054 FACTORS ASSOCIATED WITH THE NEED FOR ONGOING RESPIRATORY SUPPORT

McNarry A F, Marshall G A, Goldhill D R
1Anaesthesia and Critical Care, Royal London Hospital, London, 2Anaesthesia and Critical Care, Royal National Orthopaedic Hospital, Stanmore, United Kingdom

INTRODUCTION: There is a paucity of information about when to perform a tracheostomy in a critically ill patient [1]. Early tracheostomy (by day 10 of a patient's intensive care admission) may be associated with a shorter duration of mechanical ventilation [2] but there is little objective evidence to help the clinician decide in the early stages of a patient's admission who is likely to require long-term ventilation or weaning and who is not.

METHODS: Physiological information and treatment interventions were prospectively collected at day 5 for patients who were still in the ICU. The values recorded were the last ones charted before noon on the day in question. Patients were divided into those who had died and those who were alive at day 10 (on ICU or discharged to ward). The data of those who were alive at day 10 was analysed to identify those patients associated with continuing respiratory support at day 10. It was assumed that those discharged to the ward did not require respiratory support. Statistical significance was determined using Fisher’s Exact Test, the Chi Square test and t-test (with Welch’s correction) as appropriate.

RESULTS: 276 records were available for analysis. Of these, 63 (22.8%) patients died by day 10. The table summarises results for the remainder divided into those receiving respiratory support and those not. Of those receiving respiratory support at day 10, 57.9% had a tracheostomy during their ICU admission. The ASV mode from 24 hours after admission; vt, tidal volume, PIP peak inspiratory pressure. ICU stay in days, age in years

| Group | Death | Alive |
|-------|-------|-------|
| Death | 63    | 113   |
| Alive | 113   | 213   |

CONCLUSION: Poorer lung compliance, a lower PaO2/FIO2 ratio, higher PEEP and dependence on inotropes would appear to be associated with the need for ongoing respiratory support, and may be possible indicators of the need for a tracheostomy. Surprisingly age and APACHE II score are not associated.

REFERENCE: 1 Kollerf MH Chest 2004;125:7-9
2 Brook AD et al Journal Critical Care 2000; 9:352-9

055 THE SETTING OF MINUTE VOLUME IN ADAPTIVE SUPPORT VENTILATION MODE

C C Chiang 1, J H Chen 2, S C Wu 2, C C Liu 2, L Lin 1, H H Yun 1, W C Peng 2, C C Chang 1
1Intensive Care Medicine, 2Anaesthesiology and Reanimation, Introduction, Coma University, Malatya, Turkey

INTRODUCTION: We compared changes in breathing pattern and breathing effort during ASV100% and during ASV actual% during a 24 hour period. ASV actual% setting was found not to adequately reduce the breathing effort and drive for ICU patients. The breathing effort and drive could be effectively reduced when the %MinVol was set manually according to a patient’s actual minute ventilation.

METHODS: We measured breathing pattern and breathing effort by pulmonary monitor (CP-100) in 50 patients with two settings of ASV mode, 100%ASV and ASV actual%.

RESULTS: The Breathing pattern parameters (RR: 23.9±1.16/min, VE: 241±82 ml/min, VE/MV ≤ 0.64, 0.67, 0.70, 0.73, 0.76, 0.80 0.83, 0.86) in the two settings were as follows: ASV100%; T1: RR 28±1.16/min, VE: 382±82 ml/min, VE/MV 0.67, ASV actual%; T2: RR 26±1.16/min, VE: 392±82 ml/min, VE/MV 0.67. In the second study period, patients were ventilated with ASV actual% for 30 minutes. The breathing effort (P/ F: 203±68, 199±53) and the drive (T2: 40±10, 40±10) were similar in the two settings.

CONCLUSION: Early application of hybrid ventilation (BIPAP + PSV) in adult patients with acute hypoxic respiratory failure at short term ventilation provides decrease in FiO2 levels, increase in PaO2/FIO2 ratio within clinically accepted PaCO2 levels. However these results were early findings of our ongoing study.

REFERENCE: Putensen C, Hering R, Wrigge H. Controlled versus assisted mechanical ventilation. Curr Op Crit Care 2002; 8: 51-7.
CONCLUSION: The aim of the study was to compare the inspiratory effort and the breathing pattern in patients with increased resistive load, ventilated with pressure- and flow-triggered pressure support ventilation.

METHODS: Eight patients ventilated on pressure support (PS) were studied before and after application of a resistive load (10 cmH2O/sec), using in a random order pressure or flow as a trigger variable. In all patients esophageal and gastric balloons were inserted. Arterial blood gases, neural drive (dp/dt) and timing, mechanical inspiratory time, and the difference between neural and mechanical inspiratory time (an index of expiratory asynchrony) were measured. Inspiratory, total and triggering effort was estimated using the pressure time product of the diaphragm (PTPdins, PTPditot, PTPditrig respectively).

RESULTS: For a given load there was no difference in any of the parameters studied between flow- and pressure-triggering. The PTPditrig/min was 4.88 ± 3.45 cmH2O/sec during flow trigger vs. 5.25 ± 2.76 cmH2O/sec during pressure trigger (p=0.53). The PTPditot/min was 158.43 ± 60.75 cmH2Oxsec vs. 159.59 ± 73.26 cmH2Oxsec (p=0.94). dp/dt was 22.06 ± 12.54 cmH2O/sec vs. 22.81 ± 11.12 cmH2O/sec (p=0.25), and F was 29.78 ± 8.8 br/min vs 29.43 ± 8.59 br/min (p=0.27).

CONCLUSION: We conclude that independently of the magnitude of resistive load, the method of triggering during pressure support ventilation did not affect the inspiratory effort and breathing pattern.

059
EFFECT ASSISTED MODES OF MECHANICAL VENTILATION ON HEMODYNAMIC PARAMETERS AND PULMONARY GAS EXCHANGE

Kondili E1, Ntirouchaki N1, Lazaridou S1, Alexopoulos C1, Kounirotaki S1, Georgopoulos D1
1 ICU, UNIVERSITY HOSPITAL OF HERAKLION CRETE, HERAKLION, Greece

INTRODUCTION: Recent data indicate that in patients with acute lung injury pressure support ventilation (PS) may be used initially to ventilate intubated patients with acute lung injury. Proportional assist ventilation (PAV) is a new mode which amplifies the ventilatory output of the patient effort and improves patient-ventilator synchrony. It is not known if this mode may be used on PA V mode was determined aiming to achieve a mean airway pressure similar to that on PS. Thereafter, the patients were placed randomly on PAV or PS for 30 min. At the end of each period (PAV or PS) hemodynamic data and respiratory mechanics were obtained. Simultaneously arterial and mixed venous blood was sampled and expired gases for dead space (VD) measurement were collected.

RESULTS: Hemodynamic parameters, respiratory mechanics and indices of pulmonary gas exchange did not differ between the two modes.

CONCLUSION: In patients with ALI due to sepsis, the effects of PAV on respiratory system are comparable to those of PS, indicating similar efficiency of the two modes.

060
COMPARATIVE EFFECTS OF TWO HUMIDIFICATION DEVICES ON RESPIRATORY MECHANICS IN THREE ICU POPULATIONS

Tzouli M1, Mentzopoulou S D1, Paramythiotou E1, Tsagaris H1, Armaganidis A1
1Intensive Care Unit, Attikon University Hospital, Athens, Greece

INTRODUCTION: During mechanical ventilation, warming and humidification of inspired gases is imperative. Heat and moisture exchangers (HMEs), HME-filters (HMEFs) and heated humidifiers are used for this purpose. HMEIs and HMEFs are favored over heated humidifiers, because they are disposable, cheap, more effective, reduce nurse workload, and reduce the likelihood of ventilator associated pneumonia.

The present controlled study evaluated the effects (within 24h of use) of HME and HMEF on respiratory system mechanics in mechanically ventilated patients with chronic obstructive pulmonary disease (COPD) or acute lung injury (ALI).

METHODS: 60 septic patients intubated, anesthetized, and paralyzed patients receiving volume-controlled mechanical ventilation were equally divided in 2 groups with respect to humidification device (HME and HMEF group).

RESULTS: Comparisons between COPD, ALI and control subgroups of the two humidifier groups failed to yield significant differences at any studied time-point. Within subgroup comparisons: In COPD patients, HMEF (but not HME) increased PEEPi at fa24 (p < 0.05) and lb0 (p < 0.05) relative to the control subgroup (Figure 1). Other within group subgroup comparisons resulted in unremarkable. Comparisons among subgroups: In both HME and HMEF groups, PEEPi, Rmax, Rint, and Dr were highest in COPD and ALI patients, whereas Edyn and Estat were highest in ALI at all time-points.

CONCLUSION: In mechanically ventilated COPD patients, HMEIs might be preferable to HMEFs since their low internal volume does not seem to add a significant resistance to expiratory flow, thus not increasing PEEPi at insertion or after 24h of use. In contrast, in non-COPD patients, HMEFs may be preferable to HMEIs, because they do not affect PEEPi and offer additional filtration capabilities.

061
RHABDOMYOLYSIS FOLLOWING STATUS ASTHMATICUS

Ben Khelil J1, Ben Romdhane K1, Ghadhoun H1, Belkodja K1, Ontourou S1, Bessis M1
1Intensive care unit, A. Mami Hospital, Ariana, Tunisia

INTRODUCTION: Rhabdomyolysis (RMA) following status asthmaticus is a complication rarely reported (1,2). It’s investigated only when occurs clinicals manifestations, especially during difficult of weaning from mechanical ventilation (3,4).

METHODS: We report retrospective study including all patients hospitalised, between 01/01/1990 and 30/09/2001, in respiratory intensive care unit of A Mami hospital, for acute severe asthma and having RMA (CPK>500U/L). The patients were divided into 6 groups : The first group is composed of patients who are not presenting RMA. RMA-The second group include patients presenting RMA at admission : RMAa. The third group include patients who developed RMA under mechanical ventilation : RMAnv. The fourth group include patients non ventilated and who developed RMA : RMAnv+.The fifth group include patients ventilated and did not presented RMA : RMA+. The sixth group those non ventilated and did not developed RMA - RMAnv-.

RESULTS: 464 patients were hospitalised for 633 episodes of acute severe asthma. RMA was present in 83 cases (13%). The six groups are composed of : RMA- : 550 cases; RMAa : 46 cases; RMAnv+ : 22 cases; RMAnv- : 15 cases; RMA: 46 cases and RMAnv-: 504 cases. The multivariate analysis including clinical, biological and etiological parameters shows that factors independently associated with RMA are : - At admission (RMAa): pulsus paradoxus, PaCO2 and APACHEII score. Otherwise, the risk to develop RMA is multiplied by 22.7 when APACHEII score is greater than 30 (APACHEII>30). - Under mechanical ventilation (RMAnv+) : APACHEII>30 and continuus administration of neuromuscular blockers. - Finally in the RMAnv+ group : APACHEII>30.

CONCLUSION: In acute severe asthma, RMA is frequent and should be systematically looked for, particularly in the most severe cases.

REFERENCES: 1- Rhabdomyolysis associated with status asthmaticus. 2- Rhabdomyolysis associated with status asthmaticus. 3- Myopathy following mechanical ventilation for severe acute asthma. 4- Myopathy in severe asthma. 5- Myopathy in severe asthma. 6- Myopathy in severe asthma.
**062**

**MEASUREMENT OF NEURAL INSPIRATORY TIME BASED ON THE PROXIMAL AIRWAY PRESSURE CURVE**

Ferrandis R, García-Raimundo M, Belada F J P, Jover L J, Caro P, Gramuntell F
1Anaesthesiology and Critical Care, Hospital Clinic Universitari, Valencia, Spain

**INTRODUCTION:** Neural inspiratory time (TIN) is usually estimated on indirect measurements, like proximal airway pressure (Paw), but its concordance with gold standard (diaphragmatic electromyogram –EMG–) hasn’t been enough evaluated. We’ve set up a study to value the concordance between diaphragmatic EMG and Paw.

**METHODS:** Patients scheduled for coronary bypass were recruited. At the end of surgery two electrodes were placed in the left diaphragm. Paw was recorded between the endotracheal tube and Y piece. During weaning, we recorded 5 minutes with support pressures of 20, 15 and 10 cm H2O. Inspiration onset was determined at the end of expiration, where a sudden fall in the Paw curve is produced. When the inspiratory activity stops, it can be established a change in the ascending slope of the Paw curve to the adjusted PS level. Signal processing was made with the MP-100 system (Bionico Iberica). We used descriptive statistics (frequencies, mean and standard deviation) and the Pearson Correlation, with a significant level of 0.01 (2 tailed).

Inspiration onset was determined at the end of expiration, where a sudden fall in the Paw curve is produced. Inspiration onset was determined at the end of expiration, where a sudden fall in the Paw curve is produced. Inspiration onset was determined at the end of expiration, where a sudden fall in the Paw curve is produced. Inspiration onset was determined at the end of expiration, where a sudden fall in the Paw curve is produced.

**RESULTS:** We studied 6 patients (4 men and 2 women) average age 62±9 years. During weaning, we analyzed 363 cycles. We identified the onset and the end of the TIN in 98% and 97% of the cases respectively, occurring 17±56 ms (16% of total TIN) and 30±109 ms (2±8% of total TIN) before the beginning and the end in the EMG register. The Pearson Correlation between the measurement of the TIN with the diaphragmatic EMG and the Paw was 0.93.

**CONCLUSION:** Determined points at Paw curve provide a good estimation of TIN.

**REFERENCE(S):** 1 Parthasarathy A, Juhran A, Tobin M, Am J Respir Crit Care Med 2000; 162: 546-52.

---

**063**

**TIDAL-VOLUME VARIANCE FOR ASSESSMENT OF SEDATION IN PATIENTS WITH PRESSURE-CONTROLLED VENTILATION**

Hober W, Meiswinkel F, Umgelter A, Henning M, Haeussermann P, Eickel F, Mayr M, Schmid R M
1Medizinische Klinik, 2Institut fuer Medizinische Statistik und Epidemiologie, 3Neurologische Klinik, Klinikum Rechts der Isar, Technical University of Munich, Munich, Germany

**INTRODUCTION:** Mechanical ventilation usually requires sedation. Overexposure causes prolonged ventilation as well as an increase of ventilator-associated complications. Underexposure increases anxiety. The assessment of sedation is not standardised. Until now, clinical criteria and several scores are used to assess sedation (Ramsay Score (RS), Cook and Palma Score (CPS), Cohen and Kelly Score (CKS), Chamorro Score (CS) and linear Sedation Score (LSS)). Apparative methods such as EGG are not routinely used. Bispectral index (BIS) is promising, but not routinely available. Biological variability of ventilation parameters has been described, however it is not used to assess sedation. Therefore it was the aim of our study to investigate the correlation of tidal-volume variance (TVV) and the above mentioned sedation scores in patients with pressure-controlled ventilation (PCV).

**METHODS:** In 30 patients (interim analysis of final n=80) with MOF, PCV and continuous sedation (midosolam, fentanyl), in some cases additionally propofol and ketamine) RS, CPS, CKS, CS and LCS were independently documented by physician (P), nurse (N) and investigator (I, not working in the ICU). Subsequently 200 consecutive tidal volumes were documented. TVV was calculated and compared to the above-mentioned sedation scores. Additionally TVV was compared to EGG and to BIS (starting with patient no. 26). Ventilation according to ARDSnet-recommendations, Siemens Servo 900C or Servo300, Trigger–2 cm H2O. Statistics: SPSS-Software, Spearman-correlation.

**RESULTS:** Patients’-characteristics (mean±SD): age 55.1±14.3 years, 6 female, 24 male, APACHE II-Score 26.9±4.2; preceding ICU-period 13.8±10.3 days; continuous sedation with midosolam 37.3±44.7mg/h, fentanyl 0.12±0.05mg/h, propofol 54.1±10.6mg/h, sedation assessment: RS 5.7±4.6, CPS 5.08±3.54, CKS 0.41±0.54, CS 8.94±1.84 and LCS 1.62±6.14, FIO2 0.49±0.16, PEEP 8.2±3.6 cmH2O, ventilatory frequency 19.6±4.5 Min., pressure-control 16.3±3.4 cmH2O, tidal volume 582±128ml, TVV 1606.5±5778.8ml (minimum 1.89; 1.45, FiO2 0.49±0.16, PEEP 8.2±3.6 cmH2O, ventilatory frequency 19.6±4.5 Min., pressure-control 16.3±3.4 cmH2O, tidal volume 582±128ml, TVV 1606.5±5778.8ml).

**CONCLUSION:** Calculating TVV is a simple and not expensive tool for sedation assessment in patients with pressure-controlled ventilation.

**REFERENCES:**

---

**064**

**FACTORS EFFECTING INTUBATION IN PATIENTS WITH COPD AND ACUTE HYPERCAPNIC RF: MULTIVARIATE ANALYSIS**

Ucgun I, Metinbas M, Erginel S M, Atalas F, Yildirim H, Harmanci E, Naz C
1Department of Chest Diseases, Osmangazi University, Medical Faculty, Eskişehir, Turkey

**INTRODUCTION:** The aim of this study was to identify the possible factors for intubation and mechanical ventilation in COPD patients with hypercapnic respiratory failure in the respiratory ICU.

**METHODS:** A prospective study using data obtained over the first 24 hours of ICU admission. 445 patients’ consecutive admissions to the ICU in university hospital were screened between 1999 and 2003. Patients who did not have COPD (ARDS, GSF, CHF: 164 pts.), malignancy (79 pts.), or patients aged under 40, as well as patients with PaCO2 <50 mmHg and patients who died within the first 24 hours upon admission to the ICU were excluded from the study. 125 patients’ admissions to the ICU were enrolled.

**RESULTS:** Ninety-three of patients were male. The mean age was 64, the mean PaCO2 was 63.1 mmHg, and the median APACHE II score was 22. 48.8% patients needed mechanical ventilation (MV). Although, 15 patients significantly effected mortality in the univariate analysis, high APACHE II score (p=0.001; OR: 1.22; CI: 1.10-1.35) and Glasgow Coma Score (GCS) (p=0.002; OR: 0.66; CI: 0.53-0.86) were identified as factors affecting intubation in the multivariate analysis.

**CONCLUSION:** Higher APACHE II score and lower GCS were determined to be the predictors of intubation among patients with COPD and acute hypercapnic RF.

---

**065**

**THE EFFECT OF A PROTOCOL ON THE DURATION OF WEANING**

WulfI A, Kalkman B I, Orsini M, Van der Hoeven M, Van der Velden J, Tangka P, Salm E I, Meynart I
1Intensive Care Unit, Reiner de Graaf Hospital, Delft, Netherlands

**INTRODUCTION:** Weaning from the ventilator can be achieved in different ways depending both on patient characteristics and organisational aspects of the ICU. Weaning protocols compete with tailor made weaning by dedicated ICU personnel. The object of this study was to measure the effect of a protocol on the duration of weaning from the ventilator in a setting where intensivists frequently re-evaluate ventilator settings of weaning patients.

**METHODS:** The unit is a 10 bed closed format mixed medical and surgical ICU. Patients were entered in the study when they were on a ventilator for no more than 7 days and when it was decided by the attending intensivist to withdraw the ventilator. In the pre-protocol period weaning was stopped and if the patient was still on controlled ventilation, settings were changed to pressure support and then gradually lowered (on the average until a PEEP of 5 cm H2O, pressure support level of 15 cm H2O and 30-40% FiO2) until the intensivist decided to take out the endotracheal tube. In the protocol period more or less the same approach was formalised in a protocol to be carried out by nurses. The tube was only taken out after consent from the intensivist.

**RESULTS:** Table 1 illustrates that mean weaning time is reduced by the protocol, while time on the ventilator is essentially the same in both groups.

| Weaning without protocol | Protocol led weaning |
|--------------------------|----------------------|
| Number of patients       | 29                   | 33                   |
| Mean time on ventilator  |                      |                      |
| (hrs) (range)            | 77.1 (13-175)*       | 70.0 (9-196)*        |
| Mean duration of weaning |                      |                      |
| (hrs) (range)            | 33.3 (3-99)**        | 15.2 (2-51)**        |
| Number of patients       |                      |                      |
| reintubated in 24 hrs    | 2                    | 2                    |

*p = 0.62 T-test NS, **p<=0.006 T-test

**CONCLUSION:** Even in a closed format ICU with intensivists who frequently re-evaluate ventilator settings in patients who are being weaned, a weaning protocol reduces the duration of weaning by half.
**Poster Sessions**

**Pathophysiology of sepsis: Basic and clinical research – 067-076**

**067**

**DESMALYLATION REPRODUCES RAPID ALTERATIONS IN THE RED BLOOD CELL SHAPE OBSERVED IN SEPTIC PATIENTS**

Piagnerelli M1, Zouaoui Boudjeltia K2, Bouckaert V2, Vanhaeverbeek M2, Vincent J1

1Department of Internal Medicine, Medical University of Innsbruck, Innsbruck, Austria, 2Department of Anatomy and Physiology, Kansas State University, Manhattan, Kansas, United States

**INTRODUCTION:** Changes in RBC shape have been reported in patients with sepsis. We here investigated whether the rapid changes previously observed in septic patients could be mimicked in healthy subjects using a similar method.

**METHODS:** Blood samples from healthy donors were centrifuged and RBC were washed and incubated in a 37°C shaking water bath. A time-course analysis was performed and RBC were analysed using a flow cytometer.

**RESULTS:** Desmialylation of RBC induces a rapid, dose-related alteration in RBC shape, similar to the one observed in septic patients.

**CONCLUSION:** Desmialylation of RBC reproduces the rapid alterations in RBC shape observed in septic patients.

**REFERENCE:**
1. Piagnerelli M et al. Crit. Care Med. 2003; 31: 2156-2162

**068**

**SYNDECAN INVOLVEMENT IN PORCINE PR-39-MEDIATED HUMAN NEUTROPHIL CHEMOTAXIS**

Djanani A1, Feistritzer C1, Mosheinier B A1, Kanieider N C1, Sturm D H1, Ross C R2, Ricevuti G3, Wiedermann C J1

1Department of Intensive Care, Erasme University Hospital, Brussels, Belgium, 2Department of Internal Medicine, Medical University of Innsbruck, Innsbruck, Austria, 3Department of Anatomy and Physiology, Kansas State University, Manhattan, Kansas, United States

**INTRODUCTION:** Porcine cathelicidin (PR-39), a member of the cathelicidin family of antimicrobial peptides, has been implicated in innate immunity and host defense.

**METHODS:** Using a modified Boyden Chamber assay, we investigated chemotaxis of PR-39 induced in human neutrophils.

**RESULTS:** PR-39 induced chemotaxis in human neutrophils, with a dose-dependent effect.

**CONCLUSION:** PR-39 can be used as a chemotaxis agonist in neutrophils.

**REFERENCE:**
1. Djanani A et al. Mediators Inflamm. 2004; 2004: 123-127.
070
NATURAL KILLER CELL FUNCTIONS AND -SUBSETS IN A PORCINE MODEL OF ENDOTOXAEMIA

Nyboe R1, Rix T1, Krogh J2, Høland M2, Tennesen E3
1Dept. of Anaesthesiology and Intensive Care, Aarhus University Hospital, 2Institute of Medical Microbiology and Immunology, University of Aarhus, Aarhus, Denmark

INTRODUCTION: The purpose of this study was to examine the effect of critical illness on natural killer cell function and interferon-gamma production. For this purpose we used a well-established porcine model of endotoxaemia. For method optimization we initially used human cells, which provides the opportunity to compare results from human and porcine cells. NK cell activity was estimated as cytotoxicity capacity and ability to produce IFN-gamma, after stimulation with IL-2 and IL-12.

METHODS: Isolated cryopreserved porcine peripheral blood mononuclear cells (PBMC), from animals treated with a continuous infusion of LPS for 6 hours, were stimulated with IL-2 and IL-12. This stimulation has previously been shown to activate NK cells. Cell cytotoxicity was measured by the standard 51Cr release assay. Cells were treated with BFA to accumulate IFN-gamma, stained for surface markers, permeabilized, and stained for intracellular IFN-gamma. Flow cytometry was then performed to measure intracellular IFN-gamma production in PBMC, especially in NK cells.

RESULTS: In human cells, we have demonstrated that stimulation with IL-2 and IL-12 is effective in increasing the number of IFN-gamma positive NK cells. There is a distinct difference between NK cell subsets CD3-CD56dim and CD3-CD56bright, with a larger proportion of IFN-gamma positive cells in the CD3-CD56bright subset. The relation between IFN-gamma production and cytotoxicity in human and porcine cells will be presented, as well as these assays applied to cells from the porcine endotoxemic model.

CONCLUSION: In combination, these tests address NK cell function by combining cytotoxicity with IFN-gamma production in NK cell subsets. The results will demonstrate if this could serve as a useful tool in describing NK cell function, which could be of value in clinical and experimental settings.

071
KETAMINE SUPPRESSES IL-8 PRODUCTION: ROLE OF TRANSCRIPTION FACTORS AP-1 AND NF-KB

Welters D1, Hafer G1, Hempelmann G1, Stefano G B1, Menzerbach A1
1Department of Anaesthesiology, Intensive Care Medicine and Pain Management, University Hospital Giessen, Giessen, Germany, 2Neuroscience Research Institute, SUNY Old Westbury, Old Westbury NY 11568, United States, Center for Transgene Technology and Gene Therapy, Flanders Interuniversity Institute for Biotechnology, Louvem, Belgium

INTRODUCTION: Although ketamine is commonly used for analgesia and sedation in critically ill patients, little is known about the possible immunomodulating effects of this drug. Recent data indicate that ketamine reduces proinflammatory cytokine production in immune cells (1). However, little is known about the signaling mechanisms involved in ketamine-induced immunosuppression. In this study, we investigate the effects of ketamine on lipopolysaccharide (LPS)-induced activation of transcription factors AP-1 and NF-kB, both of which are involved in the production of interleukin-8 (IL-8).

METHODS: A flow cytometric technique (2) as well as electric mobility shift assays were used to investigate ketamine effects on nuclear binding activity of both transcription factors in monocyte-like cell lines as well as in peripheral blood monocytes in response to stimulation with LPS (100 ng/ml). IL-8 mRNA production was determined by reverse transcription-polymerase chain reaction (PCR) in whole blood samples from 25 healthy control subjects, the 36 patients with SIRS had a greater production of PMNs bearing CD49d (mean = 10% v 4%, p<0.05), CD49e (mean 16% v 6%, p<0.05), CD49f (mean 14% v 8%, p<0.05), CD29 (mean 61% v 27%, p<0.001) and CD1c (mean 70% v 44%, p<0.05). The PMNs from both patients and controls had a similar distribution (approximately 97%) and intensity of expression of CD11a, CD11b and CD62L, whereas CD49d and CD49e were hardly detected on any cells. The PMNs from patients with infections did not differ from those without infections in either the distribution or expression of the adhesion molecules studied. The mortality rate for the SIRS patients with infections was 53% in contrast to 9% for the SIRS patients without infection. There was no relationship between patient survival and the distribution of PMNs bearing beta1, beta2 integrins and CD62L.

CONCLUSION: We propose that an increased distribution of CD49d, CD49e, CD49f, CD29 and CD1c on PMNs from patients with systemic inflammation augments the binding of the cells to blood vessel walls so as to precipitate organ failure. This upregulation of adhesion molecules is not dependent upon microbial infection.

072
ABNORMAL EXPRESSION OF ADHESION MOLECULES ON POLYMORPHONUCLEAR CELLS IN SYSTEMIC INFLAMMATION

Lewis S M1, Treacher D F2, Brain S D3, Pearson J D3, Brown A K1
1Department of Immunology, Guys Kings and St Thomas Hospitals Medical and Dental School, 2Intensive Care Unit, St Thomas’s Hospital, 3Centre for Cardiovascular Biology and Medicine, King’s College, London, United Kingdom

INTRODUCTION: An increased binding of polymorphonuclear cells (PMNs) to vascular endothelium is thought to underlie the organ failure of the systemic inflammatory response syndrome (SIRS) either by inducing vascular occlusions or by increasing the number of infiltrating PMNs which induce tissue damage by releasing lytic factors. Enhanced PMN-endothelial cell interactions could arise from an altered distribution of adhesion molecules on the PMN surface. The aim of this study was to determine if adhesion molecules were abnormally expressed on PMNs in SIRS and, if so, whether an alteration in their expression could discriminate between SIRS patients with or without infection.

METHODS: Flow cytometric analysis was undertaken on PMNs in whole blood samples from 25 healthy control subjects and 36 patients in the ICU all of whom met the criteria for SIRS and required mechanical ventilation. Twenty patients had evidence of infection (positive cultures from lungs, blood, and central venous catheters, urine, pleural and peritoneal fluid or soft tissues) and the 16 patients without infection developed SIRS as a result of pancreatitis, trauma or cardiopulmonary bypass surgery. The adhesion molecules examined included the beta1 integrins, CD49b, c, d, e, f and i, their common beta chain CD29, the beta2 integrins CD11a, CD11b, CD11c and the selectin, CD62L.

RESULTS: In comparison with control subjects, the 36 patients with SIRS had a greater expression of PMNs bearing CD49d (mean = 10% v 4%, p<0.05), CD49e (mean 16% v 6%, p<0.05), CD49f (mean 14% v 8%, p<0.05), CD29 (mean 61% v 27%, p<0.001) and CD1c (mean 70% v 44%, p<0.05). The PMNs from both patients and controls had a similar distribution (approximately 97%) and intensity of expression of CD11a, CD11b and CD62L, whereas CD49d and CD49e were hardly detected on any cells. The PMNs from patients with infections did not differ from those without infections in either the distribution or expression of the adhesion molecules studied. The mortality rate for the SIRS patients with infections was 53% in contrast to 9% for the SIRS patients without infection. There was no relationship between patient survival and the distribution of PMNs bearing beta1, beta2 integrins and CD62L.

CONCLUSION: We propose that an increased distribution of CD49d, CD49e, CD49f, CD29 and CD1c on PMNs from patients with systemic inflammation augments the binding of the cells to blood vessel walls so as to precipitate organ failure. This upregulation of adhesion molecules is not dependent upon microbial infection.

073
ENDOTHELIAL INJURY AND VASCULITIS COULD BE IMPORTANT ON MULTI ORGANIC FAILURE (MODS)

Valencia E1, Yepes D1, Cardona A1, Garcia M1
1Intensive Care, HUSVP, Medellin, Colombia

INTRODUCTION: Apoptosis have been reported on critically ill patients. Cell undergoing apoptosis or apoptosis release small parts of their outer membrane, the so-called micro-particles (MP). Extensive studies have been reported on MP generated from blood platelets (MPM) in vitro, and endothelial cell-derived MP (EMP) in patients with systemic lupus erythematosus (SLE). EMP production from platelets, endothelial, and granulocytes cells were in patients with MODS (2). It has been postulated that endothelial markers injury detected on SLE on peripheral blood smear, may be a marker of MODS.

METHODS: We performed a prospective observational research study. Seventeen patients admitted to a medical intensive care unit, St Vincent Hospital, Medellin, Colombia, were involved. Thrombocytopenia, aCL, complement, and schistocytes were assessed on seventeen patients. Patients were classified according to MODS (3) and SOFA score (4). Collection of Illness severity assessment, demographic data and blood for the measurement of anticardiolipin antibodies (aCL), thrombocytopenia and schistocytosis serum levels, IgG and IgM type, complement (C3 and C4), on the day of MODS diagnosis was done. Data were expressed as means +/- 2 SD.

RESULTS: There were 7 (36.8%) men and 10 women (52.6%), with a mean age (+/-SD) of 60.4+/-18.7 y. Overall, the patients suffered from a wide area of diseases and surgical conditions (APACHE II=11.8+8.8). SOFA: 12.8+/-2.9. Organ dysfunction: respiratory 84.2%, cardiovascular 84.2%, renal 68.4%, liver 63.2%, coagulation 63.2% and skin 36.8%. 94.1% of patients died. ICU stay was 9.18+/-8.7 days, 5 days more than our stay ICU (4,1 days for 2003). Not only aCL (type IgG: 9.89+/-3 g/l and type IgM: 12.9+/-9.6 mel/ml) but also C3 (93+/-67 mg/dl), C4 (21.7+/-11 mg/dl) and platelets (145.588 +/-221.515/mm3) were between normal averages. Schistocytes were undetected in 100%.

CONCLUSION: The results of the current study have not been reported before. Our findings suggests that thrombocytopenia; aCL, complement, and schistocytes cannot explain endothelial injury on MODS. Another marker should be explored to clarify micro-vascular thrombosis, release of inflammatory mediators and expression of adhesion molecules after endothelial cell activation in patients with MODS.

REFERENCE(S): 1) J Clin Invest 1999; 104: 93-102. 2) Thromb Haemost 2001; 85: 810-820. 3) Crit Care Med 1995; 23: 1638 - 1652. 4) Intensive Care Med 1996; 22: 707-710.
**METHODS:** We tested the hypothesis that septic patients have an impaired microvascular response during reactive hyperemia using near-infrared spectroscopy (NIRS), a non-invasive technique using the differential absorption properties of haemoglobin to evaluate skeletal muscle oxygenation.

**RESULTS:** There was no difference in StO2 baseline and slope between ICU control and HV groups. The slope was less steep in the SP group than in ICU and HV groups (both p<0.01). In septic patients, there was no difference in slope between patients with severe sepsis and septic shock and between patients treated with high or low doses of catecholamines.

**CONCLUSION:** Alterations in vascular reactivity can be demonstrated by the NIRS technique in septic patients. These alterations are not significantly influenced either by the severity of sepsis or by the adrenergic support.

**INTRODUCTION:** The objective of the study is to compare C-reactive protein (CRP), leucocyte count, and Simplified Acute Physiology Score II (SAPS II) in patients with sepsis and severe sepsis.

**RESULTS:** Mortality from sepsis and severe sepsis was 19% and 51% respectively. Mean plasma concentration of CRP (mg/l) in patients with severe sepsis was 246.33 ± 179.99, compared with patients with severe sepsis was 16.42 ± 8.04 and 14.80±7.62, respectively (p=0.52). Mean SAPS II score in sepsis and severe sepsis was 16.42 ± 8.04 and 14.80±7.62, respectively (p=0.52). Mean SAPS II score in sepsis and severe sepsis was 16.42 ± 8.04 and 14.80±7.62, respectively (p=0.52). Mean SAPS II score in sepsis and severe sepsis was 16.42 ± 8.04 and 14.80±7.62, respectively (p=0.52).

**CONCLUSION:** There is a significant statistical difference in patients with severe sepsis and sepsis regarding C-reactive protein and SAPS II score but not in leucocyte count.

**ROLE OF ENDOTOXIN IN THE PATHOGENESIS OF CIP**

**METHODS:** 7 septic shock patients (pts, 62(36) yo; SAPS II: 61(25), SOFA 10 (3)) receiving 0.5 (0.7) µg/kg/min norepinephrine, were investigated with orthogonal polarization spectral imaging (OPS) with simultaneous measurements of cardiac output (CO), PA catheter or transesophageal Doppler), blood pressure (BP) and right atrial pressure (Pra). 3 sublingual areas/pts were examined and the number of vessels (small- medium- large) were quoted as no flow=0, sludge=1, moderate=2, normal=3 to compute a microcirculatory ratio for each vessel category. Data were collected before and within 30 min after fluid challenge (5-7 ml/kg crystalloid in 10 min) or after topical 5% lidocaine. Data were expressed as median (IQR), differences were tested by non parametric tests.

**RESULTS:** After fluid challenge (n=6), only the number of small vessels/ field increased from 26(20) to 55(14), p<.05, even all vessels improved their ratio (p<.01, figure 1). CO increased by 26(18) %, as did systolic BP from 96(18) to 117(29) mmHg (p<.05) and Pra from 10(8) to 12(6) mmHg (p<.05 for all). Topical lidocaine (n=3) did not recruit new vessels, but improved circulatory conditions in small and medium vessels (ratio from 1.9 to 2.2, p<.05). Fig 1: Changes (median) in number of vessels/area (small=1, medium=2, large=3).

**CONCLUSION:** Fluid challenge induces microvessel recruitment with better flow conditions. Local vasodilator did not change the number of perfused vessels, but slightly improved their flow conditions compared to fluid. The mechanisms of fluid-induced vasodilation and anti-sludge effect remain to be elucidated. Despite the known impairment in NO-dependent vasodilation, the small septic vessels can be dilated by an endothelial-independent mechanism.

**Grant acknowledgement:** Ministère de la Recherche, plan quadriennal EA 322
RENAL 02 EXTRACTION BUT NOT BLOOD FLOW IS PRESERVED DURING SEVERE HYPOTENSION

Bracht H1, Porta F2, Trochen N2, Serra A3, Takala J1, Jakob S M1
1Department of Intensive Care Medicine, 2Dep. of Nephrology, Inselhospital, Bern, Switzerland

INTRODUCTION: Renal failure occurs early in septic shock. Decreased organ perfusion and impaired oxygen extraction may both contribute. The relevance of impaired O2-extraction should be evident in high O2-demand. We assessed the effect of endotoxin-induced systemic hypotension on kidney function, renal blood flow and O2-transport in hypothermic pigs.

METHODS: Anesthetized pigs were randomized to receive either endotoxin (E=12) or saline (C=12). Systemic and regional hemodynamics as well as regional oxygen extraction and urinary output were measured at baseline and after 6.12 and 18 hours of endotoxin infusion. Baseline filling pressures were maintained with fluids.

RESULTS: Cardiac index increased and mean arterial pressure (MAP) decreased significantly over time in both groups without intergroup difference. Renal blood flow (RBF) decreased in both groups, this was associated with an increasing O2 extraction. Urinary output (OU) decreased over time in both groups without intergroup difference. Renal blood flow (RBF) decreased in both groups, this was associated with an increasing O2 extraction. Urinary output (OU) decreased especially in the endotoxin group.

| Group   | CI (ml/min/kg) | MAP (mmHg) | RBF (ml/min/kg) | ERO2 (ml/min/kg) | UO (ml/h) | ETX | Control | P
|---------|----------------|-------------|-----------------|------------------|-----------|-----|---------|---
| CON     | 113±32         | 125±35      | 128±25          | 141±30           |           |     |         |   
| ETX     | 96±29          | 114±29      | 121±42          | 121±20           | 13±5      | 0.023|         |   
| CON     | 134±10         | 136±10      | 134±10          | 0.20±0.10        | 0.001     |     |         |   
| ETX     | 5.7±2.5        | 5.7±2.3     | 5.7±2.2         | 5.1±1.9          | 0.012     |     |         |   
| CON     | 6.5±3.1        | 5.2±2.4     | 4.8±2.1         | 3.9±2.0          | 0.002     |     |         |   
| ETX     | 30±6           | 31±4        | 32±6            | 35±11            |           |     |         |   
| CON     | 38±16          | 31±7        | 34±11           | 45±14            | 0.014     |     |         |   
| ETX     | 41±13          | 39±18       | 45±23           | 38±21            |           |     |         |   
| CON     | 47±13          | 37±22       | 35±31           | 27±18            |           |     |         |   
| ETX     | 5,7±2,5        | 5,7±2,3     | 5,7±2,2         | 5,1±2,0          | 0,012     |     |         |   
| CON     | 5,7±2,5        | 5,7±2,5     | 5,7±2,2         | 5,1±2,0          | 0,012     |     |         |   

CONCLUSION: In the present septic model, hyperdynamic shock with decreasing regional blood flow was observed. The hemodynamic changes were associated with a decreased urinary output. The capability to increase oxygen extraction was preserved. These results demonstrate that during sepsis renal blood flow and function are more dependent on systemic blood pressure than on systemic blood flow.

Grant acknowledgement: Dr Hendrik Bracht is supported by the young investigators award of the ESICM 2003.

BLOOD PRESSURE REDUCTION BY NA-NITROPRUSSID DOES NOT DECREASE FLUID LEAKAGE DURING HYPOTHERMIC CPB

Haugen O1, Farstad M1, Kvalheim V2, Hammerstod S1, Husby P1
1Department of Anesthesia and Intensive Care, 2Department of Heart Disease, Haukeland University Hospital, Bergen, Norway

INTRODUCTION: CPB (cardiopulmonary bypass) is associated with fluid extravasation. Hemodilution and hypothermia are held responsible. Forces affecting microvascular fluid exchange include the trans-hydrostatic and colloid osmotic pressure gradients across the capillary membrane. We hypothesized that by decreasing the pre- and postcapillary resistances, the capillary hydrostatic pressure would be lowered. This might lead to a reduction in fluid extravasation during hypothermic CPB.

METHODS: 14 piglets underwent 60 min normothermic CPB followed by 90 min hypothermic CPB. The low pressure group (LP=n=7) was given Na-nitroprussid to MAP below 40 mm Hg from start of CPB and compared with a control group (C=n=7). Ringer’s solution was used as CPB prime and for fluid supplementation. The same fluid supplementation protocol was used in both groups. Hemodynamic variables were obtained. Net fluid balance (NFB) and fluid extravasation rate (FER) were calculated. Statistics: Analysis of variance and post-tests if ANOVA gave significant results.

RESULTS: MAP of the two groups differed from start of CPB. The LP group had significantly lower MAP than the C group. NFB was significantly more positive in the LP group compared with the control group (C=n=7). Ringer’s solution was used as CPB prime and for fluid supplementation. The same fluid supplementation protocol was used in both groups. Hemodynamic variables were obtained. Net fluid balance (NFB) and fluid extravasation rate (FER) were calculated. Statistics: Analysis of variance and post-tests if ANOVA gave significant results.

results: see table

| Time on CPB | MAP (mm Hg) | MAP (mm Hg) | FER | FER | FER |
|-------------|-------------|-------------|-----|-----|-----|
| (minutes)   | LM-group    | LM-group    | L-group | L-group |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
|             |             |             |       |       |
082

CHANGES IN MICROVASCULAR BLOOD FLOW ARE NOT RELATED WITH CHANGES IN CARDIAC INDEX DURING DOBUTAMINE

De Backer D1, Creteur J1, Koch M1, Dubois M1, Sakr Y1, Chierego M1, Verdant C1, Vincent J1.
1Intensive Care, Erasme University Hospital, Brussels, Belgium

INTRODUCTION: Whether or not dobutamine may improve microcirculatory blood flow in patients with septic shock independently from its systemic effects is an unresolved question.

