339
INTRA-ABDOMINAL HYPERTENSION IN SEPTIC SHOCK PATIENTS

Hernandez G1, Regueira T2, Cornejo R3, Rebollo B2, Aguirre M2, Romero C4, Castillo L2, Bugedo G1
1Anestesia y Programa Medicina Intensiva, Pontificia Universidad Catolica de Chile, 2Anestesia y Programa Medicina Intensiva, Pontificia Universidad Catolica de Chile, Santiago, Chile

INTRODUCTION. Intra-abdominal hypertension (IAH) may contribute to splanchnic hypoperfusion and multiple organ failure in critically ill patients. Nevertheless, limited information exists about IAH in septic shock patients, where severe distributive and microcirculatory abnormalities are present. Even moderate increases in intra-abdominal pressure may worsen hypoperfusion during septic shock. Our aim was to evaluate in septic shock patients compared to postoperative control patients with known risk factors for IAH: (a) the incidence and time course of IAH during early ICU stay; and (b) the consequences of IAH in lactate levels, maximum SOFA and norepinephrine requirements.

METHODS. 27 septic shock patients and 19 abdominal surgery patients with > 2 risk factors for IAH admitted consecutively were included. Intra-abdominal pressure was measured every 6 h during the first 48 h. IAH was diagnosed with 2 consecutive measurements > 20 mmHg. Clinical data and risk factors for IAH were registered. During follow-up, SOFA, peak norepinephrine doses and lactate levels were registered daily. IAH incidence was established in both groups. Lactate levels, norepinephrine requirements and SOFA scores in patients with and without IAH in both groups were statistically compared.

RESULTS. 51% of septic shock and 31% of control patients developed IAH. Septic shock patients with and without IAH were comparable in peak norepinephrine dose, SOFA and mortality. However, peak lactate levels were significantly higher in septic shock patients with IAH compared with those without IAH (3.5 vs. 1.9 mmol/L, p<0.04). There was a significant positive temporal correlation between intra-abdominal pressure and lactate in septic shock patients with IAH. Peak levels of both occurred early and decreased progressively over time. Control patients with and without IAH exhibited comparable normal lactate levels.

CONCLUSION. We demonstrated a very high incidence of IAH in septic shock. Lactate levels were significantly higher in septic shock patients compared to those patients without IAH or to control patients with IAH. There was a close temporal correlation between lactate and intra-abdominal pressure values over time.

340
MEASURING GLOBAL HAEMOSTASIS IN CRITICALLY ILL PATIENTS WITH SEPSIS

Macchiavello L1, Sayyam A1, G1, Macartney N1, Lees S1, Floros G1, Lewis S1, Findlay G P2, Collins P W1
1Critical Care, Haematology and Blood Bank, 2Leukaemia and Platelet Laboratory, Sanquin, Amsterdam, Netherlands

INTRODUCTION. Seppsi is associated with complex changes in haemostasis. Clotting tests poorly predict bleeding and can lead to excess usage of blood products. Thrombin generation (TG) triggered by tissue factor (TF) plays a critical role in haemostasis. Measures of global haemostasis initiated by physiological doses of TF may better reflect haemostasis.

METHODS. Prospective, observational study in a University Hospital ICU. 40 subjects with sepsis were enrolled after consent and blood tested for: (a) TG in platelet-poor (PP) and platelet-rich plasma (PRP); (b) derived parameters of low dose TF activated clotting time (ROTEM assay); and (c) Factors I-XII.

RESULTS. Septic patients that had delayed peak TG. Total TG, measured by endogenous thrombin potential (ETP), was not significantly reduced (Table 1: mean±range **p<0.001; *p<0.01). Clotting screens were abnormal in 36/40 cases: PT 20s (13.1-37.3), aPTT 44 (22-105) [mean (range)]; 10/36 patients had normal coagulation factor levels. 6/10 had normal peak thrombin/ETP and 6/10 had normal Vmax & AUC.

| TABLE 1. |
| Control | PPP Sepsis | PPC Control | PRP Sepsis | PRP |
|---------|------------|-------------|------------|-----|
| Time to peak thrombin (sec) | 6.8±6.5** | 3.5±0.5 | 52±27 | 32±14 |
| Peak thrombin (muml/L) | 334±146** | 500±63 | 58±29 | 82±33 |
| ETP | 164±5442 | 1776±23 | 137±30 | 159±284 |

| TABLE 2. |
|----------|-----------|------------|
| Clot time (CT) | 1170±766** | 741±173 |
| Maximum clot velocity (Vmax) | 12±7 | 8±3 |
| Area under clot firmness curve (AUC) | 60±15** | 54±8 |
| Maximum clot firmness (MCF) | 67±7** | 55±8 |

CONCLUSION. Global tests may better reflect physiological haemostasis than standard screens or individual factor assays in critically ill patients with sepsis. Studies that involve clinically relevant endpoints of bleeding are required.

REFERENCES. (1) Eisenberg et al. Arch Surg 117:48, 1982 (2) Mann et al. J T&H 1:1504, 2003

341
SYSTEMIC EFFECTS OF FIBEROPTIC BRONCHOSCOPY AND BRONCHALVEOLAR LAVAGE IN CRITICALLY ILL PATIENTS

Estella Garcia A1, Gil Cano A1, G1, G1, Miguez Garcia M1, Saize Baranda A2, Jarelo Chaumel A2
1Intensive Care Unit, Hospital de Jerez, Jerez de la Frontera, Spain

INTRODUCTION. Bronchoscopy bronchoalveolar lavage (BAL) may be followed by a systemic inflammatory response which clinical effects in critically ill patients are unknown. We designed this study to examine the effects of fiberoptic bronchoscopy (FOB) with and without BAL on body temperature, systemic arterial pressure, heart rate and supportive therapies requirements in mechanically ventilated patients.

METHODS. 46 consecutive mechanically ventilated patients were prospectively enrolled. FOB with BAL (150 ml of isotonic saline instilled by aliquots of 50 ml) was performed in 29 patients and without BAL in 17. Heart rate and mean arterial pressure were recorded 4 h before (time 1), at the beginning (time 2), and 4 and 24 hrs after the procedure (time 3). Body temperature, vasopressors, urine output and fluid balance were registered during 24 h before and after FOB.

RESULTS. There were not changes in hemodynamic parameters, body temperature nor supportive therapies (p = n.s.) in FOB patients without BAL. On the contrary, in patients with BAL, there was a significant decrease in mean arterial pressure 4 hrs after the procedure (Table). Fluid balance and urine output remained unchanged (p = n.s.), but number of patients on vasopressor therapy and mean vasopressors dosage increased after BAL. (from 0.20±0.51 µg/kg/min to 0.48±0.92 µg/kg/min; p<0.01); body temperature did not change (p = n.s.).

| TABLE 1. |
|----------|----------|----------|----------|----------|
| Time | Mean arterial pressure (mm Hg) |
| time 1 | time 2 | time 3 | time 4 |
| FOR without BAL (n: 17) | 86±9 | 87±12 | 90±11 | 89±12 |
| FOR with BAL (n: 29) | 92±11 | 94±13 | 71±11* | 97±12 |

CONCLUSION. 1) These findings confirm that BAL may produce hypotensive effects in mechanically ventilated patients and 2), the hemodynamic effects of BAL may lead to increase support therapies (vasopressors in this study).

Grant acknowledgement. RED GIRA G03/063

342
DIAGNOSIS AND ESTIMATED INCIDENCE OF HEPARIN-INDUCED THROMBOCYTOPENIA IN THE CRITICALLY ILL

Wester J P1, Loyte A1, Persson L1, Bosman R F2, Oudeman-Van Straaten H M3, Van der Spoel J F4, Zandstra D F5
1Intensive Care Medicine, 2Haematology and Clinical Chemistry, 3Onze Lieve Vrouwe Gasthuis, 4Leucoseyt and Platelet Laboratory, Sanquin, Amsterdam, Netherlands

INTRODUCTION. The diagnosis of heparin-induced thrombocytopenia (HIT) in critically ill patients is difficult due to multiple causes for thrombocytopenia. As a consequence the incidence of HIT is not exactly known. We evaluated the diagnostic according to recently developed diagnostic scoring systems by the ISTH SSC Scientific Subcommittee on Platelet Immunology using the combination of clinical criteria and laboratory testing.

METHODS. Prospective observational study in a 18-bed tertiary referral university-affiliated general ICU from January-February 2004. We defined thrombocytopenia as <100 G/l measured at least twice and persisting for >24 hours. All patients admitted >36 hours were tested for anti-heparin/platelet factor 4 antibodies (ELISA) at day 3, 6, 10 and 15. Pre-test probability scores according to Warkentin (SSC Birmingham 2003) were calculated at day 3, 6, 10 and 15. Finally, the diagnostic classification score according to Chong (SSC Paris 2001) was calculated.

RESULTS. We investigated 43 patients (26 men, 17 women; age 67±13.8 yrs, APACHE II scores 25.9±7.9 points). Thrombocytopenia developed in 17/43 patients (39.5%). The pre-test probability was calculated as low in 32, intermediate in 9 and high in 2 patients. Positive HIT-antibodies were found in 7/43 patients (16.3%); 5 in the pre-test probability category low, 2 in the category intermediate, resulting in a possible diagnosis of HIT in 2/43 patients (4.7%). The final diagnostic classification rendered HIT unlikely in 33/43 patients (76.7%) (2 with positive tests), possible in 7/43 patients (16.3%) (5 with positive tests), probable in 0/43 patients (7.0%) and definitive in 0/43 patients (0%).

CONCLUSION. In critically ill patients, the incidence of probable or definitive HIT according to the ISTH SSC criteria is between 0.7%. The discrepancy between clinical criteria and ELISA results is large. We advocate a special focus on critically ill patients in the final unified international classification system for HIT.

