The lactate/pyruvate ratio is also a better marker of ischemia ($p<0.005$) than lactate alone ($p<0.1$).

CONCLUSION: 1.Microdialysis is an effective tool for studying extracellular chemistry and, thus, has great potential for exploring the pathophysiology of secondary brain damage. 2. The sensitivity and specificity of microdialysis for ischemia and secondary damage are better than ICP. 3. There are data to confirm that microdialysis can be used to direct therapy and influence outcome.