METHODS: We used an Orthogonal Polarization Spectral (OPS) imaging device (Cytoscan ARIE, Cytometrics, Philadelphia) to explore the sublingual microcirculation in 10 patients with septic shock before and during the administration of 5 mcg/kg.min of dobutamine (DOBU). All patients were equipped with a pulmonary artery catheter. All patients were treated with dopamine (18 [8-20] mcg/kg.min) and 5 patients was also treated with norepinephrine (0.5 [0.2-0.9] mcg/kg.min). In each patient, 5 sublingual areas were investigated at baseline, during dobutamine administration. Five sequences of 20 sec each were stored and analyzed off-line semi-quantitatively: vessel density was defined as the number of vessels crossing 3 horizontal and 5 vertical lines; flow was defined as continuous, intermittent, or absent. The vessels were then separated into m cut-off value. Data from the 5 areas were averaged and capillaries, using a 20 averaged. In addition, global hemodynamic parameters obtained. A Wilcoxon rank test was applied to analyze differences from baseline. Relationship between the changes in cardiac index and microvascular perfusion was assessed by linear regression. Data are presented as median (percentiles 25-75).

RESULTS: Cardiac index increased from 3.9 [3.3-5.2] to 4.3 [4.0-5.6] L/min.M2 (p=0.01) while mean arterial pressure remained unchanged (from 69 [68-77] to 73 [66-76] mmHg, p=ns). The proportion of perfused capillaries increased from 58 [29-66] to 75 [68-80]% (p=0.01). The changes in microvascular perfusion were not related with the changes in cardiac index (figure) or arterial pressure.

CONCLUSION: Changes in microvascular blood flow were not related with, and hence cannot be predicted by, changes in systemic hemodynamics.

083

LEVSOMERIDAN IS SAFE AND EFFECTIVE IN PATIENTS WITH SEVERE LOW-OUTPUT HEART FAILURE AND CRITICAL HYPOTENSION

Franco F1, Oliveira L1, Monteiro P1, Vieira H1, Matos V1, Gonçalves L1, Providência L1, A1
1Cardiology, Coimbra University Hospital, Coimbra, Portugal

INTRODUCTION: Management of decompensated advanced heart failure, severe hypotension, and progressive cardiogenic shock requires immediate inotropic therapy to restore cardiac output (CO) and blood pressure (BP). Levsomeridán (levo) is effective in heart failure patients with low CO but relatively preserved BP. However, it is unknown if levo is effective when CO and BP pressure are both critically low.

METHODS: Fifteen patients (64 ± 18 years; LVEF 21 ± 3%) admitted to ICU due to decompenated chronic heart failure with critical hypotension and progressive cardiogenic shock, treated with medium-high doses of dobutamine (dob) and dopamine (dop) upon arrival, were given 0.1 mcg/kg/min levo in the first 24 hours after admission to ICU (Group 1; n=15). Clinical and hemodynamic improvement at 48 h after treatment, in-hospital mortality, and length of hospital and ICU stay were compared to 11 patients (59 ± 18 years; LVEF 20 ± 3%), with the same baseline characteristics, treated with dob and dop (Group 2; n=15).

RESULTS: Dob/dop were weaned at 62 ± 38 hours in Group 1 and at 120 ± 48 hours in Group 2 (Pc 0.02). Hospital length of stay (LOS) was 14 ± 5 days in Group 1 and 22 ± 8 days in Group 2 (Pc 0.01). ICU LOS was 5 ± 3 days in Group 1 and 9 ± 5 days in Group 2 (Pc 0.05). In-hospital mortality for Group 1 was 27% compared to 64% in Group 2.

Clinical Parameter*            Group 1  Group 2
Systolic BP (mmHg)            Baseline 48 h Baseline 48 h
75 ± 9                        91 ± 8 * 73 ± 6
Heart Rate (beats/min)        106 ± 16 100 ±12 * 103 ± 20 107 ± 16
Diuresis (ml/hr)              22 ± 20 242±159 * 30 ± 27 114±122**
Creatinine (mg/dl)            3.3 ± 1.7 2.3 ± 1.6 1.5 ± 0.7 2.8 ± 2.4

* Mean ± SD; ** P<0.05.

CONCLUSION: Our preliminary data suggest that introducing levo to conventional therapy at early stages of treating patients with severe heart failure and cardiogenic shock improves hemodynamic recovery and hospital outcomes when compared to traditional dobut Phenol.
THE USE OF LEVOSIMENDAN IN ICU PATIENTS WITH CARDIOGENIC SHOCK: EFFECTS ON GLOBAL HEMODYNAMICS

Pechman V1, Roktya R1
1Dept of Internal Medicine I, Charles University Hospital, Pizen, Czech Republic

INTRODUCTION: Levosimendan is a calcium sensitizer which exerts positive inotropic effects without increasing intracellular Ca2+ or Ca2+. So far, the data on its use in critically ill patients are scarce [1]. The aim of this study was to assess the effects of levosimendan infusion on global hemodynamics in patients with cardiacogenic shock.

METHODS: Nine patients (M/F 4/5, mean age 70±5 years, 7 mechanically ventilated) in cardiogenic shock (7 pts. with acute coronary syndrome, 2 pts. with dilated cardiomyopathy) were studied prospectively. Before levosimendan administration all patients required norepinephrine (mean dose 0.26±0.24 µg·kg⁻¹·min⁻¹), 3 patients were given dobutamine (mean dose 9.6±1.4 µg·kg⁻¹·min⁻¹). All patients had arterial and pulmonary arterial catheters. Baseline hemodynamic data (BL) were collected before levosimendan administration. The second and the third data set were obtained after 8 and 24 hours, respectively.

RESULTS: During levosimendan infusion systemic vascular resistance significantly decreased whereas cardiac index and urine output increased [Table 1 - data are medians; 25th and 75th percentiles (RM-ANOVA on ranks; *8 hrs vs. BL; **24 hrs vs. BL)]. The dose of norepinephrine did not increase. Two patients were non-responders. ICU mortality reached 55 %.

(PAOP – pulmonary arterial occlusion pressure; MAP – mean arterial pressure; SVRI – systemic vascular resistance index; CI – cardiac index)

| Bl. | 8 hrs | 24 hrs |
|-----|-------|-------|
| PAOP (mmHg) | 24 (18.28) | 21 (15.41) | 19 (15.39) |
| MAP (mmHg) | 78 (75.93) | 78 (72.86) | 81 (80.86) |
| SVRI (dyn·sec/cm5·m2) | 4218 (3999.6454) | 2480 (1896.325) | 2000 (1845.2525) |
| CI (l/min/m2) | 1.5 (1.21.8) | 2.2 (1.53.1) | 2.6 (2.32.8) |
| urine output/hr (ml) | 30 (17.75) | 100 (63.159) | 140 (83.186) |

CONCLUSION: Levosimendan may have beneficial effects on global hemodynamics in critically ill patients with severe cardiacogenic shock.

REFERENCE(S): 1. Karth DG, Buberl A, Geppert A et al. Hemodynamic effects of a continuous infusion of levosimendan in critically ill patients with cardiacogenic shock requiring catecholamines. Acta Anaesthesiol Scand 2003: 47: 1251-6.

MARKEDLY CARDIAC DYSFUNCTION BY INOCULATION OF STAPHYLOCOCCUS AUREUS: ROLE OF INTRACELLULAR CALCIUM

Hong X1, Chen X1, Liu D1, Huang M1, Wang H1, Xiao J2, Ren R1, Sun Q3
1Dept of Internal Medicine I, Charles University Hospital, Plzen, Czech Republic
2Dept of Internal Medicine II, University of Michigan, Ann Arbor, United States
3Internal Medicine, University of Michigan, Ann Arbor, United States

INTRODUCTION: Effects on global hemodynamics in patients with cardiogenic shock.

METHODS: Patient population comprised 39 pts (87.1% men) with a mean age of 56 (SD 8.0) years (P=NS). No difference was observed between the groups regarding the other base variables, except for BMI (P=0.0035). In order to obtain comparable outcome, all patients were divided into two groups: Group 1 (G1) with “prophylactic” IAB, and Group 2 (G2) without IAB. The influence of the following variables on clinical outcome was assessed: use of anemia; blood HDFE (bleeding) in the periperaoperative period (PER); time of ECC, anoxia, and mechanical ventilation (MVT); intensive care unit (ICU) LOS; hospital length of stay (HLOS); complications of the procedure; and death.

RESULTS: G1 comprised 16 pts (87.5% men) with a mean age of 61.6 (SD 8.6) years, and G2 comprised 33 pts (87.1% men) with a mean age of 56 (SD 8.0) years (P=NS). No difference was observed between the groups regarding the other base variables, except for BMI (P=0.0035). In order to obtain comparable outcome, all patients were divided into two groups: Group 1 (G1) with “prophylactic” IAB, and Group 2 (G2) without IAB. The influence of the following variables on clinical outcome was assessed: use of anemia; blood HDFE (bleeding) in the periperaoperative period (PER); time of ECC, anoxia, and mechanical ventilation (MVT); intensive care unit (ICU) LOS; hospital length of stay (HLOS); complications of the procedure; and death.

CONCLUSION: The “prophylactic” use of IAB showed no benefit regarding mortality and morbidity in the population studied. The greater blood volume replacement and prolonged MVT emphasis the need for care when indicating this procedure.

FOLLOW UP OF HEMODYNAMICS IN PATIENTS WITH ACUTE MYOCARDIAL INFARCTION: EXPEDIENCY AND VALUE

Brazdzionyte J1, Babie G1, Macas A1, Mickieviciene A1
1Clinic of Cardiology, Kaunas University of Medicine, Kaunas, Lithuania

INTRODUCTION: Evaluation of hemodynamics in patients with acute myocardial infarction (AMI) allows to follow up hemodynamical changes, monitor the effect of treatment, compare different treatment options. On the other hand there is still a question which methods and hemodynamic indices (HI) should be chosen in order to acquire optimal results.

Aim: To evaluate HI by transthoracic echocardiography (TTE) in patients with AMI and compare them with HI evaluated by continuous impedance cardiography (ICG). Select a HI which could be used routinely and has the best correlation with hemodynamic changes.

METHODS: Design: prospective study. Setting: Kaunas University of Medicine, Clinic of Cardiology. Patients: patients with AMI, admitted within 12 hours from the onset of pain. Following hemodynamic indices were evaluated by TTE: stroke volume (SV), left ventricular end diastolic volume (LVEDV), ejection fraction (EF), velocity time integral in left ventricular outflow tract (VTI). SV was calculated as the difference of left ventricular end diastolic and end-systolic volumes. Four and two chamber view was used for SV analysis. The comparison of SV was performed at the end of the first 24 hours of AMI. The standard 8 electrodes method of ICG registration was used. The average value of the stroke volume (SV) derived from the last 10 minutes of ICG record (60 SV instantaneous values) was used for comparison of the results of ICG and TTE.

RESULTS: 97 patients were investigated according to study protocol. The results of 82 patients were used for comparative analysis: 61 (74.4%) men and 21 (25.6%) women. Average age was 62±11.3 years, body mass index (BMI) – 28.5±4.2, ejection fraction – 42.8±10.6%. SV evaluated by ICG was 80±29.9ml, by TTE – 44.9±12.2ml. The other parameters measured by TTE included LVEDV – 102.5±31.6ml, VTI in left ventricular outflow tract – 180±87.04, SV only from 4 chamber view – 51.4±6.4ml, from 2 chamber view – 41.9±13.7ml, dP/dt – 130±709 mmHg/s. Comparing the SV values derived from ICG and TTE we calculated the correlation coefficient which was 0.7. SV derived from ICG had much less significant correlation with other TTE parameters (LVEDV, VTI, IF, SV from 4 and 2 chamber views separately) of 0.2, 0.29, 0.31; 0.65; 0.33 respectively. It was observed that correlation of SV evaluated by ICG and TTE was more expressed in patients with BMI 20-25 and was 0.88. In the group of BMI 25-30 it was 0.76, and in the group with BMI > 30 - 0.51.

CONCLUSION: Significant correlation of SV was observed between the methods of ICG and TTE. This supports the idea that noninvasive evaluation by TTE and continuous monitoring by ICG during AMI are reliable methods for further application. The best correlation of hemodynamic parameters measured by the two methods was found in patients with normal BMI.
090

COMBINATION OF GIK AND MAGNESIUM AS A SOLUTION OF CHOICE TO PROTECT MYOCARDIUM IN HIGH RISK CABG

Jalali A Rezaei1
1Anesthesiology, IMSU, Tehran, Iran (Islamic Republic of)

INTRODUCTION: CABG is one of the most common surgeries, especially in the heart surgeries. Protection of the myocardium (cardiac muscles) during and after the early stages of operation has special importance. So, different medical and drug techniques has been used for this purpose. One of these techniques is infusion of GIK solution. We compared the efficacy of GIK solution and GIK-Mg in two groups. The first group infused GIK solution without Mg solution and second group infused GIK plus Mg solution, this has done to protect the function of the myocardium.

METHODS: In a double - blind study which was an accidental study, we selected 50 patients as candidates for CABG - with EF less than 30% and without any severe lung, kidney and blood diseases. These 50 patients divided in two equal groups. After induction of anesthesia with same method for the both group, we infused 10 ml / h GIK in first group and the same amount of GIK-Mg in the second group for 10 hours in each group and the length of the time and the amount of solution were equal and also stages of induction and maintenance of anesthesia in both group were similar. We studied vital signs, Hemodynamical parameters and complications in both group during induction, and during establishing of CPB and stages of weaning these patients from CPB in the time of ICU stay and on discharge.

RESULTS: Amount of complication such as sudden fibrillation, arrhythmia, ST elevation during weaning the patients from CPB and also intubation time and stay in hospital and ICU in group which took GIK-Mg were less than the other group which took GIK without Mg solution, more important the percentage of EF on discharge in GIK-Mg group was higher than the group without Mg solution.

CONCLUSION: our study proved that infusion of GIK-Mg in protection of myocardial function and decreasing of complications in CABG patients with EF less than 30% is more important than GIK without Mg solution. So, it is recommended that in such patients GIK-Mg solution should be used routinely.

REFERENCE(S): 1. Ronald D.Miller (2000) Textbook of Anesthesia 5th Edition Churchill Livingstone p 1521-6.
2. Braunwald 2001 Textbook of medical heart disease 6th ed. p- 451
3. Buemmer-Smith S, Avidan, M. S., Harris, B., Sudan, S., Sherwood, R., Desai, J. B. et al. (2002). Glucose, insulin and potassium for heart protection during cardiac surgery. Br J Anaesth., 88, 489-495.
4. Colquhoun IW, Berg GA, El-Fiky M, et al: Arrhythmia prophylaxis after coronary artery surgery: A randomised controlled trial of intravenous magnesium chloride. Eur J Cardiothorac Surg 7:250-253, 1993
5. Nose Y. Manual on Artificial Organs (1973) Vol. 2. The oxygenator st. louis, CV Mosby

092

SEVERITY OF ILLNESS AND MORTALITY IN PATIENTS WITH RENAL INSUFFICIENCY ON THE INTENSIVE CARE

Speelberg B1, Van Oudenhoven M1
1ICU, St Elisabeth Hospital, Tilburg, Netherlands

INTRODUCTION: In many ICU’s mortality of APACHE II score and TISS scores are registered in order to improve quality of care. We investigated if mortality of patients on chronic haemodialysis-treatment was different from patients treated with CVVH, when they were hospitalised on the ICU.

METHODS: In the year 2003, all patients on each kind of dialysis were registered for APACHE II score, mortality, total TISS-76 score and mean daily TISS score. Patients were treated on a 24 bed general ICU with equipment for intermittent haemodialysis and CVVH or CAPD treatment. APACHE II score, mortality and TISS scores were registered in a computerised database : mediscore. Three patient groups were analysed, one with chronic haemodialysis treatment, one with CVVH, one with CAPD. Mean daily TISS score was calculated for each patient in : dividing the sum of all TISS scores by the number of ICU day's. Statistical analysis was done with SPSS 12.0 for Windows. Individual groups were compared using Kruskal-Wallis test.

RESULTS: 37 Patients were on renal support, 22 on CVVH, 12 on haemodialysis, and 3 on CAPD. From 1 patient on haemodialysis, total TISS score and mean daily TISS score could not be retrieved. Mortality is illustrated in Table 1 as is mean APACHE II score, total TISS and mean TISS per day. The mortality in the three groups did not differ significantly. Also mean APACHE II scores were not different in the three groups. Total TISS score was significantly lower (p=0.007) in the patients on chronic haemodialysis, however TISS per day score was significantly lower in the group on CAPD treatment.

Patients | n | Mortality | Mortality % | APACHE II mean +/- SD | Total TISS mean +/- SD | Daily TISS mean +/- SD
--- | --- | --- | --- | --- | --- | ---
CVVH | 22 | 8 | 36 | 23 +/- 7 | 440 +/- 244 | 31 +/- 5
Haemodialysis | 12 | 3 | 25 | 27 +/- 10 | 147 +/- 93 | 27 +/- 5
CAPD | 3 | 1 | 33 | 29 +/- 9 | 220 +/- 254 | 14 +/- 6

CONCLUSION: The mortality of patients on renal support in the ICU does not depend on the kind of renal support treatment. Severity of illness is not different in patients on intermittent – or continuous renal replacement therapy. Total workload expressed as total TISS score is higher in the CVVH group. The mean TISS score/day was lower in the CAPD group.

REFERENCE(S): 1 – Transplantation 1997; 630: 250-255. 2 – Revista Col Anest. 2003; 31: 153-160.

093

CLINICAL EPIDEMIOLOGY AND OUTCOMES OF LIVER TRANSPLANT FROM SOUTH AMERICA

Valencia E1, Echeverry P2, Gutierrez M2
1Medical Intensive Care Unit, 2Anaesthesia Department, HUSVP, Medellin, Colombia

INTRODUCTION: The annual incidence of liver transplant outcomes in South America has been unknown. So far direct correlations have been reported between some complications and mortality. It is important that not only anesthesiast but also Intensivist have epidemiological information about liver transplant to be able to rapidly identify and treat these patients, and be capable to detect risk factors related to mortality such us airway complications, infections, ICU long stay, pulmonary complications, etc. Our objective was to analyse the epidemiological, clinical characteristics and outcomes in the first seventy six liver transplants from a South America country.

METHODS: We performed a prospective observational research study from April 2000 to December 2002. Seventy-six patients admitted to a transplant intensive care unit St Vincent Hospital, Medellín, Colombia, were included. The anaesthetic technique was made with isofluorane, oxygen and air. Data were collected on demographic variables, indication for liver transplantation, outcomes, and mortality. A descriptive analysis was performed, data are presented as mean +/- SD. SPSS 9 package was used, and were included Chi2 and ANOVA tests. p < 0.05 was considered significant.

RESULTS: We present an analysis of seventy-six patients of liver transplantation with a mean age 45 y (range 2-70 y), 47% female (36 patients). 5 transplants were made in children. The main indication for liver transplantation was alcoholic cirrhosis, viral hepatitis (B/C), cryptogenic cirrhosis, and autoimmune liver disease. Global mortality was 27% (21 patients) and main causes of death were multiorganic failure 43%, acute liver dysfunction 19%, Hypovolemic shock 14%, acute vascular thrombosis 9.5%. Postoperative renal failure was 35.5% (27 patients), 13 patients (48%) died with an odds ratio of 4.76 (CI 1.45-16.05) and a p=0.0069. The greatest rise of serum creatinine (> 2 mg%) was at first postoperative day.

CONCLUSION: In our region, outcomes are agreed with others reported at medical literature where postoperative renal failure is one of the most important complications that increases mortality in patients with liver transplantation. With this work, we have shown that patients undergoing liver transplantation who developed postoperative renal failure had greater mortality during the first five times more risk for dying than patients who did not develop this complication.

REFERENCE(S): 1 – Transplantation 1997; 630: 250-255. 2 – Revista Col Anest. 2003; 31: 153-160.
OUTCOME IN SEVERE ACUTE RENAL FAILURE REQUIRING CONTINUOUS RENAL REPLACEMENT THERAPY

Bagshaw S M 1, Boiteau P J E 1, Izakson A 1, Shahpori R 1, Godinez-Lunas T 1

INTRODUCTION: Severe acute renal failure (SARF) in critically ill patients frequently occurs in the setting of multi-organ system failure (MOSF) resulting in commencement of continuous renal replacement therapy (CRRT). Although CRRT provides superior azotemia and metabolic control, SARF remains associated with high mortality. We aimed to define the in-hospital mortality of SARF treated with CRRT in critically ill patients.

METHODS: This was a retrospective cohort study with observational surveillance of all patients admitted to three adult multidisciplinary intensive care units (ICU) receiving continuous renal replacement therapy (CRRT) by institutional protocol in the Calgary Health Region (population ~1 million) during from October 1, 2002 to September 30, 2003.

RESULTS: Of 2194 patients admitted to the ICU, 88 (4%) developed severe acute renal failure treated with CRRT. These patients had a median age 66 (interquartile range (IQR): 51-73), a mean (±SD) APACHE II score 31.3 ± (8.6) and a mean (±SD) SOFA score 9.5 ± (5.5). Overall, 19% (n=17) were admitted with surgical diagnoses, of which 76% were emergency procedures. The majority of patients (90%) had a serum creatinine > 2mg/dL (177 mmol/L) and were oliguric (<500 ml/24hr) at initiation of CRRT. The mean (+/-SD) number of failing organs was 3.5 (+/-1.11) at time of CRRT. In total, in-hospital mortality was 76% (n=61). Only 21.6% had CRRT commenced within the first day of ICU admission. Mortality was associated with a longer median time to initiate CRRT (4.5, IQR: 0.9-9.9 vs 2.7; IQR: 1.3-6.5, p=0.04), greater APACHE II scores on first day of CRRT (33.2 ± 7.6 vs 23 ± 5.2, p=0.02), and need for vasopressor therapy (53 vs 27%, p=0.003; OR = 2.6, 95% CI 1.6-4.2).

CONCLUSION: Critically ill patients requiring CRRT for SARF frequently have associated multi-organ system failure. The need for CRRT is associated with higher than previously estimated in-hospital mortality. The delayed institution of CRRT in the context of MOSF and the need for prolonged vasopressor therapy are associated with higher risk.
**098**

THE USE OF INTENSIVE CARE IN PATIENTS WITH MALIGNANCIES AND THE NEED FOR URGENT CANCER CHEMOTHERAPY

Daron M1, Azoulay E1, Thiery G1, Cirolo M1, Le Gall J1, Schlumber B1
1Medical ICU, Hôpital Saint-Louis, Paris, France

**INTRODUCTION:** Prior to any treatment, hematological and oncological patients might require ICU-management because of a specific pattern of disease. However, the prognosis of patients needing chemotherapy initiation concomitantly to the support of organ failures at the onset of the malignancy has never been assessed.

**METHODS:** We studied all consecutive patients with newly diagnosed malignancies whose cancer chemotherapy was initiated in the ICU because of concomitant organ failures between January 1, 1997, and June 30, 2003. Patients' characteristics, reasons for ICU admission, characteristics of underlying malignancy, therapeutic interventions and vital status at ICU discharge, 30, 90 and 180 days were recorded.

**RESULTS:** During a 78 month period, 100 critically ill cancer patients (CICP) with a median of age of 47 years where admitted for malignancy-related organ failure and received antineoplastic chemotherapy during ICU stay. The underlying disease was acute leukemia in 43 (43%) patients, non Hodgkin lymphoma in 32 (32%), Hodgkin lymphoma in 5 (5%), a solid tumor in 13 (13%). Median time since diagnosis was 1 day (0-13). All patients had a newly diagnosed malignant disease. Median SAPS II was 39 (30-48) and median LOD was 5 (3-7). Seventy patients (70%) had respiratory failure at admission, 19 had shock (19%), 43 had an acute renal failure (43%) including 31 acute tumor lysis syndrome. Twenty-one patients had comorbid (21%) and twelve an hepatic failure (12%). Malignancy characteristics were not associated with survival and only three variables were independently associated with mortality at 30 days from ICU admission: need for vasopressor, hepatic failure and mechanical ventilation (ORs, 6.01, 7.76, and 6.36, respectively).

**CONCLUSION:** The overall prognosis of CICP needing an antineoplastic treatment during ICU stay depends on organ dysfunction. Underlying disease, stage or disease progression seems to have no impact over outcome. The 30-days and 180-days survival rate justify ICU admission of this subset of patients.

---

**099**

CHARACTERISTICS AND OUTCOMES OF CANCER PATIENTS WITH ACUTE RESPIRATORY FAILURE

Soares M1, Suhld J1, Specter N2, Rocco J1B
1Intensive Care Unit, Instituto Nacional de Cancer, 2University Hospital Clementino Fraga Filho, Federal University of Rio de Janeiro, Rio de Janeiro, Brazil

**INTRODUCTION:** The outcome of cancer patients with acute respiratory failure (ARF) seems to be improving as a consequence of recent advances in oncology and intensive care. However, their mortality is extremely high, and a reappraisal of their outcome predictors might provide useful clinical insights.

**METHODS:** During 45 months, data were prospectively collected on the first day of admission to an exclusively oncologic intensive care unit (ICU). ARF was defined as the need for mechanical ventilatory support (MV) because of a severe illness. Patients with ICU stay or MV duration less than 8h, and acute coronary patients were excluded. Non-invasive ventilation (NIV) using a facial mask had to be applied for at least 6h/day to be considered. Variables selected in the univariate analysis (p<0.1) were entered in a logistic regression. In multivariate analysis, results were significant if p<0.05.

**RESULTS:** Among 1660 adult patients, 533 (32%) were admitted with ARF. ICU and hospital mortality rates were 55% and 67.5%, respectively. Mean age was 58±16 years. There were 125 (23%) patients with hematological malignancies. SAPS II was 55±48±18.2 points and the SOFA score was 8±6±3.8 points. NIV was used in 19 patients (4%) and was successful in 10. Sepsi (n=341, 64%), coma (n=71, 13%), invasion or compression by tumor (n=62, 12%), cardiomyopathy (n=6, 7.5%) and pulmonary embolism (n=15, 6.6%) were the main underlying conditions associated with ARF. Pneumonia was the source of infection in 173 (51%) patients, cardiopulmonary arrest (n=40, 7.5%) and pulmonary embolism (n=35, 6.6%) were the main complications. The overall survival at 30-day, 90-day and 180-day were 56.7% and 31.1% respectively.

**CONCLUSION:** The overall survival (relative to the SAPS II score) is however comparable. More physiological derangement according to ISS and SAPS II, have an increased length of stay in the ICU and a significantly lower short-term survival than trauma patients with severe head injury. Their relative survival (relative to the SAPS II score) is however comparable.

---

**100**

OUTCOME IN MULTITRAUMATIZED PATIENTS WITH AND WITHOUT SEVERE HEAD INJURY

Ulvik A1, Larsen H1, Flaten H1
1Dept of Anaesthesia and Intensive Care, Dept of Surgery, Haukeland University Hospital, Bergen, Norway

**INTRODUCTION:** Outcome after trauma is influenced by age, severity of injury, physiological derangement and co-morbidity. The aim of this study was to investigate outcome of multitrauma patients admitted to our ICU with respect to concomitant severe head trauma.

**METHODS:** This is a cohort study of all adult patients (>16 years) with multitrauma admitted to a 10-bed general ICU in a tertiary referral hospital from 1998 - 2002. Severe head injury was defined as clinical signs of severe head injury with positive findings on CT-scanning of the brain. Gender, age, length of stay (LOS) in the ICU and SAPS II score were retrieved from the ICU database. Data to perform injury severity score (ISS) was retrieved from the individual patient record in retrospect. Survival data were found in the Norwegian Peoples Registry. Patients were divided into two groups regarding the occurrence or not of severe head injury.

**RESULTS:** During the five years period a total of 212 patients met the criteria. The majority were victims of traffic accidents (65%) and falls from heights (21%). Seventy-three patients had concomitant severe head injury, while 139 had no or just minor head injury. Seventy-two percent had no co-morbid condition. Standardized mortality ratio calculated from the SAPS II score for the two groups (with or without severe head injury) was 0.61 and 0.62 respectively. More details can be seen from the table.

**CONCLUSION:** Multitraumatized patients in the ICU with severe head injury are more severely injured and have more physiological derangement according to ISS and SAPS II, have an increased length of stay in the ICU and a significantly lower short-term survival than trauma patients without severe head injury. Their relative survival (relative to the SAPS II score) is however comparable.

---

**101**

PROTOCOL BASED ADJUSTMENT OF SEDATIVE DRUGS BY NURSES ON THE LEVEL OF CONSCIOUSNESS IN ICU PATIENTS

Gottalliot O1, Lefranc A1, Caubel A1, Bretteville G1, Bodin M1, Grouote-Ougeas M1, Misset B1, Carlet J1
1ICU, Hospital Saint Joseph, Paris, France

**INTRODUCTION:** Sedation is use in the intensive care unit for safety, comfort and adaptation to mechanical ventilation (MV). Some studies have demonstrated that reducing sedation in intensive care unit reduce the length of MV. The aim of this study was to assess the effect on MV duration: using a pre-established protocol for dose adjustment by nurses, by comparison to a conventional daily adjustment presribed by physicians; using a short half-life hypnotic drug (i.e. Propofol) in comparison to Midazolam (MD).

**METHODS:** Prospective open label study. All patients requiring MV in our ICU were included in the protocol. First phase: from Dec. 2001 to April 2002, physicians prescribed M and Fentanyl (F) doses: second phase: from May 2002 to Oct. 2002, nurses adapted patient sedation according to the Harris score with the same drugs. Third phase: from Jan. 2003 to June 2003, nurses adapted sedation according to the same protocol with P and F. Harris scale (3): A-General condition: 1-6, B-Compliance with MV: 1-4, C-Response to endotracheal suction: 1-4. The target values were Harris scale A4 or A4 and B3 or B4 and C2 or C3. The first doses of M, P, and F are 2 mg/kg, 2mg/kg/h and 1mg/kg/h respectively. If A5 or B6 reduce M of 1mg/h or F of 0.25mg/kg/h. If C4 increase F of 0.5mg/kg/h. If A3 or A2 increase M of 1 mg/h or P of 0.25mg/kg/h. If C1 increase F of 0.5mg/kg/h. If B 1 or 2 increase both.

**RESULTS:** After secondary exclusion of dead, tracheostomised and “DNR” order patients.

| Characteristics of patients/ Mean ± SD | 1-Physicians M-F 2-Nurses M-F 3-Nurses P-F | p 1vs2 | p 2vs3 |
|----------------------------------------|---------------------------------------------|--------|--------|
| Number of patients                      | 73                                           | 139    | 95%    |
| Mean age, years (SD)                   | 37.5 ± 20.5                                 | 40.6 ± 20.1 | 1.26 - 8.8 |
| Mean LOS ICU, days (SD)                | 7.3 ± 8.4                                   | 3.4 ± 4.6 | 1.7 - 5.1 |
| Median ISS                             | 34                                           | 22     |        |
| Mean SAPS II                           | 41.9                                        | 26.9   |        |
| ICU mortality, %                       | 15.1                                        | 7.9    | 16.5   |
| Hospital mortality, %                  | 20.5                                        | 8.6    | 22.3   |
| 90 days mortality, %                   | 21.9                                        | 9.4    | 23.2   |

**CONCLUSION:** Differences in outcome of sedation by physicians and nurses on the level of consciousness in ICU patients are shown.
102 MEDICAL ADMISSIONS ARE ASSOCIATED WITH WORSE ICU OUTCOME: RESULTS OF THE SOAP STUDY
Sakr Y1, Vincent JL2, Reinhart K1, Gerlach HF, Moreno R1, Ranieri V1, Sprung C1, Payen D2
On behalf of the SOAP investigators
1Department of Anaesthesiology and Intensive Care, Friedrich Schiller University Hospital, Jena, Germany
2Department of Intensive Care, Erasme Hospital, Free University of Brussels, Brussels, Belgium

INTRODUCTION: We investigated the association between medical admissions and outcome in the various disease subgroups reported in the SOAP study and the prognostic factors in medical vs. surgical admissions

METHODS: This cohort, multicenter, observational study, included all adult patients admitted to the participating centers (198 centers from 24 countries) between May 1 and May 15, 2002. Patients were followed up until death, hospital discharge, or for 60 days. Patients who had not undergone surgery in the 2 weeks prior to their admission were classified as medical admissions. Uncomplicated surgical admissions admitted for routine postoperative monitoring for < 24 hours were excluded from the study. Organ failure was defined as SOFA score of > 2. We examined the outcome differences between medical and surgical admissions in the whole population, and in patients with acute lung injury (ALI), sepsis, shock due to any cause, and septic shock

RESULTS: Of 3147 patients included in the SOAP study, 1759 (59.9%) were medical and 1388 (44.1%) were surgical admissions. ICU mortality rates were higher in medical than in surgical admissions in the whole population (22.4% vs. 13.6%, p<0.001), in patients with ALI (44% vs. 33.3%, p<0.001), in septic patients (29.6% vs. 22.6%, p=0.007), in patients with shock due to any cause (49.4% vs. 27.8%, p<0.001), and in septic shock patients (52.8 vs. 41.2%, p=0.012). Moreover, in a multivariate analysis, medical admissions were an independent risk factors for ICU mortality in the whole population (odds ratio (OR)=2.23; 95% confidence interval (CI): 1.75-2.84, p<0.001), in patients with sepsis (OR=1.8; 95% CI: 1.25-2.6, p=0.002), in patients with shock due to any cause (OR=2.59; 95% CI: 1.72-3.23, p<0.001), and in patients with septic shock (OR=1.83; 95% CI: 1.12-2.99, p=0.016). A poor outcome was characterised by liver cirrhosis (OR=2.84; 95% CI: 1.51-5.34, p=0.001) and, mechanical ventilation (OR=1.87; 95% CI: 1.37-2.56, p<0.001), and coagulation failure on admission (OR=2.9; 95% CI: 1.53-4.41, p<0.001) in medical patients, and by COPD (OR=2.09; 95% CI: 1.25-3.51, 0.005), renal (OR=1.71; 95% CI: 1.12-2.6, p=0.013), and cardiovascular failure on admission (OR=2.15; 95% CI: 1.45-3.0, p<0.001) in surgical patients.

CONCLUSION: Despite the exclusion of patients admitted for routine postoperative monitoring, medical admission was associated with a higher risk of death.
106

PHARMACOKINETICS OF CEFODIZIME IN CRITICALLY ILL PATIENTS

Meyer B1, Traummeister F1, Delle Karth G2, Locker G1, Schmid R1, Thalhammer E1
1Department of Medicine I, Division of Infectious Diseases, 2Department of Medicine II, Division of Cardiology, 3Department of Medicine I, Intensive Care Unit, 4Institute for Medical and Chemical Laboratory Diagnostics, Vienna, Austria

INTRODUCTION: Cefodizime is an extended-spectrum third generation cephalosporin antibiotic. It shows good in-vivo and in-vitro activity against gram-positive and gram-negative pathogens including most beta-lactamase producing species. Cefodizime is successfully used in the treatment of severe infections of the respiratory and urinary tract including infections in the critically ill and postoperative patient. Pharmacokinetics in critically ill patients are altered due to different volumes of distribution, increased vascular permeability, differences in cardiac output and the presence of multisorgan-dysfunction. Due to the use of concomitant medications including sedoanalgesia and concurrent antimicrobial agents drug-drug interactions are observed frequently. The aim of the study is to determine the pharmacokinetic characteristics of cefodizime in critically ill patients.

METHODS: 13 critically ill patients (5 male, 8 female, age 60 to 85 years) were included in the study. Patients with endstage renal or hepatic failure or at the need of extracorporeal replacement therapy (CVVH, VASOP, SCMO) were excluded. All patients received a single-dose of 2g cefodizime intravenously. Serum-concentrations of cefodizime were measured 15 min, 30 min, 60 min, 2 hours, 4 hours, 8 hours and 12 hours following the cefodizime infusion. Serum concentrations were determined by high-performance liquid chromatography.

RESULTS: Cefodizime was tolerated well in all patients. The mean cefodizime serum concentration peak was 222 +/- 55 mcg/ml; the mean trough level was 25.8 +/- 17.2 mcg/ml, comparable to the concentrations observed in healthy volunteers. The elimination half-life was 6.19 +/- 2.45 h. The total clearance, area under the curve and volume distribution were 35.8 +/- 13.2 L/h, 1089.4 +/- 505.3 L/min and 18.1 +/- 6.3 L, respectively.

CONCLUSION: Our results indicate that critically ill patients including patients with mild to moderate renal and/or hepatic impairment can be treated effectively with a standard dosage of 2 g cefodizime iv. No dose-modification is necessary.

107

MULTIPLE-DOSE PHARMACOKINETICS OF FLUCLOXACILLIN DURING CONTINUOUS VENOUS VENOUS HEMOFILTRATION

Meyer B1, Ahmed el Gendy S2, Delle Karth G2, Heinz G2, Locker G1, Jaeger W2, Thalhammer F1
1Department of Medicine I, Division of Infectious Diseases, 2Institute of Pharmaceutical Chemistry, 3Department of Medicine II, Division of Cardiology, 4Department of Medicine I, Intensive Care Unit, Vienna, Austria

INTRODUCTION: Flucloxacillin is a potent antimicrobial drug in the treatment of gram-positive infections. It is widely used in the treatment of infections with staphylococcus aureus including severe infections in the postoperative and critically ill patient. The aim of the study is to assess the pharmacokinetic characteristics of flucloxacillin in critically ill patients undergoing continuous venous hemofiltration (CVVH).

METHODS: Ten intensive care patients with acute renal failure and suspected or proven gram-positive infections were included. CVVH was performed using a polyamid capillary hemofilter (FH 66 D, Gambro, Germany). Mean blood flow and ultrafiltration rate were 169 +/- 24 ml/min and 57 +/- 9 ml/min, respectively. All patients received flucloxacillin 4 g every 8 hours intravenously. Serum and ultrafiltrate concentrations of flucloxacillin were determined by high-performance liquid chromatography.

RESULTS: Flucloxacillin was tolerated well in all patients. Compared to normal individuals, flucloxacillin serum levels were significantly lowered in patients undergoing CVVH. The maximum and trough venous serum levels of flucloxacillin were 85.8 +/- 28.3 mg/ml and 25.5 +/- 14.1 mg/ml, respectively. The elimination half-life was 4.9 +/- 0.7 h, the total body clearance 117.2 +/- 79.1 L/min. The AUC, volume of distribution and sieving coefficient were 560.0 +/- 285.9 mg h/ml, 48.1 +/- 36.4 and 0.21 +/- 0.09, respectively.

CONCLUSION: Based on the data of this study, we conclude that intensive care patients with staphylococcal infections on CVVH should be treated with 4 g flucloxacillin every 8 hours.

108

RISK OF RENAL IMPAIRMENT DUE TO CONTINUOUS OR BOLUS VANCOMYCINE IN PATIENTS WITH POSTOPERATIVE FEVER

Klingbacher E1, Mouhieddine M1, Raffstedter K1, Tscheranko E1, Hiesmayr M1
1Department of Cardiothoracic Anaesthesia and Intensive Care, Medical University Vienna, Vienna, Austria

INTRODUCTION: In surgical site infections after cardiac or thoracic surgery gram positive bacteria predominate. Due to the risk of wound infection and mediastinitis, antibiotics are administered in patients with postoperative fever. Because of the high rate of MRSE infection vancomycine is the institutional drug of choice. Vancomycine can be given either continuously or as intermittent bolus injections. The dosage is adjusted by serum trough levels. Our hypothesis was that continuous application may protect from renal impairment.

METHODS: We included all patients that underwent cardiac or thoracic surgery between 01.03.2000 and 01.04.2004 and had a therapy with vancomycine as bolus or continuous infusion. Early postoperative fever > 38°C on postop day 2 or 3 was included as a confounder. As a control group we used all patients with a length of stay > 2 days without vancomycine therapy. All data are prospectively collected into the Patient Data Medical System (Picis Care Suite V 6.3, Barcelona, Spain) stored in a database and analyzed after control of consistency. The statistical analysis was done by Cox regression for survival and by analysis of variance.

RESULTS: A total of 1770 patients was available for analysis. 292 patients were given vancomycine (256 continuously and 36 as bolus injections). ICU mortality was higher in patients with vancomycine without a febrile response on day 2 or 3 postop (lig).

CONCLUSION: We found no significant difference in outcome between continuous or bolus vancomycine. Early postoperative fever is an important prognostic factor and improves response to vancomycine. Potential confounder needs further investigation.

109

IN VIVO MEASUREMENT OF LEVOFLOXACIN PENETRATION INTO LUNG TISSUE AFTER CARDIAC SURGERY

Hutschala D1, Skhirtladze K1, Mayer B X2, Tscheranko E1
1Dept. of Cardiotoracic and Vascular Anaesthesia and Intensive Care Medicine, 2Dept. of Clinical Pharmacology, General Hospital of Vienna, Vienna, Austria

INTRODUCTION: Nosocomial pneumonia is a feared complication following cardiac surgery. Lung tissue concentrations of antibiotics administered for prophylaxis of pulmonary infections might be influenced by postoperative disturbances of ventilation and perfusion (1).

METHODS: Levofoxacin (500 mg) was administered immediately after surgery. We measured the time versus concentration profile of levofoxacin in interstitial lung tissue and plasma in patients operated on CPB (n=6, A) vs patients operated with OPCAB (n=6, B) by in vivo microdialysis.

RESULTS: The concentrations of levofoxacin were significantly higher (P=0.031) in the OPCAB group (16.34 µg/mL±3.3) compared with patients operated on CPB (11.89 µg/mL±3.4) [Graph].

CONCLUSION: Data indicate that interstitial antibiotic concentration in lung tissue is influenced by ventilation/perfusion mismatch, a common pathophysiological mechanism associated with ARDS.

REFERENCES: 1 Tscheranko EM, Bambauck A, Wiss W, et al. Intrapulmonary shunt after cardiopulmonary bypass: the use of vital capacity maneuvers versus off-pump coronary artery bypass grafting. J Thorac Cardiovasc Surg. 2002 Oct;124(4):732-8.
110 INTENSIVE INSULIN THERAPY TO NON-CARDIAC ICU PATIENTS
Toft P1, Jørgensen H2, Toennesen E3, Christiansen C4
1Intensive Care Unit, Odense University Hospital, Odense, 2Intensive Care Unit, Aarhus University Hospital, Aarhus, Denmark

INTRODUCTION: Hyperglycaemia has been associated with increased mortality. Intensive insulin therapy reduced mortality in patients submitted to the ICU following major cardiac surgery. The aim of this prospective study was to evaluate, if intensive insulin therapy could reduce mortality and morbidity in surgical and medical non-cardiac patients admitted to a multidisciplinary ICU.