Grant acknowledgement. NHS Trust R&D Grant
343 DEVELOPMENT OF INFECTIONS IN HEPATIC TRANSPLANT WITH RENAL PROTECTION IMMUNOSUPPRESSION

Lopez-Lugo A1, Varo E1, Rivero C1, Villanueva J P1, Acuna J1, Ferrer E1
1Intensive Care Unit, 2Hepatic Transplant Unit, Clinic University Hospital of Santiago, Santiago de Compostela, Spain

INTRODUCTION. The infections are an important reason of morbimortality in the Hepatic Transplant (HTX). The immunosupression influences in the number and in the type of infections. We present our experience with a new guideline of renal protection immunosupression with anti CD25 and low doses of anticalcineurinics and its influence in the development of infections during the first year post HTX.

METHODS. Prospective study of the infections during the 1st year post HTX in a series of 47 patients from the 1999 to 2004 with Acute Renal Failure (ARF) in the early postoperative of HTX (Creatinine >1.5 mg/dl and/or CrCl <50ml/min). The standard immunosuppression therapy was Tacrolimus (Tac) and steroids. In the moment in which ARF was detected, Tac dose was diminished to 1mg/12h or was suspended and starting therapy with Mycophenolate mofetil (MMF) and managed the first dose of anti CD 25 (Daclizumab or Basiliximab), repeating dose during the 4th day in case of Basiliximab or the 7th day in case of Daclizumab. Antibacterial prevention with Cefazidime, Amoxicillin-Clavulanate acid and Metronidazole was administrated during the first 5 days. Antifungal prevention was realized with Fluconazole.

RESULTS. The number of infectious episodes was 47. The infection incidence was 55.28%. Bacterial infections were more frequent (65.9%), followed by fungical infections (19.1%). 70.2% of the infections were in the first month, and in the main they were bacterial. Pneumonias represented 37.5% basically Staphylococcus followed by Enterococcus faecalis. Bacteremias represented 15.2% predominantly from gram-positive microorganisms. During the first six months, 23.4% of the infections were present, mostly of them bacterial urine ones. After a year we reported a case of Hepatitis C reinfetction and a case of rotavirus gastroenteritis. The total mortality was 29.7% and the mortality attributed to the infection was 76.9%.

CONCLUSION. We do not observed differences in the temporary distribution of the infections after a HTX between our series of patients treated with very low doses of anticalcineurinics plus anti CD25 and the published ones in the literature treated with standard immunosuppression. The most frequent etiology in our series was bacterial. The mortality is lower than other series of patients with HTX treated with standard immunosuppression.

Grant acknowledgement. This study was made with a grant of MMA.

344 CANDIDA BLOOD STREAM INFECTIONS IN AN ICU IN HONG KONG

Yap F H Y1, Kwok R1, Joynt G1, Gomersall C1
1Anaesthesia and Intensive Care, Prince of Wales Hospital, Hong Kong, China

INTRODUCTION. Fungal infections have become more important in the ICU. Data from Asia is scanty. We aim to describe the epidemiology of Candida blood stream infections (CBIs) in a 22-bedded medical-surgical ICU in HK.

METHODS. Consecutive patients in the ICU with CBIs between 1998 and 2003 were identified from the microbiology database. Demographic and clinical data were retrieved from hospital records. Data for antibiotic use were obtained from the hospital pharmacy database.

RESULTS. Altogether 80 CBIs were identified. The incidence was 2.08 per 1000 patient-days, with a rising incidence over time (fig 1). C albicans was the major species identified (53%), with a trend towards increasing non-albicans spp with time. The proportion of non- albicans spp was 33.3% and 56.5% in 1998 and 2003 respectively. Between 1998 and 2003, there was no significant increase in the use of antibiotics or the use of fluconazole. The incidence of non-albicans species is also rising. The ICU and hospital mortality rate of patients with candidemia was high compared to published data.

CONCLUSION. Our data in ICU showed that the incidence of CBI is high and steadily rising despite stable ICU antibiotic use. The incidence of non-albicans species is also rising. The ICU and hospital mortality rate of patients with candidemia was high compared to published data.

345 PANCREATITIS - ASSOCIATED PROTEIN IN THE CRITICALLY ILL: SEVERITY OF DISEASE OR Pancreatic Damage?

Siegel L J1, Mayr A1, Fiedler F1
1Institut für Anästhesiologie und Operative Intensivmedizin, Fakultät für Klinische Medizin Mannheim - Ruprecht-Karls-Universität Heidelberg, Mannheim, Germany

INTRODUCTION. Besides lipase (lip), amylase (amy) and others, Pancreatitis-associated Protein (PAP) is related to acute pancreatitis. Intensive care patients are prone to pancreatitis as diagnosed by raised plasma enzymes. A variety of publications suggest that PAP is not only induced during pancreatitis. To evaluate the relation of amy, lip and PAP with type and severity of disease, we followed their plasma levels in a mixed patient population of a surgical/neurosurgical intensive care unit (ICU).

METHODS. 185 consecutive patients were reviewed. Inclusion criteria were an assumed ICU stay of at least 6 days. Exclusion criteria were refused consent, previous pancreatic disease, operations of the pancreas, alcohol abuse, pregnancy, age of less than 16 years. Plasma levels of lip/amy and PAP were examined on a daily base for a threefold increase, 100ng/ml (PAP) and 50ng/ml (lip/amy) respectively. Murray and APACHE II (APS) scores were calculated. Patients were divided into trauma and non-trauma patients and subdivided according to the involved anatomical sites. Organ dysfunction and drugs administration were monitored.

RESULTS. A total of 87 patients were included (34 women, 53 men, mean age 45 years, mean time on ICU 17 days, min 7/max 53 days, 22 died, mean APS 6.8). 48 (55%) patients suffered injuries (42 head, 28 chest, 19 abdominal and 21 limb injuries) and 39 (45%) suffered other diseases (22 intracranial bleedings, 4 pulmonary and 13 abdominal diseases). 74 (85%) had surgery during or shortly before ICU admission, 13 (15%) were treated purely medically. 79 (91%) patients showed elevated PAP levels of at least 100ng/ml. 86%/41%/45% of Patients with isolated intracranial bleedings showed PAP/amy elevations and so did 94%/78%/83% of patients with abdominal trauma. Patients suffering/not suffering further organ dysfunction showed no changes in amy and lip. But clearly higher PAP levels were found with organ dysfunction. Similar changes were found with adrenalin/noradrenalin and caerulein medication. ICU survivors had lower PAP levels than did patients who died.

CONCLUSION. With both, abdominal and isolated intracranial pathologies increased PAP levels were found. PAP is not specific for acute pancreatitis as it is limited to intra-abdominal pathologies. PAP correlates with additional organ dysfunction and may serve as a marker of survival and intensive care morbidity.

346 PATHOGENESIS OF COAGULATION DISTURBANCES IN PATIENTS WITH SEVERE Pancreatitis

Posivnych M M1, Perenyjov A1, Chekoilsin O1
1Department of Surgery, Medical University, Lviv, Ukraine

INTRODUCTION. Disorders of microcirculation are typical for the necrotizing pancreatitis. They manifested by increased vascular permeability, intravascular coagulation, and capillary stasis. These processes initiated and mediated by the various proinflammatory stimuli. The role of activated protein C (APC) and adhesion molecules in these disorders in patients with necrotizing pancreatitis still completely unknown.

METHODS. Plasma levels of APC and ICAM-1, using the ELISA technique, were studied in 56 patients with acute pancreatitis. According the Atlanta criterion the mild pancreatitis was established in 32 of patients and necrotizing – in 24 patients. Patients who admitted to clinic not later than 48 hours of the disease onset were enrolled in this study. Ten healthy volunteers compiled the control group.

RESULTS. At the time of admission the levels of ICAM-1 increased in all patients with acute pancreatitis compared with the control group (p<0.05). Besides that, the highest levels were noted in patients with necrotizing pancreatitis. The APC levels were lowest in patients with severe pancreatitis, while in control group it was higher than 100%. The reverse correlation between ICAM-1 and APC plasma levels was noted in patients with acute pancreatitis. The levels of ICAM-1 gradually decreased with the simultaneously increase of APC levels in patients with favorable outcome, while in patients with lethal outcome the APC levels were stable low. The deficiency of APC clear correlated with the presence of necrotic changes defined by CT.

CONCLUSION. Thus, the overexpression of ICAM-1 and deficiency of APC determine the coagulation disorders in patients with severe pancreatitis and promote the progression of necrotic changes.
347 SOLUBLE ENDOTHELIAL MARKERS IN PANCREATITIS-ASSOCIATED LUNG INJURY

Siemiatkowski A1, Wereszczyńska-Siemiatowska U1, Mroczko B1, Boricki J1
1Anesthesiology and Intensive Therapy, Gastroenterology and Internal Medicine, Biochemical Diagnostics, Medical University of Białystok, Białystok, Poland

INTRODUCTION. Lung injury is a common and serious complication in severe acute pancreatitis (AP). The mechanisms by which the effects of AP spread to involve acute lung injury are not completely elucidated, but evidence suggests that activated or injured endothelial cells can produce and release injury-promoting mediators as a response to the local tissue damage.

METHODS. The aim of study was to estimate soluble E-selection (sE-selectin), intercellular adhesion molecule-1 (sICAM-1) and von Willebrand factor (vWF:Ag), tissue factor (TF:Ag) antigens profiles of the patients with severe AP with respect to the lung function. The studies were carried out on 69 patients with severe AP. At admission and on the 2nd, 3rd, 5th and 10th day of hospitalization, sE-selectin in serum and vWF:Ag, TF:Ag, ICAM-1, CRP and polymorphonuclear leukocyte elastase (PMN-E) concentrations were measured. PMN-E and NO scores were calculated. Patients with AP were stratified by the absence (SV-AP) or presence (MV-AP) necessity of mechanical ventilation.