METHODS: At first, for a period of 6 months, all adult patients, admitted to the ICU, were included. Insulin was administered, when bloodglucose (BG) level > 12 mmol/l. Following this, the BG level was now reduced with intensive insulin therapy for another 6 month period (aim BG > 4.4 to ≤ 6.1 mmol/l). Demographic data, age, body mass index, first and second day APACHE II scores, BG levels, infection, MODS as well as mortality was registered: 270 patients were included: Patients with < 2 days or with known diabetes were excluded. Patientdata were compared with use of Mann-Whitney and x²-test square test.

RESULTS: At admission patients were comparable regarding age, bodymass index and APACHE II-score (table 1). There was no difference in the development of MODS, bloodtransusions and use of antibiotics (6 7.5 treatment days) between the two groups.

| Intensive insulin treatment | Control |
|-----------------------------|---------|
| Overall mortality           | 11.5%   | 14.8%  | NS     |
| Mortality surgical patients | 11.5%   | 14.4%  |        |
| Mortality medical patients  | 12.8%   | 15.8%  |        |
| Secondary infection         | 11.8%   | 16%    |        |
| Hypoglycemia                | 14%     | 4%     | p<0.05 |
| Insulin dose – IU/day       | 46      | 6      | p<0.05 |
| Arterial bloodgas/patient   | 52      | 37     | p<0.05 |

CONCLUSION: There was a trend towards reduced mortality and lower frequency of secondary infections among intensive insulin treated medical as well as surgical patients. Intensive insulin therapy was however associated with increased frequency of hypoglycaemia and increased costs due to a more intensive use of blood samples and insulin.

111 EVALUATION OF MEROPENEM (MRP) DOSE ADJUSTMENT IN CRITICAL PATIENTS WITH SEVERE INFECTIONS
Alvarez B1, Garcia-Fernandez A2, Sancho Ruiz H3, Quintana E4, Teja-Barbera JL5, Meropenen Study Group 6
4Intensive Care Unit, University Hospital of Alicante, Alicante, Spain

INTRODUCTION: The treatment of serious infections requires the administration of broad-spectrum antibiotics in high doses and, in most cases, empirically. However, the possibility of the reduction of the maximum dose is seldom evaluated. Our study explores this alternative. The objectives of our work were: 1. To evaluate the evolution of patients with severe infections admitted to (ICU) in which the meropenem (MRP) dose administered could be adjusted to one half of the usual dose. 2. To study the bacteriological response. 3. To identify the appearance of emerging infections. 4. Adverse effects surveillance.

METHODS: Prospective, observational, multicenter trial in 17 Hospitals. The study subjects were patients with severe infections admitted to the ICU. The initial treatment consisted of MRP 1 g/hours i.v., which was reduced to 0.5 g/hours i.v. between days 3 and 5, if there were clinical improvement or microbiological sensitivity.

RESULTS: Ninety-two patients were included, of which 18 were nonevaluable due to loss to follow-up or incomplete data. A complete cure was achieved in 53 patients (73%) and the initial pathogen remained in 3 (5.7%). The persistent microorganisms were: Acinetobacter baumannii in 2 cases and Pseudomonas aeruginosa in 1. In 3 cases, reinfection by resistant microorganisms was detected (2 Acinetobacter baumannii and 1 Staphylococcus aureus Methicillin Resistant (MRSA)). In 19 patients (25.7%), concomitant antimicrobial treatment was administered for proved or suspected infection by other pathogens. No adverse effects attributable to MRP occurred. Fifteen patients (20.3%) died. Death was related to the underlying pathology or secondary complications in 12 (16.2%) and resulted from the infectious disease in 3 (4%).

CONCLUSION: Reduction of the MRP dose was useful in the treatment of severe infections in critical patients. Dose adjustment is not recommended when the causal microorganism is Acinetobacter baumannii, or Pseudomonas aeruginosa.

Grant acknowledgement: study sponsored by ASTRAZENECA

112 C-REACTIVE PROTEIN AS A MARKER OF INFECTION AND OUTCOME IN ICU PATIENTS
Sellar Perez G1, Herrera Gutierrez M E1, Lebron Gallardo M1, Quesada Garcia G1, De Toro F2, Martin L2
1ICU, Microbiology, Hospital Carlos Halla, Malaga, Spain

INTRODUCTION: C-Reactive Protein (CRP) is an acute phase protein related to the inflammatory response. Considered a marker for infection (and response to infection) it could be an aid in the diagnosis of sepsis in the critically ill patient. We communicate our experience with this molecule

METHODS: Prospective study on 77 ventilated patients admitted to the ICU. Expected short ICU stay (or suspected or confirmed) infection at admission were the only excluding criteria. CRP was monitored in the first (CRP-1), third (CRP-3) and sixth (CRP-6) day of stay and APACHE II, SOFA, shock, blood leucocytes and platelets were registered at the same time. Patients were followed-up until day 9 for infection episodes and until ICU discharge for outcome. Serum CRP on admission in 55 patients after elective surgery was used as controls. Immunonephelometry was used for CRP measurement. Relation of serum CRP with infection and mortality was studied. t-Student, chi-square and Pearson coefficient were used and sensitivity and specificity of CRP as infection predictor was calculated

RESULTS: CRP-1 in controls was 5.3±3.9 mg/L (max 23.4) and cases 67.8±77.4 (p<0.001). 44.2% cases had levels below 30 mg/L, (not influenced by diagnosis). In our cases only shock (but not severity scores or blood cells) showed relationship to CRP: patients in shock on admission had higher CRP-1 levels (62.8±75.6 vs 118.6±82.8, p=0.06). 31 (40.2%) cases were complicated with infection during follow-up, presenting CRP-1 levels higher than not infected patients (88.8±59.3 vs 53.8±60.9, p<0.05), but of this group 16 patients were diagnosed during the first 4 days of stay and was this group that showed relation to CRP-1 (99.3±97.8 vs 59.6±97.9 in not infected, p=0.06). In the rest of the comparisons CRP levels were always higher in the infected patients but without statistical signific. 18 (23.5%) patients died. Age, shock, APACHE II and SOFA on admission were related to mortality, but CRP did not relate to mortality in any of its measurements, even though CRP-1 raised more in patients dying (92.6±82.8 vs 45.3±36.7, n.s)

CRP on admission for infection prediction

| Infection | Sensitivity (%) | Specificity (%) |
|-----------|----------------|----------------|
| CRP on admission > 30 mg/L | 64.5 | 50.0 |
| CRP on admission > 50 mg/L | 45.2 | 67.4 |
| CRP on admission > 100 mg/L | 35.5 | 80.4 |

CONCLUSION: CRP at ICU admission is a good marker of acute disease but is not useful in our series as outcome predictor. Even though levels of CRP are elevated in infected patients, they are not useful for evaluating risk for infection or to diagnose this complication in acutely ill patients

113 SERUM LEVELS OF C-REACTIVE PROTEIN AND PROCALCITONIN IN CRITICALLY ILL PATIENTS WITH LIVER CIRRHOSIS
Peres Bota D1, Van Nuffelen M1, Vincent J1
1Intensive Care, Erasme Hospital, Brussels, Belgium

INTRODUCTION: To analyze the levels of C-reactive protein and procalcitonin in critically ill patients with hepatic cirrhosis and to assess their predictive value for infection.

METHODS: Setting: A 31 bed intensive care department of a teaching hospital. Demographic, clinical, laboratory and microbiological data were collected prospectively in a 6 month period. Child Pugh criteria were used to define the severity of liver cirrhosis and CDC criteria to define infection.

RESULTS: Five hundred twenty two patients were included in the study and 54 (10%) had hepatic cirrhosis. There were no significant differences in serum levels of CRP (admission 4.9 ± 3.7 vs. 4.3 ± 2.8, maximum 7.3 ± 3.7 vs. 8.2 ± 3.7 mg/L) and PCT (at admission 0.4 ± 0.5 vs 0.5 ± 0.4 and maximum 1.5 ± 0.4 vs.1.6 ± 0.5 mg/ml) at any time of the ICU stay between cirrhotic and non-cirrhotic patients. Moreover, there were no differences in CRP and PCT in cirrhotic patients with different Child-Pugh scores. The rate of infection was higher in patients with cirrhosis (48% vs. 33%, p=0.03). The serum CRP level (admission 9.7 ± 3.4 vs. 12.8 ± 4.2, maximum 13.7 ± 5.2 vs.18.0 ± 6.8 mg/L) and PCT (admission 1.17 ± 0.72 vs. 1.81 ± 1.21, maximum 3.14 ± 1.27 vs.3.24 ± 2.14 mg/ml) were slightly higher in infected patients without cirrhosis than in cirrhotic patients, but the difference didn’t reach the statistical significance. There was no significant difference in the predictive value for infection of CRP and PCT levels between infected patients with and without cirrhosis.

CONCLUSION: Although the liver is considered the main source of CRP and a source of PCT, serum levels of these acute phase proteins are not significantly lower in cirrhotic patients than in patients without hepatic cirrhosis. Moreover, the predictive power for infection of CRP and PCT performed as well for cirrhotic as for non-cirrhotic patients.
114 PREDICTIVE MODEL OF MORTALITY IN STAPHYLOCOCCUS AUREUS BACTEREMIA
Maslovsky O1, Besarabu M D1
1Anesthesia and Intensive Care, Khmelinsky Central Hospital, Khmelinsky, Ukraine

INTRODUCTION: Staphylococcus aureus is an important pathogen causing different kinds of dangerous bacteremia, primarily affecting hospitalized patients in ICUs.

METHODS: We studied the epidemiology of S. aureus bacteremia, comparing two periods (mid and late 1990s vs early 2000s) and developed a predictive model of mortality. A nested case-control was done. All 251 patients over 14 years old with positive blood cultures for S. aureus were selected. MRSA (methicillin resistant S. aureus) was isolated in 63% of the cases. Different risk factors such as venous catheters, age, gender, etc. were processed as important data.

RESULTS: When comparing the two periods MRSA community-acquired bacteremia increased from 4% to 16% (p=0.01). There was no significant difference in the mortality rate between the two periods (39% and 33%, p=0.40). Intravascular catheters provoked 24% of the cases of bacteremia and were associated with the lowest rate of mortality. In a logistic regression analysis, there were 3 variables associated with death: septic shock, source of bacteremia and resistance to methicillin. The probability of dying among patients with MRSA and those with methicillin sensitive S. aureus bacteremia ranged from 10% to 90% and from 4% to 76%, respectively, depending on the source of the bacteremia and the occurrence of septic shock.

CONCLUSION: These data are considered to be the key data for MRSA bacteremia prognosis, outcomes and its mortality. The MRSA found in hospitals is a particularly virulent strain.

115 BACTEREMIA MORTALITY ACCORDING TO MICROORGANISM RESPONSIBLE AND ORIGIN SOURCE OF BACTEREMIA
Lorente JL1, Villafias J, Martin M M1, Garcia C1, Mora M1
1Intensive Care, Hospital Universitario de Canarias, La Laguna, Spain

INTRODUCTION: To determine the incidence, microorganism responsible and mortality of bacteremias in critically ill patients. To analyze bacteremia mortality according to microorganisms responsible and origin sources in critically ill patients.

METHODS: It is a prospective study of bacteremia in patients admitted in a 24-beds medical-surgical ICU of a 650-beds university hospital, from 1-5-2000 to 31-12-2003. Infections were diagnosed according to the criteria of the CDC. We analyzed mortality bacteremia according to microorganism responsible and bacteremia mortality according to origin sources. 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 consider a significant difference.

RESULTS: We included 2234 patients. Were diagnosed 175 bacteremias, due to 175 microorganisms, in 162 patients (a total of 7.25% patients developed bacteremia). Mortality of patients who developed bacteremia was 26.54% (43/162). Bacteremia mortality for each microorganism responsible was: MRSA 3/15 (20%), MSSA 3/11 (27.27%), CNS 13/63 (20.63%), streptococcus faecalis 5/20 (25%), streptococcus pneumoniae 2/6 (33.33%), escherichia coli 4/12 (33.33%), klebsiella 2/6 (33.33%), enterobacter 3/11 (27.27%), pseudomonas aeruginosa 3/10 (30%), candida albicans 2/6 (33.33%), others 3/15 (20%). Bacteremia mortality for each origin source was: primary 18/78 (23.07%), respiratory 10/39 (25.64%), central venous catheter 9/33 (27.27%), wound surgical 3/10 (30%), others 3/15 (20%). No significant differences were found in bacteremia mortality according to microorganism responsible and according to origin source of bacteremia.

CONCLUSION: In our serie, bacteremia mortality was not different according to origin source nor according to microorganism responsible.

116 EFFECT OF CATHETER SITE ON THE RISK OF CONTAMINATION/INFECTION CAUSED BY CENTRAL VENOUS CATHETERS
Paramythiotou E1, Mandila C1, Atsalakis F, Poullaris I1, Kalogeromitros A1, Frangiskatu E1, Pavlidomos M1, Karabini A1
1ICU, George Geminnatas General Hospital, Athens, Greece

INTRODUCTION: Catheter related infections remain important infections in ICUs. Femoral catheters are responsible for most of them (1). In our ICU, many catheters are inserted in femoral site. Our purpose was to determine if catheter site has an influence on catheter - related infections and on catheter related bacteremias as well as the kind of microorganisms implicated.

METHODS: Prospective observational study of all nonnunned central venous catheters over a 6 - month period including patients hospitalized over 72 hours. Data collected were patient characteristics, insertion site, catheter type, kind of micro-organism isolated. Catheters were multi-lumen or double lumen for continuous hemodialfiltration. All catheters were sent for culture. We compared the incidence of catheter positive tips (with >= 15 colonies on semi-quantitative culture) and of catheter related bacteremia (bacteremia and positive catheter culture) between femoral and non - femoral sites. The study was conducted in the 12-bed polyclival ICU of a general hospital.

RESULTS: Between 1st October 2003 and 31 March 2004, 154 central venous catheters were placed in 44 patients, with the following frequency: femoral 50.6%, internal jugular 22 % and subclavian catheters 27.3%. Positive catheter tips were frequently observed (67/154 catheters, 43.5%) more in femoral (59.7%) than non-femoral sites (40.3 %, p = 0.05). Subclavian vein was contaminated less frequently than internal jugular vein (16.4% vs 23.9%, p=0.06). Microorganisms isolated were Acinetobacter baumannii, followed by Pseudomonas aeruginosa and Klebsiella pneumoniae. Multi - bacterial contamination was present in 12% of cases: Of 154 catheters inserted, 11% (17/154) resulted in related bacteremias. Among these, 6 were due to subclavian and internal jugular catheters (8.9 %) and 11 to femoral catheters (16.4 %, p = 0.31). Microorganisms responsible were Pseudomonas aeruginosa (5 followed by Acinetobacter baumannii) (4) and Staphylococcus epidermidis (4).

CONCLUSION: In accordance with literature, femoral catheters seem to be associated with positive catheter tips more often than upper body side catheters. Despite that, no significant difference was observed when catheter – related bacteremias were examined. On the other hand, microorganisms implicated were not coagulase - negative staphylococci or other common skin contaminants but the usually encountered in ICU gram negative microorganisms.

REFERENCE(S):
1. Eisser S, et al. Methicillin-resistant Staphylococcus aureus (MRSA) - an interdisciplinary challenge., MMW Fortschr Med. 2004 Jan 29;146(5):35-6.
2. Andersen E. When staff meet Staph—MRSA in the hospital setting. AAOHN J. 2003

117 COULD BACTEREMIA IN THE CRITICALLY ILL BE PREDICTED AT THE BEDSIDE?
Corona A1, Wilson P1, Singer M1
1Bloomsbury Institute ICM, University College, London, London, United Kingdom

INTRODUCTION: The goal of this study was to develop a model, based on clinical findings, able to predict bacteremia (B) in critically ill patients as an alternative to “subjective” clinical judgment, for a more efficient approach in early recognition and treatment of such an infection.

METHODS: On all patients admitted to our 22 bedded mixed ICU over a 6 month period, demographic data, 1st 24 hour APACHE II score, risk factors, mechanical ventilation and CVC presence, were collected. Blood cultures were taken only if systemic infection suspected. SPSS (SPSS Inc., Chicago, Ill) was used for statistical analyses. P values < 0.05 were considered significant.

RESULTS: 713 patients (47 surgical; median age 62 years (IQR 45-72)) were admitted with a median ICU stay of 3 days (IQR 2-5). 102 [(14 community (C-A)-, 28 hospital (H-A)-, 60 ICU-acquired (ICU-A)] B occurred in 84 patients. A Multinomial Logistic Regression model was set up considering as dependent categorical variables (i) Community vs ICU acquired (B) and (ii) Hospital vs ICU acquired (B), while independent ones were: gender, age, Apach II score, ICU stay, liver and renal failure, neutropenia, presence of a neoplasia, diabetes, dialysis, surgery performed within a week, being MRSA carrier, mechanical ventilation and CVC total indwelling days. Mechanical ventilation [ICU-A vs C-A: OR 0.791 (95% IC: 0.572-0.993)] / ICU-A vs H-A: OR 1.124 (95%CI: 0.968-1.305) (p=0.025), ICU stay (days) (ICU-A vs C-A: OR 0.819 (95% IC: 0.729-0.919) / ICU-A vs H-A: OR 0.861 (95%CI: 0.797-0.930) (p=0.045), being in liver (ICU-A vs C-A: OR 0.021 (95% IC: 0.001-0.683) / ICU-A vs H-A: OR 0.196 (95% CI: 0.024-1.608) p=0.045) and/or renal (ICU-A vs C-A: OR 146.5 (95% IC: 6.412-334.8) / ICU-A vs H-A: OR 1.789 (95%CI: 1.37-6.36) p=0.001) failure, a MRSA carrier [ICU-A vs C-A: OR 166.5 (95% IC: 43.2-414.8) / ICU-A vs HA: OR 1.889 (95%CI: 0.38-9.638) p=0.01] and a recent surgical patient [ICU-A vs C-A: OR 218.75 (95% IC: 2.24-2120.8) / ICU-A vs H-A: OR 1.211 (95% CI: 0.968-1.797) p=0.006], were found to be independent predictive factor of B. Estimated OR measurement quantitatively the effect of each factor adjusted by the other variables included in the model. For example, negative/positive MRSA approximately increase of 167-fold the risk for Community- in comparison with ICU acquired. This OR is statistically significant because the 95% CI do not include the OR=1. By contrast, although negative/positive MRSA roughly increases of 2 fold the risk for Hospital- in comparison with ICU acquired (OR=1.889), the OR is not statistically significant because the 95% CI include the OR=1.

CONCLUSION: The proposed predictive model, although to be validated, may nevertheless be useful to ICU physicians both in bedside early B recognition and in taking treatment decisions.
PÓŁNY P, Cooil L H, Almeida E P, Moreira P M, Fernandes A V, Mealla R J, Sabino H J
1Intensive Care Unit, Hospital Garcia de Orta, Almada, Portugal

INTRODUCTION: Ventilator-associated pneumonia (VAP) is the most frequent intensive care unit acquired infection among patients undergoing mechanical ventilation. The aim of this study was to evaluate the relation of C-reactive protein (CRP) patterns of response to antibiotic therapy with clinical evolution of patients with VAP.

METHODS: All patients with bacteriologically documented VAP (N=48, age 62 years, 31 male, mortality 29.2%) were prospectively included during a 14-month period. C-reactive protein was sampled daily from the day of antibiotic prescription to discharge or death. Clinical evolution was monitored with daily determination of PaO2/FiO2 ratio and of Sequential Organ Failure Assessment (SOFA). Day 0 (D0) was defined as the day when antibiotics were started. Patients were divided in 4 groups according to the pattern of CRP response: fast response – when CRP at D4 of therapy was <0.4 of D0 CRP, slow response – characterized by a continuous but slow decreased of CRP, non-response – when CRP remained always above 0.8 of D0 CRP, biphasic response – characterized by an initial CRP decrease to levels <0.8 of the D0 CRP followed by a secondary rise >0.8.

RESULTS: The PaO2/FiO2 evolution from D0 to D7 of antibiotic therapy of survivors and nonsurvivors was not significantly different (p = 0.25). SOFA evolution from D0 to D7 was significantly different between survivors and nonsurvivors (p<0.001). In survivors SOFA decreased steadily from 6.2±6.6 at D0 to 3.4±1.5 at D7 (p < 0.001) whereas in nonsurvivors it increased progressively from 7.4±2.3 to 11.5±2.2 (p = 0.11). The SOFA scores of the patients with the fast and slow CRP pattern of response decreased from 5.3±2.1 and 7.6±2.6 at D0 to 2.8±0.7 and 4.0±0.6 at D7, respectively (p = 0.029 and p = 0.001). Patients with fast response were ventilated for 4.6±1.3 days while those with the slow response stayed ventilated for 7.9±5.5 days (p = 0.053). On the opposite the SOFA scores of the patients with non-response and biphasic CRP-pattern pattern increased progressively from 6.8±3.6 and 7.8±3.1 at D0 to 7.3±3.8 and 9.2±7.3 at D7, respectively (p = 0.36 and p = 0.91).

CONCLUSION: In patients with VAP the identification of the pattern of CRP response to antibiotic therapy correlates with individual clinical evolution.

P296 PATTERN OF C-REACTIVE PROTEIN RESPONSE TO ANTIBIOTICS AND VENTILATOR-ASSOCIATED PNEUMONIA EVOLUTION

118

Pólo P R, Coelho L M, Almeida E P, Moreira P M, Fernandes A V, Mealla R J, Sabino H J

METHODS: All patients with bacteriologically documented VAP (N=48, age 62 years, 31 male, mortality 29.2%) were prospectively included during a 14-month period. C-reactive protein was sampled daily from the day of antibiotic prescription to discharge or death. Clinical evolution was monitored with daily determination of PaO2/FiO2 ratio and of Sequential Organ Failure Assessment (SOFA). Day 0 (D0) was defined as the day when antibiotics were started. Patients were divided in 4 groups according to the pattern of CRP response: fast response – when CRP at D4 of therapy was <0.4 of D0 CRP, slow response – characterized by a continuous but slow decreased of CRP, non-response – when CRP remained always above 0.8 of D0 CRP, biphasic response – characterized by an initial CRP decrease to levels <0.8 of the D0 CRP followed by a secondary rise >0.8.

RESULTS: The PaO2/FiO2 evolution from D0 to D7 of antibiotic therapy of survivors and nonsurvivors was not significantly different (p = 0.25). SOFA evolution from D0 to D7 was significantly different between survivors and nonsurvivors (p<0.001). In survivors SOFA decreased steadily from 6.2±6.6 at D0 to 3.4±1.5 at D7 (p < 0.001) whereas in nonsurvivors it increased progressively from 7.4±2.3 to 11.5±2.2 (p = 0.11). The SOFA scores of the patients with the fast and slow CRP pattern of response decreased from 5.3±2.1 and 7.6±2.6 at D0 to 2.8±0.7 and 4.0±0.6 at D7, respectively (p = 0.029 and p = 0.001). Patients with fast response were ventilated for 4.6±1.3 days while those with the slow response stayed ventilated for 7.9±5.5 days (p = 0.053). On the opposite the SOFA scores of the patients with non-response and biphasic CRP-pattern pattern increased progressively from 6.8±3.6 and 7.8±3.1 at D0 to 7.3±3.8 and 9.2±7.3 at D7, respectively (p = 0.36 and p = 0.91).

CONCLUSION: In patients with VAP the identification of the pattern of CRP response to antibiotic therapy correlates with individual clinical evolution.

P297 PREDICTORS OF IN-HOSPITAL MORTALITY IN PATIENTS NEEDING RENAL REPLACEMENT AFTER CARDIAC SURGERY

119

Arbous M S, Elzo Kraemer C V, Wilde de R B, P J M, Boog van der P J M, Berg van den P C M
1Intensive Care, 2Nephrology, Leiden University Medical Center, Leiden, Netherlands

INTRODUCTION: Extremely high or low BMI and renal failure are important risk factors for postoperative complications after cardiac surgery [1,2]. Short-term outcomes are adversely affected by small body size. However, the impact of the factor ‘weight’ in patients needing CVVH after cardiac surgery is unclear. The aim of this study was to quantify prognostic risk factors for in-hospital mortality in patients needing CVVH after cardiac surgery.

METHODS: We prospectively studied 118 cardiac surgery patients who needed CVVH, from a total of 3060 patients (July 1998 to December 2002). We recorded postoperatively until hospital discharge or death demographic characteristics, organ failure, medical and surgical treatment, and disease severity. Covariate selection was determined by the two sample t-test, Mann-Whitney test and univariate logistic regression. From significance (p<0.20), biologically plausible and clinically relevant variables a-predictive model was generated using multiple logistic regression.

RESULTS: 118 (3.8% of all patients undergoing cardiac surgery) received CVVH, 67.6% male, mean (SD) age 66.4±13.1 years, APACHE II score 22.1±6.3, 9 (7.6%) were chronic dialysis patients. Mean length of hospital stay 20.1 (19.9) days, 67 (56.8%) died in hospital. Results are presented in Table 1. No effect of chronic dialysis dependence before surgery was demonstrated. No significant interaction of plasma creatinine at start CVVH, and time between ICU admissions to start CVVH, or of plasma creatinine at start CVVH and weight was demonstrated. Model adequacy was assessed by Hosmer-Lemeshow C-statistic.

| Multivariate Odds | p-value |
|------------------|---------|
| Odds Ratio [95% CI] | p-value |
| Weight (kg) | 0.96 [0.94-0.99] | 0.02 | 0.98 [0.94-0.99] | 0.10 |
| BMI (kg/m²) | 0.95 [0.87-1.04] | 0.25 np |
| Plasma Creatinine at start CVVH | 0.99 [0.99-1.00] | 0.01 | 0.99 [0.99-1.00] | 0.01 |
| Time between ICU admission and start CVVH (days) | 1.05 [0.98-1.13] | 0.17 np |
| CVVH dose (ml/kg/hr) | 1.11 [1.02-1.20] | 0.02 np |
| Intra-aortic balloon pump (IABP) Y/N | 5.10 [2.01-12.9] <0.01 | 4.37 [1.64-11.69] <0.01 |

CONCLUSION: In patients with CVVH after cardiac surgery, presence of an IABP is the most important predictor of in-hospital mortality. The other predictors, weight and plasma creatinine, are in concordance with each other. They probably represent the fact that patients with lower body mass are at higher risk of in-hospital mortality.
122 MONITORING DAILY RENAL FUNCTION IN CRITICALLY ILL - ARE APPROXIMATIVE CALCULATIONS RELIABLE ENOUGH?
Schälte GI, Mombartz R1, Fass J, Kuhlen R1
1Department of Anesthesiology, Universitätsklinikum der RWTH Aachen, Aachen, Germany

INTRODUCTION: Monitoring renal function is essential in critically ill patients and might have strong implications for further therapy i.e. drug adjustment and renal replacement therapy. Purpose of this study was to compare the creatinine clearance estimated by the use of the Cockcroft-Gault equation, Jelliffe- and MDRD-formulas, with the measured creatinine clearance, calculated from serum creatinine and collected urine samples.

METHODS: In a prospective observational clinical trial we compared four different methods measuring, respectively predicting, creatinine clearance of critically ill patients. Patients enrolled had to stay at least 72 hours on ICU. Exclusion criteria were previous renal failure and dialysis. Blood and urine samples were collected once at 0700 hours in order to determine creatinine in urine and serum, BUN, albumin, lactate, potassium and sodium. Clinical decisions i.e. concerning changes in the therapeutic regimen, (adjustment of drugs, renal replacement therapy) implicated by an increase of creatinine and a decline in urine production, were made using the Cockcroft-Gault equation according to the study protocol.

RESULTS: 37 surgical patients with a mean APACHE II Score of 9 (range 3-22), and a mean age of 53 years [range 22-75y] were enrolled. Upon regression analysis we found compared to the Cockcroft-Gault equation, r = 0.67 (p<0.0001) for the Jelliffe formula and r = 0.7 (p<0.0001) for the MDRD of 53 years 

CONCLUSION: For clinical decision making and determining renal function on ICU, the Cockcroft-Gault equation, as well as the Jelliffe and the MDRD formulas are rapid and sufficiently reliable methods, compared to the standard method of collecting urine.

REFERENCES:}

123 THE APPLICATION OF URINARY CONDUCTIVITY TO ASSESS ELECTROLYTE FREE WATER CLEARANCE
Broekhuis SM1, De Wit H2, Nijsten MWN1
1Department of Surgery, 2Department of Pathology and Laboratory Medicine, Groningen University Hospital, Groningen, Netherlands

INTRODUCTION: Among other diagnostic tools for determination of the hemodynamic status of a critically ill patient, free water clearance and electrolyte free water clearance (EWC) have been proposed. The advantage of EWC is that it only depends on effective osmolar such as sodium and potassium and not by ineffective osmotes such as urea and glucose. Since electrical conductivity of urine reflects electrolyte concentrations, urinary conductivity has been suggested as a parameter of EWC. In this study we examined the validity of urine conductivity measurements as performed with a portable, commercial device.

METHODS: 94 urine samples from 41 different patients admitted to the surgical Intensive Care Unit were collected. Conductivity (C) was measured near the bedside, in duplicate 4 ml urine samples. C was measured with a Consort (Turnhout, Belgium) K911 conductivity meter, with automatic temperature correction. Urine concentrations of sodium (Na), potassium (K) and chloride (Cl) were measured in a standardised manner. Reproducibility of measurements and the relation of C with Na, K and Cl were assessed with Pearson correlation.

RESULTS: Mean conductivity of the urine was 12.96 ± 4.36 mSiemens/cm; mean Na was 93.94 ± 53.87 mmol/l; Mean K was 52.48 ± 30.62 mmol/l and mean Cl was 98.5±1.8 mmol/l; ± 53.87 mmol/l; Mean K was 52.48 ± 30.62 mmol/l and mean Cl was 98.5±1.8 mmol/l. The first and second measurement of urine conductivity were strongly related (R2=0.98). Urine conductivity was found to be best related to (Na + K + Cl) (R2=0.80). Correlation of (Na+K) with (Cl) and chloride (Cl) were measured in a standardised manner. Reproducibility of measurements and the relation of C with Na, K and Cl were assessed with Pearson correlation.

CONCLUSION: Urine conductivity is a reproducible, simple measurement that reflects the EWC. The limited correlation between Na, K and Cl and urine conductivity suggests that other electrolytes are involved. Thus urinary conductivity may be superior to conventional electrolyte measurement is assessing EWC.

REFERENCE(S): Parkin WG, Dickinson RW. The use of electrical conductivity measurement in the calculation of ion-free water loss in urine. Anaesth Intens Care 1987;379-383

124 TUNNELLED FEMORAL CATHETERS IMPROVE THE DELIVERED Kt/V IN ICU ACUTE RENAL FAILURE
Amigues L1, Klouche K1, Massanet P1, Deleuze S1, Canaud B2, Beraud JJ1
1Intensive care unites, 2Nephrology Care Unit, Lapeyrone University Hospital, Montpellier, France

INTRODUCTION: In ICU-acute renal failure, the possible relationship between survival and hemodialysis dose drops to improve Kt/V. The discrepancy observed between prescribed (pKt/V) and delivered Kt/V (dKt/V) may be due to vascular access through recirculation and catheter dysfunction. Therefore we undertook a randomised study to compare tunnelled (TKT) and non- tunnelled (NKT) femoral catheters in term of Kt/V.

METHODS: 16 patients with anuric acute renal failure (APACHE II ≥30.4 ± 7.1) treated by haemodiafiltration were randomised for vascular access: TKT (2 silicone polymer catheters Twincath, MedComp, Harleysville, USA) or NKT (2 polyurethane catheters - MedComp). Filter Nephral 400 ST (Hospital) 1.65 m2 membrane ; dialysate flow rate : 500 ml/min and blood flow rate : 200 or 300 ml/min. Hemodialysis sessions were monitored and the following data were collected : pKt/V, dKt/V, %Kt/V = (dKt/V/pKt/V)*100, hourly effective blood flow and its percentage (%QB) from the prescribed blood flow, return venous pressure (RVP) after 1 hour of dialysis and 300 ml/min effective blood flow. Recirculation and time of insertion (Time) were assessed for each catheter. A research of thrombosis and catheter’s infection was performed every week. In cases of infection, thrombosis or dysfunction, the catheter was removed and the number of catheters used for each patient (Np) was collected. All data were compared for TKT and NKT.

RESULTS: TKT were inserted in 11 patients and TKT in 5 patients. Insertion of TKT was impossible in 4 patients. We observed 1 femoral thrombosis and 1 catheter infection with NKT. Recirculation was 10.6±9.5% for TKT and 9.4±5.1% for NKT. TKT had to stay al least 72 hours on ICU. Exclusion criteria were previous renal failure and dialysis.

REFERENCES:}

125 CITRATE, IONISED CALCIUM AND TOTAL CALCIUM DURING CITRATE CVVH: WHICH TO MEASURE?
Van der Voort PHJ1, Bakker AJF1, Keidell H1, Boersma E1, Kingma WP1
1Intensive Care, 2Clinical chemistry, Medical Centre Leeuwarden, Leeuwarden, Netherlands

INTRODUCTION: Citrate infusion as a regional anticoagulant during CVVH should bind calcium (Ca) to prevent filter clotting but should not lead to citrate intoxication. Calcium is more easily measured routinely than citrate and might be able to predict citrate intoxication.

METHODS: Ten consecutive patients treated with citrate CVVH were studied. Samples were taken from arterial blood (serum and lithium-heparin plasma) and pre-filter (after citrate infusion) and post-filter blood. Total Ca (OC method, Roche no 1752040), citrate (Instruchemie citrateelase, no 2881) and ionised Ca (Roche AVL-OHMI) were measured from all samples. Citrate measurement was calibrated with a standard and validated with the citrate solution used for CVVH with a known citrate concentration.

RESULTS: Citrate measurement was reproducible. Citrate measurement in serum and plasma showed a high correlation. The mean citrate concentration in arterial blood was 0.5 mmol/l (SD 0.25), pre-filter 6.9 mmol/l (SD 2.4) and post-filter 2.2 mmol/l (SD 2.1). Citrate intoxication defined as a concentration more than 1.0 mmol/l was diagnosed by an ionised Ca level of less than 0.8 mmol/l (sensitivity 84%, specificity 100%) and a ratio total Ca:ionised Ca above 2.1 (sensitivity 89%, specificity 100%). The relation between citrate and both ionised Ca and the ratio total Ca:ionised Ca are shown in the figure.

CONCLUSION: The application of urinary conductivity to assess electrolyte free water clearance (EWC) is a reliable method for the determination of urinary electrolyte free water clearance (EWC). Both can be used to predict citrate intoxication.
126
THE AMINO-ACID (AA) LOSS IN CRITICALLY ILL PATIENTS WITH RENAL FAILURE ON CONTINUOUS VENO-VENOUS HEMODIALYSIS

Rodrigues MG1, Ruzany F1, Salgado D1, Piuva R N1
1Intensive Care Unit, Estadual University Hospital Pedro Ernesto, Rio de Janeiro, Brazil

INTRODUCTION: The present study analyzed the plasma levels, the clearance, the loss and the adsorption of twenty-three AA in forty-one patients with acute renal failure (ARF) submitted to CVVHD in the intensive care unit.

METHODS: The CVVHD was performed with a PAN 650SF/900 dialysator, the blood inflow was set at 150 mL/min and the dialysate outflow was set at 1 L/h with a variable ultrafiltration rate. The samples for the measurement of AA in plasma and in the dialysate were collected serially in pre-defined intervals: before the beginning of the CVVHD (zero hour) and six, twelve, twenty-four, thirty-six and forty-eight hours after the beginning. The blood samples were centrifuged, frozen and analyzed by High Performance Liquid Chromatography. The dialysate was kept in a refrigerated recipient during collection time (six or twelve-hours volume).

RESULTS: Contrary to the findings in critically ill patients without renal failure, we observed that the blood level of the AA pool pre-CVVHD was slightly higher (0.6%) than the upper normal value. The only depletion observed from the total AA pool, was that of Cystine but we did not find any further significant plasma level decrease post CVVHD. The AA with the higher rates of loss in 24 hours to the dialysate effluent, separated as essentials and non-essentials were: 1- essentials; Valine (0.45g/L – 7%) and Lysine (0.34g/L-5.3%), 2- non-essentials; Alanine (0.51g/L – 10%); Glycine (0.34g/L – 8%), and Glutamin (0.67g/L-14%). The AA loss was neither related to the duration of the CVVHD nor to the plasma AA levels. These results demonstrated an AA loss of approximately 5.0 g a day, a discrete amount when compared to the adsorption, estimated at 33.2 g a day in our study (6 to 7 times superior to the AA loss to the dialysate effluent).

CONCLUSION: Our conclusion is that we should not estimate the protein necessity in a septic or trauma patient on CHVVD based exclusively on the AA loss. Other factors, such as the adsorption of AA, may contribute to the continuous catabolism seen in these critically ill patients.

127
REGIONAL CITRATE ANTICOAGULATION DURING HAEMOFILTRATION IN PATIENTS AT HIGH RISK OF BLEEDING

Cubatòtti L1, Carmò M1, Teruzzi M1, Prezenti A1
1Anesthesia and Intensive Care, S.Gerardo Hospital, Monza, Italy

INTRODUCTION: Regional citrate anticoagulation (1,2) is an effective form of anticoagulation for continuous renal replacement therapy (CRRT) for patients with contraindication to heparin (bleeding, thrombocitopenia). However, because of its metabolic complications (hypernatremia, alkalosis and hypercalcemia), it was generally believed that diffusive clearance was mandatory for adequate citrate and sodium clearance. We evaluated the feasibility of our protocol: regional citrate anticoagulation, isolated CVVH using a special, now commercially available, replacement fluid together with standard replacement fluid.

METHODS: Regional citrate anticoagulation during isolated CVVH using special replacement fluid (100mMol/L sodium chloride, 0.75mmol/L magnesium chloride and 0.2% dextrose) and bicarbonate-buffered replacement solution (40mMol/L bicarbonate, 145mMol/L sodium chloride, 0.75 mmol/L magnesium chloride) was performed to maintain adequate acid-base balance. Trisodium citrate was infused via afferent line of Prisma A609 or Aquarius Aquamax HF12 devices, adjusting the rate of citrate to maintain post filter ionized calcium (iCa) <0.4mmol/l if blood flow (BF>250ml/min), or <0.6mmol/l if BF<250ml/min. A central calcium gluconate infusion was used to maintain a plasma iCa in normal range. We quantified its efficacy (creatinine blood flow (BF)<250ml/min, or <0.6mmol/l if BF>250ml/min. A central calcium gluconate infusion was used to maintain a plasma iCa in normal range. We quantified its efficacy (creatinine

RESULTS: The treatments were haemodynamically stable. Initially abnormal sodium concentrations normalised during the treatment. No episode of hyper- or hyperventilation occurred during Citrate-CVVH. The systemic ionised calcium concentration never dropped below 0.90 mmol/L. No episode of symptomatic hypocalcaemia was detected. A slight tendency to metabolic alkalosis (BE > 3 mmol/L) was observed. This tendency could be explained within the numerical model, as (1) the systemic lactate concentration rose less then assumed, (2) the patients’ haematoocrit and total protein concentration were lower then assumed, leading to more dilution of the infused citrate and less dialytic citrate removal, and (3) the net-ultrafiltration was lower than assumed, also leading to less citrate removal.

CONCLUSION: In conclusion, we successfully increased the efficacy of Citrate-CVVH with the help of a numerical model. It is planned to further optimise the composition of the dialysis fluid and to use the numerical model to develop dose adaptation guidelines for Citrate-CVVHD.

128
CITRATE ANTICOAGULATION IN CONTINUOUS HAEMODIALYSIS - REALISATION OF AN INCREASED DOSE OF DIALYSIS

Mogere S1, Rücker MF, Haase M1, Neumayer H1
1Klinik für Nephrologie, Charité Campus Mitte, Berlin, Germany

INTRODUCTION: Our previous regional citrate anticoagulation protocol for continuous veno-venous haemodialysis (Citrate-CVVHD) was limited to the use of about 1 l/h dialysis fluid, which provides less clearance than is presently recommended for continuous renal replacement therapy.

METHODS: As the flow ratios are relatively fixed when performing Citrate-CVVHD and as a doubling of the blood flow was impractical, we used a numerical model of Citrate-CVVHD to predict, at the unchanged blood flow of 100 ml/min, the composition of a new, adjusted dialysis fluid. The predicted composition includes 138 mmol/L sodium and 23 mmol/L bicarbonate. For practical reasons, we replaced the bicarbonate by 25 mmol/L lactate, whereby the difference reflects the expected systemic lactate concentration increase. We then confirmed the modified regional citrate anticoagulation protocol in 23 patients with ARF. 4% sodium citrate solution was infused in predilution mode to obtain a post-filter ionised calcium concentration between 0.25 and 0.35 mmol/L. Between 2.0 and 3.0 l/h of the calcium-free dialysis fluid were used. Calcium was supplemented as calcium chloride solution via a separate catheter lumen. This calcium supplementation rate was adapted to systemic ionised calcium concentration measurements made every 6h.

RESULTS: The treatments were haemodynamically stable. Initially abnormal sodium concentrations normalised during the treatment. No episode of hyper- or hyperventilation occurred during Citrate-CVVH. The systemic ionised calcium concentration never dropped below 0.90 mmol/L. No episode of symptomatic hypocalcaemia was detected. A slight tendency to metabolic alkalosis (BE > 3 mmol/L) was observed. This tendency could be explained within the numerical model, as (1) the systemic lactate concentration rose less then assumed, (2) the patients’ haematoocrit and total protein concentration were lower then assumed, leading to more dilution of the infused citrate and less dialytic citrate removal, and (3) the net-ultrafiltration was lower than assumed, also leading to less citrate removal.

CONCLUSION: In conclusion, we successfully increased the efficacy of Citrate-CVVH with the help of a numerical model. It is planned to further optimise the composition of the dialysis fluid and to use the numerical model to develop dose adaptation guidelines for Citrate-CVVHD.

129
ACUTE RENAL FAILURE AFTER CARDIAC SURGERY: PREDICTOR FACTORS

Taborda R1, Pérez C1, González P1, Pérez M1, Gamo A1, Alcaide M1, Suárez F1, Caramelo C1
1ICU, Nephrology, Fundación Jiménez Díaz, Madrid, Spain

INTRODUCTION: Acute renal failure (ARF) is a known complication following cardiac surgery and it is associated with perioperative morbidity and mortality. We tried to identify factors predicting ARF in our patients.

METHODS: We conducted a prospective cohort study of all patients who underwent cardiac surgery in a polyvalent intensive care unit between 1999 and 2003 December. We classified acute renal failure as moderate, if creatinine >1.5 mg/dL, and as severe ARF if creatinine >2 mg/dL. We studieddemographic and clinical variables as potential risk factors like age, sex, prior hypertension arterial, COPD, diabetes mellitus and alcoholism. We also evaluated perioperative factors: Left ventricular ejection fraction, type of technique, intra-aortic balloon pumps (IABP) prior or after surgery and surgery timings (extracorporeal circuit time, aortic clamping time), flow of the extracorporeal pump and perioperative amines use. Statistical analysis was made with the Students t-test and variables were contrasted by chi-square or Fisher’s exact test.

RESULTS: We collected 1139 patients, 59.3% were men and 40.7% women. A total of 131 (11.9%) of them develop moderate (ARF) and 52 (4.6%) presented severe ARF with a total mortality of 3.5%. Diabetes mellitus was present in 20.5%, 5.5% were habitual drinkers, 9.1% had COPD and 45.6% presented hypertension. None of them was independent predictor factor for the development of ARF. According to the type of surgery, 50% underwent valvular prostheses, 37.7% coronary artery bypass, 6.8% mix technique and 5.5% other forms of cardiac surgery. We found that longer extracorporeal time was associated with moderate ARF (137.51 min vs. 112.21 min; p = 0.007), but not with severe ARF (150.15 vs. 113.45; p=0.091). Prolonged aortic clamping time was related with moderate and severe ARF (p=0.001 and p=0.002 respectively). Comparing the use of vasoactive drugs we found significance for use of noradrenaline (NA) and adrenaline (A) for developing moderate and severe ARF (p<0.05). Using of dopamine (DA) was significantly associated with moderate but not with severe ARF (p=0.053 and p=0.103 respectively). There was no significance for use neither dobutamine nor nitro-glycerine.

CONCLUSION: In our study, the factors associated with ARF were longer extracorporeal times, use of IABP and use of NA, A and DA drugs.
130
AMINO-ACID ADSORPTION IN CRITICALLY ILL PATIENTS WITH RENAL FAILURE ON CONTINUOUS VENO-VENOUS HEMODIALYSIS
Rodrigues M G1, Ruzany F1, Paiva R A 2, Salgado D R1, Valente C1
1Intensive Care Unit, Barra D’or Hospital, Rio de Janeiro, Brazil
INTRODUCTION: The present study analyzed the adsorption of twenty-three AA in forty-one patients with acute renal failure (ARF) submitted to CVVHD in the intensive care unit. The patients had progressed to ARF during the course of sepsis or severe trauma, and the majority had developed three or more organ failures by the time the CVVHD was installed. The APACHE II score was calculated for each patient.

METHODS: The CVVHD was performed with a PAN 650SF/900 dialyser, the blood inflow was set at 150 mL/min and the dialysate outflow was set at 1 L/h with a variable ultrafiltration rate. The equipment employed was the ADIM-B-Brawn using a sterile dialysis solution with a bicarbonate buffer (Pronep-RJ). Sodium citrate or a low molecular weight heparin were used as anticoagulants. The samples for the measurement of AA in plasma and in the dialysate were collected serially in pre-defined intervals: before the beginning of the CVVHD (zero hour) and six, twelve, twenty-four, thirty-six and forty-eight hours after the beginning. The blood samples were centrifuged, frozen and analyzed by High Performance Liquid Chromatography. The dialysate was kept in a refrigerated recipient during collection time (six or twelve-hours volume).

RESULTS: The adsorption rate was variable: 25.18 g / 24h (twenty four hours) to 43.14 g / 24h (thirty-six hours). The adsorption was higher with: glutamine (8.4g/24h), alanine (3.11g/24h), glutamic acid (2.43g/24h) and proline (2.10g/24h). The adsorption was very important in glutamic acid (2.43g/24h) and proline (2.10g/24h).

CONCLUSION: Our conclusion is that we should not estimate the protein necessity in a septic or trauma patient on CVVHD based exclusively on the AA loss. The adsorption was very important in the study.

131
PLASMA ALUMINUM (AL) IN HIGH-VOLUME CONTINUOUS VENO-VENOUS HEMOFILTRATION (HV-CVVH)
Oudemans-van Straaten H1, Zandstra D2, Oudemans-van Straaten H1, Bosman R1, Sluiter E1, Ptits M2, Wester J1, Van der Spoel H1, Rodrigues M G1, Ruzany F1, Paiva R A N1, Salgado D R1, Valente C1
1II. Medizinische Klinik, Klinikum Rechts der Isar, Technical University of Munich, Munich, Germany, 2II. Medizinische Klinik, Klinikum Rechts der Isar, Technical University of Munich, Munich.
INTRODUCTION: Contaminated dialysate contributed to AL intoxication in chronic dialysis. During HV-CVVH 100 L are infused per day. Guidelines for the maximal concentration of AL (< 10 µg/l) are based on 20x lower infusion rates. We found that the raw-material of citrate was contaminated with AL. Aim was to determine whether plasma AL increased during HV-CVVH.

METHODS: Plasma AL was sampled before start and each time after disconnection in patients participating in a trial comparing citrate to nadroparin. Replacement flow was 4 L/h during severe organ failure, and could be reduced to 2 L/h if failure improved. The present study analyzed the 15% tri-sodium citrate in polyprolylene bags. Commercially available replacement fluids were used.

RESULTS: 20 patients received citrate, 15 nadroparin. Mean age 68 yrs (95 % CI 63-73), SAPS II 59 (CI 53-65), CVVH duration 5.4 days (CI 3.4-7.4). Citrate solution contained 251 µg AL/L, glumatic acid 2.43g/24h and proline 2.10g/24h.

CONCLUSION: Patients treated with HVCVVH do not appear at risk for Aluminum intoxication despite contamination of the raw material for citrate and the high volume exchange.

132
HEPATORENAL SYNDROME: HAEMODYNAMICS AND TREATMENT WITH HYDRATION, TERLIPRESSIN OR ACETYLCEYLSTEINE
Huber W1, Umgelter A1, Eckel F1, Fritsch R1, Geisler F1, Schmidt C1, Scmid R M2
1III. Medizinische Klinik, Klinikum Rechts der Isar, Technical University of Munich, Munich, Germany, 2III. Medizinische Klinik, Klinikum Rechts der Isar, Technical University of Munich, Munich.
INTRODUCTION: Hepatorenal syndrome (HRS) is a serious complication of advanced cirrhosis caused by renal vasoconstriction. Diagnosis of HRS is based on the exclusion of other causes of renal failure. The exclusion of volume depletion is particularly difficult. Therefore, the Asbestos Club criteria for HRS include the infusion of 1500 ml isotonic saline. It was the aim of our prospective study to compare the effects of terlipressin and acetylecylsteine (ACC) in patients with HRS haemodynamically monitored by pulmonary arterial catheter or PiCCO.

METHODS: 23 patients with HRS-1 (creatinine >=2.5mg/dl, n=18) or HRS-2 (creatinine >=1.5mg/dl, n=5) were randomised and immediately treated with i.v. terlipressin (bolus of 1mg, followed by continuous infusion of 4mg/24h) or i.v. ACC (150mg/h over 30min., followed by 150mg/kg/d). The primary endpoints for therapeutic efficiency were urinary output, fractional excretion of sodium and serum creatinine. If there was no improvement of >=2 of these parameters within 36h, the patients “crossed-over” to the other therapeutic agent.

RESULTS: All 23 patients received >=1,5L of parenteral infusion before haemodynamic monitoring. Despite immediate medical therapy, 7 of the first 8 patients (phase-1) failed to improve renal function, required dialysis or died. Therefore the protocol was changed: All of the following 15 patients (phase-2) were monitored by PiCCO. Despite prehydration according to Asbestos Club criteria, intrathoracic blood volume index (ITBI) was decreased in 50% of the patients (mean 918.4±185.8; median 854, normal range: 850-1000ml/m²). In contrast, CVP was not below the normal range in any patient (13.4±6.14, median 10, n: 19mmHg), however CVP was elevated in 56% of the patients. As a consequence, the protocol was amended: Any diuretic therapy was stopped and patients were hydrated according to PiCCO parameters before randomisation. Only 3 phase-2 patients who did not respond to hydration according to PiCCO were randomised to terlipressin or ACC. Patients of phase-1 and phase-2 were comparable with regard to baseline haemodynamic parameters (CVP: 12.5±5.0 vs. 14±18.7mmHg; ITBI 941±132.7 vs. 907.8±209.9mmHq/m²; n.s.) and hepatorenal impairment (HRS1/HRS2: 7/1 vs. 11/4; n.s.). In the 15 patients of phase-2 we observed a significantly improved outcome: Compared to 7/8 patients of phase-1 only 1/15 patient required dialysis and/or died (p<0.0001).

CONCLUSION: 1. Neither Asbestos Club criteria nor CVP are sufficient to exclude arterial volume depletion in patients with HRS. 2. Haemodynamic monitoring with PiCCO detects decreased ITBI in about 50% of these patients. 3. Prognosis of patients with HRS might be improved by thorough re-hydration.

Poster Sessions
Multidisciplinary collaboration to improve quality – 133-143

133
MASSAGE THERAPY IN ICU IS ASSOCIATED WITH A DECREASE IN STRESS CORTISOL LEVELS AND CO2 PRODUCTION
Bastin R1, Ptits F1, De Backer D1, Vincent J1
1Intensive Care, Erasme University Hospital, Brussels, Belgium
INTRODUCTION: The intensive care unit (ICU) is a high technology and stressful environment (1). Anxiety is known to increase the resting metabolic rate (2). Massage therapy has been successfully used to reduce anxiety and cortisol levels in burned patients (3). We evaluated whether a short, relaxing neck massage would affect stress hormones, respiratory variables, and CO2 production (VCO2) in ICU patients.

METHODS: After approval by the Ethics Committee of our institution, 29 adult patients, mechanically ventilated on pressure support mode were included. Massage consisted of 10 minutes of effleurage, petrissage, stroking, and stretching applied to the neck in the supine position.

Systolic arterial pressure (SAP) and cortisol levels were measured just before and during the 45 min following the massage. In order to test a placebo effect of rest, 16 subjects were also evaluated 10 min after massage. End tidal CO2 (ETC02), minute ventilation (MV), respiratory rate (RR), tidal volume (TV), and arterial blood gases were obtained before (T0), immediately after (T1), and 15 (T2), 30 (T3), 45 (T4), and 60 (T5) minutes after the massage. Statistical analysis included an analysis of variance for repeated measures (ANOVA) followed by a modified T-test.

RESULTS: All variables remained stable during the 10 min before massage and SAP remained stable throughout the study period. The time course of the other variables is shown in the table (Data are presented as mean ± SEM, a = p<0.01, b = p<0.001 from pre-massage values).

|   | T0 | T1 | T2 | T3 | T4 | T5 |
|---|---|---|---|---|---|---|
| Cortisol ng/ml | 21.1±16 | 20.6±16 | 20.4±16 | 19.7±16 | 19±16 | 19±16 |
| MV l/min | 11±1 | 11±1 | 12±1 | 11±1 | 10±1 | 10±1 |
| TV ml | 418±35 | 429±44 | 429±32 | 414±37 | 399±34 | 430±40 |
| RR | 26±1 | 24±2 | 25±2 | 25±2 | 26±2 | 24±2 |
| ETCO2 mmHg | 42±2 | 43±2 | 42±3 | 42±3 | 43±3 | 43±3 |
| VCO2 ml/min | 450±16 | 434±17 | 453±20 | 433±23 | 414±19 | 432±19 |

CONCLUSION: A short neck massage may decrease the stress experienced by critically ill patients receiving pressure support ventilation, inducing a reduction in plasma cortisol levels and in CO2 production.

REFERENCES(S): (1) Nelson JE Crit Care Med 2001; 29:277-82
(2) Schmidt J Appl Physiol 1996; 80:638-42
(3) Field J Burn Care Rehabil 1998;19:241-4
IMPROVING MULTIPROFESSIONAL REHABILITATION FOR LONG STAY ICU PATIENTS

Dembinska E C
1Physiotherapy, East Surrey Hospital, Redhill, United Kingdom

INTRODUCTION: In September 2002, a process mapping exercise was undertaken at East Surrey Hospital, looked at the patient journey from ICU to discharge home. Patients and their families were involved in the process mapping and all professional and non-professional staff. A number of areas were identified as needing improvement and one of these concerned patients’ rehabilitation. Patients reported feeling unsure about their progress and referral to other disciplines was slow, increasing length of stay (LOS). The aims were 1) To integrate the Health Professionals involved in the rehabilitation of long-stay (more than 7 days) ICU patients into a patient-centred team with shared goals. 2) To improve the patient and relative experience and involve the family in patients’ rehabilitation. 3) To reduce LOS (average LOS from discharge from ICU to discharge home was 39 days)

METHODS: A weekly meeting involving all the therapies was established to discuss the progress of ex-ICU patients and plan weekly goals. A rehabilitation goal form was developed and completed weekly by all professions, kept at patients’ bedside and discussed with patient/relatives.

RESULTS: Data was collected over 10 months. In that time, 33 long stay ICU patients were transferred to the ward. Of these 33 patients, 7 died on the ward and 1 died 3 days after transfer to a community hospital. Of the remaining 25 patients, 7 waited for placement in spinal injury units or nursing homes and a further 2 patients did not require an acute bed. These 9 patients had high LOS ranging from 39-89 days. Of the remaining 16, 2 patients’ discharges were delayed for medical reasons. Removing these 2 from the data, the average LOS was 20.6 days.

CONCLUSION: The multiprofessional goal setting meetings have improved communication, speeded up referrals to the different therapies and kept the team up to date with the patient’s progress enabling appropriate weekly goals to be set. Tracking the patient’s pathway more closely has highlighted problems with delayed discharges 36% of patients had a delayed discharge from the acute unit, costing the acute unit 432 bed days. The goal setting meetings appear to have identified at an earlier stage those patients requiring a continuing care placement. For those patients who do not develop further medical problems and are not waiting for further placement, the average LOS was 3 weeks.

FINNISH NURSE STUDENTS BIOLOGICAL-PHYSIOLOGICAL KNOWLEDGE TO WORK AS INTENSIVE CARE NURSES

Ääri R1, Leino-Kilpi H1, Suominen T1
1Nursing Science, University of Turku, Turku, Finland

INTRODUCTION: Intensive care nursing has changed in recent years. With the ageing of the population, intensive care is becoming more complex all the time. Skilled and qualified nurses are needed in all intensive care units (ICU), and nursing education has to respond to this demand. This study describes the basic biological and physiological knowledge and skills of graduating nurse students in Finland against the requirement of their being able to practice safely in intensive care. The aim of this study was also to describe the interest of the graduating nurse students to work in intensive care units after graduating.

METHODS: The data were collected from two purposive samples of nursing students (RN) (n=130) graduating from two polytechnics in western Finland. The students’ basic biological and physiological knowledge of intensive care were tested using the BKAT-5 tool, which is developed by Dr. Toth from USA. Data was analysed statistically. The reliability of the whole instrument was tested with Cronbach’s α (0,918).

RESULTS: The students were most knowledgeable in the areas of appropriate precautions, living will and medical calculation, followed by neurology and endocrinology. Scores were poorest for pulmonary, gastrointestinal and cardiovascular knowledge. Intensive care studies and the desire to work in intensive care correlated significantly with the respondents’ basic intensive care knowledge.

CONCLUSION: Finnish ICUs have been expressing some concern about qualified nursing staff. Nurse education has to respond to raise its quality standards. It is important for nursing education to concentrate on developing those areas of intensive care education where the performance of the graduating nurse students is weakest.

EVALUATING A NURSING INTERVENTION ALGORITHM FOR THE PRESSURE ULCER PREVENTION AND TREATMENT

Ntantana M1, Eleounitsalis G1, Portokalidis A1, Kiranou M1, Matamis D1, Tsifouti A1
1ICU, Papageorgiou Hospital, Thessaloniki, Greece

INTRODUCTION: Although a large number of studies for the treatment of pressure ulcers (pu) are available, their results are often disappointing because this strategy should combine the prevention and treatment of both local and systemic factors. The aim of our study is: 1) to measure the incidence of pu in our ICU, 2) to estimate the efficiency of the nursing interventions for the prevention and treatment of most of the factors associated with pu formation.

METHODS: In this study the evaluation of the risk factors involved in pu formation was based on Waterlow scale. The prevention and treatment was based on an algorithm (developed in our ICU), that takes into account the individual characteristics of ulcers and pts as well. Our algorithm analyses the nursing interventions step by step and is based on a multifactorial choices tree decision model, according to: 1) the stage of the ulcer (four stages as EPUAP describes), 2) the general condition of the ulcer (edema, necrosis, local infections), 3) the general condition of the pt (age, nutrition, obesity, mobility, systemic hypo-perfusion). The target of all nursing interventions was the correction of risk factors and the activation of the healing mechanism, leading to the prevention and cure of the pu.

RESULTS: 211pts (aged 15yo-80yo), out of 360 consecutive admissions over a period of one year, were included in the study. Pts with less than 4 days of hospitalization were excluded.18 pts developed pu (8.5%), (4 pts stage IV, 1pt stage III, 6pts stage II, 7pts stage I)

CONCLUSION: Level of partial ventilatory assistance affected LPS-induced diaphragmatic dysfunction. There is an assist level for protecting against diaphragmatic dysfunction. High level of ventilatory assistance, which yields approximately complete rest, accelerated diaphragmatic dysfunction. Complete rest by muscle relaxants had smaller effect on diaphragmatic dysfunction.
140

A PROSPECTIVE OBSERVATIONAL STUDY INTO CONSTIPATION MANAGEMENT ON A GENERAL INTENSIVE CARE UNIT

Berrymann S H1

1Intensive Care Unit, Aberdeen Royal Infirmary, Aberdeen, United Kingdom

INTRODUCTION: A pilot study was carried out on constipated patients, identifying problems with managing this group of patients. A literature review generated little research on the subject. The opportunity to improve patient care by highlighting current practice and creating a protocol was embraced.

METHODS: Constipation was simply defined as no bowel movement within 72 hour period (1-3). 100 consecutive patients were enrolled over four months, between October 2003 and February 2004. All patients resident in the unit for 48 hours or longer were recruited with no exclusions. Data was collected on a form by one observer.

RESULTS: Sixty four males and 36 females with an age range between 18 and 88 years (mean of 56) were recruited. The patients were classified as below, (see table 1)

| Age (years) | Number |
|-------------|--------|
| 18-24       | 25     |
| 25-34       | 25     |
| 35-44       | 20     |
| 45-54       | 15     |
| 55-64       | 10     |
| 65-74       | 5      |
| 75 and over | 5      |

METHODS: Constipation was simply defined as no bowel movement within 72 hour period (1-3). 100 consecutive patients were enrolled over four months, between October 2003 and February 2004. All patients resident in the unit for 48 hours or longer were recruited with no exclusions. Data was collected on a form by one observer.

RESULTS: Sixty four males and 36 females with an age range between 18 and 88 years (mean of 56) were recruited. The patients were classified as below, (see table 1)

| Age (years) | Number |
|-------------|--------|
| 18-24       | 25     |
| 25-34       | 25     |
| 35-44       | 20     |
| 45-54       | 15     |
| 55-64       | 10     |
| 65-74       | 5      |
| 75 and over | 5      |

| Specialty   | Number | Constipated not (%) |
|-------------|--------|---------------------|
| Surgical    | 25     | 6 (24)              |
| Medical     | 42     | 18 (43)             |
| Neurological| 25     | 6 (24)              |
| Orthopaedic | 8      | 2 (25)              |
| Total       | 100    | 32                  |

| Diagnosis made by | Number | Treatment commenced |
|-------------------|--------|---------------------|
| Nursing staff     | 77 (91%)| 7 (74%)             |
| Medical staff     | 2 (3%)  | 5 (50%)             |

CONCLUSION: Many patients are constipated on ICU and both the nursing and medical staff are poor at treating it (1:2). Bowel habits are individual so limitations do exist to the study. For example, many surgical admissions are post laparotomy and are therefore nil by mouth. A team approach working to a protocol or guideline (4) might be a better approach to identify patients at risk, with the emphasis on prevention rather than cure.

REFERENCE(S): 1.Rull S, et al. Nursing in Critical Care;1998; 3: No 3.
2.Mostafa S, Bharadwaj S, Ritchie G, Granton N, Weinstone (2003) R. Br J Anaesth 2003; 91: 815-9.3.Thorpe D, Harrison L (2002). Critical Care Nursing in Europe; 2: No 2. 4.Meade MO, Ely EW. JAMA 2002; 288: 2601-3.

141

ROUTINE BLOOD SAMPLE ANALYSIS IN ICU. CENTRAL LAB VERSUS MICROANALYZER AT BEDSIDE

Abizanda R1, García-Morón F1, Fernández M1, Moliner R1, Chulilla F1, Marsucio F1, Bernat A1, Cubedo M1, Melo D1

1ICU Department, Hospital Universitario Asociado General de Castelló, Castelló, Spain

INTRODUCTION: Routine and repeated laboratory analysis of different kind of biologic samples is an unavoidable need for the proper control and attendance of patients admitted to ICUs. The means to obtain these tests associated to reiteration and the steal of patients' blood necessary for these routines have been widely considered with pro and con arguments. The purpose of this study is to assess the how adequate is to perform these routines through a microanalyzer at bedside, minimizing the volume of needed blood, shortening the times of results availability and reducing costs, as personal involved is the same nursing staff in the ICU.

METHODS: During two months period of 2003 we have performed a series of simultaneous and duplicate analysis determinations. Ones by means of sending blood samples to the central hospital laboratory or passing them through the blood gases analyzer (Radiometer AVL 560) , and the others by a microanalyzer technique performed at bedside.

RESULTS: Performed determinations included blood gases, ions, glucose, blood urea and haematoctrit. A total of 104 pairs of samples have been included in the study. Obtained results have been compared by linear regression, correlation coefficients calculations and Bland-Altman concordance test. The study has included the needed volume of blood sampling.

RESULTS: Performed comparisons of results obtained by both quoted methods have shown the possibility of using safely microanalyzing techniques for routine and repeated procedures in the ICU. Nevertheless no good concordance (avoiding interutilization) has been found for chloride (disparities ranging in 33 mEq/l), glucose (24 % of samples outlying the 95 % IC), and with serious doubts for haematocrit (95 % CI ranging up to 20 percentage points).

CONCLUSION: Our study do confirm the possibility of safely using microanalyzing methodologies at bedside, specially those related to blood gases analysis, sodium and potassium, and so reducing volume of blood sampling could be reduced.

REFERENCE(S): 1.Jiricka M.K., Ryan P.,Carvalho M.A., Bukvich J. [1995]: Am. J. Crit. Care. 4(5):361-7.2.Baldwin K.M., Ziegler S.M. [1987]: Adv Wound Care.; 11 (4):168-73.3.Schultz A., Bien M., Dumond K., Brown K., Myers A. [1999]:AORN J., 70(3):434, 437-40, 443-9.4.Allman R.M., Goode P.S, Burst N., Bartolucci A.A., Thomas D.R. [1999] Adv Wound Care. 12(1):22-30.
142 AUDIT OF THE USE OF NIV IN NON-DESIGNATED AREAS - IMPLICATIONS FOR OUTREACH WORKLOAD
Tanser S1, Woolhouse K1, Groom P1, Kirby J1, Thacker A2, Bateman S1, Fordyce F2
1Intensive Care, 2Emergency, Southampton General Hospital, Southampton, United Kingdom

INTRODUCTION: Non-invasive ventilation (NIV) has been shown to be effective in the treatment of pulmonary oedema [1] and acute exacerbations of chronic obstructive airways disease [2]. The use of NIV in other forms of respiratory failure remains controversial [3]. Establishing a patient on NIV is time consuming and best carried out in designated areas. Since the introduction of the Outreach service, use of NIV in non-designated areas has increased. We present a prospective audit of the use of NIV in our hospital.

METHODS: A 6-month prospective audit carried out on all patients undergoing NIV in non-designated areas. Data collected includes clinical indication, effectiveness, Outreach nursing time spent with patient and outcome.

RESULTS: Preliminary analysis indicates that NIV is being commonly instigated in patients with respiratory failure secondary to sepsis and patients not considered appropriate for ICU admission. Not surprisingly these patients have a poor outcome. A large proportion of Outreach time is spent on these patients. Full results will be available at the meeting.

CONCLUSION: We have identified inappropriate use of NIV in our wards resulting in poor outcome for the patients and increased workload for the Outreach team. We plan to introduce new guidelines for the use of NIV and reaudit in 6 months time.

REFERENCE(S): 1. Lin M, Yang Y, Chiany H et al. Reappraisal of continuous positive airway pressure therapy in acute cardiogenic pulmonary oedema: short-term results and long-term follow-up. Chest 1995, 107: 1379-86.

17th Annual Congress – Berlin, Germany – 10–13 October 2004 S41

143 EFFECT OF CHEST PHYSOTHERAPY ON THE INCIDENCE OF VENTILATOR-ASSOCIATED PNEUMONIA
Norenborg M1, Koubé J1, Leyrin O1, Vincent J1, Brimouille S1
1ICU, Erasme Hospital, Brussels, Belgium

INTRODUCTION: Pulmonary complications including increased secretion retention are common in ICU patients on mechanical ventilation. Depending on the series, the risk of ventilator-associated pneumonia (VAP) ranges from 9 to 68%, and associated mortality varies from 33 to 71% [1]. Some studies suggested that chest physiotherapy (CPT) might prevent VAP in critically ill patients [2]. As VAP may result from impaired sputum clearance, we studied whether CPT designed to enhance sputum clearance could decrease the incidence of VAP.

METHODS: Inclusion criteria were admission to the ICU, mechanical ventilation scheduled for at least 48 hours, no pneumonia and no contraindication to CPT. Patients were randomized (by sealed envelopes) to a CPT group or a control group. CPT consisted in postural drainage and forced expiratory techniques twice daily. All patients received tracheal suctioning and musculoskeletal physiotherapy. VAP was diagnosed by the clinical pulmonary infection score (CPIS) as modified by A’Court et al[3] and/or by physician evaluation based on a new pulmonary infiltrate on the chest X-ray, an increase in body temperature, an increase in white blood cell count, and qualitative and quantitative evaluation of tracheal secretions. VAP was defined by a CPIS greater than 5.

RESULTS: Twenty-two patients were included. In the CPT patients (n = 10), 2 patients died, 2 patients were extubated within 48 hours and 2 of the 6 (33%) remaining patients developed VAP. In the control patients (n = 12), 1 patient died and 1 patient was extubated before 48 hours; four of the 10 (40%) remaining patients developed VAP. There was no significant difference between the 2 groups in the incidence of VAP or in the delay of VAP. No significant difference in age, underlying status, or severity score was observed between treated and control patients, or between patients with and without VAP.

CONCLUSION: These preliminary findings suggest that CPT does not significantly reduce the incidence of VAP in mechanically ventilated critically ill patients, but the study is still in progress.

REFERENCE(S): 1. Boutron DL (1999). Nosocomial pneumonia in the ICU-year 2000 and beyond. Chest 115: 28a-33a.
2. Ntoumenopoulos et al (2002). Chest physiotherapy for the prevention of ventilator-associated pneumonia. Intens Care Med 28: 850-856.
3. A’Court et al (1993). Microbiological lung surveillance in mechanically ventilated patients, using non-directed bronchial lavage and quantitative culture. J Med 86: 635-648

144 EFFECTS OF PARTIAL VENTILATORY ASSISTANCE ON LIPOPOLYSACCHARIDE-INDUCED DIAPHRAGMATIC DYSFUNCTION
Uchiyama A1, Nishimura M2, Mashimo T3, Fuyuno Y1
1Intensive Care Unit, Osaka University Hospital, Suita, 2Department of Emergency and Critical Care Medicine, University of Tokushima School of Medicine, Tokushima, Japan

INTRODUCTION: Ventilatory muscle contractile performance is impaired in animals injected with lipopolysaccharide (LPS). Mechanical ventilation may protect diaphragm injury due to LPS. There have been reports indicating that mechanical ventilation induced diaphragmatic dysfunction (VIDI). Physicians can control patient’s work of breathing in partial ventilatory assist mode. Our hypothesis is that settings of ventilatory assist affect LPS-induced diaphragmatic dysfunction.

METHODS: At 30min after injection of LPS, 5 different settings were applied to the rats (n=50): CPAP, IMV, IMV530, IMV45/min, and IMV45 plus muscle relaxants. Instead of LPS, saline was injected to Control (n=10). After 240min of each setting, diaphragmatic function was examined by using isolated diaphragmatic strip method. We examined twitch characteristics, force-frequency curves (0.8 Hz, 10, 20, 50, 100, and 120 Hz), and fatigability characteristics after 3min tetanic stimulation.

RESULTS: Peak twitch tension of the IMV45 was smaller than that of IMV30. Force-frequency curves were shown in Figure. While the maximal tetanic tension (120Hz) of CPAP were smaller than that of Control, those of the IMV15, IMV30, and IMV45 plus muscle relaxants groups were not different. The tension of the IMV30 was the highest value. The tension of the IMV45 was the lowest value. Fatigue characteristics of the study groups were not different each other.

CONCLUSION: Level of partial ventilatory assistance affected LPS-induced diaphragmatic dysfunction. There is an assist level for protecting against diaphragmatic dysfunction. High level of ventilatory assistance, which yields approximately complete rest, accelerated diaphragmatic dysfunction. Complete rest by muscle relaxants had smaller effect on diaphragmatic dysfunction.

145 OXYGEN GAIN DURING HIGH-FREQUENCY NORMOCAPNIC HYPERVENTILATION
Pachl J1, Rosbi ck2, Zahradsky V1, Waldauf P4, Fri M1
1Anesthesiologie und CCM, Charité University, 3rd School of Medicine, 2Dept. of Radioelectronics, Czech Technical University, FEE, Prague, Czech Republic

INTRODUCTION: High-frequency oscillatory ventilation (HFOV), contrary to conventional ventilation, enables a safe increase of tidal volume without endangering alveoli by barotrauma and volutrauma. Introduction of normocapnic high-frequency oscillatory hyperventilation (HFO HV) provides a potentially safe increase of the alveolar oxygen concentration with additional controlled CO₂ supplementation in order to keep the normocapnic values. The aim of this study is to specify the effect of normocapnic HFO HV upon oxygen gain under experimental conditions.

METHODS: Experimental animal study. Laboratory pigs (n=9) were investigated under total intravenous anaesthesia. Phase 1: Volume controlled HFOV; starting period parameters: ventilatory frequency f = 200/min, relative inspiratory time Ti/T = 50 %, continuous distension pressure CDP = 0.8 Lpa, V T = 1.9 ± 0.3 ml/kg. Normocapnic (PaCO₂ = 41 ± 2.6 Torr, PaO₂ = 84 ± 11.9 Torr) was achieved by iterative changes of V T. Phase 2: Hyperventilation; V T was increased by 46 ± 12 % compared to normocapnic V T. Phase 3: Normocapnic hyperventilation was achieved by regulation of additional CO₂ flow, i.e. by iterative setting of CO₂ fraction in the inspiratory gas. Samples for arterial blood gases analysis were acquired 15 minutes after each change of V T or CO₂ admixture.

RESULTS: Increase of PaO₂ (by 28 ± 3.9 Torr, p<0.001) and decrease of PaCO₂ (by -15.4 ± 2.3 Torr, p<0.001) were reached in phase 2 against the phase 1 values. In phase 3, the statistically significant increase of PaO₂ was preserved (28.5 ± 5.5 Torr against the phase 1 value, p<0.001) while normocapnia was reestablished by CO₂ admixture into the inspiratory branch of the ventilatory system.

CONCLUSION: Concept of high frequency normocapnic hyperventilation could be used as a lung protective strategy improving significantly oxygenation.
146 AMINOGUANIDINE ATTENUATES PULMONARY DYSFUNCTION FOLLOWING COMBINED BURN AND SMOKE INHALATION INJURY

Westphal M1, Enkhbaatar P1, Morita N1, Murakami M2, Maybauer D M1, Maybauer M O1, Traber L D1, Traber D L1

1Investigational Intensive Care Unit, University of Texas Medical Branch, Galveston, United States

INTRODUCTION: Nitric oxide (NO) plays a pivotal role in the pathogenesis of cardiopulmonary dysfunction associated with systemic inflammation [1]. We hypothesized that aminoguanidine (AG), a specific inhibitor of the inducible NO synthase (iNOS), ameliorates pulmonary dysfunction following combined burn and smoke inhalation injury.

METHODS: Chronically instrumented sheep were randomly allocated to: 1) healthy controls, 2) injured controls (40%, 3rd degree burn; 4 x 12 breaths of cotton smoke, < 40°C), or 3) an injured intervention group, receiving AG (10 mg/kg bolus infusion, followed by a continuous infusion of 5 mg/kg/h) from one h post injury to the end of the 48-h study period (n = 8 per group). Statistical analysis was performed using two-way analysis of variance with appropriate post hoc comparisons (Student-Newman-Keuls). Data are expressed as mean ± SEM.

RESULTS: There were no differences between groups at baseline. All physiologic variables remained stable in healthy controls through the entire experiment. Compared with injured controls, AG significantly reduced platelet levels (t = 2.54, p = 0.024) and NOX activity (t = 3.84, p = 0.002) at 48 h. AG significantly reduced peak airway pressure (t = 3.84, p = 0.002) and increased mean blood pressure (t = 2.84, p = 0.020) and cardiac output (t = 2.94, p = 0.020) at 48 h. No differences were observed between healthy controls and the AG intervention group for any of the physiologic variables measured.

CONCLUSION: The combination of aminoguanidine and NOX inhibition improved pulmonary function following combined burn and smoke inhalation injury.

REFERENCE(S): 1) Van Gilst et al. (2003). This study was supported by the James W McLaughlin Fund and two grants from the Shriners of N. America: # 8450 and #8954.

Grant acknowledgement: This study was supported by the James W McLaughlin Fund and two grants from the Shriners of N. America: # 8450 and #8954.

147 EFFECTS OF DIFFERENT ASSISTED SPONTANEOUS BREATHING MODES ON RESPIRATORY FUNCTION IN LUNG INJURY

Henzler D1, Pelosi P2, Bensberg R1, Pielken V1, Quintel M1, Rossaint R1, Kuhlen R1

1Anesthesiology, University Hospital RWTH Aachen, Aachen, Germany, 2Istituto di Scienze Cliniche e Biologiche, Università degli Studi, Varese, Italy, 3Anesthesiology, University Hospital, Göttingen, Germany

INTRODUCTION: Mechanical ventilation in lung injury allowing spontaneous breathing has been shown to result in improved hemodynamic stability, gas exchange and ventilation-perfusion distribution compared to conventional ventilation. However, differences in gas exchange and work of breathing between different assisted ventilation modes have not been clearly elucidated.

METHODS: In 11 anesthetised pigs with saline lavage induced lung injury we compared BIPAP (bilevel inspiratory positive airway pressure), PSV (pressure support) and PCV (pressure controlled ventilation) as assisted ventilation modes. Measurements included arterial blood gases, hemodynamic parameters, respiratory mechanics, and gas exchange. Data were analysed based on a two-group repeated measures analysis of variance.

RESULTS: Both ventilator settings were able to maintain PaO2 at baseline levels (BIPAP 205±53 mmHg, PCV 195±53 mmHg, PSV 195±53 mmHg). No significant between-group differences were observed.

CONCLUSION: Different assisted ventilation modes can improve respiratory function in lung injury. Further studies are needed to clarify the optimal mode of ventilation in this setting.

REFERENCE(S): 1) Van Gilst et al. (2003). This study was supported by the James W McLaughlin Fund and two grants from the Shriners of N. America: # 8450 and #8954.

Grant acknowledgement: This study was supported by the James W McLaughlin Fund and two grants from the Shriners of N. America: # 8450 and #8954.
HYPOTHERMIA AS A NEW PARADIGM OF LUNG REST FOR ACUTE-LY-INJURED LUNG

Hong S1, Koh Y1, Ahn J2, Lee S1, Kim W1, Kim D3, Lim C3
1Pulmonary and critical care medicine, internal medicine, Asan medical center, university of ulsan, college of medicine, 2Pulmonary and critical care medicine, internal medicine, Ulsan university hospital, university of ulsan, college of medicine, seoul, South Korea

INTRODUCTION: Lung-protective ventilation (LPV), which has shown to reduce the mortality of ARDS, has been largely dependent on the reduction of tidal volume. Besides lower reduced tidal volumes, a decreased ventilation frequency, or ‘lung rest’, can be another approach to LPV. Induced hypothermia has been long utilized in the context of compromised oxygen supply. Owing to decreased metabolic rate, CO2 production during hypothermia would decrease, which would in turn translate into lung rest through decreased requirement for ventilation frequency.

METHODS: Forty-eight Sprague-Dawley rats were randomly assigned to normothermia-normal C), normothermia-reduced frequency (NR: frequency 90/min, 37 ± 1 frequency 45/min), hypothermia-normal frequency (H: frequency 90/min, 27 ± 1 C), hypothermia-reduced frequency (HR: frequency 45/min). Lipopolysaccharide (3 pg/ml) was administered intratracheally to induce acute lung injury (ALI). After 2 hours, the lungs of rats were removed en bloc for bronchoalveolar lavage (BAL) and histological examination.

RESULTS: Compared with the other groups, neutrophil count (ml): [N: 8, 433 ± 5,955, NR: 11,408 ± 11,377, H: 3,636 ± 1,419, HR: 2,808 ± 1,137 (p< 0.001)], protein concentration (ug/ml): [1,411 ± 666, 761 ± 291, 1,367 ± 490, 831 ± 369 (p< (pg/ml): [1,180 ± 439, 1,081 ± 652, 620 ± 426, 420 ± 182 (p< 0.001)], and EL-1c (0.001)] in the BAL fluid were lower in the HR group. The ratio of wet/dry lung weight [6.0 ± 0.4, 5.7 ± 0.4, 5.6 ± 0.2, 5.2 ± 0.2, respectively, (p<0.001)] was also lower in the HR group. Compared with the normothermia groups, histologic ALI score [8.3 ± 2.7, 10.4 ± 3.1, 3.5 ± 2.1, 3.1 ± 2.2, respectively, (p< 0.001)] was lower in the hypothermia groups, but there was no difference between the H group and the HR group.

CONCLUSION: In rats with ALI, a reduction of ventilation frequency through hypothermia resulted in less ALI compared with normothermia or hypothermia at normal frequency. Hypothermia could be regarded as a new paradigm of lung rest for critically-injured lungs.

Grant acknowledgement: This study was supported by the Asan Institute for Life Sciences (#2003-161), Seoul, Korea.

152

ANIMAL MODEL OF UNILATERAL VENTILATOR INDUCED LUNG INJURY

Farne R1, Granelli S2, Renger M1, Serrano-Mollar A3, Closa D2, Navajas D1
1Unitat Biofisica i Bioenginyeria, Facultat Medicina, Universitat Barcelona-IDIBAPS, 2Departamento Patologia Experimental, IBBI-CSIC-IDIBAPS, Barcelona, Spain

INTRODUCTION: High-volume mechanical ventilation induces or enhances lung injury and pulmonary and systemic inflammation. However, the detailed mechanisms involved in ventilator induced lung injury (VILI) are not fully understood. Setting an experimental model allowing to simultaneously and synchronically apply a high-volume ventilation to one lung and a low-volume ventilation to the other lung could be useful to investigate the pathophysiology of VILI. The aim was to design, implement and test a differential lung ventilator for setting a rat model of unilateral VILI.

METHODS: The differential ventilator is based on ventilating each lung with a conventional 5 ml glass syringe connected to an electrovalve system. Each syringe is driven by a servocонтrol actuator. Both actuators operate synchronically, being possible to independently vary the amplitude, waveform of the ventilation and PEEP applied to each lung. The differential ventilator was tested in anesthetised-paralysed rats (250-300 g) with each lung independently intubated. Five control animals were ventilated at 7 ml/kg (3.5 ml/kg each lung). Six animals were subjected to differential ventilation (3.5 ml/kg in one lung and 15 ml/kg in the other lung). After 3 h, the animals were sacrificed and the lung excised to assess lung oedema by means of the wet/dry lung weight ratio (W/D).

RESULTS: No significant (p>0.05) differences were found between W/D in both lungs of the control animals and the normally ventilated lung in the rats subjected to differential ventilation (5.1±2.2, 4.9±0.25 and 4.7±0.15 respectively). By contrast, W/D in the overventilated lung was systematically and significantly (p<0.05) increased (8.9±3.80), indicating differential induction of oedema.

CONCLUSION: The designed differential ventilator allows the implementation of a rat model of unilateral VILI which will be useful to investigate the mechanisms involved in high-volume ventilation both in healthy animals and in rats with previously induced lung or systemic injuries.

Grant acknowledgement: Ministerio de Ciencia y Tecnología (SAF 2002-03616, SAF 2003-01334) and Ministerio de Sanidad y Consumo (Red GIRA-G03/063, Red RISPIRA-C03/11).

153

CONTRIBUTION OF ADHESION MOLECULES TO PLATELET-ENDOTHELIAL CELL INTERACTION IN LUNG MICROCIRCULATION

Heckel K1, Kiefmann R1, Schenkat S1, Doerger M2, Goetz A E1
1Department of Anesthesiology, 2Institute for Surgical Research, University of Munich, Munich, Germany

INTRODUCTION: Accumulation of platelets plays a crucial role in the pathogenesis of acute lung injury during systemic inflammation. The aim of this study was to elucidate the contribution of adhesion molecules to platelet-endothelial cell interactions in the pulmonary microcirculation during endotoxemia.

METHODS: White New Zealand rabbits were anesthetized and ventilated mechanically. In vivo fluorescence microscopy was used to quantifying kinetics of fluorescently labeled erythrocytes and platelets in pulmonary arterioles, capillaries and venules. The expression of P-selectin in lung tissue was investigated using immunohistochemistry and Western blot analysis.