RESULTS. Of the 69 patients with AP enrolled, 35 required mechanical respiratory support. At admission, median values of APACHE II ratio, MODS and LIS scores were found to be increased to 6.5, 3.5 and 0.5 points in SV-AP, as well as 13.0, 6.0 and 2.0 in MV-AP, respectively. Decreased values of PMN-E and NO2/NO2 ratio in all AP patients were observed, with the lowest ratios in MV-AP. We have found, that in MV-AP patients, levels of sE-selectin were significantly higher than in SV-AP. Marked elevations of sE-selectin were paralleled to the significant increase of PMN-E concentration. Plasma ICAM-1 levels in AP patients in all days of study were increased and reached the highest values in MV-AP patients. Plasma vWF:Ag and TF:Ag concentrations in SV-AP and MV-AP gradually increased to the top values at the 5 day. The strong negative correlations were present between sE-selectin, ICAM-1, TF:Ag concentrations and PMN-E/NO2 ratio (R=0.549, R=0.382, R=0.511 [p<0.001, respectively])

CONCLUSION. Severe pancreatitis induces endothelial cell activation, reflecting in increased sE-selectin, ICAM-1, vWF:Ag and TF:Ag concentrations. These mediators are in part responsible for pulmonary dysfunction observed in severe AP and might be used as factors for the early evaluation of acute lung injury severity and for monitoring this complication.

348 PRO-INFLAMMATORY MONOCYTES AND LOSS OF HLA-DR EXPRESSION FOLLOWING CARDIAC SURGERY IN CHILDREN

Schadenberg A W L 1, 2, Vastert S F, Even F C M 1, Kuiss W 1, Van Vught A J 2, Francken B J 2, Jansen N J G 1
1Paediatric Intensive Care, 2Paediatric Immunology, Paediatric Thoracic Surgery, WKZ, UMCU, Utrecht, Netherlands

INTRODUCTION. Cardiac surgery is associated with a direct systemic inflammatory response (SIRS). Little is known about the role of monocytes in this response. Monocytes are circulating precursors of tissue macrophages, which have an important role in initiating immune responses. Monocytes can be divided into two distinct subsets in relation to CD16 (Fc-gamma type III receptor) expression. Compared to CD16 negative monocytes, CD16 positive monocytes have an increased capacity to phagocytose, have a robust plasticity to induce T-cell proliferation and can produce pro-inflammatory cytokines. In SIRS/sepsis a low monocyte Human Leukocyte Antigen-DR (HLA-DR) expression is associated with deactivation of monocytes and poor outcome. We studied the dynamics and the HLA-DR expression of pro-inflammatory CD16+ monocytes in children undergoing cardiac surgery.

METHODS. 7 ASD-II and 7 VSD children were investigated, with a median age of 63 weeks (16-520). The median ICU-stay was 2 days (1-3). Peripheral blood mononuclear cells were isolated before, during and at 24 and 48 hrs after operation and analysed by flowcytometry.

RESULTS. We observed a monocytosis within 24 hours after surgery. Within the total population of monocytes the percentage of the CD16+ pro-inflammatory subset increased from 12% before surgery to 25% 24 hours after surgery (p<0.001) and returned to normal levels 48 hours after surgery. Mean fluorescent intensity of HLA-DR was as at all time points at least three times higher on CD16+ pro-inflammatory monocytes compared to CD16- monocytes. In both subsets HLA-DR expression decreased significantly (p>70%) after surgery with lowest values after 24 hours.

CONCLUSION. Following cardiac surgery the proportion of pro-inflammatory CD16+ monocytes in the circulation substantially increases. This initial response is rapidly regulated and the pro-inflammatory monocyte population returns to normal levels 48 hours after surgery alongside with the patient’s clinical improvement. Higher HLA-DR expression on CD16+ monocytes underlines their activated state. The significant loss of surface HLA-DR expression on both subsets was not related with poor outcome. Further experiments will include cytokine production of monocytes to investigate the role of the pro-inflammatory monocytes in systemic inflammation following cardiac surgery.

349 REGULATORY T CELLS AND THE IMMUNE RESPONSE FOLLOWING CARDIAC SURGERY IN CHILDREN

Schadenberg A W L 1, 2, Vastert S F, Even F C M 1, Kuiss W 1, Van Vught A J 2, Francken B J 2, Jansen N J G 1
1Paediatric Intensive Care, 2Paediatric Immunology, Paediatric Thoracic Surgery, WKZ, UMCU, Utrecht, Netherlands

INTRODUCTION. Cardiac surgery induces a systemic inflammatory response. Depending on the preoperative clinical state and the extent of surgery this pro-inflammatory response will be more or less counteracted by an anti-inflammatory response. The balance between pro-inflammation and anti-inflammation is critical in determining clinical outcome. Specific regulatory T-cells are important mediators of controlling inflammation. This has mainly been studied in unregulated states such as autoimmune disease and transplantation medicine. Recently it has been shown that the CD4 T cells with the brightest expression of CD25 are regulatory T-cells. It is known whether these CD4CD25bright cells play an active role in controlling inflammation following cardiac surgery. In this study we investigated the kinetics of regulatory T-cells on the systemic inflammation upon cardiac surgery in children.

METHODS. 7 ASD-II and 7 VSD children were investigated, with a median age of 63 weeks (16-520). Peripheral blood mononuclear cells were isolated before, during and at 24 hours and 48 hours after operation and analysed by flowcytometry. In sorted CD4CD25 populations FoxP3 mRNA, the only marker highly specific for regulatory T cells, was determined by semi-quantitative real-time PCR.

RESULTS. Flowcytometric analysis shows a relative increase (+46%, p<0.0005) in CD4CD25bright cells within 24 hrs after surgery. These CD4CD25bright cells have phenotypic characteristics of regulatory T cells, as defined by a substantial higher amount of cells positive for CTLA-4 and GITR. FoxP3 levels in CD25 negative, intermediate and bright populations before surgery were respectively 0.2, 4.7 and 13.2 times higher than an internal control. Over time the FoxP3 ratios did not alter notably between the three subgroups.

CONCLUSION. We demonstrate an increase in CD4CD25bright T cells with regulatory characteristics following cardiac surgery. FoxP3 levels, a transcription marker highly specific for regulatory T-cells, indicate the selected CD4CD25bright population contains regulatory T cells and the increase following surgery is not attributable to an increase of activated CD25+ T cells. Regulatory T cells play an important role in controlling the balance of pro- and anti-inflammation after cardiac surgery in children.

REFERENCE(S). 1 IM de Kleer, et al. J. Immunol. 2004; 172(10):6435-43

350 BIOCHEMICAL MARKERS OF SEPSIS ASSOCIATED ENCEPHALOPATHY

Piazza O, Esposito G, Russo E, Fortunato A, Rossì R, Cotena S
1Anestesia e Rianimazione, Università degli Studi di Napoli Federico II, 2Patiologia Clinica, BCCS Pascali, Napoli, Italy

INTRODUCTION. S100beta is a dimeric acidic calcium-binding protein found intracellularly and extracellularly in the brain (1). Aim of this study was to describe the increase in S100beta serum levels in early conditions of encephalopathy associated with sepsis (SAE).

METHODS. Seven patients with the diagnosis of sepsis (2) and alteration of consciousness were included in this study. Patients with hypotension, despite adequate fluid replacement were excluded from this study. Other exclusion criteria were return to normal awake state within 12 hours, previous documented cerebral damage or peripheral nervous system pathology, malignant melanoma and gliona because elevated plasma levels for S100 have been reported for these diseases, hepatic and renal failure, which can cause encephalopathy. S100beta serum levels were measured on the clinical diagnosis of sepsis and the test was repeated after 72 hours and 7 days later. We used as cut off value 0.2mg/l.

RESULTS. Only one patient out of seven survived and was dismissed at home, one year later his GOS was 5. The other six patients died in ICU without recovering consciousness. Mean S100beta on the day of diagnosis of sepsis was 0.47 ± 0.31 mg/l. The values were still pathological on the second and third measurement: EEG findings were scored as severe, diffuse not specific damage.

CONCLUSION. Considering the profound changes induced by sepsis, it is not surprising that the nervous system is affected. However, SAE may be reversible and even a marked increase in S100beta serum level can be expression of a still amendable brain damage.

REFERENCE(S). 1) De Luca P, Cotena S, Russo E, Gily B, Piazza O. Serum S-100 levels in cardiac arrest survivors. Minerva Anestesiol 2004;70(suppl 2): 515-6 2) Members of the American College of Physicians/Clinical Care Consensus Conference Committee. Definitions for sepsis and organ failure and guidelines for the use of innovative therapies in sepsis. Crit Care Med 1992; 20:864-874 3) Young GB, Bolton CF, Austin TW, Archibald YM, Gonder J, Wels GA. The encephalopathy associated with septic illness Clin Invest Med. 1990 Dec;13(6):297-304.
Poster Sessions
Acute cardiac failure 353-366

353
ATRIAL FIBRILLATION AFTER LUNG TRANSPLANTATION
Kogan A G1, Sahar G1, Stamler A1, Sharoni E1, Valde B A1
1 Department of Cardiothoracic Surgery, Rabin Medical Center, Petah-Tiqwa, Israel

INTRODUCTION. Atrial fibrillation (AF) is the most common dysrhythmia seen early after major thoracic surgery. Atrial fibrhythmia has been observed in children undergoing lung transplantation [1,2], but only one report [3] described AF after adult lung transplantation in the early postoperative period.

METHODS. We performed a prospective study in the Heart and Lung Transplant Unit in the Department of Cardiothoracic Surgery in a university hospital.

RESULTS. During the last 6 years, 108 lung transplantsations (92 single-lung and 16 double-lung) were performed in our department. AF developed in 9 patients (8.3%); in two patients after double-lung transplantation and in seven patients after single-lung transplantation. Two patients were operated with CPB. Two patients had a history of arrhythmias and received antiarrhythmic medication. No patient had AF related to a rejection episode. One patient had AF transiently during the first postoperative day, but it resolved spontaneously. Seven patients had AF but began 2-5 days after the operation. AF was treated with Amiodarone with good results.

RESULTS. All patients returned to sinus rhythm. Risk factors for developing of AF were age of the patient and ischemic time.

CONCLUSION. AF commonly occurs in the immediate postoperative period after lung transplantation in adults. Amiodarone is the treatment of choice.

REFERENCE(S). 1. Hoffman TM, Rhodes LA, Wicend TS et al. Arhythmias after pediatric lung transplantation. Pediatr Transplant 2001; 5:349-52.

354
COMPARISON OF MONOPHASIC VersUS BIPHASIC ELECTRICAL CARdioversion IN ATRIAL FIBRILLATION
Vaisman M1, Bittencourt M F1, Rey R C V1, Bronstein A F1, Costa Filho R C1, Rangel F O D1, Rocha R M1, Espinaca R1
1Coronary Care Unit, 2Emergency Unit, 3Intensive Care Unit, Pró-Cardíaco Hospital, Rio de Janeiro, Brazil

INTRODUCTION. Electrical cardioversion (CV) of patients with atrial fibrillation (AF) is a current practice. Recent data suggest that biphasic waveforms shocks are more effective than monophasic ones for transthoracic CV but the optimal protocol has not been defined. The aim of this study was to determine the rate of CV success comparing biphasic versus monophasic waveform energies; and which one is more effective to achieve cardioversion at initial shock and access the cumulative energy used by each waveform energy.

METHODS. We conducted a prospective, randomized study of 43 patients with atrial fibrillation during an 18 month period. Success rates of CV with defibrillator using monophasic waveform energy with a sequential energy of 200J-300J-360J (group 1) and biphasic waveform energy with a sequential energy of 120J-150J-200J (group 2) were randomly compared. If the maximum energy used by one group did not achieve CV success a crossover to the maximum energy of the other group was performed.

RESULTS. The study population consisted of 22 patients in group 1 and 21 patients in group 2 with similar baseline characteristics. The rate of CV success was 95.5% in group 1 and 85.5% in group 2 (p=0.15). Group 1 achieve success at initial shockin 95.5% and group 2 in 57.1% (p=0.27). The mean cumulative energy was 203J in group 1 and 203±15J in the biphasic waveform group (p=0.078).

CONCLUSION. In this study, atrial fibrillation cardioversion using biphasic waveform energy was not more effective than that observed with monophasic pulse. This result could be attributed to the initial energy of 200J used by monophasic group.
355 COST AND BENEFIT IN ANGIOPLASTY VERSUS THROMBOLYTIC THERAPY IN THE AMI
Barrientos-Vega R1
1ICU, Hospital Virgen de la Salud, Toledo, Spain

INTRODUCTION. While works are numerous that compare the benefits of different forms of revascularisation in the acute coronary syndrome, on the opposite, cost studies on different forms of revascularisation are seldom.

METHODS. By means of retrospective revision of clinical histories, we have identified and gathered the different types of revascularisation made, together with the corresponding consumed resources. The hospital administration has provided us information related to the cost of structures, direct and repelled wages in addition to consumption of consumable equipment, cost along with prosthesis and drugs cost. Concerning the costs, they are invoiced by the hospital in the first semester of year 2004. As for the benefits, we referred to medical literature on multi-centrally analysed works as well as meta-analysed ones.

RESULTS. Each revascularisation modus operandi keep patients 48/72 hours in a coronary unit, as a result these costs are not included. Costs of thrombolytic therapy: Tecnetiophase: 1150 €, sodium heparin: 64 €, nurse timing for preparation of drugs: 16 €, leads to an average cost of: 1,230 €. Cost of angioplasty(with stent): structure’s amortization, employee’s wages, functioning and repelled costs, represent an average cost per exploration of: 352 €, added to the average cost of: 1051 € that corresponds to the procedure’s cost. Added to professional’s cost, that goes from 950 to 2247 € each, is utilised an average of 1.1 stent for each procedure, leading to an average cost of: 1522 € per PTCA. In 68% of the cases is used abciximab, the average cost appeared to be: 467 €. As a consequence, the global average cost of the whole procedure reaches: 3,392 € per PTCA. The results that appear in different studies indicate that the diminution of mortality related to the type of revascularisation in favour of angioplasty is of: 0.6%, 2.1% and 2.1% (1,2,3). CONCLUSION. The results in favour of angioplasty compared with thrombolytic therapy are important although quantitatively small. The costs of these benefits are on the contrary very high: 310,869 € to 103,671 €, for a mortality that goes from 0.6% to 2.1%. The incidence due to reinfarction or cerebral stroke, modify partially these costs.

REFERENCES(1) Metha J, Am Coll Cardiol 2002; 40: 1034-40. (2) Weaver et al. JAMA 1997; 17, 278: 2903-8. (3) Keeley et al. Lancet 2003; 361: 13-20.

356 ELECTROCARDIOGRAPHIC ALGORITHM TO PREDICT THE OCCLUSION IN LEFT ANTERIOR DESCENDING CORONARY ARTERY
Rosselli Ferrer A1, Rodriguez A1, Riera M1, Carrillo A1, Piol M1
1Intensive Care and Coronary Unit, Son Dureta Hospital, Palma de Mallorca, Spain

INTRODUCTION. The ST elevation in precordial leads (STEPL) indicates an acute myocardial infarction (AMI) due to occlusion of a left anterior descending coronary artery (LAD). The proximal LAD occlusion involves larger zone of myocardium and worse outcome. The aim of this study was to elaborate an ECG algorithm compared to angiographical findings to predict the place of occlusion of LAD.

METHODS. Retrospective analysis of ECG and angio graphical findings in patients with AMI with STEPL. Inclusion criteria: Coronary angiography performed during first 12 hours from the beginning of symptoms and evidence of total occlusion or stenosis >70% only in LAD. Patients were divided into 3 groups (Table 1): ST changes in inferior leads (III, VF) were analysed to predict the occlusion in relation to D1 and then in case of occlusion proximal to D1 ST changes in VR, V1 and V6 leads to locate occlusion in relation to S1 artery. All criteria were put into sequential algorithm.

RESULTS. 60 patients (48 men, 55±13 years) were studied. The main clinical characteristics of study population are displayed in the table. ST depression > or = 2.5 mm in inferior leads (III, VF) was sensitive(74%) and specific(91%) for prediction of LAD occlusion proximal to D1 artery. Subsequent analysis of the criterion of the sum of ST changes in VR and V1 minus V6 > or = 0 allowed locating the occlusion proximal to S1 with sensitivity of 73% and specificity of 82%.

TABLE 1.

| Group A (n=20) | Group B (n=18) | Group C (n=22) |
|---------------|---------------|---------------|
| Before S1 and D1 | Between S1 and D1 | Distal to D1 |
| LVEF at the time of | 58±12° | 45±17° | 59±10° |
| Peak CPK | 4890±2940° | 3122±2520° | 2113±1870° |
| Peak CK-MB | 463±293° | 281±343° | 351±300° |
| Killip III-IV class | 6 (30.0%) | 11.5% | 6 (0.0%) |

a,c,P<0.001, b,d,P<0.05

CONCLUSION. In case of AMI with STEPL our sequential ECG algorithm based on analysis of inferior leads followed by assessment of ST changes in VR,V1 and V6 leads allow us to predict the place of occlusion in LAD with high accuracy. It might be recommended to be used in everyday clinical practise.

357 CPR AND AUTOMATED EXTERNAL DEFRIBRILLATOR: WHAT IS REALLY KNOWN IN THE PUBLIC POPULATION?
Nesslinger M1, Trappe H1
1Department of Cardiology and Angiology, Marienhospital Herne, Herne, Germany

INTRODUCTION. Victims of sudden cardiac arrest (SCA) due to ventricular fibrillation (VF) or ventricular tachycardia (VT) can survive if bystanders and emergency medical system (EMS) providers act quickly. Bystanders must be able to recognise cardiac arrest, phone the EMS, perform cardiopulmonary resuscitation (CPR), and use the automated external defibrillator (AED). However, it is still unclear if the public population has enough knowledge about CPR and AED.

METHODS. Eight AEDs were installed in a large swimming park (LAGO – Die Therme) with approximately 700,000 visitors (V) per year. All V were asked about the knowledge in CPR and AED-use by questionnaire (QS).

RESULTS. Five hundred and eighty-eight V (336 males, 252 females, mean age 38±21 [range 11-79] years) were asked during a month period. Among these 588 V, cardiac diseases were present in 44% (7%); 241 V (41%) had coronary risk factors and 95 V (16%) had suffered from symptoms like angina or dyspnea. Training in CPR was performed prior to the QS in 147 V (25%) < 1 year before, in 312 V (19%) between 2.5 years, in 76 V (13%) between 5-10 years and in the remaining 253 V (43%) > 10 years. The AEDs were not noticed by 450 V (77%). 254 V (43%) had information about the use of the AEDs and more sporting activities due to the AED were performed by 289 V (49%).

CONCLUSION. The knowledge in CPR in the public population is low and only 25% had CPR training within the last 12 months. In contrast, 43% of our V had information about the AED and a better feeling about safety (78%). Therefore, more activities in CPR and AED training are necessary to improve the rate of SCA survivors.