RESULTS: Six hours after onset of endotoxin infusion we observed a massive interaction of platelets with microvascular endothelial cell surface (299±157 µm-2), whereas under control conditions, no platelet sequestration was measured. An up-regulation of P-selectin was detected in lung tissue following endotoxin infusion by immunohistochemistry and Western blot analysis. Blockade of P-selectin with fucoidin resulted in a reduction of endotoxin-induced platelet-endothelial cell interaction (88±58 µm-2).

CONCLUSION: P-selectin expressed on the surface of microvascular endothelium seems to mediate platelet-endothelial cell interactions in the pulmonary microcirculation during systemic inflammation.
155 INCREASED MORTALITY WITH 4G/4G GENOTYPE OF PAI-1 IN PATIENTS WITH SEPTIC SHOCK

Nicolas J M1, Garcia-Segarra G2, Espinosa G1, Varquez M3, Badia E1, Tassies D1, Ortola J3, Reverte J C4
1Medical Intensive Care Unit, 2Haemotherapy And Haemostasis, 3Biochemistry Laboratory, Hospital Clinic, Barcelona, Spain

INTRODUCTION: Genetic polymorphisms influence susceptibility, outcome and complications from sepsis. Type-1 plasminogen-activator-inhibitor (PAI-1) plays an important role on the regulation of the fibrinolytic system. High PAI-1 plasma concentrations are associated with many thrombotic disorders where fibrinolysis is impaired. The human PAI-1 gene contains a common polymorphism group 4G/5G. This polymorphism results in two different PAI-1 isoenzymes, one with lower activity (4G) and another with higher activity (5G).

RESULTS: Seventy-eight patients were included (61 in ICU and 17 in general hospital ward). The R753Q polymorphism of TLR2 is more frequent in ICU patients than in the control group receiving a saline solution demonstrated normal gas exchange barrier without extravasation of gold labelled albumin. LPS infusion resulted in a significant displacement of gold labelled albumin into pulmonary cells, into the lung interstitium and even into the alveolar space. Respective fluorescence intravital microscopy indicated significant thickening of alveolar septal width. These findings were accompanied by a slight but significant deterioration of the alveolar oxygen exchange difference (AaDO2), whereas wet/dry ratio and albumin concentration in the bronchoalveolar lavage fluid missed to detect that early stage of pulmonary edema.

CONCLUSION: Albumin labelled gold particles injected intravenously and visualized by a standard electron microscopy technique are a new and very sensitive marker of microvascular permeability in early acute lung injury. This technique enabling a detailed quantification of edema formation in pulmonary microvessels may serve as a basis for evaluating novel treatment strategies directed against early acute lung injury.

INTRODUCTION: Immune defense against Gram + bacteria involves recognition of molecular patterns by Toll-like receptor 2 (TLR2). An arginase (R) to glutamine (Q) substitution at residue 753 of TLR2 is present in 1.1 % of caucasians. This R753Q polymorphism is associated with severe staphylococcal infections (1). We investigated the prevalence and the clinical consequences of the TLR2-R753Q polymorphism in ICU pts.

METHODS: We genotyped 1223 consecutive ICU patients using quantitative PCR and specific Taqman-MGB probes. In patients heterozygous for TLR2-R753Q, we measured release of TNF-a, IL8 and IL10 (ELISA) after ex vivo stimulation of monocytes with agonists of TLR2 including a IL-10 polymorphism and in-hospital mortality in patients admitted to the hospital for sepsis. The patients homozigotes GG (higher capacity of producing of IL-10) were compared with those who have the A-allele (GA and AA). Empirical antibiotic therapy was performed according to the hospital guidelines. The statistical analysis was done using the Fisher and T-Student tests. The level of significance was set at p<0.05.

RESULTS: Seventy-eight patients were included (61 in ICU and 17 in general hospital ward). Only one patient received inadequate empirical antibiotic therapy. The onset of the empirical antibiotic therapy was at a median of 6 hours (interquartile range of 5) since the admission to the hospital. The sepsis sources were: Abdomen (29), lung (16), urinary tract (16), central nervous system (8) and others (9). The distribution according to the polymorphism was: 14 GG, 36 GA and 28 AA. The mortality was similar in both groups (14% vs 18%; p=0.99). The number of patients who developed septic shock was also similar (42% vs 38%; p=0.85), being the groups comparable according to age, APACHE II, SOFA at admission, appropriated empirical antibiotic therapy, sepsis source and underlying comorbidities. The worst SOFA was not different: 7±3.8 vs 7.2±4.9; p=0.556.

CONCLUSION: In our series, IL-10 polymorphism at -1082 of the promoting region does not seem to influence the outcome of patients admitted to the hospital for sepsis.
MULTIORGAN DYSFUNCTION STRATIFICATION IN A GENERAL ICU SETTING

Rafael Moreno 1, Martínez Rebollar M 1, Corcuera Romero R M 1, Morales K A 1, Llister Salvador V 1,1 Servicio de Medicina Intensiva, Hospital Universitari Sagrat Cor, Barcelona, Spain

INTRODUCTION: Organ dysfunction (OD) evaluation in a ICU setting, both when critical patients (CP) are admitted and discharged, and according to OD is acute or chronic, and its evolution to failure o no.

METHODS: Setting: Medical / Surgical ICU belonging to a 400 acute care teaching hospital. Study: Between September 16-03 and February 29-04, the data of 304 CP admitted consecutively OD was previous.

RESULTS: CP with 1 or > OD (admission): 212 (69.70 %). Mean age: 70.00. Gender: men (191), women (113). Length of stay: 4.37 d. (greatest: 35 d.). Mortality: 7.61 %. Critical CP: 216 (71.5 %). Ventilated CP: 85 (28 %). SOFA: Admission: 2.09, discharge: 2.67. Acute Physiology: admission: 49 (16.11 %); discharge: 15 (4.93 %). Admission OD: 0/98 CP, 1/98 CP, 2/59 CP, 3/36 CP, 4/9 CP, 5/2 CP, 6/2 CP, 7/0). Discharge OD: 0/13 CP, 1/124 CP, 2/13 CP, 3/21 CP, 4/1 CP, 5/3 CP, 6/1 CP, 7/0)

CONCLUSION: Respiratory and renal are the highest acute and chronic OD, respectively, although SOFA is not an optimal tool for identifying cardiovascular chronic OD. The percentage of OD changing to OF is not describable. The quantity of OD most frequent (admission) is ‘1’, and then ‘2’ and ‘3’, in regard to discharge the sequence is ‘1’, ‘3’, and ‘2’.

OUTCOME OF PATIENTS SUFFERING FROM HEAT STROKE DURING THE 2003 FRENCH HEAT WAVE

Rodriguez P O 1, Albouh J 1, Lellosuche F 1, Brochard L 1, Brun BILLARD C 1
2Réanimation Médicale, Hôpital Henri Mondor, Créteil, France

INTRODUCTION: Heat stroke affects people exposed to high environmental temperature leading sometimes to a multiple organ dysfunction syndrome (MODS). During the heat wave in Europe of august 2003, many patients required intensive care unit (ICU) admission. We evaluated clinical variables and outcome of patients admitted for heat stroke in a French ICU.

METHODS: Retrospective chart review of 16 patients admitted for heat stroke in august 2003. Quantitative variables were expressed as median (range). Qualitative variables were compared using chi-square test.

RESULTS: Age, SAPS, APACHE II, SOFA, and ORS were higher in survivors than nonsurvivors. The male patients were prevalent in survivors (66.66% NS, 69.70% S). Among etiological factors, alcohol was prevalent in nonsurvivors (33.3% vs. 24.24% in survivors) and gallstones were of the similar percentage in both groups (28.57% NS vs. 27.27% S). Concerning parameters of the intensity of acute physiology disturbance on admittance, the major difference between survivors and nonsurvivors was the arterial pH values, and glucose level. The arterial pH <7.2 was found in 80.95% nonsurvivors and it was 30.30% in survivor group. In addition, the striking difference in serum glucose was found between the two groups. In the first three days glucose >15 mmol/l was present in 66.19% nonsurvivors, compared to 27.27% in survivors.

CONCLUSION: The mortality rate in our group of patients with acute pancreatitis was high because of early presentation in ICU, or very progressive course of local and systemic process.

SEVERE SEPSIS AFTER HAEMATOPOIETIC STEM CELL TRANSPLANTATION

Kim S 1, Honda G 1, Onishi Y 1, Hiraga K 2, Takae Y 1
1Hematopoietic Stem Cell Transplantation Unit, 2Anaesthesiology, National Cancer Center Hospital, Tokyo, Japan

INTRODUCTION: Severe sepsis remains a major contributor to mortality in patients following haematopoietic stem cell transplantation (HSCT). Most physicians believed that the immunosuppressive state, such as graft-versus-host disease (GVHD) and administration of immunosuppressants, results in sepsis easily. However, little is known about the clinical manifestations and complications in septic patients received HSCT. Therefore, we investigated the characteristics of HSCT patients with severe sepsis.

METHODS: OF 390 patients who received HSCT between January 1999 and August 2003, 26 (6.7%) were diagnosed as severe sepsis. Based on the complete clinical data obtained from the patients’ records, we investigated their characteristics and determined their scores, such as APACHE II, SOFA, and Goss.

RESULTS: The mortality of HSCT in all 26 cases with severe sepsis (median age 52.5 years, 23-67, high risk leukemia 24, others 2) was allogeneic stem cell transplantation. Nine patients were diagnosed as blood stream infection (Pseudomonas aeruginosa 3, MRSA 3, others 3). Whole cases with severe sepsis had septic shock. The median day of diagnosis of sepsis was 32.5 days after HSCT (0-366). Fifteen septic recipients with ARDS required mechanical ventilation support and 35 patients (64.81%) were ventilatory supported, while haemodyalysis was necessary in 9 (16.66%). Antibiotic (Imipenem) was introduced in the presence of CRP >210mg/l, or at the end of the first week in ICU. The surgical treatment (debridement) was performed in 44 (81.48%) patients (22 zipt technique) and 11 (20.37%) of them were reoperated because of intraabdominal hemorrhage, erosive gastritis, or bowel perforation.

RESULTS: The overall mortality rate in our patients with acute pancreatitis was 25.6%, while it was 38.9% in those with the severe form. The mean age in the survivor group was 47.8±21 and 51±17 in nonsurvivors. The male patients were prevalent in both groups (66.66% NS, 69.70% S). Among etiological factors, alcohol was prevalent in nonsurvivors (33.3% vs. 24.24% in survivors) and gallstones were of the similar percentage in both groups (28.57% NS vs. 27.27% S). Concerning parameters of the intensity of acute physiology disturbance on admittance, the major difference between survivors and nonsurvivors was the arterial pH values, and glucose level. The arterial pH <7.2 was found in 80.95% nonsurvivors and it was 30.30% in survivor group. In addition, the striking difference in serum glucose was found between the two groups. In the first three days glucose >15 mmol/l was present in 66.19% nonsurvivors, compared to 27.27% in survivors.

CONCLUSION: The mortality rate in our group of patients with acute pancreatitis was high because of early presentation in ICU, or very progressive course of local and systemic process.
METHODS: The study was performed in a medical-surgical 13-bed ICU based on a 380-bed university hospital of tertiary level, between January and September/2003. All consecutive cases of SS according to ACCP/SCCM was included. The variables evaluated were: age, sex, APACHE II and SOFA score at ICU admission, heart rate (HR) and mean arterial pressure (MAP) at SS diagnosis, ICU and hospital mortality. During a period of seven days, levels of C-reactive protein (CRP), troponin 1 (Tni), mixed venous O2 saturation (SvO2) and lactate were measured, and results expressed comparing the findings of survivors (SV) and non-survivors (NSV). Statistical analysis was performed with the SPSS 10.0 software package, using the t test, Mann-Whitney and chi-square where applicable. A p level of 0.05 was considered significant.

RESULTS: In a total of 100 patients evaluated, the mean age was 58.3 ± 17.8 and 51% were male. Mean APACHE II and SOFA scores were 24 ± 7.9 and 9.0 ± 3.6. Mean HR and MAP was 105.6 ± 26.4 and 57.6 ± 19.9. The HR in SV was 98 ± 21.6 and in NSV 109.2 ± 27.8 (p = 0.05). There were no significant differences between MAP of SV and NSS (58.8 ± 15.3 and 56.9 ± 21.8; p = 0.05). CRP levels were similar in SV and NSS (17.1 ± 8.7 vs 17.0 ± 9.7; p = 0.05) and higher levels of Tni were observed in NSV than in SV (2.4 ± 4.1 and 2.1 ± 6.9; p =0.03). There were no differences among SV and NSV regarding mean So2 (72.9 ± 5.0 and 71.5 ± 7.9; p = 0.05) and lactate levels were higher in NSV than in SV (3.4 ± 3.6 vs 1.4 ± 0.7; p =0.01). ICU and hospital mortality were 67% and 73%, respectively.

CONCLUSION: Our results reflect the reality of patients with septic shock in a Brazilian ICU.

As far as we are aware, this is the first publication depicting detailed information of this subgroup of patients in our country. We hope this initiative may bring insights in the care of such patients as well as new local data, which is very important for improving strategies toward reducing mortality in septic shock.

163 EVOLUTION OF THE MORTALITY AND OF THE ORGAN FAILURE OF SEVERE SEPSIS, AN SPANISH MULTICENTER STUDY

Muriel A1, Blanco J1, Mayo A1, Valladolid M1, Cortina J1, Alvarez T1, De Frutos M1, Guerra J1
1M. Intensiva, H. U. Rio Hortega, 2Dpto. de Estadistica, U. de Valladolid, Valladolid, 3M. Intensiva, H. San Agustín, Áviles, 4M. Intensiva, H. General, Segovia, 5M. Intensiva, H. Virgen de la Concha, Zamora, 6M. Intensiva, H. General. Vagui, Burgos, 7M. Intensiva, H. de Cabudreses, Gijón, Spain

INTRODUCTION: Physiologic evaluation systems like SOFA have been employed in the evaluation of patients affected of severe sepsis. There are no data available about the characteristics of the organ failure and the temporal evolution of the mortality in this kind of patients in the Spanish ICUs. OBJECTIVES: 1. To know the evolution of the organs failure through the sequential calculation of the SOFA value in a cohort of non-cardiologic patients admitted to the ICU and diagnosed of severe sepsis. 2. To know the early mortality (48 hours) and the temporal evolution of this mortality in these patients.

METHODS: Prospective, observational, multicenter, cohort study, carried out in 14 ICUs of 13 hospitals in Spain during a six months period of 2002. Infection, SIRS, sepsis and severe sepsis were defined according to the consensus ACCP of 1992 [1]. 311 septic patients were included. Among those 324 episodes of severe sepsis were diagnosed (7 patients with 2 episodes and 3 patients with 3 episodes of acute sepsis during the stay in the ICU). The death date (if happened) and the location of the patient in this moment were recorded. The progression (trend) of organ failure was evaluated through the sequential calculation of the SOFA score in survivors and non-survivors on days 1, 3, 7, 11 and 15 from the diagnosis. Both trends were compared through the standardized area under the curve (SAUC) of survivors and non-survivors. The results are expressed as means, absolute numbers or percentage as adequate.

RESULTS: The ICU and hospital mortality rate was 48.2% and 54.3% respectively. Among non-survivors, the time course of death was as follows: 7.7% died on the day of diagnosis (day 0), 27.2% died on the day 2, and 70.4% died on day 15. The SOFA mean score in survivors was 8.1 on day 1; 6.9 on day 3; 5.8 on day 7; 4.8 on day 11 and 4.2 on day 15. The SOFA mean score in non-survivors was 11.0 on day 1; 10.4 on day 3; 9.7 on day 7; 9.3 on day 11 and 9.7 on day 15. The SAUC in survivors was 5.78 (SE=0.49) and in non-survivors 9.92 (SE=0.30) (p=0.001), with a 95% confidence interval for the difference in the SAUC of (2.95:5.28).

CONCLUSION: 1. The area under the curve of the temporal trend of SOFA score was significantly higher in non-survivors than in survivors. The early mortality was high; more than a quarter of the non-survivors had died by 48 hours after diagnosis.

REFERENCE: [1] Bone RC et al, Chest 1992; 101: 1644-55.

164 SEPTIC SHOCK OUTCOMES IN A TERTIARY LEVEL UNIVERSITY-HOSPITAL ICU IN SOUTH BRAZIL

Craig R1, Beale R1, Reinhart K2, Silva E3, Dobb G7, Sarwat S1, Vincent JL5
1Specialty Care, Lilly. India, United States, 2Intensive Care, Guy’s St. Thomas’ Hospital, London, United Kingdom, 3Specialty Care, Universitatsklinikum Jena, Jena, Germany, 4Intensive Care, Hospital Israelita Albert Einstein, Sao Paulo, Brazil, 5Intensive Care, Royal Perth Hospital, Perth, Australia, 6Intensive Care, Erasme Univ Hospital, Brussels, Belgium

INTRODUCTION: PROGRESS is a prospective, contemporary, observational study which was designed to provide a representative, contemporary description of severe sepsis worldwide. Better information on the global epidemiology of severe sepsis and the use of proven therapies and approaches for severe sepsis can help improve the treatment and survival of patients with severe sepsis. We compare ICU mortality and length of stay (LOS) and baseline disease severity across 5 of the highest enrolling countries to date in PROGRESS.

METHODS: Participating in PROGRESS are 14 ICUs of 13 hospitals in Spain during a six months period of 2002. The incidence of the severe sepsis in the Spanish ICUs was 12.37%, similar to the data reported for other countries. 2 At diagnosis 3 out of 4 patients already show failure of two or more organs. 3 A high mortality rate (1 out of 2 patients diagnosed of severe sepsis died) was recorded, higher than that published in recent international multicenter studies [2].

REFERENCES: [1] Bone RC et al, Chest 1992; 101: 1644-55. [2] PROGRESS Study Group, N Engl Med 2001; 344: 699-709.
166

PROGRESS SEVERE SEPSIS REGISTRY DATA INDICATES MORTALITY FROM SEVERE SEPSIS REMAINS HIGH

Beale R1, Reinhart K2, Garg R1, Silva E1, Dobb G1, Sarwat S1, Vincent J L3

1Intensive Care, Guy’s St Thomas’ Hospital, London, United Kingdom, 2Critical Care, University Medical Center Hamburg-Eppendorf, Hamburg, Germany, 3Intensive Care, Erasme Hospital, Brussels, Belgium

INTRODUCTION: The software development and website maintenance was funded by Eli Lilly. Prognosis and outcome are entered in an online case report form. All data handling is by secure website and all patient data are de-identified. Individual ICUs are able to compare their local baseline characteristics and outcomes to the aggregate results of other participants in the registry. An independent advisory committee with professional society representation governs PROGRESS, including oversight of data quality, access, and analysis.

RESULTS: As of April 1, 2004, PROGRESS has enrolled 4387 severe sepsis patients from 189 ICUs in 32 countries. Current enrollment rate is approximately 745 patients/month. The majority of patients [59.4% (95% CI, 58.0-60.9)] are male and the mean age is 59.1±18.8 years. The majority of the patients are Caucasian [52.6% (95% CI, 51.1-54.1)] and 63.2% are medical patients. Most patients (70.9%) were admitted to the hospital on an ICU or critical care unit. The most frequent septic complications were respiratory infection [83.4% (95% CI, 82.9-84.0)] and sepsis-induced organ dysfunction [82.9%]. The median time from first sepsis-related symptom to hospital admission was 37.3 (20.1-56.5) hours. The most frequent source of infection was respiratory [50.5% (95% CI, 48.5-52.5)]. The most frequent causative microorganism were Escherichia coli (23.5%), Staphylococcus aureus (9.2%), and the unique

167

OUTCOME OF EARLY, LATE, AND RECURRENT SHOCK IN THE ICU: RESULTS OF THE SOAP STUDY

Bruhnken F1, Sake Y1, Vincent JL2, Reinhart K1, Payan D3, Gerlach H1, Moreno R1, Sprung C3, Ranieri VM4, On behalf of the SOAP investigators 5

1Department of Anesthesiology and Intensive Care, Friedrich Schiller University Hospital, Jena, Germany, 2Department of Intensive Care, Erasme Hospital, Free University of Brussels, Brussels, Belgium

INTRODUCTION: We investigated possible differences in outcome of shock, according to the time of onset, in a large European multicenter study.

METHODS: This cohort, multicenter, observational study, included all adult patients admitted to the participating centers between May 1 and May 15, 2002. Shock was defined as a cardiovascular SOFA >2. Early and late shock were defined as onset of shock within the first 2 days or later, respectively. If more than one episode of shock occurred in a patient, the time of onset of the first episode was considered for the classification of early or late onset. Recurrent shock was defined as one or more episodes of shock with at least 24 hours free of vasopressor episodes between episodes. Patients were followed up until death, hospital discharge, or for 60 days.

RESULTS: Of 3147 patients, 1058 (33.6%) of whom 61.4% were male, had shock at any time; 462 (14.7%) had septic shock. Of 1058 patients with shock due to any cause, 119 (11.2%) had a recurrent episode of shock, mostly a single episode (81.5%). The first recurrent episode occurred within a median of 3 [1-7] days. Recurrent shock occurred more in septic (n=92) than in non septic shock (n=27), and after early (n=105) rather than late-onset shock (n=14). ICU and hospital mortality rates were similar in patients with recurrent shock compared to those without recurrent shock due to any cause (42.0% vs. 37.8% and 49.3% vs. 47.8%), septic shock (43.5% vs. 48.4% and 49.6% vs. 43.9%), and nonseptic shock (37.0% vs. 30.9% and 48.1% vs. 36.7%). However, patients with late-onset or recurrent shock pooled together had significantly higher ICU and hospital mortality rates (47.1% vs. 36.1% and 52.9% vs. 42.6%, p<0.01) compared with patients with a single episode of early shock. ICU and hospital mortality rates were increased in late shock (52.4% vs. 36.8, and 55.3% vs. 43 %, respectively). In multivariate analysis, late shock was associated with an independent risk of higher ICU mortality in shock patients (odds ratio; 2.6, 95% confidence interval; 1.6-4.3, p<0.001).

CONCLUSION: In this observational study, late, but not recurrent shock, was associated with a worse prognosis and a higher independent risk of ICU death compared to early shock.

Grant acknowledgement: The study is endorsed by the European Society of Intensive Care Medicine, and supported by an unlimited grant from Abbott, Baxter, Eli Lilly, GlaxoSmithKline and NovoNordisk

168

PREDICTORS OF MORTALITY IN ICU-BACTEREMIC PATIENTS WITH SEPTIC SHOCK

Zaragoza R1, Artero A2, Sancho S1, Camarena J3, Navarro J3, Nogueira J3

1Intensive care Unit, 2Internal medicine, 3Microbiology, Hospital Universitario Dr. Peset, Valencia, Spain

INTRODUCTION: The mortality of septic shock (SS) in most centers remains unacceptably high. Probably bacteremia associated with septic shock could be the most serious infection among critically ill patients. The aims of this study were to determine the prevalence of SS in ICU bacteremic-patients, to describe the main clinical and laboratory characteristics of such patients, to know their outcome and to determine the factors independently associated to global and related mortality to bacteremia in critically ill patients with SS.

METHODS: During a eight years and a half study period, from 1995 to 2003, 276 clinical significant bacteremia of a teaching hospital were prospectively evaluated, especially those associated with SS which was defined as hypotension not reversed with fluid resuscitation and associated with organ dysfunction or hypoperfusion abnormalities. Clinical and microbiological variables were recorded. A multivariate analysis was performed to define the risk factors associated to global and related mortality to ICU-bacteremia with septic shock using SPSS package (9.0).

RESULTS: Among 276 episodes of bacteremia, SS was present in 30.76% (n = 85). The age of these patients was 63.5±14.8 and its mean APACHE II score was 19.0±8.1. 20±7.5 and 9.4±3.2 respectively. The incidence of adequate empirical antibiotic treatment was 29.4% in SS patients. The most frequent sources of bacteremia in ICU-bacteremic patients with SS were the respiratory focus (29.4%), and unknown (28.2%). Their principal aetiologies were: Escherichia coli (23.5%), Acinetobacter baumannii (16.4%), and Staphylococcus aureus (8.2%). Global mortality and the related mortality to bacteremia was 71.7% and 43.5% respectively. Multivariate analysis showed that Chronic Obstructive Pulmonary disease (OR 2.6, 95% CI 1.04-1.31), the isolation of Staphylococcus aureus (OR 4.3: 95% CI 3.585-55), and Inadequate empirical antibiotic treatment (OR: 7.2 : 95% CI 1.3-3.81) were independent predictors of related mortality to ICU-bacteremia associated with SS.

CONCLUSION: Nowadays the frequency and mortality rates of ICU-Bacteremic patients with SS remain excessively high. COPD, SOFA score and nosocomial origin of the bacteremia must be considered predictors of global mortality in these patients. Staphylococcus aureus is the unique microorganism independently associated to related mortality to bacteremia in this study. Avoiding inappropriate empirical antimicrobial treatment is mandatory to improve the prognosis of ICU-bacteremia associated to SS.

Poster Sessions
Perioperative I – 169-182

169

CONTINUOUS PERIOPERATIVE LUNG VOLUME MONITORING BY ELECTRIC IMPEDANCE TOMOGRAPHY IN OBESE PATIENTS

Erlendsson K1, Ödestedh H2, Söndergaard S1, Lundin S1, Stenqvist O1

1Anesthesia and Intensive Care, Sahlgrenska University Hospital, Gothenburg, Sweden

INTRODUCTION: In order to optimize ventilation induced lung volume changes the clinical relevant method of EIT we challenged the method by studying lung impedance changes in severely obese patients.

METHODS: 8 patients weighing 102-178 kg (BMI 36-67) were studied during anesthesia for laparoscopic gastropasty. Before induction, 16 electrodes were placed around the thorax to monitor impedance (Z) changes (DragerGOE MFH). Calibration against volume was made using nitrogen wash-in/wash-out method after induction and before emergence of anesthesia. Measurements of global impedance changes were made during spontaneous and CPAP breathing with the patient awake, during induction of anesthesia, intubation and mechanical ventilation with volume controlled ventilation, TV 8 ml/kg ideal body weight and different PEEP levels; 10-20 cmH2O. Lung recruitment and derecruitment were assessed by monitoring the slope of baseline impedance changes over time. Measurements were discontinued during the surgical procedure.

RESULTS: Measurements of impedance changes were possible in these patients. Impedance changes closely followed changes in TV (R2 >0.95) even over periods of several hours, while baseline drift could occur during prolonged measurements. As shown in Fig 1 monitoring of lung volume changes by EIT could be used to determine PEEP levels associated with lung recruitment, derecruitment or stable endexpiratory lung volume.

CONCLUSION: EIT monitoring enables rapid assessment of changes in lung volume in severely obese patients in the perioperative period. Monitoring is not possible during electro-cautery. Baseline drift may demand calibration versus conventional FRC measurements at intervals.

REFERENCE(S): Harris et al Clin Phys Physiol Meas 1987;8(Suppl A):155-165
RESULTS: We performed ICG-DT in 15 patients. After calibration and injection of ICG at zero time (t0), we continuously withdrew arterial blood from the 2nd to the 7th minute and measured the specific extinction within the whole blood every 10 seconds. To extrapolate back to the extinction at t0 and, thus, to PV, two different approaches were compared using: i) 16 measuring points (every 10 seconds) between minutes 2 and 4.5 (method i, 1, 2, 3), ii) 5 measuring points (every minute) between the 3rd and the 7th minute (method ii, 4). The derived theoretical blood concentration of ICG at t0 was denoted CB0. The plasma concentration of ICG at t0 (CP0) and PV were calculated according to CP0 = CB0/(1 - HbLV) and PV = D/CP0, respectively, where D is the amount of dye injected, and HbLV is the arterial hematocrit.

RESULTS: Use of method i resulted in a PV of 3048 ± 528 ml. With method ii, PV was overestimated by 124% (PV = 3399 ± 587 ml). The mean difference between the PV values obtained by method i vs. ii was 350 ± 130 ml (t = 0.05).

CONCLUSION: The decrease in the specific extinction (after complete mixture) is only linear up to the 5th minute after dye injection, a slowing of the elimination of ICG can frequently be observed after the 5th minute post injection. This often leads to an overestimation of PV if there are only a few measuring points between minutes 3 to 7 (6) or even to 11 (4) after dye injection, because the two kinetics cannot be recognized. As the transcapillary escape rate of albumin within the time necessary for measuring PV (5 min) normally is less than 1% (7), this cannot lead to a considerable overestimation of PV. In order to calculate the initial distribution space of ICG, the first linear kinetic of ICG disappearance has to be taken for extrapolation (1, 2, 3). The best time interval for determining PV is between the 2nd and the 5th minute after dye injection with as many measuring points as possible.

REFERENCES: 1. Rehm M et al., Infusionsther Transfusionsmed 1998 (25): 222-28 - 2. Rehm M et al., Anesthesiology 2000 (92): 657-64 - 3. Jacob M et al., Anaesthesist 2003 (52): 896-904 - 4. Ishihara H et al., Anesth Analg 2002 (94): 781-6 - 5. Jones JH et al., Br J Anaesth 2000 (84): 226-35 - 6. Mi WD et al., Anaesth Analg 2003 (97): 1421-7 - 7. Fleck A et al., Lancet 1985 (1): 781-3.
174 EARLIER DISCHARGE FROM ICU WITH REMIFENTANIL/ PROPOFOL VERSUS FENTANYL/MIDAZOLAM

Matthys T1, Schill M2, Muelerlaus B1
1Department of Anaesthesiology and Intensive Care Medicine, Heart Centre Mecklenburg-Vorpommern, Karlburg, 2Medical Department, GlaxoSmithKline, Munich, Germany

INTRODUCTION: Remifentanil is an opioid with a unique pharmacokinetic profile. Its organ-independent elimination and context-sensitive half time of 3 to 4 minutes leads to a highly predictable offset of action. We tested the hypothesis that an anaesthesia-based sedation with remifentanil (R) and propofol (P) shortens the time in the ICU after cardiac surgery compared with a conventional regimen for anaesthesia and sedation using fentanyl (F) and midazolam (M).

METHODS: In this open, prospective, randomized, single-centre study a total of 80 patients (18-75 yr), who had undergone cardiac surgery, were postoperatively assigned to one of two treatment regimens for anaesthesia/sedation in the ICU for up to 72 hours. Anaesthesia for cardiac surgery was performed in both groups according to routine practice with remifentanil, propofol, clonidine and cisatracurium. After arrival in the ICU, patients in the R/P group received remifentanil, titrated to effect (0.1- max. 1.0 μg/kg/min). In the case of insufficient sedation at maximal remifentanil dose, propofol was supplemented (bolus 0.3-1.0 mg/kg and/or infusion 0.5-4.0 mg/kg/h). Patients in the F/M group received fentanyl (bolus 1.0-2.0 μg/kg, infusion 0.7-7.0 μg/kg/h) and midazolam (bolus 0.030-0.2 mg/kg; infusion 0.020-0.2 mg/kg/h), both titrated to effect. Sedation and mechanical ventilatory assistance was maintained in both groups for a minimum of 12 hours.

When weaning was started, all infusions were stopped and patients in the R/P group received a bolus of morphine (0.1-0.3 mg/kg). For treatment of pain after extubation, both groups received morphine (bolus 0.1-0.3 mg/kg) and/or other analgesics.

RESULTS: The following time intervals (mean values ± SD) were shorter (p<0.05) in the R/P group compared with the F/M group: Time from arrival at ICU until fulfilling the criteria for discharge from ICU (46h 03min ± 22h 06min vs. 62h 26min ± 27h 10min, primary end point); Time from arrival at ICU until discharge from ICU (46h 21min ± 24h 55min vs. 64h 99min ± 29h 16min); Time from arrival at ICU until extubation (24h 41min ± 5h 13min vs. 24h 12min ± 7h 02min).

CONCLUSION: Compared with fentanyl/midazolam, an analgesia-based sedation with propofol significantly reduced the time on mechanical ventilation and allowed earlier discharge from ICU.

Grant acknowledgement: This study was supported by GlaxoSmithKline, Germany.

175 RISK STRATIFICATION IN CORONARY SURGERY: COMPARISON OF FOUR SCORES

Durand M1, Tessier Gontier-Maurin Y1, Bouzat P1, Ruinez O1, Mounier R1, Girardet P1
1Anesthesie, CHU de Grenoble, Grenoble, France

INTRODUCTION: Risk stratification is an essential tool for cardiac surgery. Several risk scores were describe. The aim of the present study was to compare 3 additive models, the Parsonnet score [1], the Tu score [2], the EuroSCORE [3] and the logistic version of the EuroSCORE [4].

METHODS: 2089 consecutive coronary artery patients were retrospectively studied from our prospective database. The different scores were calculated as described by the authors in the original study. The main end point was mortality, defined as in-hospital death occurring during hospitalisation. ROC curves to predict mortality were calculated for each scores.

RESULTS: Mean age was 65 ± 10, 18,7% were female and EF was 59 ± 15 %. The mortality rate was 32e. The mean values of the different scores were 3.92 for the additive EuroSCORE, 3.93 for the logistic model, 8.86 for the Parsonnet and 2.14 for the Tu Mortality increased significantly with the 4 different models. The area under ROC curve was 0.85 for the additive EuroSCORE, 0.84 for the Tu score and 0.69 for the Parsonnet score.

CONCLUSION: Among the different scores, the EuroSCORE had the highest predictive value. Anyhow, the logistic EuroSCORE did not significantly improve the predictive value in low risk patients. Parsonnet score over predict the risk of mortality. It was probably because the Parsonnet score is now 16 years old.

REFERENCES: 1 Parsonnet V, Circulation, 1989;79(suppl I):I-412
2 Tu JV, Circulation 1995; 91:677-84
3 Nashel SAM, Eur J Cardiothoracic Surg 1999;16:9-13
4 Roques F. Eur Heart J 2003; 24:881-2.

176 VITAMIN D3: AN ELEMENT OF BODY RESPONSE TO SURGERY

Tognoli E1, Aliberti G2, Brunetti B1, Santanu R1, Velarde L1, Paolillo G1
1Dept. of Anaesthesiology, H. San Giuseppe dei Fatebenefratelli, Milan, Italy

INTRODUCTION: Vitamin D3 (Vit.D) is best known for its role in calcium homeostasis. Recently, the discovery of Vitamin D receptors in new different cell lines suggests a more complex biological role(1). It promotes differentiation of monocytes towards macrophage phenotype, increases macrophages survival and antimicrobial function. It also regulates the functions of keratinocytes and colonic epithelial cells. These cells are involved in tissue repair process. Aim of this study is to verify Vit.D involvement in body response to surgical trauma by measuring serum levels of its active form 1-25(OH)2Vit.D and of its precursor 25(OH)Vit.D before and after gastrointestinal-tract surgery.

METHODS: We studied twenty-five consecutive patients undergoing elective gastrointestinal-tract surgery for cancer. For each patient we reported surgery type and length, need of blood transfusion and complications. Serum 25(OH)Vit.D and 1-25(OH)2Vit.D levels were measured before surgery (D0), on 1st day (D1) and 5th day (D5) after surgery together with C-Reactive Protein (CRP) and serum calcium. Data are expressed as median(25%-75%percentiles), statistical analysis were performed by SigmaStat.

RESULTS: In study population type of surgery has been: 17 emicoleotomy, 4 gastrectomy, 2 resection and 2 esophagectomy; surgery lasted 230±40 min.; blood transfusion was given only to two patients after surgery; any complication was registered. Vit.D serum levels are presented in table 1. after surgery we have observed a significant reduction both in 25(OH)2Vit.D (Friedman RM-ANOVA on Ranks p<0.001; Student-Newman-Keuls Method: D1 vs. D5 p<0.05) and in 1-25(OH)2Vit.D (F.RM-ANOVA on Ranks p<0.001; S-N-K Method: D0 vs. D1 vs. D5 p<0.05). Calcium serum levels were reduced too (F.RM-ANOVA on Ranks p<0.013). Post-operative reduction of 25(OH)Vit.D (% of basal levels) is more marked in 17 patients who presented in 1st day after surgery a CPR value higher than 12mg/dL (-60%±25 vs -37%±18, ANOVA p=0.037); CPR 12mg/dL is the median value in our population.

CONCLUSION: Our results indicate that extensive surgical trauma, as in gastrointestinal-tract surgery, is associated to a significant reduction in Vit.D serum levels. Reduction of 25(OH)2Vit.D after surgery may be related to an increased synthesis of 1-25(OH)2Vit.D perhaps due to cells of innate immunity and particulary to macrophages that are the principal extra-renal source of 1-25(OH)2Vit.D (see relationship between PCR and 25(OH)Vit.D serum levels). Vit.D target cells can degrade 1-25(OH)2Vit.D to inactive forms. Our results support further study to better define Vit.D role in body response to surgery.

REFERENCE: 1 Physiol. reviews, 1998, 78(4): 1193-1231.

177 PERIPHERAL INSERTED CENTRAL VENOUS CATHETERS (PICC) FOR INTENSIVE CARE PATIENTS

Saager L1, Wiesner E2, Pestel G1, Rothhammer A1
1Institut für Anästhesiologie und Intensivmedizin, Leopoldina Krankenhaus, Schweinfurt, Germany, 2Dept. of Anesthesiology, Washington University School of Medicine, St. Louis, United States

INTRODUCTION: Recent studies about central venous catheters (CVC) mainly focus on central insertion complications. Each way of access has insertion-related and post-insertion complications, sometimes with great impact on intensive care patients. Peripheral insertion of CVC’s via basilic, or cephalic vein seems to attract far less attention. Goal of our study was to analyse the technique of peripheral placement of CVC’s on our intensive care unit (ICU).

METHODS: All central venous catheters placed on our 16-bed operative ICU during the year 2002 were included in this study. Placement of a CVC was documented on a separate record and data was completed during daily CVC-visits. We strived for peripheral placement of the catheters if medical reasons required no specific insertion site. Correct placement was verified via arterial EKG.

RESULTS: A total of 449 CVC placements could be included in our study. Tab. 1 shows the rates (71.3%) catheters could be placed via peripheral veins. In 84.2% (n=378) the first attempt of access was already successful. Correct placement of PICC’s could be verified by arterial EKG in 95.9% of cases. All catheters, nearly independently of site of insertion, were left in place for a mean of 7.9 ± 5.2 days. Due to daily catheter controls and immediately extraction of susceptible data was completed during daily CVC-visits. We strived for peripheral placement of the catheters if medical reasons required no specific insertion site. Correct placement was verified via arterial EKG.

REFERENCE(S): 1)N Engl J Med 2003;348:1123-33 2)JAMA 2001;286:700-7 3)Crit Care Med 2002;30:454-60 4)Chest 1986;90:707-9
INCIDENCE AND OUTCOME OF POSTOPERATIVE NEGATIVE PRESSURE PULMONARY EDEMA

Meinhardt J 1
1Department of Anesthesiology and Intensive Care, Universitätshospital Mannheim, Mannheim, Germany

INTRODUCTION: Postoperative negative pressure pulmonary edema (PNPE) is often observed after major surgery. The incidence of PNPE is variable and may be due to a combination of factors including prolonged ischemia-reperfusion time, rebleeding, and anterior mediastinal procedures. Our study aimed to determine the incidence of PNPE and to identify risk factors associated with this complication.

METHODS: A prospective observational study of postoperative PNPE was conducted in a medical ICU. All patients undergoing major surgery were included. PNPE was defined as a decrease in arterial oxygen saturation by 10% or more, associated with an increase in airway pressure of more than 5 cmH2O, and requiring reintubation. Risk factors were assessed using univariate and multivariate logistic regression analysis.

RESULTS: Of 100 patients enrolled, 20 (20%) developed PNPE. The mean time to PNPE was 24 hours postoperatively. Risk factors for PNPE included prolonged ischemia-reperfusion time, rebleeding, and anterior mediastinal procedures. The multivariate model showed that prolonged ischemia-reperfusion time and rebleeding were independently associated with PNPE.

CONCLUSION: PNPE is a serious complication that can prolong the ICU stay and increase morbidity and mortality. Identifying and preventing risk factors may help reduce the incidence of PNPE.

REFERENCE(S):

1. Fricke P, Weiß G, Lippert H (2002) Ischemia-/reperfusion syndrome - pathogenesis and prevention. Surgery. 2003;129:739-45.

PROGNOSTIC VALUE OF SERUM MYOglobin IN CRITICALLY ILL SURGICAL PATIENTs

Bütter M 1, Sakka S G 1
1Anesthesiology and Intensive Care Medicine, Friedrich - Schiller-University, Jena, Germany

INTRODUCTION: Serum myoglobin has been described as a marker of muscle damage due to trauma, ischemia, and reperfusion. In a retrospective study in 29 surgical patients, the prognostic value of serum myoglobin as a marker of organ failure has been evaluated.

METHODS: A prospective observational study of 1,796 patients was performed to evaluate the prognostic value of serum myoglobin. Serum myoglobin levels were measured within 24 hours after admission to the ICU. The primary outcome was patient mortality. The prognostic value was assessed using receiver operating characteristic (ROC) curves.

RESULTS: Serum myoglobin levels were significantly higher in patients who died compared to survivors. The area under the ROC curve for serum myoglobin was 0.8 - 159.550 µg/l, with a cut-off value of 705 µg/l. The comparison of AUC's for serum creatinin and serum creatin kinase was of higher prognostic value than serum creatinin. However, serum creatin kinase was of a lower prognostic value than serum myoglobin.

CONCLUSION: Serum myoglobin is a valuable biomarker for the early detection of organ failure in critically ill surgical patients. Its prognostic value is superior to that of serum creatinine and creatin kinase.

REFERENCE(S):

1. Fricke P, Weiß G, Lippert H (2002) Ischemia-/reperfusion syndrome - pathogenesis and prevention. Surgery. 2003;129:739-45.

APACHE II PREDICTS FREE FLAP FAILURE IN HEAD AND NECK CANCER PATIENTS ADMITTED TO CRITICAL CARE

Grant C A1, Dempsey G1, Rogers S N2, Magennis P1, Lowe D1
1Critical Care, 2Regional Maxillo-Facial Unit, University Hospital Aintree, Liverpool, United Kingdom

INTRODUCTION: The surgical treatment of head and neck cancer can be limited by the risk of postoperative complications. Early identification of risk factors based on clinical characteristics may assist therapeutic planning. We assessed the value of the APACHE II score in predicting free flap failure.

METHODS: A prospective observational study from January 1995 to December 2002 was evaluated using the APACHE II score. Preliminary data was available on 359 (77.9%) operations. The outcome measure was free flap failure within 72 hours. Chi squared test for linear trend was used to assess the association.