358 EFFECTS OF LEVOSIMENDAN IN PATIENTS WITH ACUTE CORONARY SYNDROME AND CARDIogenic SHOCK WHEN ADMINISTRA ted BEFORE OR AFTER PERCUTANEOUS CORONARY INTERVENTION
Soss P1, Becker D1, Szabo G1, Fulop G1, Geller L1, Zima E1, Apor A1, Merkely B1
1Dept. of Cardiovascular Surgery, Semmelweis University, Budapest, Hungary

INTRODUCTION. Levosimendan is a calcium sensitizer which enhances myocardial contractility, that’s why it could be advantageous in patients with myocardial ischemia requiring inotropic support. During one year 1106 patients with high risk acute coronary syndrome underwent percutaneous coronary intervention (PCI) in our department. 87 of them had in addition cardiogenic shock. Thirty of these patients received levosimendan therapy. Cardiogenic shock developed in 8 patients before PCI or in the catheter lab (before PCI) and in 7 patients on the intensive care unit (after PCI), moreover 15 patient had severe acute heart failure (AHF).

METHODS. Levosimendan therapy was indicated as add-on therapy in patients with cardiogenic shock requiring catecholamines or in patients with impaired left ventricular function, by extensive wall motion abnormality and by high blood cardiac enzyme concentration. Levosimendan treatment was started 2.7±4±20 days after coronary intervention; initially 10 minutes bolus (12 microg/kg/min) following 6 hours continuous infusion (0.1 microg/kg/min).

RESULTS. In-hospital mortality of patients with cardiogenic shock was substantially lower when they received levosimendan (13.3% vs. 28.7%; p=0.1). Focusing on the levosimendan group, there was no difference in mortality according to the onset of shock (before PCI: 12.5% vs. after PCI: 14.5%; p=N.S) or when these were compared to the mortality of heart failure patients (13.3%; p=N.S). The rate of successful removing of intraaortic balloon pump (IABP) did not differ in the three groups (AHF: 46% (66.7%), before PCI: 56% (83.3%), after PCI: 44% (100.0%); p=N.S) as well as the rate of successful weaning from respirator (AHF: 71% (70.9%), before PCI: 58% (62.5%), after PCI: 45% (80.1%); p=N.S.). The number of days the patients spent on the intensive care unit was almost the same in the three groups (AHF: 7.5±1.2 days, before PCI: 7.4±1.4, after PCI: 7.4±1.0; p=N.S).

CONCLUSION. Levosimendan may improve cardiac function and decrease short-term mortality in high risk patients with acute myocardial ischemia when cardiogenic shock developed. The indication of levosimendan therapy may be independent of the onset of cardiogenic shock - before, during or after PCI. Levosimendan therapy may help to wean from the respirator, to remove IABP in patients with cardiogenic shock similarly as in patients with acute heart failure.
359  
THE INFLUENCE OF C REACTIVE PROTEIN IN THE INTRAHOSPITAL PROGNOSTIC OF ACUTE CORONARY SYNDROMES

Lopez-Lago A1, De Lange S1, Garcia-Acuna J1, Tocino V2, Villanueva J1, Amaro A1, Pena Gil C1, Jaquet M1
1Intensive Care Unit, 2Coronary Care Unit, Clinic University Hospital of Santiago, Santiago de Compostela, Spain

INTRODUCTION. The Ultra Sensible C Reactive Protein (US-CRP) offers important prognostic information. It is not clear that the determination of the US-CRP in the acute phase of the Coronary Syndromes (ACS) could permit the discrimination of those patients with higher risk of cardiovascular complications during the intrahospital period.

METHODS. 60 patients consecutively admitted in the Coronary Unit of for an ACS have been studied. From all patients were taken a blood sample during the first 24 hours, in order to determine a complete hemograma, a lipid profile with total cholesterol, LDL cholesterol and triglycerides, US-CRP, blood glucose, fibrinogen and HbA1c. The peak of myocardic necrosis markers (Tropionin I, CKP, CK-MB) was registered in all the patients. Also a diagnostic coronaryography had been done before 48 hours of evolution with therapeutic purposes. Eventually, the US-CRP was determined in the moment of discharge. All the complications during the hospitalisation were registered: death of cardiovascular origin, refractory angina, cardiac insufficiency, ventricular arrhythmias and the need for revascularization.

RESULTS. The mean age was 68 years (39-85). 77% were males and 17% were diabetics. 58,13% of patients presented an Non-ST-elevation myocardic infarction (NSTEMI) and 41,86% an ST-elevation myocardial infarction (STEMI). No significant differences had been observed in the determination of leukocytes, fibrinogen and glycosylated hemoglobin between the two groups of myocardic infarction. The total mortality was 9%. Patients who suffered from cardiovascular complications (mortality, refractory angina and cardiac insufficiency) presented a non-significant tendency of higher US-CRP (>3 mg/dL) than those who did not present cardiovascular complications. Diabetic patients presented a significantly higher US-CRP than non diabetic patients (p<0,01). No significant differences had been observed between the US-CRP levels in this group and the development of cardiovascular complications.

CONCLUSION. In the case of patients with ACS, US-CRP permits significant discrimination of those groups of patients with higher risk of cardiovascular complications intrahospitaly. It is necessary to draw new studies for a better understanding of the role of US-CRP in the intrahospital phase of the ACS.

---

360  
HYPOXEMIA IN PATIENTS WITH ACUTE MYOCARDIAL INFARCTION

Maup J1, Páez J1, Cancio B1, Sanchez B1, Padró J1, Ballús J1, Sabater J1, Manresa R1
1ICU, Hospital Dos de Maig. Consorci Sanitari Integral, Barcelona, Spain

INTRODUCTION. There is no recent data about the incidence and implications of hypoxemia measured by pulse-oximetry (SpO2) in patients with acute myocardic infarction (AMI).

METHODS. A series of 206 consecutive patients with AMI were studied prospectively registering baseline SpO2 during the first three days. This value was obtained in the morning round taking the steadiest value on room air. Patients were distributed in 3 groups according to baseline SpO2 values: Group-1 (no hypoxemia: SpO2>93%), Group-2 (mild hypoxemia: SpO2 90-93%) and Group-3 (moderate-severe hypoxemia: SpO2<90%). After the discharge, patients were followed-up for 12 months. Patients with cardiogenic shock were excluded.

RESULTS. One hundred thirteen patients (55%) presented hypoxemia: 38% in the first day (Group-2: 25% and Group-3: 13%), 38% on the second (30 % and 8%) and 33 % on the third day (24% and 9%). Patients with hypoxemia were older (69 vs 59; p<0.0005), diabetes, chronic bronchitis and prior AMI in comparison to patients without hypoxemia. The infant size (measured by CK-MB peak) tended to be larger; heart rate (78 vs 72 beats/m; p=0.005) and breathing frequency (20.7 vs 18.8 breaths/m; p<0.0005) were higher, whereas left ventricular ejection fraction was lower in patients with hypoxemia (59% vs 59% respectively; p<0.005). Age (Odds ratio 1.05 [95%CI: 1.02-1.08]) and acute heart failure [10.7 (4.6-25.1)] were independent predictor variables of hypoxemia in the logistic regression analysis. Kaplan-Miner survival curves for the groups of SpO2 showed significantly different one-year event-free rates (readmission for heart failure or mortality): (Group-1) 92%; (Group-2) 79 % and (Group-3) 53 %; p=0.0001, log rank test.

CONCLUSION. In the acute phase of AMI half of the patients have some degree of hypoxemia measured by SpO2, which is still prevalent on the third day. Hypoxemia is strongly related to age and the presentation of acute heart failure. The severity of hypoxemia on the first three days may have significant prognostic implications.

---

361  
984  
362  
S96 18th Annual Congress – Amsterdam, Netherlands – 25–28 September 2005

361  
NECISITIDE IN ACUTE HEART FAILURE, FROM RANDOMISED CONTROLLED STUDIES TO DAILY PRACTICE

Müller A1, Fischler M1, Maggiorini M1
1Intensive Care Unit, Department of Internal Medicine, University Hospital, Zurich, Switzerland

INTRODUCTION. Nesiritide, a B-type natriuretic peptide for treatment of acute heart failure (HF), has recently been approved by health authorities in our country and hence introduced in our algorithm for treatment of acute HF. We retrospectively analysed the results of the first 20 patients treated with nesiritide in our medical ICU.

METHODS. Nesiritide was given when i.v. nitrates failed to improve symptoms and signs of congestive HF. Fourteen of the 20 patients were monitored with a pulmonary-artery catheter. Hemodynamic parameters were assessed at baseline, 6, 12, and 48 hours. After a bolus of 1-2 µg/kg/min nesiritide infusion was started at a dose of 0.01 and increased to a maximum of 0.03 µg/kg/min. The initial bolus was not given when the systolic blood pressure (BP) was <90 mmHg.

RESULTS. A coronary artery disease was the cause of HF in 55% of our patients. The median left ventricular ejection fraction was 35% and creatinine clearance 44 ml/min. The average dose of nesiritide infused was 0.018 µg/kg/min. The median treatment time was 46 hours, but ranged from 16 to 446 hours. The evolution of mean arterial pressure (MAP), pulmonary artery occlusion pressure (PAOP), cardiac index (CI) and diuresis/urine is shown in table 1. Values are given as the median of the maximal and minimal values recorded. At baseline 7 patients received dobutamine and 4 patients more than 48 hours dobutamine could be stopped in 3 patients in one patient. In one patient nesiritide was stopped after 16 hours because of persistent hypotension. No other side effects were registered.

CONCLUSION. The results of our study indicate that nesiritide used in an unselected group of patients with acute HF safely improves hemodynamics and diuresis. Our results confirm those reported in large randomised controlled multicenter trials.

362  
DOES FIBRINOLYTIC THERAPY INCREASES THE RISK OF DEATH IN PATIENTS 70 YEARS AND OLDER WITH STEMI?

Caballero Zirena A1, Cortes Dia-3 S2, Marcos Prieto L1, Alvarez Terrero A1
1Intensive Care Unit, Hospital Virgen de la Cava, Zamora, Spain

INTRODUCTION. There is no evidence supporting thrombolytic therapy in patients older than 70 years, but international guidelines have included its use for elderly patients with ST-segment-elevation myocardial infarction (STEMI). However the risk/benefit ratio of antithrombotics should be carefully evaluated because of concerns about increased risk for bleeding complications, particularly intracranial haemorrhage.

METHODS. To determine whether thrombolytic therapy for elderly patients is associated with a survival advantage, we conducted a retrospective study of all the patients who were 70 years of age or older, that were hospitalized in the Intensive Care Unit from 1999 to 2004 with the diagnosis of STEMI.

RESULTS. A total of 482 patients 70 years and older were hospitalized in the ICU. The mean age was 76.30 (range 70-90) of whom 33.88% received fibrinolytic therapy and 66.12% did not received such treatment. The global mortality was of 26%. The mortality was higher among patients who received no reperfusion therapy (19,5%) than among those who had fibrinolytic (14,6%). In addition, although the risk of stroke increase with age, the absolute excess risk of stroke in patients older than age 70 years receiving thrombolytic treatment was < 1%, and there was no age-associated excess in the risk of the other major bleeding complications. Patients who did not receive reperfusion therapy were older, had longer duration of chest pain, higher risk score for thrombolysis or had absolute or relative contraindications.

CONCLUSION. Fibrinolytic therapy in patients with STEMI who are 70 years and older is associated with a reduction in the composite of mortality and the risk of major adverse events is acceptably low, therefore the indication of intravenous thrombolytic therapy should be considered in elderly patients.

REFERENCE(S). -Aronow WS. Myocardial infarction in the elderly: benefits and risks of thrombolitics. Drug Saf. 2002; 25(1):753-8.
-Elf Stenestrand, MD. Fibrinolytic Therapy in patients 75 years and older with ST-Segment-elevation Myocardial Infarction. Arch Intern Med. 2003; 163:965-971.
THE ROLE OF C REACTIVE PROTEIN AS A MARKER OF VASCULAR INJURY IN ACUTE CORONARY SYNDROMES

Lopez-Lago A, De Lange S, Garcia-Acuna J, Tocuian V, Gomez F, Trillo R, Gonzalez-Huayarte J
Intensive Care Unit, ‘Corona’ Care Unit, Clinica Universitaria Hospital de Santiago, Santiago de Compostela, Spain

INTRODUCTION. Ultra Sensitive C Reactive Protein (US-CRP) is considered by some authors as a cardiovascular risk factor and a prognostic indicator of cardiovascular complications. However, a lot of studies show that it is only an indicator of the vascular injury.

METHODS. 60 patients consecutively admitted to the Coronary Care Unit of our centre for an ACS have been studied. From all patients were taken a blood sample during the first 24 hours, in order to determine a complete hemograma, a lipid profile with total cholesterol, LDL, cholesterol and triglycerides, US-CRP; blood glucose, fibrinogen and glycosylated hemoglobin. The peak of myocardic necrosis markers (Troponin I, CKP, CK-MB) was registered in all patients. Also a diagnostic coronarography had been done before 48 hours of evolution with therapeutic purposes. Eventually, the US-CRP was determined in the moment of discharge. All the complications during the hospitalisation were registered: death of cardiovascular origin, refractory angina, cardiac insufficiency, ventricular arrhythmias and the need for revascularization.

RESULTS. 58.13% of all the patients presented a Non-ST-elevation myocardial infarction (NSTEMI) and 41.86% a ST-elevation myocardial infarction. US-CRP and 17% of the patients were diabetics. Peripheral arteriopathy was diagnosed in 18% of the cases and 7% of them suffered an ischemic cerebral vascular accident. The diabetic patients presented a US-CRP significantly superior to non diabetic patients (6.75 vs. 2.91, p<0.01). The patients with peripheral arteriopathy had a US-CRP significantly superior to those who did not had it (6.78 vs. 3.24, p<0.05). Similar data could be found in the patients who had suffered an ictus (6.28 vs. 3.68; p<0.05). A non significant tendency of higher US-CRP had been observed in the patients with ACS and Renal Insufficiency and icuc. No significant differences had been observed between the degree of coronary injury and the US-CRP.

CONCLUSION. The elevated levels of US-CRP in the patients who suffered from an ACS was associated with the existence of a vascular injury in the peripheral and cerebral circulation. These findings could indicate that the elevation of US-CRP in those with ACS probably reflect the presence of a more extended vascular injury.

LEVOSIMENDAN-HEMODYNAMIC SUPPORT DURING OFF-PUMP CORONARY ARTERY BYPASS GRAFT SURGERY

Husezdinovic F, Barzin B, Bradic N
'Clinic of Anaesthesiology, Reanimatology and Intensive Care Medicine, University Hospital Dubrava, Zagreb, Croatia

INTRODUCTION. We tested the hypothesis that levosimendan produced good hemodynamic effects during off-pump coronary artery bypass surgery in patients with normal preoperative left ventricular function (ejection fraction > 40%).

METHODS. Loading dose of levosimendan (12 mg/kg during 15 minutes) or placebo were administered 15 minutes after anaesthesia induction in 30 patients. Bolus thermodilution with calibrated flow probe were employed for qualitative variables. A p< 0.05 was considered statistically significant.

RESULTS. Heart rate, mean arterial pressure, pulmonary capillary wedge pressure, and systemic vascular resistance were not significantly different between groups. Significant increases in CO and left ventricular EF occurred in levosimendan group (Table 1, Table 2).

CONCLUSION. Levosimendan produced good hemodynamic support during off-pump coronary artery bypass graft surgery in patients with normal preoperative left ventricular function.

LOW DOSE DOBUTAMINE IS OPTIMUM FOR LV DIASTOLIC FUNCTION & RELAXATION OF CORONARY VESSELS

Sherif H, Wadie A, Abdel-Fattah A, El-Tawel A, Mokhtar S
‘Critical Care Medicine, Faculty of Medicine, Cairo University, Cairo, Egypt

INTRODUCTION. The normal left ventricle (LV) operates below the bend of the pressure-volume curve. In congestive heart failure (CHF) the impairment of both LV systolic and diastolic functions leads to rightward displacement of this curve and redistributes the total flow.

METHODS. We studied 30 critically ill cardiac patients (pts mean age: 49±10.1 years), all had CHF due to ischemic heart disease (18 pts), or dilated cardiomyopathy (12 pts), and a control group of 15 males (mean age: 41±8.6 years). Patients at baseline & controls had been subjected to both techniques of multigated equilibrium radionuclide angiography (99mTc-pertechnetate) to measure LV cardiac index (CI) using the coude proportional non-geometric method and LV diastolic function evaluation by the peak filling rate (PFR) & the renal normal scintigraphy (Tc-99m marcaptopoietin-triglycine) to estimate the effective renal plasma flow. The whole procedure was repeated in pts group, first under low dose (5 microgram/kg/min), and then under high dose (20 microgram/kg/min) of dobutamine, with 24 hours apart.

RESULTS. Compared to controls, pts at baseline showed significant lower values of CI (mean: 1.87±0.5, vs. 3.45±0.5 L/m/m², p<0.008), PFR (0.82±0.7, vs. 2.88±1.2 EDV/sec, p<0.01) and RBF (332.7±84.7, vs. 679.3±103.8 L/m/min, p<0.002). Both LV systolic and diastolic functions and renal hemodynamics were analyzed with general linear models for repeated measures to identify any significant changes from baseline to dobutamine infusion doses. Compared to pts at baseline, the low dose could significantly improve CI to 2.44±0.5, p<0.003, PFR to 1.61±0.2, p<0.006 and RBF to 410±9, p<0.05. On the other hand, the higher dose of dobutamine, showed further significant increase of CI to 2.78±0.6, p<0.003, but the change were insignificant in PFR (1.64±0.7) and decreased insignificantly in RBF (391.3±110.6).

CONCLUSION. The effects of different doses of dobutamine on the total flow were not paralleled by similar effects on the selective regional distribution. The lower dose of dobutamine was significantly optimal for both renal blood flow and LV diastolic function. The target to improve the renal blood flow & LV diastolic function can’t be reached only, by adjustment of the cardiac index in congestive heart failure.

TIROFIBAN AND CLOPIDOGREL IN NON-ST-SEGMENT PERSISTENT ELEVATION ACUTE CORONARY SYNDROMES

Blancas R, Nevado E, Lopez B, Sereno F, Martinez C, Gonzalez J, ‘Intensive Care Unit, Hospital General La Mancha Centro, Alcalá de San Juan, Spain

INTRODUCTION. In non-ST-segment persistent elevation acute coronary syndromes (NSTE-ACS), cardiac catheterism is sometimes delayed. The usefulness of tirofiban in that setting has been proposed. The aim of this study was to know if clopidogrel adds some benefit to tirofiban in high risk NSTE-ACS, when percutaneous intervention is not planned.

METHODS. During a two-year period, high risk patients with NSTE-ACS were included. The first year, patients received tirofiban alone (group B). Tirofiban was administered as a 48 hours infusion. Urgent catheterism was requested if angina or acute myocardial infarction (AMI) appeared during tirofiban infusion. The primary end-point was a composite of angina, AMI and death during tirofiban infusion. Hemorrhagic events were compared among groups. Statistical analysis: ‘Two-sample T test was employed for qualitative variables. A p<0.05 was considered statistically significant.

RESULTS. Neither statistically significant difference among both groups for the primary end-point, nor angina, AMI, death, urgent catheterism or hemorrhagic events were found.