RESULTS: 12.3% (57/461) of operations had early surgical complications. Overall flap failure rate was 5.4% (25/461). Both the number of immediate (bleeding, haematoma, flap failure) and overall surgical complications (P=0.001) and flap failures (P=0.002) had a highly significant correlation with APACHE II scores.

REFERENCE(S):

1N. Pouliart, L. Huyghens. Critical Care 2002, 6(Suppl 1):P5
2Z. Balogh, Grant C A, Dempsey G, Rogers S N, Magennis P, Lowe D
3Wee G, Lippert H (2002) Ischemia-/reperfusion syndrome - pathogenesis and prevention. Surgery. 2003;129:739-45.
182 THE MATERNAL CEREBRAL CIRCULATION HAEMODYNAMICS IN PATIENTS WITH SEVERE PREECLAMPSIA
Shifman E M1, Goumeniouk E G1, Ivshin A A1
1Department of Obstetrics and Gynecology, Petrovaskodiv State University, Republican Perinatal Center, Ministry of Healthcare, Petrovaskodiv, Russian Federation
INTRODUCTION: Analysis of cerebral haemodynamics in pregnant patients with preeclampsia represents an area of special interest. Goal of the present study was to estimate and to compare values of cerebral haemodynamics in pregnancy, complicated by preeclampsia and in uncomplicated pregnancy.
METHODS: We designed and performed prospective study, which included 45 patients, age of 17 - 38 years (mean age 27.5 ± 5.3 years) with verified diagnosis of severe preeclampsia and 72 patients with normal pregnancy, 3rd trimester, without significant co-morbid states, age ranged from 19 to 34 years (mean age 24.5 ± 4.3 years) - this was a control group. All patients underwent duplex scan of extracranial portions of brachiocephalic arteries with linear probe, frequency 5 MHz and transcranial duplex scan (TCDs) in the area of middle cerebral artery (MCA) (segment M1) with sector probe, frequency 2.5. During TCDs we determined lumen of large basal arteries and quantitative features of blood flow in MCA. By transcranial presence in MCA M1 segment we determined peak systolic flow velocity (Vps), maximal end-diastolic velocity (Ved), time - adjusted maximal velocity (TAMX), resistance index (RI), pulsative index (PI), systolic/diastolic ratio (S/D). Significance of mean values differences were calculated with determination of Student t-criteria with normal spread in group, in that way itConfirmed by Kolmogorov-Smirnov and Lilliefors tests.
RESULTS: From the analysis of our data we could find the following: all haemodynamic values in M1 segment of MCA in preeclamptic patients were decreased in comparison with the same values in healthy pregnant women with different significance: PI (mean 0.77 vs. 0.84, p<0,01); RI (mean 0.52 vs. 0.54, p<0.05); Vps (mean 90,22 vs. 104.74 cm/sec, p<0.001); Ved (mean 43,25 vs. 48.53 cm/sec, p<0.001); TAMX (mean 61.48 vs. 67,30 cm/sec, p<0.001); S/D (mean 2.02 vs. 2.06, p<0.05). These pathophysiologic changes of cerebral haemodynamics were consistent with dopplerographic pattern of diminished perfusion and are typical for vascular segments, which are located proximally to the zone of abnormally high haemodynamic resistance: pre-stenotic arterial segments, episodes of arterial hypertension and distal vasoconstriction.
CONCLUSION: We concluded that results of the performed study showed that in severe preeclampsia patients had decreased cerebral perfusion.

184 A PROSPECTIVE COMPARATIVE STUDY OF THREE SETS OF CRITERIA FOR DISSEMINATED INTRAVASCULAR COAGULATION
Hayakawa M1, Hoshino H1, Gando S1
1Department of Anesthesiology and Critical Care Medicine, Hokkaido University Graduate School of Medicine, Sapporo, Japan
INTRODUCTION: Disseminated intravascular coagulation (DIC) compromises the blood supply to organs and is accompanied with hemorrhagic and metabolic derangements, contributes to the failure of multiple organs. Because DIC is often completely reversible when promptly and adequately treated, early recognition is important. In 1988, DIC Diagnostic Standards were published by the Japanese Ministry of Health and Welfare. The criteria have been widely used for more than 10 years in Japan. However, a good definition and scoring system for global use have remained unavailable. In 2001, clinical and laboratory criteria and a scoring system for DIC were published by the International Society on Thrombosis and Haemostasis. The ISTH established two sets of criteria: one set to diagnose a stressed but compensated hemostatic system (non-DIC), and another set to diagnose a stressed but decompensated hemostatic system (overt DIC). In order to establish the availability and predictive value of the ISTH criteria in patients with DIC, prospective validation of the scoring system is now underway. In the present study, we prospectively compared the three sets of DIC diagnostic criteria and investigated the relationship between each set of criteria and patient’s outcome.
METHODS: We studied 74 patients who were admitted to our general ICU between January 2002 and December 2002, who met the inclusion criteria of this study. Patients whose platelet counts had decreased by less than 150 x 10^9/L were included in this study. Daily DIC scores and sequential SOFA scores were recorded from days 0 to 4 after the patients met the inclusion criteria of the study. Twenty-eighth-day mortality was recorded.
RESULTS: The Japanese DIC included the overt DIC, and the both patients were included by the non-overt DIC. The Japanese DIC criteria diagnosed DIC earlier than the non-overt DIC criteria did (p = .020). The DIC patients diagnosed by the Japanese and the overt DIC criteria showed higher incidence of multiple organ failure than those without DIC (p = .013 and p = .022, respectively). The Japanese and the non-overt DIC criteria trend to predict the patients’ prognoses effectively.
CONCLUSION: The Japanese and the non-overt DIC criteria may be superior to the overt DIC criteria in DIC diagnostic sensitivity and outcome prediction. The results suggest the importance of the simultaneous application of the overt and the non-overt DIC criteria for DIC diagnosis.

Poster Sessions

185 IMPACT OF COMORBIDITIES ON THE OUTCOME OF CRITICALLY ILL CANCER PATIENTS
Soares M1, Spector N2, Saltih J1, Toscano L1, Rocco JR2
1Intensive Care Unit, Instituto Nacional de Cancer, 2University Hospital Clementino Fraga Filho, Federal University of Rio de Janeiro, Rio de Janeiro, Brazil
INTRODUCTION: Information regarding the influence of comorbidities on the outcome of cancer patients admitted to an intensive care unit (ICU) is limited. Our objectives were to describe the rate and pattern of comorbid conditions in these patients, and to evaluate their prognostic impact.
METHODS: During 45 months, data were prospectively collected from patients with cancer requiring ICU admission. Patients admitted for routine postoperative care were excluded. Comorbidities were assessed using the Charlson Age-Comorbidity Index (CACI).3 Cancer diagnoses were excluded from the original CACI and were studied as individual variables in order to allow the CACI to reflect the real effect of comorbid conditions. Variables selected in the univariate analysis (p<0.1) were entered in a logistic regression. In the multivariate analysis, results were expressed as odds ratio (confidence interval 95%). ICU mortality was the end-point of interest.
RESULTS: A total of 913 patients were studied. Their mean age was 58±16 years and 156 (17%) had hematological malignancies. Conventional mechanical ventilation was used in 557 (61%) patients and 439 (48%) had sepsis. The ICU and hospital mortality were 34% and 47%, respectively. At least one comorbid condition was identified in 521 (57%) patients. Median SAPS II was 42 (range=5-121). SOFA score was 6 (1-19) and CACI was 2 (0-9) points. The more frequent comorbid conditions were arterial hypertension (34%), diabetes mellitus (8%), chronic pulmonary obstructive disease (7%), coronary artery disease (6%) and chronic renal failure (5%). Variables selected in the multivariate analysis were: performance status 3-4 [OR=4.81 (2.2-9.9)]; controlled cancer [OR=0.60 (0.4-0.9)]; previous surgery with curative intent [OR=0.60 (0.4-0.9)]; conventional mechanical ventilation [OR=3.21 (2.4-9.2)]; SOFA score (each 1 point) [OR=2.18 (1.8-2.7)], and CACI (each point) [OR=1.31 (1-2.5)].
CONCLUSION: Elevated CACI scores were independently associated with an increased ICU mortality, in addition to acute organ dysfunction, poor performance status and cancer status. Detailed information about comorbidity should be included in the outcome evaluation of cancer patients in the ICU.
REFERENCE: [1] Charlson M et al. J Clin Epidmiol 1994;47:1245-51.

183 VALIDATION OF A VERY SIMPLE PROGNOSTIC ESTIMATION INDEX IN CRITICAL CARE PATIENTS
ABIZANDA R1, Padrón A2, Sánchez F3, Madero J1, Vidal B1, Reig R1, Belenguer A1, Ferrándiz A1
1ICU Department, Hospital Universitario Asociado General de Castelló, Castelló, Spain, 2ICU, Hospital Hermanos Armejeiras, La Habana, Cuba
REFERENCE: 1Electrónica), 2002, Vol. 1. Núm. 1
186

A BEDSIDE PREDICTIVE MODEL TO ASSESS HIV-PATIENT ICU OUTCOME THROUGH THE HAART ERA

Corona A1, Raimondi F1, Righi B1, Crippa S1, Castelli A1, Rech R1, Ferrari S1, Colombi R1, Della Porta V1
1Intensive Care Unit, Ospedale Luigi Sacco - Polo Universitario, Milano, Italy

INTRODUCTION: HAART (Highly Active Antiretroviral Therapy) has produced a significant decrease in mortality and morbidity from HIV infection. Whether this therapy resulted in changes in outcome in HIV-infected patients admitted to ICU is still controversial (1).

METHODS: We reviewed the clinical notes of HIV positive patients admitted to our ICU from 1996 through 2003. On each patient the following was collected (i) demographics, (age, ICU admission/discharge date) (ii) admission diagnosis (iii) 24 hours APACHE II score (iv) HIV infection epidemiological and clinical characteristics. A Logistic Regression Model was set up using using SPSS (SPSS inc. Chicago III) to estimate the effect of each considered risk factor on a death (yes/no) outcome for HIV patients. P values less than 0.05 were considered significant.

RESULTS: Over the study period, 101 (5.1%) HIV infected patients (76.5% males, 58.8% with AIDS), out of 2002 total admission, with a mean (SD) age of 43.1 (10.3) and a median (IQR) 1st 24 hour APACHE II score of 21(13.24), were admitted to our ICU. Being drug abuser was the main risk factor (51%), while respiratory failure (58.8%) the most frequent reason of ICU admission. Median ICU stay was 6 days (IQR 2-11), CD4+ value was 150/mm3 (IQR 30-400) and median viral load was 52.5x106 (IQR 1.1-207x106). Overall mortality was higher in HIV positive patients than in general population [40.2% vs 20.4% (p < 0.000)]. A Logistic Regression Model was performed, considering HIV-infected patient ICU outcome (dead/alive) as the categorical dependent variable and (i) presence of organ failure (kidney, liver, CNS, heart and respiratory system); (ii) taking HAART; (iii) CD4+ absolute value < or > 200/mm3; (iv) HIV status (presence or not of the Acquired Immunodeficiency Syndrome), as the independent ones. By such a model we found that taking HAART (p = 0.0002, OR = 147.95 95% CI 3.85-59) and not developing a liver failure (p = 0.002, OR = 7.95 95% CI 1.8-33.3) were predictive factors of positive outcome in HIV-infected ICU patients.

CONCLUSION: Although retrospectively collected, our data suggest that HIV-infected patients, taking HAART and not in liver failure, if admitted to ICU, have a significantly higher chance of survival than others. A prospective study is going to be started to validate such a predictive model.

REFERENCE: (1) Morris A, Creasman J, Turner J, Luce JM, Wachter RM, Huang L. Intensive care of human immunodeficiency virus-infected patients during the era of highly active antiretroviral therapy. Am J Respir Crit Care Med. 2002 Aug 1;166(3):262-7.

187

PERFORMANCE OF APACHE II, APACHE III AND SAPS II IN LOW MORTALITY ICU PATIENTS IN 9 SPANISH ICUS

Domínguez L A1, Enríquez P1, Blanco J1, De Frutos M2, Sagredo V3, Carriedo D4, Gandía F5, Domínguez A6
1Intensive Care Medicine, Hospital Río Hortega, Valladolid, 2Intensive Care Medicine, Hospital General Yague, Burgos, 3Intensive Care Medicine, Hospital Clínico Universitario, Salamanca, 4Intensive Care Medicine, Centro hospitalario de León, León, 5Intensive Care Medicine, Hospital Clínico Universitario, Valladolid, 6Intensive Care Medicine, Hospital Río Carrión, Palencia, Spain

INTRODUCTION: Some doubts remain about the ability of prognostic models to evaluate performance in low mortality risk patients admitted in Intensive Care Unit (ICU).

METHODS: The objective of our study was to evaluate the performance of APACHE II, APACHE III customized for Spain and SAPS II in low mortality risk patients admitted in 9 Spanish ICUs. Patients were consecutively admitted from November 1999 to March 2000. Patients under age of 16, patients with ICU stay less than 24 hours, patients admitted for scheduled pacemaker implantation and patients admitted in ICU during the same hospital stay were excluded. Coronary patients were included. For the study of performance of low risk mortality patients, coronary patients were selected using the list of diagnosis of APACHE III model. General characteristics of patients, patient status and cause of ICU admission were evaluated according to the outcome in the ICU. The Acute Physiology and Chronic Health Evaluation (APACHE II)-score, Multiple Organ Dysfunction Score (MODS) and the Sequential Organ Failure Assessment (SOFA) score were well evaluated to predict the risk in ICU patients. The objective of the present study was to find parameters or simple combinations of parameters with predictive value at the beginning of the ICU stay.

RESULTS: Of 2677 patients included, 2473 (92.4%) had complete data for ultimate discharge from an acute hospital and readmissions to the critical care unit during the same hospital stay were excluded. Seven of the nine modified Glasgow criteria 1-3 have been devised to predict outcome but these are largely historical and based on small numbers of patients. We used physiological data from 2677 patients admitted to UK critical care units with a primary reason for admission of pancreatitis 2-5 to determine which variables are the best predictors of a poor outcome.

METHODS: Patients admitted to 159 adult, general critical care units in England, Wales and Northern Ireland between December 1995 and June 2003 with a primary reason for admission to the critical care unit recorded as pancreatitis to determine which variables are the best predictors of a poor outcome.

RESULTS: Of 2677 admissions with pancreatitis, 2473 (92.4%) had complete data for ultimate hospital mortality and were not readmissions of patients previously admitted during the same hospital stay. Mortality increased with the presence of an increasing number of modified Glasgow criteria, however a number of individual physiological measurements and the APACHE II score presented an area under the ROC curve of 0.671 and 0.67, respectively. Nonlinear regression analysis showed a strong relationship between outcome in ICU and mortality (r=0.99). For mortality values higher than 322 mosmol/kg the estimated probability of death in the ICU exceeds 50%.

CONCLUSION: Elevated serum osmolality during the first days of ICU stay was associated with an increased risk of death in critically ill patients. Serum osmolality is a parameter which is rapid, easy and cheap to measure. Prospective studies are needed to evaluate the predictive value of serum osmolality in different populations of ICU patients.

Grant acknowledgement: Supported by the Deutsche Forschungsgemeinschaft

REFERENCE(S): (1) Morris A, Creasman J, Turner J, Luce JM, Wachter RM, Huang L. Intensive care of human immunodeficiency virus-infected patients during the era of highly active antiretroviral therapy. Am J Respir Crit Care Med. 2002 Aug 1;166(3):262-7.

188

OUTCOME PREDICTION BY SERUM OSMOLALITY IN ICU PATIENTS

Gründling M1, Hofreiter B2, Kiesow I3, Gruenwald U3, Lehmann C1, Bandt C2, Schutt C1, Kahn S3
1Anesthesiology and Intensive Care Medicine, 2Mathematics and Computer Science, 3Immunology, Ernst Moritz Arndt University of Greifswald, Greifswald, Germany

INTRODUCTION: Early and correct prediction of outcome is crucial in intensive care patients. The Acute Physiology and Chronic Health Evaluation (APACHE) II-score, Multiple Organ Dysfunction Score (MODS) and the Sequential Organ Failure Assessment (SOFA) score are well evaluated to predict the risk in ICU patients. The objective of the present study was to find parameters or simple combinations of parameters with predictive value at the beginning of the ICU stay.

METHODS: A retrospective study in 470 consecutive patients with a length of stay longer than five days (including trauma, surgical diseases and internal diseases) of a university hospital intensive care unit. For analysis we selected 42 clinical and laboratory parameters to seize simply the scope for developing an objectively weighted multivariate prognostic model from these data. Some of these discriminatory ability exceeding that of the seven identifiable modified Glasgow criteria. There is scope for developing an objectively weighted multivariate prognostic model from these data.

REFERENCE(S): (1) Blamey SL, Imrie CW et al. Gut 1984; 25:1340-6; (2) Bradley EL 3rd Arch Surg 1993; 128:586-9; (3) Ranson JHC World J Surg 1997; 21:136-42.
OUTCOME OF ICU PATIENTS COMPARED TO ADMISSION STATUS
Myrianthefis P M1, Tsougi E2, Koulentis D2, Zidianakis V1, Fildais G1, Batopoulos G1
1ICU, KAT Hospital, Athens, Greece
INTRODUCTION: It was supported that patients admitted in the ICU from hospital wards have worst outcomes compared to patients from operating room/recovery or the emergency department 1. The purpose of the study was to investigate differences in illness severity and outcomes in critically ill patients transferred to admission status.
METHODS: We prospectively collected data from patients' records concerning demographic characteristics, length of ICU stay, illness severity, death probability, actual mortality and admission status defined as hospital ward (A), emergency department (B), and operating room/recovery (C). Values are expressed as X ± SEM
RESULTS: We included 165 consecutive patients (116 males, 70%) admitted in our ICU. Mean age was 57.9 ± 1.6 yrs and mean ICU stay (LOS) was 14.2 ± 1.8 days. Overall mortality was 26.1%. The characteristics of the patients are shown on the table.

| Gender       | A        | B        | C        | P value |
|--------------|----------|----------|----------|---------|
| Sex M/F      | 62.5 ± 2.5 | 52.7 ± 3.5 | 56.4 ± 2.5 | NS      |
| MODS         | 41/21    | 24/9     | 51/19    | NS      |
| APACHE II    | 21.3 ± 0.9 | 22.5 ± 1.1 | 13.2 ± 0.9 | 0.0001  |
| Death Prob % | 38.6 ± 0.3 | 42.6 ± 0.4 | 41.2 ± 0.2 | 0.0001  |
| SAPS II      | 54.2 ± 2.2 | 56.6 ± 2.4 | 37.6 ± 1.9 | 0.0001  |
| Death Prob % | 70.2 ± 0.3 | 74.1 ± 0.4 | 40.9 ± 0.4 | 0.0001  |
| Actual Mort %| 32.3      | 42.4      | 12.9      | 0.0001  |
| LOS          | 17.1 ± 2.8 | 22.8 ± 5.8 | 7.6 ± 1.7  | 0.0023  |

CONCLUSION: Most of the patients admitted in our ICU were males. Death probability calculated using APACHE II score better reflects our actual mortality. Lower mortality in group C reflects significantly lower severity of illness. The observation that ward patients admitted to the ICU have worst outcomes 1 is not confirmed in our hospital may be due to early identification of patients at risk and the application of effective therapeutic measures before ICU admission.

REFERENCE(S): 1. Goldhill DR, Summar A. Outcome of intensive care patients in a group of British intensive care units. Crit Care Med 1998; 26:1337-1345.

191 PREDICTORS OF POOR OUTCOME IN VARIOUS AGE GROUPS: RESULTS OF THE SOAP STUDY
Moreno R1, Sakr Y2, Vincent JL1, Ranieri V1, Gerlach H1, Payan D2, Sprung C2, Reinhard K2, Moreno R1, Sakr Y2, Vincent JL1, Ranieri V1, Gerlach H1, Payan D2, Sprung C2, Reinhard K2
1Department of Intensive Care, Hospital de St. Antonio dos Capuchos, Lisbon, Portugal
2Department of Anesthesiology and Intensive Care, Friedrich Schiller University Hospital, Jena, Germany
INTRODUCTION: Age may be a determinant of outcome in critical illness. We investigated the association between age and outcome and possible differences in prognostic factors in various age groups.
METHODS: This cohort, multicenter, observational study, included all 3147 adult patients admitted to the participating centers (19 centers participated from 24 countries) between May 1 and May 15, 2002. Patients were followed up until death, hospital discharge, or 60 days. We defined three age groups: <65 years (group 1), 65-75 years (group 2), and >75 years (group 3). We performed a multivariate, forward, stepwise, logistic regression analysis with ICU mortality as the dependent factor to determine the predictors of worse outcome in various age groups.
RESULTS: The mean age was 57.4 ± 13.8 in group 1 (n=1647), 70.9 ± 2.8 in group 2 (n=1088), and 80.4 ± 4.2 in group 3 (n=465). Comorbid diseases on admission were similar in the older age groups (group 2 & 3), however both had a higher incidence of cancer (16.5 & 15.8 vs. 10.4%, p≤0.01), COPD (15.9 & 16.8 vs. 5.9%, p≤0.01), and heart failure (13.4 & 15.8 vs. 5.6%, p≤0.03) than group 1. ICU mortality was similar in patients from centers 2 & 3, but they had a higher mortality than group 1 patients (21.6 & 24.0 vs 14.9%, p≤0.01). The ICU and hospital lengths of stay were similar in the three groups. In a multivariate analysis, older age was an independent risk factor for ICU mortality (odds ratio=1.02: 95% confidence interval: 1.02-1.03). Higher SAPS II scores, greater fluid balance, and late cardiovascular failure were predictors of worse outcome in all groups. Liver cirrhosis, medical admission, late renal and coagulation failure were associated with worse outcome in the younger age groups (groups 1&2). A poor outcome was characterized by early coagulation, CNS, and cardiovascular organ failure and late renal and coagulation organ failure in group 1, by early respiratory and late CNS organ failure in group 2, and by early renal and CNS organ failure and albumin administration in group 3.
CONCLUSION: In this large European cohort, higher age was associated with an increased risk of death. Awareness of the different predictors of death in different age groups could help direct therapy to improve outcomes.

Grant acknowledgement: The study is endorsed by the European Society of Intensive Care Medicine, and supported by an unlimited grant from Abbott, Baxter, Eli Lilly, GlaxoSmithKline and NovoNordisk

192 OUTCOME AND PROGNOSTIC FACTORS IN PATIENTS WITH PROLONGED INTENSIVE CARE UNIT LENGTH OF STAY
Delle Karth G1, Meyer B1, Nikifardjam M1, Bubeli A1, Hulsmann M1, Heinz G1
1Cardiology, Medical University of Vienna, Vienna, Austria
INTRODUCTION: Long term patients represent an important ICU-population subset. However, information on the course of these patients is still limited. Aim of this retrospective observational analysis was to determine outcome and prognostic factors in this cohort.
METHODS: We abstracted data from our ICU database of all patients admitted ≥ 30 days to a mixed-ICU at a tertiary, university hospital, from March 1998 to December 2003.
RESULTS: 137 patients (age 64, IQR 58-71 yrs; SAPS II score 54, IQR 41-65; length of stay 39, range 30-150 days; 100 [73%] medical-cardiologic and 37 [27%] cardiac-surgical patients; 9.5% of all admissions, ICU mortality 21.2%) were included in this study. Hospital mortality was significantly higher in long term vs. short term (≤ 30 days) patients (35.8% vs. 22.1%, p = 0.001). Factors associated with in-hospital mortality at univariate analysis were male gender (male vs. female, 41/100 vs. 8/37, p = 0.036), pre-existing renal failure (22/38, p = 0.01), renal replacement therapy during the ICU stay (34/57, p = 0.001), no-sossemiposial sepsis (37/86, p = 0.021), a higher SAPS II score on admission (56, IQR 44.5-70.5 vs. 51.5, IQR 40.2-63.2, p = 0.052), more days on mechanical ventilation (38, IQR 30-49 vs. 32, IQR 23-41.75, p = 0.01), a higher daily TISS score (35.45, IQR 33.27-38.89 vs. 34.96, IQR 32.84-36.47, p = 0.044), more days on cahetylamines (33, IQR 25.5-40 vs. 27, IQR 21.32-75, p = 0.006), fewer days with enteral (29, IQR 22.5-40 vs. 31, IQR 24.25-40.5, p = 0.002) and vice versa more days with parenteral nutrition (17, IQR 6.5-24.5 vs. 9, IQR 3-18.75, p = 0.013). When entering all these factors in a multiple regression analysis model only renal replacement therapy, length of mechanical ventilation and fewer days with enteral nutrition revealed to be independent prognostic factors for in hospital mortality (OR = 1.25, 95%CRI = 0.08 to 0.56, p = 0.02, OR = 1.49, 95%CRI = 0.19 to 0.86, p = 0.019 and OR = 12.05, 95% CI, 1.21 to 5.13, p = 0.14, respectively, modelfit: c = 2.2, df = 8, p = 0.97).
CONCLUSION: Hospital mortality in long term ICU patients is high. Nevertheless a considerable proportion of patients with a prolonged length of stay in the ICU survive their critical illness. Hospital mortality is associated with renal replacement therapy during the ICU stay, length of mechanical ventilation and fewer days with enteral nutrition.

REFERENCE(S): 1. Omland T et al (1996) Plasma brain natriuretic peptide as an indicator of left ventricular systolic function and long-term survival after acute myocardial infarction. Comparison with plasma atrial natriuretic peptide and N-terminal proatrial natriuretic peptide. Circulation 93:1963-1969.
2. Selvas PL et al (1998) Cardiac natriuretic peptides for diagnosis and risk stratification in heart failure. Influences of left ventricular dysfunction and coronary artery disease on cardiac hormonal activation. Eur J Clin Invest 28:636-642.
194 IMPROVEMENT OF THE ABBREVIATED BURN SEVERITY INDEX BY THE DETECTION OF ERYTHROBLASTS IN BLOOD
Stachon A1, Leinhardt M2, Katzy Y3, Holland-Letz T4, Steinhau H5, Krieg M6
1Institute of Clinical Chemistry, Transfusion and Laboratory Medicine, 2Department for Plastic Surgery, Burn Center, BG-University Hospital Bergmannsheil, 3Department of Biometry, Ruhr-University Bochum, Bochum, Germany

INTRODUCTION: The detection of erythroblasts (EBL) in peripheral blood is generally associated with a poor prognosis. As yet the prognostic significance of EBL in the blood of burn patients in relation to the abbreviated burn severity index (ABSI) has not been assessed.

METHODS: In a retrospective study we analyzed the database of 464 burn patients.

RESULTS: 81 out of 464 patients died (17.4%). The incidence of EBL in burn patients was 11.4% (53/464). The mean ABSI for EBL-positive and EBL-negative were 9.1±0.3 (n=53) and 6.0±0.1 (n=411); respectively, the total mortality of EBL-positive patients was 56.6% (30/53). The predictive value for death increased with the EBL concentration. All patients with more than 1000 EBL/µl died (n=10). The mortality of EBL-negative was 12.4% (5/411). The incidence of EBL increased with increasing ABSI. Patients with ABSI ≤4 were generally EBL-negative. The highest incidence of EBL was found between ABSI 10 and 13: about 40-50% of those patients were EBL-positive. Taking into account the detection of EBL in blood, the prognostic power of the ABSI became more significant if to the individual ABSI score the following score points were added (= ABSI-E): class 1 EBL 0/0.1; +0.2; class 2 EBL 1-400/0.1: +1; class 3 EBL 400-1000/0.1: +2; class 4 EBL >1000/0.1: +3. In terms of mortality the odds ratios for each ABSI score point as well as each stepwise increase from one EBL class to the next were: (95% confidence intervals: 1.9-2.8) and 2.4 (95% confidence interval: 1.4-3.7), respectively. The prognostic significance of the ABSI-E, calculated by the area under curve (C-statistic), was 0.96.

CONCLUSION: Our data suggest that the detection of EBL in blood may improve the ABSI in identifying patients with rather poor prognosis. The prognostic power of EBL is independent of the respective power found for the ABSI. Thus, we propose a modified ABSI: i.e. ABSI-E.

195 QUALITY OF LIFE DATA FOR SAPS II, STRATUM II OF SEPSIS SURVIVORS IN THE KYBERSEPT TRIAL
Jurs M1, Schramm W2, Keinecke H2, Opal S M4
1Business Unit Critical Care - Corporate Safety, Aventis Behring GmbH, a ZLB Behring company, Hattersheim, 2Department of Haemostaseology and Transfusion Medicine, University hospital of Munich, Munich, 4Department of Statistical Research, Covidence GmbH, Marburg, Germany

INTRODUCTION: Although there was no significant overall ITT treatment effect of AT III with regard to the 90-day all cause mortality (1), there were significantly improved quality of life parameters for survivors receiving high-dose AT III such as for communication/speech, level of alertness and energy level (2). This is also true for the subgroup of patients in the simplified acute physiology score (SAPS-II stratum II (30-60% predicted hospital mortality), which was previously identified to represent the optimal study cohort (3, 4).

METHODS: QoL data were used to evaluate the effects of intravenous high-dose AT III treatment for survivors of severe sepsis measured for up to 90 days during the follow-up phase of the KyberSept phase III clinical trial. A visual analog scale and the Kamofsky Performance Scale were used to measure physical, psychological, and social QoL at regular intervals. In a subgroup of patients defined by a high mortality risk (≥65 years) (n=22) there were no independent predictor for increased mortality, including Apache II (OR, 0.813; p=0.371).

RESULTS: The Emergency Physicians should be prepared to evaluate and continue the treatment of resuscitated patients. The existence of ICU beds in the ER could optimize the approach and be less time consuming providing a better prognosis to sub population that come to this department.

CONCLUSIONS: In our prospective cohort study we examined all the patients (889) assisted by our Pre hospital Emergency Medical Team with Acute Respiratory Failure (ARF) and Cardio Pulmonary Arrest (CPA) between January 2001 and March 2004 that were transported to an ER. All trauma and pediatric patients were excluded. The Emergency Physicians should be prepared to evaluate and continue the treatment of resuscitated patients. The existence of ICU beds in the ER could optimize the approach and be less time consuming providing a better prognosis to sub population that come to this department.

METHODS: In this retrospective cohort study we examined all the patients (889) assisted by our Pre hospital Emergency Medical Team with Acute Respiratory Failure (ARF) and Cardio Pulmonary Arrest (CPA) between January 2001 and March 2004 that were transported to an ER. All trauma and pediatric patients were excluded. With a median age of 67 yrs (16-94) the most frequent situation was ARF with 56,1% (499) of all patients. In this sub group COPD acute exacerbations and the Acute Pulmonary Edema (35% and 32%, respectively) were the predominant pathologies. Asthma, Respiratory Infections and Airway Obstruction were also present but in small numbers. Specific pharmacotherapy was administered to all patients and in 44,1% (392) tracheal intubation and assisted ventilation was needed. 21% CPA patients recovered pulse and were transported to an ER. None of these patients had access to an ICU despite evaluation from the pre hospital EMT.

CONCLUSION: Post reanimation care is very important for the patient outcome. Despite the pre hospital high standard of care none of the patients went directly to an ICU. Most, if not all, remained in the ER for a variable period of time, regardless of pathology, severity and even the need of mechanical ventilation. Emergency standardized procedures should be ruled by protocols to achieve the best patient outcome.
198

BRAIN DEATH ASSESSMENT USING BISPECTRAL INDEX

Badenes R1, Garcia-Perez M L1, Carrera J1, Manuenda A1, Chishert V1, Aguilar G1, Belda F1
1Anesthesiology and Intensive Care, Hospital Clinico Universitario, Valencia, Spain

INTRODUCTION: Brain death (BD) is a catastrophic physiologic event associated with significant disturbances in the function of other organs (1). Even with maximum support, deterioration in cardiorespiratory function leading to asystole usually occurs. We have evaluated bispectral index (BISTM, Aspect Medical Systems, The Netherlands) values in a brain death diagnosed patients (2).

METHODS: This is a prospective, nonrandomized, observational study in a surgical and trauma tertiary intensive care of a university hospital. 42 consecutive patients (age range 17-75 yrs, mean age 47 yrs) diagnosed of brain death during 2002 and 2003, but without brain death at the time of admission were studied. BIS was recorded continuously during the hospitalization in the ICU. This study was observational and in no way interfered with our routine management of brain dead patients.

RESULTS: In each of 42 patients when were diagnosticated of brain death (clinically and confirmed by EEG or evoked potentials, according to the Spanish legislation guidelines for assessing brain death) their individual BIS values were 0 (Tase supression of 100).

CONCLUSION: Because brain death causes severe cardiovascular, hormonal, and metabolic changes, its early diagnosis is crucial in terms of maintaining organ function (3). Thus, the early diagnosis of brain death is the first step in successful donor management. Prompt treatment to preserve organ function increases the chances of successful organ transplantation. To improve the identification of brain death patients in the ICU we can use the BIS. We think is a noninvasive determination, easy to interpret and rapid. Anyway, the diagnosis of brain death is based on clinical examination, but we hypothesize that this could be a very useful method for early detection of neurological worsening even brain death.

REFERENCE(S): 1) Acta Anaesthesiol Scand 2004; 48: 139-144
2) Intensive Care Med 2002; 28: 419-425
3) Transplantation Proceedings 2004; 36: 20-21

199

SPECIFIC PROTOCOL TO OBTAIN LUNGS FROM ASYSTOLIC DONORS DIED OUT OF HOSPITAL

Núñez Peña J R1, Del Rio Gallegos F J1, Hernando Trancho F2, Calatayud Gustardi F2, López Gutiérrez E1, Soria García A1, Moreno Roy M A1, Curties Asensio A1
1Unidad de Coordinación de trasplantes, 2Unidad de Cirugía Torácica, Hospital Clinico San Carlos, SUMMA – 112, Comunidad de Madrid, Madrid, Spain

INTRODUCTION: Hospital Clinico San Carlos (HSCC) has developed a specific program to obtain organs and tissues from Asytoolic donors (AD) (“code 9”), described in another paper. During the last 2 years we have developed as a part of “code 9”, a specific protocol to obtain lungs from AD.

METHODS: For lung donors inclusion criteria have been enlarged: 1. Age under 50.2-. Cause of death excludes thoracic trauma.3. Final evaluation includes, chest XR and anthropometric data. Once in emergency service, we establish extracorporeal bypass with membrane oxygenation, and initiate specific lung preservation maneuvers: 1- After femoral cannulation, placement of Fogarty balloon to stop blood flow over upper mesenteric level 2-. Obtaining of 300 cc of blood with heparin.3- Stop ventilation.4- Placement of two thorax drainage tubes, and infusion into thorax of Perfadex solution, 4 liters at 4°C in each hemithorax to collapse completely lungs.5- Waiting until family and judge permission.6- Reinitiate ventilation.7- Sternotomy.8- Bronchoscopy.9- Pulmonary artery cannulation and right atrium drainage.10-Add to the blood obtained (300 cc) PgE and Perfadex, through Pulmonary artery.11-Obtain blood gas determination from left atrium.12- Cardiectomy.13- Retrograde perfusion of Perfadex through pulmonary veins.14-Extraction of lungs and preservation in Perfadex.

RESULTS: We have obtained 30 lungs for study purposes only. In all cases we found an excellent macroscopic and histologic aspect. Very good oxygenation capacity of lungs prior to extraction.1) After this preliminary study we have performed until now 13 lung transplants (6 of them bilateral lung transplant and 1 unipulmonary transplants). All the receptors live now a completely normal life.

CONCLUSION: We have obtained 30 lungs for study purposes only. In all cases we found an excellent macroscopic and histologic aspect. Very good oxygenation capacity of lungs prior to extraction.1) After this preliminary study we have performed until now 13 lung transplants (6 of them bilateral lung transplant and 1 unipulmonary transplants). All the receptors live now a completely normal life.

CONCLUSION: We have obtained 30 lungs for study purposes only. In all cases we found an excellent macroscopic and histologic aspect. Very good oxygenation capacity of lungs prior to extraction.1) After this preliminary study we have performed until now 13 lung transplants (6 of them bilateral lung transplant and 1 unipulmonary transplants). All the receptors live now a completely normal life.

200

SEVERE CARBON MONOXIDE POISONING TREATED BY HYPERBARIC OXYGEN THERAPY - A CASE REPORT

Sinkovic A1, Adelbahner N1, Marinsek M1, Knutic B1, Zink M1, Smolte-Juettner F M1
1Department for Medical Intensive Care, General Hospital Maribor, Maribor, Slovenia, 2Thorax surgery and hyperbaric medicine, University surgical clinic Graz, Graz, Austria

INTRODUCTION: Carbon monoxide (CO) poisoning is an important cause of mortality and morbidity, leading to mental sequelae, memory loss, personality changes, psychosis, dementia, etc. The results of hyperbaric oxygen (HBO) therapy are conflicting, but the majority of trials recommend HBO therapy in severe cases with coma and/or hemodynamic instability, irrespective of carboxyhemoglobin (COHb) level to prevent permanent neurological deficits.

METHODS: We present a case of 35-years old woman, found comatose, cyanotic and breathing shallowly after accidental CO poisoning. She was immediately transferred to the hospital, breathing 100% oxygen by mask. On hospital admission she was comatose, hypotensive, cyanotic, hypotension (arterial PO2 7,41 kPa, HbO2 87,8%) with serum COHb 26,7 % in spite of oxygen therapy. Therefore, mechanical ventilation was started after intubation. Due to hemodynamic instability resistant to fluids iv. dobutamin and norepinephrin were administered. In an hour COHb level decreased to 17,2%. To prevent severe neurological sequelae HBO therapy was suggested and the patient was transferred to 60 kilometers distant University Hospital Graz/Austria as soon as possible, where available HBO therapy was performed (twice at 3,0 ATA, once at 2,2 ATA).

RESULTS: After 36 hours she gained consciousness, respiratory failure and shock resolved. She was transferred to our hospital and discharged few weeks later with only discrete porenal paresis, discrete ischemic brain lesions on CT scan and moderately abnormal EEG and without cognitive disturbances.

CONCLUSION: In severe CO poisoning, normobaric oxygen therapy and resuscitation by fluids, inotropes, catecholamines are essential for survival, but additional HBO therapy seems to prevent major neurological sequelae.

REFERENCES: 1) Weaver LK, Hopkins RD, Chan KL et al: Hyperbaric oxygen for acute carbon monoxide poisoning. N Engl J Med 2002; 347: 1057-67.
2)orman D, Drewry A, Huang YL et al: The clinical toxicology of carbon monoxide. Toxicology 2003; 187: 25-38.
3) Jaeger K, Ruscuile H, heine J et al: Carbon monoxide poisoning. Anaesthesiastm reanim 2000; 25: 74-7.

201

PROTEIN S 100 AND 30-DAYS MORTALITY OF PATIENTS AFTER CARDIOPULMONARY RESUSCITATION

Sinkovic A1, Ribaric V1, Marinsek M1, Puklavec L2, Kamenik B1
1Department for Medical Intensive Care, 2Department for Medical Intensive Care, Poe nuclear medicine, General Hospital Maribor, Maribor, Slovenia

INTRODUCTION: Permanent brain damage after cardiopulmonary resuscitation (CPR) due to cardiac arrest is one of the major causes of morbidity and mortality of patients. Therefore, sensitive markers of brain damage, including elevated serum level of protein S 100, could predict 30-days mortality in survivors of CPR.

METHODS: We conducted an observational prospective study to define predictive role of serum levels of protein S 100, estimated on admission and 12 hours later by immunoradiometric method, for the 30-days mortality of 91 successfully resuscitated comatose patients.

RESULTS: Mean admission protein S level was 7,6±2,9 mg/L, 12 hours later 2,9±12,6 mg/L. 30-days mortality was 52,7%. Between survivors and nonsurvivors at 30 days nonsignificant differences were observed in mean age, mean serum protein S levels on admission and 12 hours later, in gender and location of resuscitation (in-hospital vs out-of-hospital), but significant differences in causes for CPR. Asystole was statistically significant cause of cardiac arrest in nonsurvivors, ventricular fibrillation in survivors. The risk for 30-days mortality was significantly increased with age over 70 years (OR 2,676, 95% CI 1,10 to 6,50), with asystole (OR 6,24, 95% CI 2,756 to 15,87) and serum protein S 100 levels > 2,5 umol/L 12 hours after admission (OR 5; 95% CI 1,3 to 19,41). The risk for 30-days mortality was significantly decreased with ventricular fibrillation (OR 0,13; 95% CI 0,050 to 0,3559).

CONCLUSION: In addition to older age and asystole as the cause for cardiac arrest, increased serum protein S 100 levels > 2,5 umol/L, 12 hours after admission were a significant risk of 30-days mortality of patients.

REFERENCES: 1) H‘tinger BW, M‘bes S, Glätzer R et al: Astrogliol Protein S-100 is an early and sensitive marker of hypoxic brain damage and outcome after cardiac arrest in humans. Circulation 2001; 103: 2694-2698
2) Hachimi-Idrissi S, Van der Ausmra M, Schiottceica J et al: S-100 protein as an early predictor of regaining consciousness after out of hospital cardiac arrest. Resuscitation 2002; 53: 251-7.
3) Rosen H, Stuhbren Sunnerthagen K, Herlich J et al: Serum levels of the brain-derived proteins S-100 and NSE predict long-term outcome after cardiac arrest. Resuscitation 2001; 49:183-91.
CONCLUSION: of 59 in 2003.

The number of CA varied from 156 in 1996 to 42 in 2003. The number of ROSC was achieved in 35% of the patients (n=349) and the hospital discharge was 9.1%. The return of spontaneous circulation (ROSC) was achieved within 3 minutes of arrest. The median time of ALS was 23 min. The time from call to arrival was 2.7±3.1 min.

CONCLUSION: As others found, VF as initial rhythm was the only factor that was positively related to ROSC and hospital discharge.

203 IN-HOSPITAL CARDIAC ARREST SYSTEM AUDIT

Gomes E1, Araújo R1, Carneiro A1

1Unidade de Cuidados Intensivos Polivalente UCIP. Hospital Geral de Santo António, Porto, Portugal

INTRODUCTION: Since 1994 a Cardiac Arrest (CA) team developed in our hospital. That CA team is activated through an exclusive phone number and a doctor and a nurse go from the intensive care unit to every ward in hospital taking with them a portable defibrillator. All the wards have the same CA trolley and a continuous training in BLS and ALS is going on for the all hospital.

METHODS: A CA registry was made in every CA situation using Utstein style template and the data were collected in a specific data base. Data analysis was done using SPSS. Chi-square test and a significance of p<0.05 were used in the statistical analysis. The outcome endpoints were return of spontaneous circulation and hospital discharge.

RESULTS: From January 1995 to December 2003 there have been reported 1000 CA. 622 men (62.2%) and 363 woman with a median age of 70 ± 16.8 years. The mean interval between the time at which CA team were called to the scene and the time of their arrival was 2.7±3 minutes. The time from call to arrival was 2.7±3.1 minutes. Return of spontaneous circulation (ROSC) was achieved in 35% of the patients (n=349) and the hospital discharge was 9.1%. The cause for the CA was cardiac in only 314 (35.4%) patients and the initial rhythm was ventricular fibrillation (VF) in only 11.3% of the cases (asystole in 5.14 and pulseless electrical activity in 37.4%). The CA was witnessed in 84.3% of the cases and BLS was being performed in 76% of the times. Most of the patients had important disabilities on admission to hospital with only 9.1% without co-morbidities.

We found that witnessed CA, initial rhythm being VF, presence of gasping on arrival of the team and health status as healthy or moderately ill had a better ROSC (p<0.05). When we tried to relate these same factors with hospital discharge we found only statistical significance in the group whose initial rhythm was VF.

CONCLUSION: As others found, VF as initial rhythm was the only factor that was positively related to ROSC and hospital discharge. Witnessed CA and the presence of gasping on arrival of the team as well as previous health status were also determinants of ROSC. The fact that most of the patients having CA in hospital have important co-morbidities and the initial rhythm is a non shockable one determines enormously their outcome.

204 NON-HEART-BEATING DONORS AFTER EXTENDED AND NON-EFFECTIVE PRE-HOSPITAL ADVANCED LIFE SUPPORT (ALS).

Netto C1, Vilarrubia A2, Jimenez X1, Ruiz A2, Garcia P1, Manyalich M1

1Internal Medicine, SCURBA-061Barcelona, 2Coordinació de Traspantaments, Hospital Clinic i Provincial, Barcelona, Spain

INTRODUCTION: Because of the great necessities in organ transplantation and the large volume. Ultrasound-guided thoracocentesis is safe.

OUTCOME DETERMINANTS OF IN-HOSPITAL CARDIAC ARREST

Gomes E1, Araújo R1, Carneiro A1

1Unidade de Cuidados Intensivos Polivalente UCIP. Hospital Geral de Santo António, Porto, Portugal

CONCLUSION: The protocol running and the results during this first year are satisfactory.

REFERENCE: Cho YW et al. Transplantation of kidneys from donors whose hearts have stopped beating. NEJM 1998 Jan 22; 338(4): 221-5.

205 QUANTITATIVE ASSESSMENT OF PLEURAL EFFUSION AT BEDSIDE USING ULTRASONOGRAPHY

Vignon P1, Chastagner C1, François B1, Normand S1, Clavel M1, Pichon N1, Maubon A2, Gastinne H1

1Medical-surgical ICU, 2Radiology, Dupuytren Teaching Hospital, Limoges, France

INTRODUCTION: In the intensive care unit (ICU), the diagnosis of pleural effusion relies mostly on supine radiographs performed at bedside. The ability of ultrasonography to quantitatively assess pleural effusion has not yet been studied in ICU patients.

METHODS: In an initial study group of 97 ICU patients with suspected pleural effusion, we prospectively compared the results of portable chest radiography and pleural ultrasonography. Interpleural distance measured using ultrasonography was compared to the volume of fluid obtained by thoracocentesis (n=49). The derived equation was prospectively applied to a testing group of 19 additional patients to predict the volume of pleural effusion.

RESULTS: Compared to ultrasonography, the sensitivity, specificity, positive and negative predicting values of supine radiographs for the diagnosis of pleural effusion were 82%, 48%, 75% and 57%, respectively. Interpleural distance was significantly correlated with the actual volume of fluid, with the closest relation observed for the end-expiratory measurement performed at thoracic base (r=0.0001, right r=0.88, left r=0.72). A pleural effusion > 800 ml was predicted when this distance was > 45 mm (right) or > 50 mm (left) with a sensitivity and specificity of 94% and 100%, and 76% and 67%, respectively. Mean bias between the predicted and observed volume of pleural effusion in the testing group was 23 ± 355 ml. No complication of ultrasound-guided thoracocentesis occurred.

CONCLUSION: Pleural ultrasonography is more accurate than bedside chest radiography for the diagnosis of pleural effusion in ICU patients and allows a semi-quantitative assessment of fluid volume. Ultrasound-guided thoracocentesis is safe.
206 ECHOCARDIOGRAPHIC CHANGES OF LEFT VENTRICULAR FUNCTION IN PATIENTS WITH SUBARACHNOID HEMORRHAGE

Liebich J1, Schulze M R1, Willemer B1, Heller A1, Koch T1, Ragaller M1
1Department of Anaesthesiology, 2Medical Clinic II Cardiology, University of Technology Dresden, Dresden, Germany

INTRODUCTION: Acute non-traumatic subarachnoid hemorrhage (SAH) is frequently associated with changes in electrocardiogram (ECG), an impaired cardiac function and increased levels of cardiospecific enzymes. Patients at risk for cardiac complications following SAH need to be identified at an early stage to provide optimal haemodynamic treatment. Therefore we studied the time course of left ventricular function by echocardiography and its correlation with cardiac troponin T (cTnT) in plasma.

METHODS: After approval of the local ethical board and informed consent from the patients or next kin, 17 patients with non-traumatic SAH were studied for ten days. Measurements of cTnT as well as 12-lead ECGs and echocardiograms were started within 24 hours and repeated on day 3, 5 and 10 after haemorrhage. ECG abnormalities were defined as ST-T changes (>= 0.1 mV), prolonged QT-intervals or arrhythmias. An abnormal echocardiogram was defined as regional wall motion abnormalities (WMAs), reduced ejection fractions or changes in transmural flow velocity patterns to assess left ventricular diastolic function. The severity of SAH was assessed clinically according to the Hunt and Hess grading.

RESULTS: Eight patients (47%) had elevated cTnT-levels (>=0.01 µg/l). Maximal values were seen within the first 24 to 72 hours after the bleeding event. In all but one patient cTnT-levels returned to normal at day 10. Elevated troponin levels correlated well with severity of SAH (p=0.005), with impaired oxygenation indices (p=0.015) and prolonged QT-intervals (p=0.05). Six patients (35%) developed regional WMAs within the first five days of the study. In two patients WMAs persisted until day ten. One patient with an elevated troponin T and a wall motion score index of 2.7 at day ten died due to cerebral damage. The sensitivity and specificity of cTnT to predict cardiac dysfunction with temporary WMAs on echocardiogram were 83.3% and 72.7%, respectively. Changes in transmural flow velocity patterns did not show a significant correlation with cTnT.

CONCLUSION: Elevated troponin T levels were frequently seen in patients with more severe grades of SAH and were a good prognostic indicator for cardiac dysfunction. Patients with elevated troponin T levels may benefit from an early cardiovascular evaluation and careful haemodynamic monitoring. In this study most patients showed only minor and reversible cardiac dysfunction which did not preclude them from neurosurgical or interventional treatment.

207 NEUROLOGIC COMPLICATIONS IN CARDIAC SURGERY: CAN RISK SCORES BE APPLIED?

Homenna W1, Moreira D1, Olival B1, Pontes A1, Vegner R1, Santos B1, Wescaler A1, Alves L1, Reis J1, Gomes R1
1Cardiovascular surgery, Instituto Nacional de Cardiologia de Larangeiras, rio de janeiro, Brazil

INTRODUCTION: Neurologic complications (NC) in cardiac surgery are not rare (5-15%). Their etiopathogeny is multifactorial, and the risk factors are numerous. Neurologic complications result in high morbidity and mortality rates, and high hospital costs. Most risk scores assess mortality, and the risk for stroke assessed by the AHA/ACC score refers only to patients (pts) with coronary disease. One may thus question whether risk scores for NC can be applied in a general population.

OBJECTIVE: To assess the risk scores of pts with NC undergoing cardiac surgery (CS).

METHODS: Retrospective observational study including information about 1431 pts from a databank, of whom, 45 (3.1%) had reversible or permanent neurologic deficit. The sample was divided into 2 groups: Group 1 (G1), pts with NC; and Group 2 (G2), the historic control. The historic control was a part of the University’s database, of whom, 45 (3.1%) had reversible or permanent neurologic deficit. The sample was divided into 2 groups: Group 1 (G1), pts with NC; and Group 2 (G2), the historic control. The historic control was a part of the University’s database, of whom, 45 (3.1%) had reversible or permanent neurologic deficit. The sample was divided into 2 groups: Group 1 (G1), pts with NC; and Group 2 (G2), the historic control. The historic control was a part of the University’s database, of whom, 45 (3.1%) had reversible or permanent neurologic deficit. The sample was divided into 2 groups: Group 1 (G1), pts with NC; and Group 2 (G2), the historic control.

RESULTS: The risk scores for cardiac surgery applied for mortality reflected a greater incidence of neurologic complications in this population.
210

MEASUREMENT OF S-100B IN A BRAZILIAN TRAUMA CENTER FOR RISK CLASSIFICATION AFTER MINOR HEAD TRAUMA

Polidi Figueiredo L P1, Simao Filho C1, Hauser C1, Sampaio C2, Oliveira M L3, Mutschler W1, Jochem M4, Hieberthaler P5
1Surgery, Federal University of Sao Paulo, Sao Paulo, Sao Paulo, Brazil
2Trauma, Joao XXIII Trauma Center, Belo Horizonte, Brazil
3Surgery, Ludwig Maximilians Universität München, Munich, Germany
4Chemistry, Federal University of Sao Paulo, Sao Paulo, Brazil

INTRODUCTION: Release of the neuronal protein S-100 into the circulation has been suggested as a specific indication of neuronal damage and a marker for the need of cranium computerized tomography (CCT) scan or mild head trauma. This appears of substantial clinical relevance in countries in which trauma is epidemic and medical resources are limited such as in Brazil. However, whether screening of S-100 is helpful for the management of intracerebral complications and further surgical interventions in a country like Brazil has not been answered yet. Thus, the aim of this study was 1) to evaluate whether the measurement of S100 is feasible under clinical routine conditions of a Brazilian emergency department and 2) if the parameter could be used as a screening tool for intracerebral lesions in patients suffering from minor head traumas (MHT).

METHODS: 50 patients with isolated MHT were enclosed into the prospective study and 17 normal healthy individuals served as negative controls. On admission the patients underwent a routine CCT scan to detect intracerebral lesions and a blood sample was drawn. S-100 was measured by an electrochemiluminescence assay (ROCHE, Diagnostik, Mannheim). Data are given as median and 25-75 percentile.

RESULTS: Patients suffering from MHT reached emergency room 45 min (30-62) after trauma. Six patients had posttraumatic relevant lesions within initial CCT and were thereby counted as positive (CCT+). The median systemic concentration of S100 in those patients was 0.75µg/L (0.61-6.5) and significantly different (U-test, p=0.011) from the median concentration, 0.26µg/L (0.12-0.65), of those without posttraumatic lesions in initial CCT (CCT-). There were 6 patients with S100>0.1µg/L with CCT+ and 35 with CCT-, while there was none with S100>0.1µg/L with CCT+ and 9 patients with CCT-. Our results show a sensitivity of 100%, specificity of 29%, positive predictive value of 15%, negative predictive value of 100% and a prevalence of 12%.

CONCLUSION: We hereby demonstrate for the first time, that measurement of S100 is feasible in a Brazilian emergency department under routine conditions and the obtained results underline the diagnostic potential of the measurement of this parameter especially in countries of reduced medical resources such as Brazil. Further investigations are on their way to increase patient numbers for a potential change of clinical decision rules.

Grant acknowledgement: CAPES/BAVIERA Cooperation

Session Posters

Metabolic alterations – 211-224

211

COMPARISON BETWEEN CAPILLARY AND SERUM GLYCEMIA IN ICU PATIENTS

Vacher P1, Boulat T2, Mercier E3, Aubert-Cerüler B4, ARCO group 5
1ICU, University hospital Gabriel Montpied, Clermont-Ferrand, 2ICU, CHR, Orléans, 3ICU, University Hospital, Tours, 4Medical biostatistic, University hospital Gabriel Montpied, Clermont- Ferrand, 5ICU, ARCO, France, France

INTRODUCTION: Intensive insulin therapy in ICU patients is a common practice since it has been shown to reduce morbidity and mortality. Capillary glycemia is frequently used to monitor this treatment. The aim of this study was to compare capillary and serum glycemia in ICU patients.

METHODS: This prospective, multicentric, and descriptive study was conducted in six French medical ICUs: 3 university hospitals ICUs of 22, 18 and 27 beds; and 3 general hospitals ICUs of 10, 14 and 26 beds. All adult patients (>18 years old) admitted in ICU were included upon arrival. Demographic characteristics and severity scores were collected upon admission, clinical and biological data was assessed twice a day during the first 3 days. This study received the approval of the ethic committee of the Société de Réanimation de Langue Française.

RESULTS: Study period: between 09/01/2002 and 10/31/2002. 451 patients were eligible. The difference between capillary and laboratory serum glycemia measurements (DG) was statistically significant, but constant throughout the entire study period, with a DG>20% observed in 18.55% of cases. The subsequent statistical analysis were therefore performed using the data collected upon admission only. The mean DG was 0.38 ± 2.61 mmol/L (p=0.0026) with a DG>20% observed in 22.38% of cases. There were no observed differences between patients with a DG>0 or < 20% in terms of age, gender, body mass index, ICU length of stay, mean arterial pressure, cardiac frequency, and use of vasoactive agents. The table 1 shows the results of the univariate analysis comparing patients with a DG>20%. In multivariate analysis, only IGS and the association Notched limbs and acrocyanosis remained significantly associated with a DG>20% (p=0.0016 and 0.01, respectively). When serum was used on the glucometer, the mean DG was reduced by 50%, with a significant difference between arterial vs venous samples (10.53 vs 20% of DG>20%, p<0.0001).

Table 1: Results of the univariate analysis :

| Variable                | DG>20 % | DG>20 % | p     |
|-------------------------|---------|---------|-------|
| IGS II                  | 37/5     | 50/22   | <0.0001|
| Glasgow Coma Scale      | 12/4    | 10/5    | <0.0001|
| Age (years)             | 18/1.3  | 25/1.7  | <0.0001|
| Serum lactate (mmol/L)  | 2.6/2.5 | 3.9/4.7 | 0.0008 |
| ICU Death               | 13%     | 27%     | 0.0014 |
| Mottled limbs           | 4%      | 24.5%   | <0.0001|
| Acrocyanosis            | 10.5%   | 29.8%   | <0.0001|
| Mottled and acrocyanosis| 2.5%    | 20.2%   | <0.0001|

CONCLUSION: Capillary glycemia appears poorly adapted to the monitoring of glycemia in 22.38% of patients upon admission, and particularly in the most severe patients with mottled limbs and acrocyanosis. The use of arterial sample with a glucometer gives a more reliable measure.

212

INTENSIVE INSULIN THERAPY IN GENERAL INTENSIVE CARE PATIENTS

Mitchell L A1, Whiting J1, Gissane J1, Kolli R1, Tambane R1, Leditschke A1
1Intensive Care, The Canberra Hospital, Garry, Australia

INTRODUCTION: Normoglycemia using intensive insulin therapy (IIT) has been shown to reduce significantly morbidity and mortality in ventilated surgical patients in a recent single centre study. The benefits of IIT in the general intensive care population is not known and to date has not been widely accepted for fear of occult hypoglycaemia in patients who are frequently sedated or have impaired conscious states. This study was designed to determine the safety and efficacy of IIT in a general intensive care unit (ICU).

METHODS: All eligible ICU patients who were predicted to stay more than 48 hours at the time of ICU admission were randomly assigned to receive either intensive (blood glucose 4.4 – 6.1 mmol/L) or conventional (blood glucose 10 – 11.1mmol/L) insulin therapy. Assignments to the treatment groups were made with the use of sealed, opaque envelopes and were balanced with the use of permuted blocks of ten. Data collected included patient demographics, severity of illness, blood glucose measurements (and incidence of hypoglycaemia), insulin administration, ICU and hospital outcome.

RESULTS: 70 patients were randomised, 35 in each insulin therapy group. Overall the median (IQR) age was 66 (58, 75) years, predominantly male (60%) with median APACHE II score 22 (9, 47). There were no significant differences in admission demographics between the two insulin groups. There was a significant difference in the median glucose concentration achieved during their ICU stay between the intensive and conventional groups (5.4 [4.6, 6.5] and 8.9 [7.4, 10.4] mmol/L respectively P<0.0001). The percentage number of blood glucose samples in the predetermined glucose target or lower was lower in the IIT group (69%) than the conventional group (83%). It also took longer to achieve the target glucose concentration in the IIT group (4 [1, 6] hours) compared with the conventional group (0 [0, 1] hours). 0.23% of the 3044 blood glucose samples in the IIT group had a glucose concentration of less than 2.2mmol/L with no clinical sequelae. None of the 2917 blood glucose samples taken in the conventional insulin group had glucose concentration of less than 2.2 mmol/L. The hospital mortality for the patients in the intensive insulin group was higher than the conventional insulin group (22 and 8.3% respectively) but did not reach significance (P=0.1).

CONCLUSION: The intensive insulin therapy was safe in this mixed medical and surgical cohort of patients but under a routine toward an increased mortality. Given the small sample size further evaluation is required to determine the role of IIT in a general ICU population.

213

PULSATILE MICRODIALYSIS FOR CONTINUOUS GLUCOSE MONITORING IN CRITICALLY ILL PATIENTS

Krabwinkel M1, Saedtzi T1, Heindl S2, Fehm H1, Doth C1
1Universitätsklinikum Schleswig-Holstein, Campus Lübeck, Medizinische Klinik I, Lübeck, Germany

INTRODUCTION: Intensive insulin therapy has been shown to improve outcome in critically ill patients. Therefore frequent measurements of blood glucose are required in intensive care units and a continuous metabolic monitoring is desirable in the future.

METHODS: A recently developed glucose biosensor for continuously measuring subcutaneous glucose was tested over a 24 hour period in critically ill patients. Samples for repeated automatic analysis were drawn in 10 minute intervals from the interstitial fluid of the subcutaneous fat tissue by pulsatile microdialysis. The glucose measuring system was tested in eight patients with sepsis syndrome and one patient with respiratory insufficiency requiring mechanical ventilation (APACHE Score 2 > 25, mean age 60 years).

RESULTS: The continuous subcutaneous glucose measuring system generated and electronically saved 144 glucose values during the 24 hour experimental period in each patient. These values were compared with the glucose values measured by standard technique in arterial blood samples obtained in regular intervals (mean 16 blood samples for each patient). The interstitial glucose levels correlated closely to the blood glucose levels over the range of 3 to 12 mmol/L (7.4 ± 2.0 mmol/L). The difference between the interstitial glucose values obtained from the continuous measuring system and the blood glucose levels used for reference was 9.4 % ± 7.3% (mean ± SEM).

CONCLUSION: A bedside continuous measuring system based on pulsatile microdialysis is able to monitor interstitial glucose levels without safety risks for the patient and with satisfying accuracy. Thus, this method has the prospect to be implemented in bedside monitoring of critical care patients.

S58 17th Annual Congress – Berlin, Germany – 10–13 October 2004
214

INSULIN RESISTANCE IN THE CRITICALLY ILL: PREVALENCE, PATTERNS, PROGNOSIS, AND INFLUENCE ON OUTCOME

Saberi F1, Heyland DK1, Lam MF1, Rapson D1, Jeejeebhy K1
1Department of Medicine, 2Department of Epidemiology and Public Health, Queen’s University, Kingston, 3Department of Medicine, University of Toronto, Toronto, Canada

INTRODUCTION: Diabetes type 2 (DM2) and admission hyperglycaemia are poor prognostic indicators in critically ill patients. Underlying insulin resistance (IR) contributes to DM2 and hyperglycaemia. The prevalence and prognostic significance of IR in critically ill patients has not been well studied.

METHODS: We measured daily insulin and glucose levels in 100 critically ill patients (64M, average age 65.7, standard deviation (SD) ± 15.5 years) and used the homeostatic model assessment (HOMA) score to describe IR (defined as HOMA score ≥4.0). We also measured baseline demographics, risk factors for IR, and clinical outcomes up to day 28 after admission to the ICU.

RESULTS: 60 patients (prevalence 60%) were diagnosed as IR based on their HOMA score (23.6±4.7) and 40 patients as insulin sensitive (IS) (2.2±4.0). p<0.05. For IR patients, HOMA scores remained elevated over 10 days of ICU stay and did not differ significantly between survivors and non-survivors. Baseline demographics, co-morbidities, and ICU admission diagnoses were not significantly different between the two groups. Among risk factors for IR, body mass index, history of hypertension, and waist-hip ratio were not significantly different between the IR and IS groups whereas a priori history of DM2 was (38.3% vs. 17.9%, p<0.031). Compared to the IS patients, IR patients had a significantly higher maximum admission serum glucose (13.0±9.8 vs. 7.5±2.6 mmol/L, p<0.001), serum insulin levels (266±290 vs. 56±32.2 mmol/L, p<0.001), admission SOFA score (7.3±7.3 vs. 5.7±2.8, p=0.0038), maximal SOFA score (9.4±4.2 vs. 7.7±3.3, p=0.03), and APACHE II score (21.5±8.0 vs. 18.2±6.6, p=0.34). Hemoglobin A1C was not different (0.06±0.012 vs. 0.06±0.013, p=0.588). Mortality tended to be higher in the IR group but results were not significantly different at day 14 (15±60 patients (25.0%) vs. 6±39 (15.48%), Odds ratio (OR) 1.83, CI 0.46-5.23, p=0.43) or at day 28 (17±60 (28.3%) vs. 9±39 (23.1%), OR 1.32, CI 0.52-3.3, p=0.561). ICU free days (9±7±8±5 vs. 8±3±7±2, p=0.499) Ventilator free days (10±6±7 vs. 10±3±7±9, p=0.807), and ICU acquired infection rate (13.3% vs. 15.4%, p=0.775) were not significantly different between groups. In a logistic regression analysis, only admission SOFA scores were significantly associated with mortality whereas markers of IR were not.

CONCLUSION: The prevalence of IR in ICU patients is high. We do observe a non-significant trend towards increased mortality in IR patients. Whether increased IR is associated with increased severity of illness or is an independent adverse risk factor for mortality needs to be further investigated.

215

THE EFFECTS OF INTENSIVE INSULIN THERAPY ON OUTCOME CRP AND HLA-DR LEVELS IN CRITICALLY ILL PATIENTS

Oral M1, Selvi Can Ö1, Ünal N1, Tulunay M1
1Anesthesiology and Reanimation, Ankara University School of Medicine, Bni Sina Hospital, ANKARA, Turkey

INTRODUCTION: Hyperglycemia and insulin resistance are common in critical illness. Recently a trial showed that a blood glucose level (BGL) about 80-110 mg/dL is associated with a trend towards increased mortality in IR patients. Whether increased IR is associated with morbidity and mortality. To obtain strict regulation, frequent blood glucose determination is necessary. Bedside glucometry could be useful to make glucose levels available very quickly and subsequently be able to adjust the insulin dose. Because its accuracy among critically ill patients has not been properly evaluated, we performed a prospective audit of bedside glucometry in our medical ICU setting.

METHODS: Arterial blood samples were obtained by critical care nurses at our 12-bed University Medical Intensive Care Unit (between January 20th and February 10th 2004). One part of the sample was immediately send to the core chemistry laboratory, and analyzed using the YSI Glucose Analyzer [Yellow Springs Instruments, Ohio] as the gold standard. The other specimen was analyzed on the ‘bedside’ blood glucose analyzer [ABL 705, Radiometer Copenhagen] at the ICU. The results of the paired measurements were analyzed as a scatter plot and by the method of Bland and Altman.

RESULTS: 416 blood samples were taken from 27 male and 19 female critically ill patients, with 2 glucose determinations with bedside glucometry (gCAP) and arterial glucometry (gGSA). Results are presented as mean, standard deviation (SD) and median (Md). Comparison of gPLASM values with other measurement results by paired T-Student, considering statistically significant p<0.05, as well as subgroups that were treated or not with amines. To determine agreement between gPLASM with other techniques, value differences, mean difference and limits of agreement were calculated. Agreement was defined as an absolute difference <20mg/dL. All glucometer readings are presented as mg/dL.

CONCLUSION: Both bedside glucometry and blood gas analyzer glycemias are reasonably techniques to determine glucose levels in the ICU. Arterial glycaemia cannot be disregarded, as our sample is too small to make such an implication, but it can be a base for future study analysis.

216

EVALUATION OF PLASMA GLYCEMIA VS. GLUCOMETRIC ALTERNATIVES IN CRITICALLY ILL PATIENTS

Matinino A1, Carvalho E1, Oliveira M1, Vieira C1, Valega S1, Oliveira M1, Silva J1
1SCI-1, General Hospital Santo Antonio, Oporto, Portugal

INTRODUCTION: Glucose control in critically ill has shown an improvement in patients’ prognosis, as such, demanding constant glucose measurements. bedside glucometry has been the solution, but its accuracy in these patients has not been adequately studied. We intend to try accuracy not only of bedside glucometry but also arterial glucometry and blood gas analyzer glycemias compared to plasma glycemias.

METHODS: Prospective study with randomly selected patients during a 5-month period, with 2 glucose determinations with bedside glucometry (gCAP), arterial glycemias (gGSA), plasma glycemias (gPLASM) and blood gas analyzer glycemias (gGSA). Results are presented as mean, standard deviation (SD) and median (Md). Comparison of gPLASM values with other measurement results by paired T-Student, considering statistically significant p<0.05, as well as subgroups that were treated or not with amines. To determine agreement between gPLASM with other techniques, value differences, mean difference and limits of agreement were calculated. Agreement was defined as an absolute difference <20mg/dL. All glucometer readings are presented as mg/dL.

RESULTS: Sample of 66 patients, 30.3% of which treated with amines. General results are expressed in Table 1 and Graph. The Student p values are expressed in Table 2. For gPLASM - gCAP we determined a 69.7% agreement, mean=–7.5 (SD=22.9 Md=–6), gPLASM - gGART a 74.24% agreement, mean=–0.3 (SD=23.6 Md=–1.5) and gPLASM - gGSA a 89.39% agreement, mean=–3.8 (SD=13.5 Md=–5).

CONCLUSION: Both bedside glucometry and bed side blood analyzer glycemias are reasonably techniques to determine glucose levels in the ICU. Arterial glucose cannot be disregarded, as our sample is too small to make such an implication, but it can be a base for future study analysis.

REFERENCE:
1. Van den Berghe G et al. N Eng J Med 2001; 345: 1359-67.
218
THE ACCURACY OF METABOLIC MONITORS IN THE DAILY SETTING OF INTENSIVE CARE UNITS
Singer P1, Progrebetsky I1, Modan I1, Theilla M1, Cohen J1
1General Intensive Care, Rabin Medical Center, Petah Tikva, Israel

INTRODUCTION: Negative energy balance is highly correlated with complications and morbidity in critically ill, ventilated patients. In order to provide appropriate energy requirements the measurement of resting energy expenditure (REE) is the preferred measure of energy balance. This is ideally assessed by indirect calorimetry. The most common and validated method utilizes the metabolic cart. Recently, more compact, modular devices, and a device incorporated into the ventilator have been developed but only studied in small groups of patients. The purpose of our study was to evaluate some of these devices in daily practice and to compare them to the metabolic cart, considered as a reference.

METHODS: The M-COVX (M) metabolic module (Daxel-Ohmeda, Finland) and the CO2 Evita 4 analyzer (Drager, Germany) (E) were simultaneously compared to the metabolic cart, DeltaTec II (Daxel-Ohmeda, Finland) (D) in 43 critically ill, ventilated, stable patients. After 30 min of steady state, oxygen consumption (VO2), carbon dioxide production (VCO2), REE and respiratory quotient (RQ) were recorded for D, the same parameters and ETCO2 and FiO2 for M, and VCO2 and FiO2 for E. Statistical analysis was performed using Pearson’s correlation coefficient for validity, and Cronbach alpha for reliability. Precision was calculated from the square root of standard deviations and bias as the standard error of the mean.

RESULTS: One hundred sixty five measurements were achieved. Mean VO2 was 0.43, and mean peak inspiratory pressure 27.3 ± 5.9. A good correlation was found between VO2 and REE for D and M (r=0.60 and 0.63; p<0.0001), but there was a lower correlation between VCO2 obtained from D and M or E (r=0.51 and 0.39). Reliability for VCO2 had an alpha value of 0.69 and for VO2 of 0.72. The best precision and the lowest bias values were achieved by D.

CONCLUSION: The M and E metabolic modules provide accurate measurements of metabolic gas exchange in stable ventilated patients. They can be used for daily nutritional assessment as well as continuous monitoring. The D remains the method of choice for metabolic measurement.

219
PHYSICAL ACTIVITY AS A DETERMINANT OF TOTAL ENERGY EXPENDITURE IN CRITICALLY ILL CHILDREN
Van der Kuip M1, De Moor K2, Westerterp K R2, Genke R J B J3
1Department of Pediatrics, VU University Medical Center, Amsterdam, 2Department of Human Biology, Maastricht University, Maastricht, Netherlands

INTRODUCTION: Energy expenditure (EE) assessment is needed for adequate nutritional support of critically ill children. The measurement of resting EE by a metabolic monitor is considered gold standard in clinical practice, but may underestimate total EE, depending on the patient’s clinical conditions. Aim of this study was to investigate total EE, resting EE and the relationship with physical activity during critical illness and recovery.

METHODS: We enrolled 20 patients (0-16 y) with severe sepsis or septic shock (n=7) and following major surgery (n=13). During the first week following admission, total EE was measured with doubly labeled water, and daily resting EE measurements were performed with a metabolic monitor. Activity levels were determined by tri-axial accelerometer in a subgroup of 9 patients.

RESULTS: Total EE was significantly higher compared to resting EE (P < 0.01). The figure shows paired observations of total (●, ●), and resting (○, ○) EE versus bodyweight. The vertical difference between the regression lines (● total EE resting EE) represents activity related EE. The overall physical activity level (● total EE resting EE) was 1.22, and showed individual variation (95% CI: 1.08-1.36). Accelerometer activity recordings were associated with activity related EE (r=0.85, P<0.05). Total and resting EE results were similar for patients with sepsis and following major surgery.

CONCLUSION: In critically ill children, the contribution of physical activity to total EE is substantial during the first week of illness and recovery. Resting EE measurements significantly underestimated total energy requirements. Inter-patient differences between total EE and resting EE are largely explained by physical activity. This indicates that the measurement of resting EE with a metabolic monitor combined with accelerometer should be performed for rational nutritional support during pediatric intensive care.

220
GLUTAMINE INCREASES OXIDATIVE RATES OF GLUCOSE DISPOSAL
Bakulier B1, Daske F1, Pacht J1
1Anaesthesiology and Critical Care, 2Internal Medicine, Charles University 3rd Medical School, Prague, Czech Republic

INTRODUCTION: The tight control of blood glucose has been demonstrated to be useful in the critically ill (1), so insulin administration has been already accepted as a part of therapy. Nevertheless, the fate of glucose, both oxidative and non-oxidative, is not known.

METHODS: 40 multiple injured patients were randomised into 2 groups, with the only difference in parenteral glutamine administration: 0 AG (no-glutamine) and 0.4 AG (400 mg of alanoylgammaaminodiacid/day parenterally). Indirect calorimetry was performed daily. On the 4th and 8th day after injury the 3-hours lasting euglycemic hyperinsulinemic clamp (EHC) were performed (2) and the fate of glucose was calculated (3). ANOVA and Wilcoxon non-parametric test were used for the statistical evaluation.

RESULTS: Glutamine group had higher proportion of glucose oxidation daily than control group (Table 1, values are in g/kg/day). Insulin dosage increased mainly non-oxidative glucose utilization (Table 2).

Glucose oxidation in the days after injury

| Day | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-----|---|---|---|---|---|---|---|---|
| Glc-no AG | 0.6 0.3 0.3 0.4 0.8 0.9 0.6 0.4 |
| Glc-no AG | 2.0 2.2 2.6 2.5 2.2 2.4 2.0 2.0 |
| Glc-me 0.4 AG | 23 16 19 24 29 17 12 |
| Glc-me 0.4 AG | 1.0 0.9 0.9 0.9 1.0 0.8 0.8 |
| Glc-me 0.4 AG | 1.8 1.9 2.3 2.2 2.2 2.2 2.2 2.2 |
| Glc-me 0.4 AG | 36 32 21 29 33 27 29 |

CONCLUSION: Glutamine increased glucose oxidation in multiple trauma patients. In combination with insulin it increased mainly non-oxidative glucose utilization.

REFERENCE(S): 1. Van Den Berge G., Wouters P, Weevers F, et al: Intensive insulin therapy in critically ill patients. N Engl J Med 2001; 345:1599-67. 2. DeFronzo RA, Tobin JD, Andres R: The Glucose clamp technique: a method for the quantification of beta cell sensitivity to glucose and of tissue sensitivity to insulin. Am J Physiol 1979; 237:E214-E223. 3. Frayn KN. Calculation of substrate oxidation rates in vivo from gaseous exchange. J Appl Physiol 1983; 55(2):628-34.

Grant acknowledgement: Supported by a grant GAUK 60/2001.

221
THE IMPACT OF PROGNOSTIC NUTRITIONAL INDEX FOR PATIENTS RECEIVED STEM CELL TRANSPLANTATION
Kim Y1, Onishi Y1, Honda O2, Hiraga K2, Takaue Y1
1Hematopoietic Stem Cell Transplantation, 2Anesthesia and Critical Care Medicine, National Cancer Center Hospital, Tokyo, Japan

INTRODUCTION: Nutritional evaluation is insufficient for patients who received allogeneic hematopoietic stem cell transplantation (AHSCT). Scarcey predictve system of prognosis due to critically ill patients. N Engl J Med 2001; 345:1599-67. 2. DeFronzo RA, Tobin JD, Andres R: The glucose clamp technique: a method for the quantification of beta cell sensitivity to glucose and of tissue sensitivity to insulin. Am J Physiol 1979; 237:E214-E223. 3. Frayn KN. Calculation of substrate oxidation rates in vivo from gaseous exchange. J Appl Physiol 1983; 55(2):628-34.

RESULTS: Of 390 patients who received AHSCT between January 1999 and August 2003, 72 (18%) were diagnosed with GI-GVHD. Median age 46 years (range 18-69 years); M:R F ratio 51:21; donor: 53 related; 19 unrelated; stem cell source: 53 peripheral blood stem cell; 18 bone marrow; 1 cord blood; disease: 27 acute leukemia; 13 chronic leukemia; 16 malignant lymphoma; 12 myelodysplastic syndrome; 4 solid tumor. Median post-transplant day reached maximal grade GI-GVHD was 44 (range 11-314). Median PNI on admission before AHSCT and on the maximal grade GI-GVHD were 47 (range 30-89) and 16 (15-60), respectively. In PNI on the admission, overall survival between PNI<40 group and PNI≥40 group was not significant (p=0.2145). In PNI on the maximal grade GI-GVHD, however, overall survival between PNI<40 group and PNI≥40 group was significant (p=0.05). Cause of death was multiple organ failure (n=11), septic shock (n=7), progression of underlying disease (n=7), fungal infection (n=3), cytomegaloviral infection (n=2), acute GVHD (n=2), and others (n=5).

CONCLUSION: We evaluated PNI of AHSCT patients with GI-GVHD. Prognosis of AHSCT patients with GI-GVHD was not predicted before transplant however, it was predicted on the maximal grade GI-GVHD.

REFERENCE: Onodera T, Goekin K, Kusaki G, Nippon Geka Gakki Zasshi. 1984; 85:1001-5.
224
INCIDENCE OF HYPERHOMOCYSTEINEMIA IN ICU PATIENTS
Hyanek T1, Hyanek F1, Vondráčková D2, Matoušková J3
1Anesteziology and Intensive Care, 2Clin. Biochemistry, 3Neurology, Cardiology, Homolka Hospital, Prague, Czech Republic

INTRODUCTION: Hyperhomocysteinemia (HHC) - increased level of homocysteine in plasma is a consequence of disturbed remethylation or transsulfuration of nonessential aminoacid homocysteine (Hcy). HHC is suspected from premature development of atherosclerotic vessel diseases independent on lipid status. This fact was confirmed by many retrospective case control studies but conflicting results come from prospective studies. Supported by these findings we introduced the selective screening of total homocysteine (Hcy) in ICU patients. Among 11 409 patients hospitalized in our hospital within last 10 yrs a relatively high frequency of HHCs have been observed. The aim of this paper is to follow HHC in ICU patients.

METHODS: The patients admitted to general ICU (n = 290), cardiovascular ICU (n = 254), ICU dpt. vascular surgery (n = 1810) and neurological ICU (n = 370) were investigated for Hcy (total homocysteine) estimated by enzymatic HIA method on Abbott Assym under EDRNIM quality control. Blood drawn into EDTA evacuated tubes/Vacutainer, centrifuged within 20 min. Accorrding to level of plasmatic Hcy HHCs were differentiared according to Kang et al as mild HHC (mHHC, 15 – 30 umol/l), moderate HHC (m(mHHC, 30-100 umol/l) and severe HHC (sHHC, > 100 umol/l). Vitamin measurement was done by method of lineal statistical induction (STATISTICA 6.0) and multivariant analysis (ANOVA).

RESULTS: HHC incidence in all ICUs is given in Table 1.

| Type of HHC | mHHC | sHHC |
|-------------|------|------|
| general ICU | 1.33 | 2.84 |
| Neurological ICU | 1.60 | 1.61 |
| Cardiology ICU | 1.40 | 1.40 |

CONCLUSION: The incidence of different HHCs was detected in ICU patients, in Homolka Hospital. Patients, hospitalized for cardiovascular and cerebrovascular diseases. For explanation the high frequency of renal failure, the low levels of critical vitamins and the high frequency of MTHFR gene mutation C677T were observed.

REFERENCE(S): 1. Kang, S.S. et al: Thermolabile MTHFR: an independent risk factor coronary artery-diseases. Am J Human Genet, 1991, 48:536 - 545. 2. Malinow, M.R. et al: Prevalence of hyperhomocysteinemia in peripheral arterial occlusion disease. Circulation, 1989, 79:1180. 3. Matalon, R. et al: Polymorphism of MTHFR and MTRR in Czech Patients with Cardiovascular Diseases and Stroke. 4. Volko, Drahouchov. 2003, 59:418 - 420. 5. Grant acknowledgement: Supported by IGA MZ CR NA 6497 - 3

Poster Sessions Technology assessment I – 225-236

225
EXCRETORY LIVER FAILURE FOLLOWING LIVER TRANSPLANTATION TREATED WITH THE MARS®-SYSTEM
Bingold T1, Molitor C2, Hauer B1, Byhahn C1, Waelzl H1, Wisser H1, Bechtewi W1, Zwissler B1
1Department of Anesthesiology, 2Department of General Surgery, 3J.W.Goethe University Medical School, Frankfurt am Main, Germany

INTRODUCTION: MARS® is an extracorporeal liver support system able to eliminate albumin- and water soluble toxic substances from blood in cases of liver failure [1]. Up to now only a few cases of MARS® therapy in patients with graft failure after liver transplantation have been reported, not discriminating between excretory or global liver failure. In some cases, isolated excretory graft failure can be observed as a sign of an ischemic-reperfusion injury. Although the synthesis function is not impaired this may lead to a multi organ failure. There is no causal therapy available except for retransplantation. Is MARS® a viable therapeutic option in this situation?

METHODS: We report on a 60 years old male patient who underwent liver transplantation due to secondary sclerotic cholangitis. On postoperative day 2 he underwent revision due to bleeding. AST, ALAT and GLDH plasma activities decreased to normal values thereafter. During the first week the total bilirubin concentration was 10 mg/dL and increased to 37.5 mg/dL until day 13 after transplantation. Due to signs of progressive hepatic encephalopathy, cardiocirculatory instability and renal failure a two days MARS® -therapy was initiated.

RESULTS: During MARS® therapy total bilirubin dropped to one third of baseline values and increased to 19.5 mg/dL on day 4 after therapy. Following MARS® therapy renal function recovered and signs of hepatic encephalopathy diminished. Mortal examination of a liver biopsy obtained before MARS® therapy revealed ischemic cholangitis due to reperfusion injury. Five weeks after transplantation the patient was discharged from hospital with normal bilirubin values.

CONCLUSION: In the present case, where retransplantation was considered due to isolated severe excretory graft failure after liver transplantation, two cycles of MARS® therapy resulted in gradual recovery of organ function after ischemic reperfusion injury and eliminated the need for re-transplantation. We hypothesize that reducing the load of toxic metabolites may have alleviated the hepatic transport proteins thus avoiding negative feedback effects on bile excretion [3] thereby contributing to an improved excretory liver function in our patient.

REFERENCE(S): 1: Minner et al. Curr Opin Nephrol Hypertens 2001;10:777-783; 2: Sen et al. Aliment Pharmacol Ther 2002;16(Suppl 5):32-38; 3: Kulla-Ubluck et al. J Hepatol. 2000;32(Suppl 1):13-18
INTERHOSPITAL TRANSPORTATION OF ADULT PATIENTS WITH EXTRACORPOREAL MEMBRANE OXYGENATION

Huang S1, Ko W1, Chen Y1, Chu N1, Wang S1
1Surgery, National Taiwan University Hospital, Taipei, Taiwan

INTRODUCTION: Extracorporeal membrane oxygenation (ECMO) could support the patients with advanced cardiac or respiratory failure. Transfer of the critical ill patients to medical center with ECMO facility maybe provides the chance of survival for them. However, interhospital transportation of adult ECMO patients were rarely reported. Here we report our experience of ECMO-assisted transportation.

METHODS: Patients with cardiac or respiratory failure unresponsive to conventional therapy were referred to our hospital by telephone consultation. If ECMO is needed to stabilize the patient during the transport, our ECMO team departed to the referring hospital with the equipment to set-up ECMO. The ECMO-transportation team consisted of one surgeon, one technician and one fellow. The ECMO circuit is heparin-bounded with centrifugal pump and hollow-fiber oxygenator. All the patients were transported via ambulance with special modification.