CONCLUSION. Neither ischemic events rate in high risk NSTE-ACS patients, nor the need of urgent cardiac catheterism decreased when clopidogrel was added to tirofiban. Hemorrhagic events risk did not increase with clopidogrel concomitant use.
**Poster Sessions**

**Acute respiratory failure 367-377**

### 367

**HEPATOPULMONARY SYNDROME IN PATIENTS WITH HYPOXIC HEPATITIS**

Fuhrmann V, Kitzberger R, Holzinger U, Funk G, Madi C, Mueller C, Schenk P
1Internal Medicine IV, Intensive Care Unit 13H1, 1Internal Medicine IV, Pulmonary Division, 2Internal Medicine IV, Division of Gastroenterology and Hepatology, Medical University of Vienna, Vienna, Austria

**INTRODUCTION.** Hypoxic hepatitis, also known as ischemic hepatitis, is characterized by clinical, biochemical and histological features. The hepatopulmonary syndrome (HPS) is defined as the triad of liver disease, impaired arterial deoxygenation and widespread pulmonary vascular dilatation. Presence of HPS is associated with increased mortality in patients with liver cirrhosis. No systematic data of prevalence and clinical consequences of HPS in acute hepatic impairment are available.

**METHODS.** 28 patients fulfilling internationally accepted criteria for hypoxic hepatitis (aminotransferase levels elevated to at least 20 times the upper limit of normal, absence of other causes) were screened for presence of HPS (impaired arterial deoxygenation, positive intrapulmonary shunting detected via echocardiography). As control group 50 critically ill patients without hypoxic hepatitis were screened for HPS.

**RESULTS.** 14 (50%) patients with hypoxic hepatitis were positive for HPS. Mean peak ASAT and ALAT levels were 3853 ± 1893 U/L, the group with HPS and 3281 ± 4046 U/L (p<0.05) and 1649 ± 1902 U/L (p=n.s.) in the group without HPS. The PaO2/FiO2 ratio at the days 1, 3, and 5 after the event were 142 ± 38 (n=10), 168 ± 46 (n=7) and 155 ± 20 (n=6) in the HPS-group vs. 269 ± 149 (n=13) (p=0.05), 201 ± 89 (n=8) (p=n.s.) and 216 ± 78 (n=8) (p=0.05) in patients with hypoxic hepatitis but without HPS. ICU-mortality was 57 % (p=n.s) in the HPS-group and 57 % (p=n.s) in patients without HPS. We could not detect intrapulmonary shunting via echocardiography in any of our control patients.

**CONCLUSION.** HPS is a frequent finding in critically ill patients with hypoxic hepatitis. Patients with HPS have higher peak serum aminotransferase levels and lower PaO2/FiO2 ratio in the first days after occurrence of hypoxic hepatitis compared to patients without HPS. ICU-mortality seems not to be influenced by the presence of HPS.

**REFERENCE(S).** 1. Henrion J et al. Hypoxic hepatitis. Clinical and hemodynamic study in 142 consecutive cases. Medicine (Baltimore) 2003; 82:392-406. 2. Schenk P et al. Prognostic significance of the hepatopulmonary syndrome in patients with cirrhosis. Gastroenterology 2003;125:1042-1052.

### 368

**NURSING QUALITY-INTENSITY AS A DETERMINANT OF OUTCOME IN ARDS/ALI PATIENTS?**

Malacrida R L, Sahinbas S, Kraljić M
1Intensive Care Unit, Regional Hospital, Lugano, Switzerland

**INTRODUCTION.** Variability of care delivery conditions has been repeatedly an important determinant of clinical outcomes. Intensive care setting are known to be exposed to the risk of providing care strategies which are dependent on the composition and organisation of the staff, specifically where nursing procedures play a major role. The framework of a multicentric trial focused on the testing of the efficacy of prone positioning on the clinical outcome of patients with ARDS/ALI specifically where nursing procedures play a major role.

**METHODS.** All patients (n=43) included in the trial of a unit known to have a tradition of specialized nursing training and favourable nurse/patient ratio, where compared with the rest of the trial population (n=263), were treated with less favourable nursing conditions.

**RESULTS.** Mortality in the unit with better favourable nursing conditions was 12% at 10 days, 23% at admission, 36% at 6 months versus 25% at 10 days, 54% at admission, 64% at 6 months with less favourable conditions. Baseline characteristics of the ARDS/ALI patients were without significances, except the sex-ratio.

**CONCLUSION.** Due to the „a posteriori“ nature of the analysis and the small number of events, no statistical estimates of the significance of differences are provided. It would be possible to presume that the difference of the mortality outcomes could be due to the different seriousness of the randomized patients despite similar SAPS and admission criteria (standard ARDS/ALI definitions) or due to the different collective of the intensive care units (average stay in hospital of the 263 patients: 10-14 days versus 3-4 days for the 43 patients). Compared to the only partially significant differences of baseline characteristics of the patients, the impressive variability of mortality outcomes could be seen as a strong stimulus to explore formally, in prospectively ad hoc designed studies, the relationship of quality-intensity of nursing care and short-medium term outcomes.

### 369

**IDIOPATHIC AND SECONDARY PULMONARY EMBOLISM IN NORTHWESTERN GREECE**

Maglaras G C, Koliatis N, Vathilomonatos G, Metafragatzis Z, Katsanos C, Dova L, Constantiopoulos S, Vassiliou M
1Pneumonology Dept, Hematology, 2Radiology, University Hospital of Ioannina, Ioannina, Greece

**INTRODUCTION.** The identification of idioptic and secondary Pulmonary Embolism cases occurring in Northwestern Greece.

**METHODS.** The study group consists of 111 adults patients (mean age >61, SD=14.5years) with symptoms suggesting the diagnosis of pulmonary embolism with high probability. Spiral CT pulmonary angiography was performed in all patients, findings consistent with pulmonary embolism was observed in 59 patients. All these patients were treated in the Pneumonology department during the last two and a half years. Four patients with definite diagnosis of severe PE are not included in this group, since they were treated at the Intensive Care Unit with unstable cardiovascular function. Then, we classified the PE as 32 secondary cases (32/59, 54.2 %) or as idioptic 27 cases (27/59, 45.8%) according to the co-existence of cancer, antiphospholipid syndrome, recent trauma, operation and for prolonged immobilization.

**RESULTS.** Although women presented more frequently secondary PE, neither the sex nor the age were statistically different between the cases of idiopatic and secondary PE. In group with secondary PE 6 (18.7%) were with neoplasmatic disease, 13 surgery or trauma (40.6 %), heart and pulmonary disease 7 (21.87%), 1 antiphospholipid syndrome ( 3.12 %), 2 chronic thromboembolic disease (6.25 %) and 3 prolonged immobilization (9.37%).

**CONCLUSION.** In our region the prevalence of idiopathic pulmonary embolism in the general population is (45.8 %) and for secondary PE which is within the same range as that reported for other European countries.

**REFERENCE(S).** Bruce D, Perry DJ, Borg JY, Carrell RW, Wardell MR. Thromboembolic disease due to thermolable conformational changes of antithrombin Rouen-VI. J Clin Invest. 1994 Dec;94(6):2265-74.

### 370

**SURVIVAL OF PATIENTS WITH BRONCHIECTASIS IN INTENSIVE CARE UNIT**

Alzeer A H, Masood M, Bashar S, Shaik S
1Intensive Care, King Khalid University Hospital, Riyadh, Saudi Arabia

**INTRODUCTION.** Respiratory failure in advance Bronchiectasis is a common problem. There has been little written about it in ICU.

**METHODS.** Objectives: To determine the outcome and its associated factors (both at ICU and later during the follow up period of patients with Bronchiectasis and Respiratory Failure. Design: A retrospective study of a 10 year period (1995-2004) was done, where all patients with the diagnosis of bronchiectasis admitted to the medical ICU of KRUH, with RF were reviewed.

**RESULTS.** Thirty five patients with age (mean ± s.d) 65.5 ± 11.7 years; APACHII score 22.3 ± 7.3 were reviewed. Of these patients 25 (71.4%) were receiving Home O2. All these patients were treated with intensive medical care, associated with non-invasive ventilation in 20 patients (57%) and 11 patients (31%) required intubations, 15 patients (43%) received Inotropic support. Activity of daily living on a scale of 4 (bed or chair bound) was identified in 24 patients (69%). Twelve patients (34%) have died in the ICU. The 6-year mortality was 60%. Among the associated variables studied during ICU admission, age >65 years (p=0.003), APACHIE score >24 (p=0.03), intubation (p=0.02), inotropic support (p=0.019), Home O2 (p=0.01) activity index (p=0.02) were associated with diminished survival in univariate analysis by cox regression. The survival probabilities were significantly low at these stratas of the above variables by log rank test. Multivariateivariate analysis of cox proportional hazard model showed that age >65 years (relative risk (RR), 5.4, 95% confidence interval (CI) 1.88, 15.68), activity index (RR:4.82; 95% CI, 1.39,16.64) and use of inotropic (RR:3.84; 95% CL1.14, 10.06) were independently associated with reduced survival.

**CONCLUSION.** This study with some of its limitations has brought out useful information related to the ICU patients for RF with bronchiectasis. The decrease in survival of these patients were associated with age >65 years, activity index (bed or chair bound) and use of inotropic support.
371

**EPIDEMIOLOGY AND OUTCOME OF ARDS AND ALI IN GERMANY**

Molitors U1, Ahrens J1, Johannig K1, Weber-Carstens S1, Frutos F2, Eiseb significant and outcome of ARDS and Acute Lung Injury (ALI) in Germany.

**METHODOLOGY.** Patients that were ventilated for more than 12 hours invasively or at least 1 hour non-invasively in May 2004 had been included from 95 Intensive Care Units of 80 hospitals from 64 German cities. They were screened for the development of ARDS and ALI. Tidal volumes (Vt) and PEEP values were averaged over the course of mechanical ventilation.

**RESULTS.** ARDS occurred in 192 (2.6%) and ALI in 63 (0.8%) of all 7540 admissions and in 18.7% and 6.1% of all 1028 mechanically ventilated patients. ICU and hospital mortality were different between patients with ARDS, ALI and the group of 773 mechanically ventilated patients without ARDS or ALI. ARDS patients had higher SAPS II scores compared to the other patient groups and received higher PEEP levels and lower Vt compared to mechanically ventilated patients without ARDS or ALI (median range) in table 1. 75% of the ARDS patients had pulmonary and 25% extrapulmonary ARDS with different mortality rates in the ICU (39 vs. 55%, p<0.001) but not during their entire hospital stay (47 vs. 60%, p>0.12).