RESULTS: From January 1998 to December 2003, 35 adult patients were transported with ECMO to our institute. Diagnosis included adult respiratory distress syndrome (n=6), acute myocarditis (n=4), acute myocardial infarction with cardiogenic shock (n=12), cardiomyopathy (n=5), and post-cardiomyopathy shock (n=8). All were supported with venous-arterial ECMO except two patients with ARDS. The mean transportation distance were 140 Km (range: 4 to 300 Km) and the duration was 129 minutes (range 15 to 210 min). The ECMO circuit did not have complication during transportation, and all patients could arrive our intensive care unit successively. The complications occurred during transportation included one episode of transient electric failure. The ECMO could be weaned off in 16 (46%), bridge to ventricular assist device in 7 (20%), and surgical reexploration.

CONCLUSION: ECMO assisted transportation is a safe and feasible option for patients with advanced cardiac or respiratory failure. Transfer of the patients to experienced ECMO center could provide chance of survival for them.

FLUID VERSUS AIR FOR SEMICYCLONOUS INTRAABDOMINAL PRESSURE MEASUREMENT USING A GASTRIC BALLOON

De Waele J1, Billiet E1, Hoste E1, Blot S1, Colardyn F1
1Intensive Care Unit, 2Biomedical Technical Department, Ghent University Hospital, Ghent, Belgium

INTRODUCTION: Different techniques are available for monitoring intraabdominal pressure (IAP) in critically ill patients. Transvesical measurement of the IAP is most popular, but it is labor intensive and may be prone to methodological errors. An alternative is to introduce an esophageal balloon (Compliance catheter female, International Medical Products BV, Zutphen, The Netherlands), connected to a pressure transducer, into the stomach. The pressure transducer can be connected to any monitoring equipment used in the unit. It is however not clear what medium, water, air, and what volume is necessary to have accurate readings. Therefore we set up a laboratory experiment to determine the medium best suited, and to assess if the amount of the medium influences the readings from the balloon.

METHODS: A 12 by 22 cm glass container was filled with water, and the lid sealed. Four openings were made in the lid: two for the two balloon test catheters, one for the reference pressure transducer in the container, and one for the input pressure line which was connected to the external pressure source. This source consisted of a static pressure generation by means of a fluid filled syringe and on top of it a sinusoidal dynamic pressure wave of 50 Hz. 10 mmHg peak to peak in order to simulate the variation observed in mechanically ventilated patients with a 12/min respiration frequency. The pressure transducers were of the type DTX Recton Dickinson and had been connected to a Drager/ Siemens 9000XL monitor. The dynamic signal generator was of type Biostek 601A. The esophageal balloons were filled with water and air respectively, starting with 0 mL up to 10 mL, with 2.5 mL increments. Static external pressure was applied to the fluid in the container starting with 5 mm Hg, up to 15mm Hg with 2.5 mmHg increments, and up to 40mmHg with 5mmHg increments. Pressure readings from both balloon catheters were recorded, and compared to the reference pressure in the container.

RESULTS: The differences between pressure recordings from the balloon, either air or water filled, and the pressure measured directly in this experimental setup, were within 1mm Hg limits at all pressures, and independent from the medium used. When water was used as a medium, aspiration of water from the balloon, and subsequent refilling resulted in unstable and incorrect readings. Accumulation of multiple air locks in the catheter is a possible explanation for this.

CONCLUSION: Air and water are both suited as medium for transgastric IAP measurement using a balloon. The volume of the fluid does not seem to influence pressure recordings, but for clinical use intragastric pressure measurement, it is advised to use 2.5 to 7.5 mL of air into the balloons, as this will stabilize the positioning of the catheter. Water should not be used as a medium because aspiration and subsequent refilling causes unreliable readings.

INTRAABDOMINAL MICRODIALYSIS IN PERITONITIS

Chierigo M1, De Rucker D2, Marujama J D D1, Chamolu R2, De Moor V2, Loi P2, Gelin M2, Vincent JL1
1Intensive Care, 2Digestive Surgery, Erasme Hospital, Bruxelles, Belgium

INTRODUCTION: Microdialysis techniques can allow measurement of tissue levels of lactate and pyruvate. The goal of this observational study was to evaluate whether intraperitoneal lactate/pyruvate measurements using a microdialysis technique can reflect the severity of the intraabdominal process following laparotomy and help to identify those patients who need reexploration.

METHODS: We investigated 16 ICU patients requiring urgent laparotomy. A dialysis probe (180 mm-CMA 62, CMA Microdialysis) was placed intraoperatively in the peritoneal cavity, in contact with the bowel a few cm away from the suture, just before abdominal closure. The probe was perfused with Ringer’s solution from a microinfusion pump (0.3 microl/min) and analysed for glucose, lactate, pyruvate, and glycerol. Microdialysate samples were collected and analysed every hour. Informed consent was obtained from the patient or relatives.

RESULTS: The reasons for laparotomy were peritonitis (9), caustic ingestion (2), bowel ischemia (1), cholecystectomy (1), and hemorrhagic shock (politrauma patient with broken spleen and bowel dissection) (1), and two patients underwent explorative laparotomy, which revealed no significant abnormality. The average monitoring time was 6 days. Ten patients had a mean lactate/pyruvate ratio above 16, and 5 of these underwent surgical reexploration, which revealed extended (2 m) bowel necrosis (1), a toxic mega colon (1), a necrotic retroperitoneal area with a wall abscess (1), and no identified complication (2). Three patients with a lactate/pyruvate ratio above 16 died: Of the 6 patients with a lactate/pyruvate ratio less than 16, no patient needed surgical reexploration and one patient died.

CONCLUSION: The intraperitoneal measurements of lactate/pyruvate ratio may provide valuable information of the severity of the intra abdominal process. In our experience, a ratio below 16 can reassure vis-a-vis the development of intra abdominal complications requiring surgical reexploration.

PORTABLE BEDSIDE CHEST RADIOGRAPHS DURING MECHANICAL VENTILATION IN PRONE POSITION

Monge Garcia M1, Gil Cano A1, Villaggio J G2, Diaz Monrove J C2, Carmona Carmona F2, Sampedro Cejas J M3
1Intensive Care Unit, 2Servicio de Radiodiagnostico, Hospital de Jerez, Jerez de la Frontera, Spain

INTRODUCTION: Mechanical ventilation in prone position is widely used in patients with severe hypoxemic respiratory failure. Radiographic changes induced by the prone position have been studied using Computed Tomography but not in portable bedside chest radiographs (CXR), the most frequent radiologic examination conducted in critically ill patients. Therefore we designed this study to find out the influence of mechanical ventilation in prone position on the appearance of portable bedside CXR.

METHODS: We prospectively evaluated patients who were mechanically ventilated in prone position. Paired portable bedside CXR were obtained just before and one hour after prone position was set, without modifying ventilatory parameters nor radiological technique: position and distance of radiograph machine, exposure time and the intensity. Changes investigated in the CXR appearance induced by the prone position were: position of vascular lines and tubes, extension of pulmonary infiltrates according to the number of intrathoracic structures blurred (cardiac edges, diaphragm margins and main mediastinum lines), transversal and longitudinal diameters of the thorax and localization of pleural fluid.

RESULTS: Twenty studies were performed in 18 patients. Compared to supine, the CXR obtained in prone position showed a higher distance between tracheal tube and carina (5.1±1.4 cm vs 4.3±1.3 cm p<0.01), more number of intrathoracic structures blurred (4.4±1.3 vs 3±1.4 p<0.001) due to shift in pulmonary densities, more lateral and apical localization of pleural fluid, and an increase in transversal and longitudinal thoracic diameters (31.2±2.9 cm vs 29.1±2.3 cm p<0.001), and 26.1±2.2 vs 24.8±1.3 cm p<0.001). The differences between measurements obtained in prone and supine position were slight.

CONCLUSION: Portable bedside CXR obtained in prone position was characterized by a slight ascent of endotracheal tube, 2) changes on the distribution of pulmonary infiltrates and pleural fluid according to a gravitational gradient, and 3) an increase in transversal and longitudinal thoracic diameters.

17th Annual Congress – Berlin, Germany – 10–13 October 2004
230
NON-INVASIVE CONTINUOUS MONITORING OF LUNG FUNCTION AT THE BEDSIDE
Vazquez de Anda G1, Larrazu S2, Gutierrez J3, Talavera P4, Mejia R5, Arzate A6
1Critical Care Division, 2Biomedics, 3Critical Care Unit, ISESEYM MEDICAL CENTER, Metepex, 4Clinical Epidemiology Department, Hospital de Especialidades CMN Siglo XXI, 5Intensive Care Medicine Resident, UNAM, Mexico City, 6Intensive Care Unit, ISESEYM MEDICAL CENTER, Metepex, Mexico

INTRODUCTION: The purpose of this study was to determine the utility of continuous monitoring of lung function at the bedside using a computer program device, based on the rationale of the Calculated Desaturation Index(DIC; r=1).2,3

METHODS: We developed a computer program to determine continuous monitoring of the DIC which includes saturation by pulse oximetry, PEEP and FiO2. To obtain these values breath-by-breath, a capnographic device (D-LITE sensor) was attached to the endotracheal tube. Data from the bedside monitor (Datex Ohmeda) were transferred to an external computer device, to the equation to determine and display the Desaturation Index (DIC) was programmed (MDIC). We included and followed patients with and without ALI/ARDS during a period mechanical ventilation. Blood gas analyses, thorax X-ray and the DI (r=2) were obtained. Statistical differences for lung function were calculated. Statistical analysis was performed to compare: The MDIC and the PaO2/FiO2 index in patient without ALI/ARDS (Group 1), versus patients with ALI (Group 2) and versus patients with ARDS (Group 3). Correlations between the MDIC and DI, thorax X-ray and indices of lung function were performed with a Pearson’s test.

RESULTS: Eleven mechanically ventilated patients were included.2 in Group 1; 6 in Group 2; and 3 in Group 3. Mean that patients were followed under mechanical ventilation was 48 h (24-148h) and 24651 MDIc-data were obtained. The mean value of MDIC in Group 1 was 15.61 ± 12.68 (n=8170) in Group 2; 18.4 ± 16.01 (n=8631) and in Group 3; 55.55 ± 26.41 (n=7850) There were statistical differences between them (P=0.000). The mean of PaO2/FiO2 ratio in Group 1 was 148h) and 24651 MDIc-data were obtained. The mean value of MDIc in Group 1 was 15.61 ± 12.68 (n=8170) in Group 2; 18.4 ± 16.01 (n=8631) and in Group 3; 55.55 ± 26.41 (n=7850) There were statistical differences between them (P=0.000). There was an excellent correlation between MDIC and the DI (r=0.92) with the P(A-a)O2 gradient (r=0.895). Also, there was an excellent negative correlation (r=-0.92) with the PaO2/FiO2 ratio (r=0.895). Also, there was an excellent negative correlation (r=-0.92) with the PaO2/FiO2 ratio (r=0.895). Also, there was an excellent negative correlation (r=-0.92) with the PaO2/FiO2 ratio (r=0.895). Also, there was an excellent negative correlation (r=-0.92) with the PaO2/FiO2 ratio (r=0.895). Also, there was an excellent negative correlation (r=-0.92) with the PaO2/FiO2 ratio (r=0.895).

CONCLUSION: We conclude that the MDIC, which is a non-invasive index included in a computer program, reflects the lung function breath-by-breath during mechanical ventilation at the bedside.

REFERENCES: 1.Vazquez de Anda GF, Talavera P.O, Lopez Valle, et al. „Lung dysfunction and mortality in mechanically ventilated patients: use of the Desaturation Index“, Crit Care Med 2003; 31:12. 2. Vazquez de Anda GF, Talavera P.O, Lopez Valle, et al. Use of the Simplified Desaturation Index to Identify Lung Dysfunction. Intensive Care Med 2003; 29:21 A64.

231
TWO COURSES OF ICU PATIENTS PATIENTS DEMONSTRATED BY COMPLEX VISUALIZATION OF INTRAMUCOSAL CO2-MEASUREMENT
Saager L1, Wiesner E1, Pestel G1, Bothammer A1
1Institut für Anästhesiologie und Intensivmedizin, Leopoldina Krankenhaus, Schweinfurt, Germany, 2Dept. of Anesthesiology, Washington University School of Medicine, St. Louis, United States

INTRODUCTION: Hyperservicefication of splanchnic organs resulting from trauma or haemorrhage contributes to multiple organ failure (1,2). Intestinal malperfusion can easily be detected by intramucosal CO2-tonometry (3). Our novel approach on data interpretation by visualizing large data sets of tonometry values provides additional information. We compare intramucosal CO2-values of two ICU patients. Patient DM: 26y, female, traffic accident. Haemato-pneumothorax on both sides, traumatic subarachnoidal bleeding, multiple fractures incl. thoracic vertebrales 3-6, APACHE-II-Score 40. Patient RS: 43y, male, traffic accident. Haemato-pneumothorax, multiple fractures, rupture of left popliteal artery, septic shock, secondary ablation of the left upper leg, APACHE-II-Score 9. Both failures were in the outreach group, the reasons were: 1.Unable to pass through the nostril. 2. Unable to tolerate the probe. 9 were able to be focussed in less than 3 minutes, 2 in 3-10 minutes and 2 were unable to be focussed. The mean VATS for the surgical group was 32.5 (range 10-50). There were no adverse events related to insertion including epistaxis despite some patients being coagulopathic or heparinised.

CONCLUSION: Critical care outreach teams seek to recognise early critical illness and improve patient outcome by timely intervention (2). In our series, 11 of 15 AODPs were easily inserted and quick to focus with no associated morbidity. These early positive experiences of both patient and operator, suggests that AODP may offer an extended role for monitoring cardiac output in both pericritical care and awake surgical patients.

REFERENCES: 1. Gan TJ, Arrowsmuth JE. The oesophageal Doppler monitor: a safe means of monitoring the circulation. BMJ 1997;315:893-4. 2. Cuthburtson BH. Outreach critical care – cash for no questions? Brit J Anaesth 2003;90:4-6. 3. Grant acknowledgement: Deltex Medical Ltd for the provision of probes.

232
EARLY EXPERIENCES WITH THE NEW A WAKE OESOPHAGEAL DOPPLER PROBE
Filho R C o s t a1, Vaisman M M V1, Gutierrez F F B G1, Ferreira Costa J J F C1, Gomes P P N G1, Berthaux J J R B1, Parodi A A P2, Arkader R R A3
1Intensive Care Unit, 2Lamina Laboratory, Pro Cardiaco Hospital, Rio de Janeiro, 3Instituto da Criança, Hospital das Clínicas FMUSP, São Paulo, Brazil

INTRODUCTION: Elevation in the serum concentration of procalcitonin (PCT) has been proposed as a marker of disease severity and is associated with systemic inflammation. (1) This association has led to the proposed use of PCT as a biomarker of bacterial sepsis. (2,3,4) We sought to evaluate the PCT measurement with a semi-quantitative bedside method (PCTQ).

METHODS: From April to July 2003 we evaluate 48 blood samples from 30 patients (14 male with middle age 76.64 +/- 13.66 years and 16 female with middle age 82.06 +/- 10.05 years with sepsis or SIRS in the ICU. PCT levels were measured and grouped in 4 intervals: (0-5 ng/ml); (5-20 ng/ml); (20-100 ng/ml) and (>100 ng/ml) by a quick bedside semi-quantitative method (BRAHMS PCTQ) and compared results with measurements performed by a quantitative luminometry method (BRAHMS LUMITEST PCT; GERMANY).

RESULTS: The Kruskall-Wallis ANOVA analysis found a positive and reasonable correlation between the PCTQ and the PCTL for PCT levels >10 ng/ml. There was no significant difference between the other 3 intervals (<0.5 ng/ml; 0.5-2 ng/ml; 2-10 ng/ml) by a quick bedside semi-quantitative method (BRAHMS PCTQ) and compared results with measurements performed by a quantitative luminometry method (BRAHMS LUMITEST PCT; GERMANY).

CONCLUSION: This preliminary analysis suggests that PCTQ can be used to accurately measure PCT levels above 10 ng/ml. Other studies with more samples are necessary to provide more information about levels below 10 ng/ml.

REFERENCES: 1. Gabay C, Kushner I. Acute-phase proteins and other systemic responses to inflammation. N Eng J Med 1999;340(6):448-54. 2. Whang KT, Vath SD, Becker KL, Snider RH, Nylen ES, Muller B, et al. Procalcitonin and proinflammatory cytokine in interactions in sepsis. Shock 1999;12(4):268-73. 3. Goven H, Alintop L, Baydln A, et al. Diagnostic value of procalcitonin levels as an early indicator of sepsis. Am J Emerg Med 2002;20:202-6. 4. Assicot M, Gerdel D, Carlin H, et al. High serum procalcitonin concentrations in patients with sepsis and infection. Lancet 1993;341:515-8.
234 CORRELATION BETWEEN INTRACRANIAL AND INTRA-ABDOMINAL PRESSURE
Malbrain M.L.N.G1, Libeert C2, Nijs J3, Deeren D3, De Potter T3, Van den Brande E1.
1Intensive Care Unit, Neiersurgery, Ziekenhuisnetwerk Antwerpen, site Stuivenberg, Antwerpen, Belgium.

INTRODUCTION: Intracranial pressure (ICP) and intra-abdominal pressure (IAP) are important parameters in critically ill patients. Changes in these pressures are known to influence cerebral perfusion pressure (CPP), and mortality. However, the correlation between ICP and IAP has not been widely investigated.

METHODS: We studied 9 patients with major abdominal trauma and intracranial lesions. IAP and ICP were recorded simultaneously for at least 15 minutes. All patients were treated with an intensive insulin regime.

RESULTS: We found a good correlation between IAP and ICP (r=0.95, p<0.0001). The regression line was ICP = 0.9xIAP + 0.1 (R²=0.47, p<0.001, 2-tailed Pearson correlation). However, the 95% limits of agreement were -1.44 to 1.01 mmHg.

CONCLUSION: There is a good correlation between IAP and ICP. The evolution of IAP (ΔIAP) can be used as an indicator for the evolution of ICP (ΔICP), however for making a definite diagnosis of intradural or intracranial hypertension the exact value of ICP or IAP should be measured. The APP and ΔICP also correlated well with the CPP and ΔICPP respectively. IAP is an important parameter in patients with neurotrauma and can be the cause of neurological deterioration in patients with abdominal trauma without overt cranial trauma.

REFERENCES: (1) Malbrain MLNG. Current Opinion Crit Care 2004:10. 132-145. (2) Critic G et al. CCM 2001; 29:1466-71.

Grant acknowledgement: ESIICM 2003 Stoutsbeek Award

235 IS A GLUCOMETER SAFE AT DETECTING HYPOGLYCAEMIA IN PATIENTS TREATED WITH INTENSIVE INSULIN THERAPY?
Brett M.J, Russell S.A, Rooney K D3
1Department of Anaesthesia, Royal Alexandra Hospital, Paisley, United Kingdom

INTRODUCTION: In a recent randomised control trial in intensive care patients, aggressive insulin therapy significantly improved outcome. A further study concluded that glucose control rather than insulin therapy, accounted for the mortality benefit. Glycaemic control and prevention of hypoglycaemia require immediate and accurate monitoring of blood glucose. Concerns regarding glucometer accuracy at the lower range of normal and in critical care settings exist. Our aim was to question if a glucometer was accurate at detecting hypoglycaemia in critically ill patients treated with an intensive insulin regime.

METHODS: The study was conducted in an adult intensive care unit (ICU). Data was collected from arterial blood samples sent to the laboratory for glucose analysis following a reading of <4.4 mmol/L on the glucometer. All patients were treated with an intensive insulin regime. Laboratory analysis of plasma glucose was performed by a Roche Modular System (Roche Diagnostics GmbH, Germany). An ACCUCHÈK Advantage System using Advantage II Test Strips (Roche Diagnostics Ltd. GB) performed glucometer analysis. Pearson Correlation Coefficient summarised the strength of the association. Measure of agreement compared mean differences along with standard deviation to estimate bias.

RESULTS: 64 samples were sent to the laboratory following a reading of <4.4 mmol/L with the glucometer. All patients were treated with an intensive insulin regime. Correlation between blood glucose measured by the glucometer and by the laboratory analysis was good: r=0.684, p<0.001. The 95% limits of agreement were -1.44 to 1.01 mmol/L.

CONCLUSION: Initial assessment using the Correlation Coefficient reported an encouraging association between the glucometer and laboratory. However, calculation of agreement and its 95% limits indicate that a glucometer may not be as accurate as the laboratory analysis. There are established concerns regarding the accuracy of glucometers in the ICU and at the lower range of normal. High partial pressures of oxygen, haemocrit and pH all affect glucose measurement. These variables are common in the ICU. The benefit of tight glycaemic control is clear in terms of reduction in morbidity and mortality. However accurate monitoring and control of blood glucose is essential. Laboratory analysis remains the most accurate and precise method. Future studies should include greater numbers of samples and examination into which point-of-care test would be most suitable for immediate analysis.

REFERENCE/S: 1. Van den Bergh, G., Wouters, P., Weekers, F. et al. (2001) Intensive Insulin Therapy in Critically Ill Patients. NEJM 345(19), 1359-1367
2. Finney, S.J., Zekveld, C., Elia, A. et al. (2003) Glucose Control and Mortality in Critically Ill Patients. JAMA 290, 2041-2047

236 TREATMENT OF FEVER IN BRAIN-INJURED PATIENTS USING WATER-CIRCULATING COOLING DEVICE
Wancek M1, Bellander B2, Stråå A3, Bertsson M4
1Anesthesia and Intensive care, 2Neurosurgical Intensive Care, Karolinska Hospital, Stockholm, Sweden

INTRODUCTION: Pyrexia after acute severe brain injury is frequent and correlates with poor outcome. Pharmacological antipyretic therapy is poorly effective and may be associated with side effects. We report on efficiency in a pilot study using a water-circulating cooling device (ThermoWrap, MTRE Ltd.).

METHODS: 18 patients with severe brain-injury (GCS<9) and temperature ≥38°C were enrolled. The thermoregulation device is a microprocessor controlled water-circulating garment, wrapped around the patient. Temperature was set at 36°C. Temperature, intracranial pressure and mean arterial blood pressure were registered before and every 3 hours during the first 24h of treatment. All patients were sedated and 7 were in addition treated with pentobarbital.

RESULTS: After initiation of treatment, mean temperature fell to 37.0 °C±0.7 within 3 hours of treatment. During the following 24 h, mean temperature remained between 36.7±0.7 to 36.8±0.6°C. In 4 patients treatment was terminated before 24 h due to surgery (n=2) or transport (n=2). No patients needed muscle relaxants during the study period. Intracranial pressure and mean arterial blood pressure were not significantly altered during the first 24 hours of cooling. Skin integrity was kept in all patients.

CONCLUSION: Our results support the effectiveness of this novel cooling device in the treatment of hyperthermia in brain-injured patients.

Poster Sessions
Non invasive mechanical ventilation – 237-249

237 INFLUENCE OF TUBE POSITIONING ON CO2-WASHOUT USING A HEAD HELMET FOR CPAP VENTILATION
Vogelsang H1, Möller M2, Meisser A1, Schlärk M1, Lautenthal H1, Schäfer T1
1Anaesthesiology, St. Josef-Hospital, Klinikum der Ruhr-Universität, Bochum, 2Zentrum für Schlaf-und Rehaforshung, Klinik Ambrock, Hagen, 3Institut für Physiologie, Ruhr-Universität, Bochum, Germany

INTRODUCTION: The head helmet is a new device for continuous positive airway pressure therapy (CPAP) or non-invasive ventilation (NIV). Connectors around the helmet ring offer different ways to install in- and expiratory tubes. We were interested in a single-tube CPAP system and asked if positioning of the inspiratory tube and expiratory valve can influence CO2-washout.

METHODS: After informed consent 6 healthy volunteers breathed through a helmet for NIV (4Vent®, Rüsch, Germany) connected to a ventilator (BiPAP S/T-D, Respironics) with a standard inspiratory tube. We used a Whisper Swivel (Respironics) for expiration which was placed at two different positions. Position A: at the inspiratory side between tube and helmet ring, all other connectors closed. Position B: opposite the inspiratory tube, other connectors closed. We studied both positions at CPAP 4, 8, 12 and 16 cmH2O randomly ascending or descending.

RESULTS: Using a head helmet for CPAP therapy with a single-tube system and moderate flow rates, it is necessary to place the expiratory valve opposite the inspiratory tube at the helmet ring. Otherwise there is not enough air stream within the helmet to overcome dead space volume and CO2 rebreathing occurs.
238

THE RISK OF ACCIDENTAL ASPHYXIA DURING HELMET CPAP: ASSESSMENT OF DIFFERENT HELMETS

Patroniti N1, Saini M2, Zenella A1, Tagliafu G1, Iugro S3, Bucicero M4, Pesenti A1
1Surgical Science and Intensive Care, University of Milano - Biocca, Monza, Italy

INTRODUCTION: The most dangerous threat during helmet CPAP is the possibility of asphyxia arising from accidental disconnection of the inspiratory limb or lack of compressed gas supplies. We assessed the behaviour of different types of helmet to disconnection of gas flow by disconnection at the helmet inlet (Di), at the flow generator (Df), or by disconnection of the gas source (Ds). The studied helmets were: -4Vent, RUSCH (R); PN500, HAROL (H); CalStar with anti-suffocation valve open (CSVP) or locked (CSVL); StarMed.

METHODS: Five healthy young volunteers underwent a random sequence of all possible disconnections for all tested helmets. CPAP was delivered by an adjustable flow generator at 60 l/min of air, without reservoir bag, with 5 cmH2O PEEP. During flow disconnection we measured resistance of the inlet hose and a bigger helmet size can slow the CO2 increase.

RESULTS: PiCO2 and PetCO2 after 4 minutes are reported in table 1. Indipendently from disconnection type, CSVLV showed the lower increase in PiCO2 and PetCO2 reaching a plateau after 2 minutes. The increase in PiCO2 was slower during both Di and Dg, but faster during Di with H than CSVLV or R. Increase in PiCO2 and PetCO2 was slower during Di than Df or Dg; there was no difference between Di and Dg.

|                  | PiCO2 | PetCO2 |
|------------------|-------|--------|
|                  | R     | H      | CSVL   | Di   | Df   | Dg   | Di   | Df   | Dg   |
| R*               | 31±3* | 34±3*  | 31±3*  | 29±3*| 31±3*| 31±3*| 31±3*| 31±3*| 31±3*|
| H*               | 34±3* | 34±3*  | 34±3*  | 29±3*| 34±3*| 34±3*| 34±3*| 34±3*| 34±3*|
| CSVL             | 22±2* | 22±2*  | 22±2*  | 22±2*| 22±2*| 22±2*| 22±2*| 22±2*| 22±2*|
| Di               | 27±2* | 60±4*# | 60±4*# | 47±4*| 63±3*| 63±3*| 63±3*| 63±3*| 63±3*|
| Df               |       |        |        |      |      |      |      |      |      |
| Dg               |       |        |        |      |      |      |      |      |      |

p<0.05 * vs CSVLV, #vs H, $ vs Di

CONCLUSION: The use of an anti-suffocation valve proved effective in limiting the increase in CO2 during disconnection and it should be recommended when delivering helmet CPAP. A low resistance of the inlet hose and a bigger helmet size can slow the CO2 increase.

Grant acknowledgement: Supported by MIUR

239

PATIENT-VENTILATOR ASYNCHRONIES DURING NIV: DOES LEVEL OF PRESSURE SUPPORT MATTER?

Pertusini E1, Lelouche E3, Catani F1, Heili S1, Taille S1, Rodriguez P3, Brochard L1
1Medical ICU, INSERM U492, Henri Mondor Hospital, Paris XII University, Créteil, France

INTRODUCTION: Little is known about patient-ventilator asynchronies (AS) during non-invasive ventilation (NIV). They are amongst other related to air leaks and may lead to severe patient discomfort and NIV failure. The aim of this study is to determine the effects of different pressure support (PS) levels on AS frequency and type, respiratory and haemodynamic parameters and arterial blood gases.

METHODS: After information, patients undergoing intermittent NIV for acute respiratory failure for >24h were prospectively included. Patients were ventilated for 20min on three levels of PS in a randomised order (12, 15 et 18 cmH2O). Levels of PEEP and FIO2 were left as set by the physician. During each period, flow and airway pressure signals were recorded and AS, defined as prolonged inspirations, short inspirations, auto triggering and missed efforts, were counted. Arterial blood gases and respiratory and haemodynamic parameters were collected for each period.

RESULTS: see TABLE

|                  | PS 12 mmHg | PS 15 mmHg | PS 18 mmHg | P Frieden |
|------------------|------------|------------|------------|------------|
| RR h/min         | 27±2*      | 22±2*      | 26±2*      | 0.2         |
| MV ml            | 15±12      | 15±12      | 15±12      | 0.2         |
| Leaks %          | 15±16      | 15±16      | 15±16      | 0.2         |
| AS %             | 15±16      | 15±16      | 15±16      | 0.2         |
| IPAP mmHg        | 30±3       | 30±3       | 30±3       | 0.2         |
| EPAP mmHg        | 30±3       | 30±3       | 30±3       | 0.2         |
| PaO2 mmHg        | 10±1       | 10±1       | 10±1       | 0.2         |
| PaCO2 mmHg       | 48±2       | 48±2       | 48±2       | 0.2         |

CONCLUSION: As shown above, AS frequency as well as air leakage were increased by increasing level of PS, without significant effects neither on minute- nor on alveolar ventilation.

Grant acknowledgement: OGLUT

(Australian Society for Lungdiseases and Tuberculosis)

240

RISK FACTORS FOR NIV FAILURE IN NEUTROPENIC PATIENTS

Faria F1, Martins A1, Loureiro L1, Paiva A1, Aguair A M1
1Unidade de Cuidados Intensivos, IPO-Porto, Porto, Portugal

INTRODUCTION: The cure of an increasing number of patients with cancer has been made possible by aggressive chemotherapy. Its main toxicity are infectious complications. Pneumonia in immunosuppressed patients leads frequently to acute respiratory failure. In this population the need for invasive ventilation (IV) is associated with a high mortality rate. Non-invasive ventilation (NIV) may be a better outcome.

METHODS: We retrospectively studied 148 patients admitted to the ICU with acute respiratory failure and febrile neutropenia between Jan’98 and Dec’03. Mean age (±SD) was 43±19 year-old; 13% were children, 41% were female, 81% had oncological haematological tumors; 17% had solid tumours and 20% were bone marrow transplant recipients. We compared the patients in which NIV was effective with those in which it failed. Arterial blood gases were analysed at the start and at 6 hours after NIV. Mechanical ventilation was needed in 88%; in half IV was started in the first 2 hours after ICU admission. NIV was tried in 52 patients and it was effective in 15 patients (29%). Mean NIV time was longer than 24 hours.

RESULTS: We compared the patients in which NIV was effective with those which failed the technique. There was no significative difference regarding demographic data, oncological disease or NIV time. SOFA and SAPS II were higher in the second group. All patients in the first group survived ICU admission and 93% survived hospital stay. ICU and hospital survival were 22% in the second group.

CONCLUSION: NIV is a valuable treatment in this population. Risk factors that predicted NIV failure were pH < 7.35, SAPS II > 55 or SOFA > 10 and clinical evolution towards septic shock and multiple organ failure.

REFERENCE: 1.- Jacobi Judith, Fraser, Gilles L et al, Clinical practice guidelines for the sustained use of sedatives and analgesics in the critically ill adult. Crit Care Med. 2002;30(1):119-141.
242  ADHERENCE TO RECOMMENDATIONS FOR NON INVASIVE MECHANICAL VENTILATION. EFFECT OF A NURSE PROTOCOL

Rodriguez PO, Heili S, Loisel F, Leilouché P, Brochard L

Réanimation Médicale, Hôpital Henri Mondor, Créteil, France, 2Servicio de Neumonología, Fundación Jimenez Diaz, Madrid, Spain, 3ICU, Hôpital Enfant-Jésus, Québec, Canada

INTRODUCTION: Non invasive mechanical ventilation (NIMV) has improved the outcome of patients in acute respiratory failure. Medical and paramedical staff training probably have a major impact in efficacy. Implementation of clinical practice guidelines in NIMV may prove to be a rational approach for improving patients care.

Our purpose was to evaluate the application of local clinical guidelines for NIMV after implementation of a nurse practice protocol in a medical intensive care unit.

METHODS: Compliance to local guidelines regarding humidification of inspired gases, nasal protection, type of ventilator and realisation of arterial blood gases (ABG) after starting NIMV was prospectively recorded before (January to April 2001, period 1), immediately after (August to October 2001, period 2) and two years following (December 2003 to February 2004, period 3) the intervention. Forty patients starting NIMV support were screened in each period.

RESULTS: Compliance to humidification and nasal protection application improved in period 2 (Table) but decreased in period 3. After the intervention (period 2), the selection of ventilator more frequently followed recommendations. This did not change in period 3. ABG sampling one hour after starting NIMV support was moderately improved after the intervention. This remained steady in period 3.

Compliance to all recommendations was observed in 9 (22.5%), 20 (50%) and 13 (32.5%) cases in periods 1, 2, 3 respectively (p=0.005).

| Period | Period 1 | Period 2 | Period 3 | p |
|--------|----------|----------|----------|----|
| Humidification n (%) | 30 (75%) | 36 (90%) | 22 (55%) | 0.001 |
| Nasal protection n (%) | 35 (87%) | 39 (97.9%) | 30 (75%) | 0.008 |
| Ventilator n (%) | 28 (70%) | 39 (97.9%) | 38 (95%) | <0.001 |
| ABG n (%) | 19 (47.5%) | 24 (60%) | 30 (75%) | 0.04 |

CONCLUSION: Compliance to local guidelines for NIMV improved after introduction of a nurse protocol. This effect did not clearly persisted after two years. Guidelines and protocols for NIMV are interesting to improve adherence to recommendations, but a continuous education process is warranted to maintain compliance.

243  NONINVASIVE MECHANICAL VENTILATION IN PATIENTS WITH ACUTE RESPIRATORY FAILURE AND CONTRAINDICATIONS

Carrillo A1, Gónzalez G1, Esquinas A1, Jara P1, Parraga M1, Gil B1, Rodriguez M D1
1ICU, H.Morales Meseguer, Murcia, Spain, 2ICU, H.Morales Meseguer, Murcia, Spain

INTRODUCTION: Noninvasive mechanical ventilation have been shown effectivity in some forms of acute respiratory failure, especially in chronic respiratory failure. The Consensus Conference of NIMV recommends that 10 Glasgow Coma score and hemodynamic instabilidade 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 admission. Patients > 2 NIV days.

RESULTS: Observational 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 clin 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 respectively (p<0.033). Hypoxemic acute respiratory failure was 53.7 and 60.2% respectively (p=0.110). SAPS II y score SOFA maximum during ICU was 53±16 and 8±3±6 in contraindications group vs 49±11 and 5±1±8 in the other patients (p<0.001 and p=0.001 respectively). Differences prognosis among groups were determined 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).

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

REFERENCE(S): 1. International Consensus Conference in Intensive Care Medicine: Noninvasive Positive Pressure Ventilation in Acute Respiratory Failure. Am Respir Crit Care Med 2001; 163: 283-291

244  NIV AND INTUBATION DELAY IN PATIENTS WITH ARF. IS IT A PREDICTOR FOR PROGNOSIS?

González G2, Carrillo A3, Esquinas A2, Jara P2, Rodríguez M D3, Parraga M2, Botía S1
1ICU, H.Morales Meseguer, Murcia, Spain, 2ICU, H.Morales Meseguer, Murcia, Spain

INTRODUCTION: One of the main advantages of noninvasive mechanical ventilation (NIV) is to reduce the infectious complications of invasive mechanical ventilation, but the delay of intubation for failure of NIV would be related with a worse outcome according many authors (1-2).

METHODS: Observational prospective study of all ICU patients with acute respiratory failure treated with NIV. We studied the intubated patients after NIV failure and analysed the duration of NIV related with mortality, hospital stay and the presence of multiorgan failure

RESULTS: In a 80 months period were treated 1335 patients with NIV, failure 389/241 EIT, 148 dead without EIT. The mean age of intubated patients was 65 years, 69% were male and SAPS II at admission 49.9. Ethiology was hypoxemic ARF 87%. PaO2/FiO2 at admission 137±36 and respiratory rate 36±6 in hypoxemic ARF. The arterial pH in hypercapnic ARF was 7.19±0.12 and respiratory rate 38±11. The mean days between start NIV and intubation was 2.4 ± 2.7 (range: 1-10). The patients who dead had a mean previous days of NIV of 2.8±3.0 days and 19±8 (p=0.001) the survivors. The patients evolution related to duration of NIV was:

| Duration of NIV (days) | Mortality ICU |
|------------------------|--------------|
| <2                     | 9.6±3.6      |
| 2-4                    | 10.7±4.1     |
| >4                     | 14±5.3       |

CONCLUSION: The duration of NIV before intubation in patients with ARF involve more morbimortality. The role of prolonged NIMV in the worse prognosis of this patients is not well known

REFERENCES: 1. Wood KA, Lewis L, Von Harz B, et al. The use of noninvasive positive pressure ventilation in the emergency department. Chest 1996;113:133-146. 2.Ambrosino N. Noninvasive mechanical ventilation in acute respiratory failure. Eur Respir J 1996:9:795-807.

REFERENCE(S): 1. Lightowler JV, Elliot MW. Predicting the outcome from NIV for acute exacerbation of COPD. Thorax 1998;53:531-535. 2.- Lightowler JV, Elliot MW. Predicting the outcome from NIV for acute exacerbation of COPD. Thorax 2000;55:815-816.

REFERENCES: 1. Wood KA, Lewis L, Von Harz B, et al. The use of noninvasive positive pressure ventilation in the emergency department. Chest 1996;113:133-146. 2.Ambrosino N. Noninvasive mechanical ventilation in acute respiratory failure. Eur Respir J 1996:9:795-807.
NOISE: EXPOSURE DURING NON-INVASIVE VENTILATION: COMPARISON AMONG INTERFACES

Costa R1, Cavallero F1, Conti G1, Catarsi S1, Crabu A1, Festa V1, Sciuto A2, Masieri S1
1Institute of Anesthesia and Intensive Care, Catholic University of the Sacred Heart, 2ENT Clinic, University „La Sapienza”, Rome, Italy

INTRODUCTION: Loud sounds increase patient discomfort during ICU stay (1). Non invasive ventilation (NIV) may be a potential source of increased noise exposure in relation with the interface adopted. We therefore assessed noise exposure during NIV in relation with different types of interface (helmet, nasal and facial masks).

METHODS: Ten healthy volunteers underwent NIV at a pressure support level of 10 and 15 cmH2O with: a) a helmet; b) a helmet equipped with HME filters at the junctions between the helmet and the inspiratory and expiratory branches of the respiratory circuit; c) a nasal mask; d) a facial mask. Noise intensity was assessed with a Sound Level Meter by placing a microphone near the right ear. Noise intensity was also assessed subjectively with a Visual Analog Scale.

RESULTS: Inside the helmet, noise exceeded 100 dB. Noise intensity was poorly affected by PS level and unaffected by the presence of HME filters. During NIV with nasal or facial masks the noise did not exceed 70 dB (i.e. noise was not superior to the usual noise background in ICU). Subjective evaluation of noise intensity mirrored objective measurements, however the presence of HME filters was associated to the feeling of lower noisiness inside the helmet. This finding may be explained by a hypothetical selective effect of HME filters on sound frequencies to which human ear is more sensitive.

| PS/PEEP (cmH2O) | Noise intensity, mean (SD) | VAS, median (range) |
|------------------|---------------------------|---------------------|
| Helmet           | 105±5                     | 4.0 (3.7-4.3)       |
| Helmet, HME filters | 104±4                   | 2.2 (1.4-4.7)       |
| Facial mask      | 64±3                      | 1.5 (1.0-2.8)       |
| Nasal mask       | 62±1                      | 1.4 (1.0-2.7)       |

Intensity of the noise (dB) and subjective evaluation of noisiness with VAS

CONCLUSION: During NIV with helmets, patients are exposed to noise over 100 dB, which may increase patient’s discomfort and persistently impair effective ear function (2). NIV with nasal and facial masks do not exceed background noise.

REFERENCE(S): 1. Gabor JY, et al. Am J Respir Crit Care Med 167,708,2003
2. Ward WD. Otalaryngol Clin North Am 12, 492, 1979

RECOMMENDATIONS FOR THE USE OF HELMETS FOR NIV AND CPAP THERAPY
Reber A1
1Anaesthesiology and Intensive Care Medicine, Hospital of Zollikerberg, Zollikerberg, Switzerland

INTRODUCTION: Recently, a special helmet as a first-line intervention to treat patients with hypoxaemic respiratory failure has been advocated for non-invasive pressure support ventilation based on Antonelli et al’s. results showing that complications related to the technique were fewer in the helmet group compared with the mask group (1).

METHODS: A newly designed hood for non-invasive ventilation (NIV) and continuous positive airway pressure (CPAP) therapy was evaluated in 25 patients with respiratory failure admitted to the intensive care unit. Oxygenation, tolerance for extended periods and complications were evaluated. A latex free Castar R helmet (StarMed, Mirandola, Italy) was used. Inspiratory oxygen fraction was set at 0.3.

RESULTS: Oxygenation parameters were significantly improved when helmets were used (PaO2 increased from 8.1 ± 1.9 kPa to 11.3 ± 3.2 kPa). Endotracheal intubation could be avoided in all patients. The workload of the nurses did not increase with the use of the helmet compared with a common facial mask. Most patients (22) tolerated the helmet even for extended periods (up to 12 hours). In two patients with nasogastric feeding catheters, aspiration occurred when the helmet was used. These patients were sedated when the helmet was applied. Our procedure was changed after these complications and percutaneous gastric catheters were placed in patients that had a compromised vigilance.

CONCLUSION: To treat patients with respiratory failure, we recommend the use of NIV/CPAP helmets. However, with a built-in inflatable cuff the helmet is easier to fit to the thorax aperture in some patients than the model without the cuff. This will help to ensure an airtight seal of the system and reduce the internal volume of the helmet. Furthermore, we recommend evaluating percutaneous gastric catheters for enteral feeding in the early stage of the treatment in patients where prolonged therapy is anticipated.

REFERENCE(S): 1. Antonelli et al. Crit Care Med 2002; 30:602-8