**CONCLUSION.** ARDS was frequent among mechanically ventilated patients in our sample of German ICUs. Compared to European ICUs of the recent ALIVE study the mortality of ALI was very similar but the mortality of ARDS was lower by 8%. This was associated with the use of lower tidal volumes and higher PEEP levels.

372

**CAN THE PERCUTANEOUS DILATATIONAL TRACHEOSTOMY BE THE ELECTION TECHNIQUE SAVING TIME AND RESOURCES?**

Marcos-Pitre L1, Caballero-Zirena A1, Cortes Diaz S2, Alvarez-Terero A1

**INTRODUCTION.** Percutaneous dilatational tracheostomy (PDT) is a technique broadly used in critical Ills to safeguard the airway in mechanical ventilation laringing that has proved, at least, to be so much or even more sure that surgical tracheostomy, all this with the existence of differences for surgical time and use of resources.

**METHODOLOGY.** Retrospective comparative study on patients went into hospital of a second level in the Intensive Care Unit about 11 beds that required tracheostomy in one of their two modalities. We analyze 38 patients, we make 28 PDT with technique of unique dilator; 10 patients that had carried out surgical tracheostomy for ORL physicians, all this with the aim of establishing comparisons between both groups as for age, sex, indications, stay, complications and mortality, paying special attention on time of realization of the technique, time of indication-procedure and staff necessary in both techniques.

**RESULTS.** Between both groups do not exist population differences. We can demonstrate that both techniques are equally safe. The techniques have showed differences as for time of the surgery duration. PDT takes 9 min. 30 seconds of average for 40 minutes of average in the surgical tracheostomy. Differences that are also present in the time of indication-procedure where the PDT is environment at 24 hours, being bigger in the surgical tracheostomy. Finally, it is objectivized the smallest necessity of human resources and experts in the percutaneous technical where 2 doctors, 1 nurse and 1 assistant nurse in the patient’s bed can carry out a technique while surgical technique needs hospital transport and operating theatre besides 2 ORL physicians, 1 anesthesiologist, 2 nurses and one assistant nurse to make it.

**CONCLUSION.** The PDT is the selected technique in the Intensive Care Units not only to demonstrate security but for saving time and the sanitary resources used.

373

**EPIDEMIOLOGY AND OUTCOME OF ARDS AND ALI IN GERMANY**

Molitors U1, Ahrens J1, Johannig K1, Weber-Carstens S1, Frutos F2, Eiseb significant and outcome of ARDS and Acute Lung Injury (ALI) in Germany.

**METHODOLOGY.** Patients that were ventilated for more than 12 hours invasively or at least 1 hour non-invasively in May 2004 had been included from 95 Intensive Care Units of 80 hospitals from 64 German cities. They were screened for the development of ARDS and ALI. Tidal volumes (Vt) and PEEP values were averaged over the course of mechanical ventilation.

**RESULTS.** ARDS occurred in 192 (2.6%) and ALI in 63 (0.8%) of all 7540 admissions and in 18.7% and 6.1% of all 1028 mechanically ventilated patients. ICU and hospital mortality were different between patients with ARDS, ALI and the group of 773 mechanically ventilated patients without ARDS or ALI. ARDS patients had higher SAPS II scores compared to the other patient groups and received higher PEEP levels and lower Vt compared to mechanically ventilated patients without ARDS or ALI (median range) in table 1. 75% of the ARDS patients had pulmonary and 25% extrapulmonary ARDS with different mortality rates in the ICU (39 vs. 55%, p<0.001) but not during their entire hospital stay (47 vs. 60%, p>0.12).

**CONCLUSION.** ARDS was frequent among mechanically ventilated patients in our sample of German ICUs. Compared to European ICUs of the recent ALIVE study the mortality of ALI was very similar but the mortality of ARDS was lower by 8%. This was associated with the use of lower tidal volumes and higher PEEP levels.

374

**EVALUATION OF PULMONARY HYPERTENSION DURING ACUTE CHEST SYNDROME**

Lent R1, Meletosso-Despau A1, Habbib A1, Brochard L1, Bruns-Buissin C1, Godeau B1, Galacteros F1, Maitre B1

**INTRODUCTION.** Positive End Expiratory Pressure (PEEP), saturation by pulse oximetry (SpO2) and the inspired fraction of oxygen (FiO2), along with a desaturating maneuver (DM) identify lung function at the bedside. However, the capability as to predict mortality have not been explored.

**CONCLUSION.** Data from from 212 mechanically ventilated patients, from June 2004 to February was used. The first data registered of FiO2, PEEP, DM, PaO2/FiO2 ratio, thorax X-Ray at the beginin of mechanical ventilation were used as independent variables, mortality due to ARDS was considered as dependent variable. Three subgroups for each variable were composed: FiO2: I less than 50%, II from 50% to 75%, III higher than 75%; PEEP: I less than 8 cm H2O, II from 8 to 10 cm H2O and III higher than 10 cm H2O; SpO2: I less than 88%, II from 88% to 95% and III higher than 95%; PaO2/FiO2 ratio; I higher than 240, II from 145 to 240 and III lower than 145. Quadrants infiltrated on the thorax X-Ray (TX-Ray), I: 1, II: 1 and 2, III: 3 and 4. Three groups of DM; I less than 20 points, II from 20 to 100 points and three higher than 100 points. Chi square was used to determine association.

**RESULTS.** Mortality due to ARDS was observed in 32 patients (15.1%). There was association with mortality in all subgroups from each variable (P<0.001). Patients with lower levels of PEEP, lower FiO2 and DM lower than 20 points had 0% mortality rate. Additionally, PEEP higher than 10 cm H2O has an association with mortality due to ARDS of 82.4% compared with 2.3% when PEEP levels were below 8 cm H2O (P=0.000), this association is increased to 90.9% when high levels of FiO2 (higher than 75%) are required and a DM higher are than 20 points are observed (P=0.000). Thorax X-Ray and PaO2/FiO2 ratio had lower capability to predict mortality at the beginin of mechanical ventilation: Mortality of 31% with less than 145 of PaO2/FiO2 ratio, 42% of mortality with 3 and 4 quadrants on the TX-Ray (P<0.000).

**CONCLUSION.** PEEP, FiO2 and the DM predict better the mortality due to ARDS than the PaO2/FiO2 ratio and TX-Ray.
375
CHANGES OF THE INTERLEUKIN-4, INTERLEUKIN-10 AND INTERLEUKIN-13 IN PLASMA IN PATIENTS WITH ARDS

Li Q1, Qian G1
1Institute of Respiratory Disease, Xinqiao Hospital, Chongqing, China

INTRODUCTION. To explore the mechanism of anti-inflammation by the way of mesurement of Interleukin-4(IL-4), Interleukin-10(IL-10) and Interleukin-13(IL-13) in plasma in acute respiratory distress syndrome(ARDS).

METHODS. Enzyme-linked immunosorbent assay (ELISA) was employed to determine contents of plasma IL-4, IL-10 and IL-13 in patients with ARDS in 67? in patients with SIRS in 87? and in the healthy control group in 10?.

RESULTS. The contents of plasma IL-4, IL-10 and IL-13 were significantly increased in patients with ARDS or SIRS. Furthermore, they were markedly higher in patients with ARDS than in those with SIRS (p<0.01).

CONCLUSION. The release of large volume of anti-inflammatory cytokines such as IL-4/IL-10 and IL-13 is probable also one of the important mechanisms of occurrence and development of SIRS as well as occurrence of ARDS.

376
CHARACTERISTICS AND OUTCOME OF VENTILATED PATIENTS IN GERMANY

Raymondos K1, Ahrens J1, Molitoris U1, Johannig K1, Frutos F2, Esteban A1, Weber-Carstens S1, Panepenbrock S1
1Anaesthesiology, University Hospital Hannover, Hannover, Germany, 2Intensive Care Medicine, University Hospital Getafe, Madrid, Spain, 3Anaesthesiology, University Hospital Charité, Berlin, Germany

INTRODUCTION. Outcome and characteristics of a large number of unselected, heterogeneous patients receiving mechanical ventilation in Germany have not been reported yet.

METHODS. Patients were included in the study who had been ventilated for more than 12 hours invasively or at least 1 hour non-invasively in May 2004. 33 ICUs in 17 university hospitals and 62 ICUs in 62 non-university hospitals participated.

RESULTS. Of 7540 patients admitted, 980 patients (13%) had been ventilated invasively for a mean (SD) duration of 8.3 (8.3) days and 48 patients (0.6%) had been ventilated non-invasively for 5.3 (3.9) days. The mortality rate was 24.4% in ICU and 30% outside ICU but in the hospital. Patients admitted to university hospitals had lower ICU and hospital mortality rates than patients in non-university hospitals (20.1% vs 29.5%, p=0.001 and 24.2% vs. 36.9%, p<0.001, respectively) and lower SAPS II scores (median (range), 34 (6-108) vs. 40 (4-109), p<0.001).

TABLE 1.

| no. (%) of patients | SAPS II | ICU mortality | hospital mortality |
|---------------------|---------|---------------|--------------------|
| medical patients in non-univ. hospitals | 212 (21.6%) | 47 (6-109) | 29% | 44% |
| medical patients in university hospitals | 167 (16.5%) | 43 (12-108) | 27% | 33% |
| surgical patients in non-univ. hospitals | 254 (25%) | 36 (4-99) | 29% | 33% |
| surgical patients in university hospitals | 303 (30%) | 32 (9-90)* | 17%** | 21%** |

*p=0.02 and **p<0.001 compared to patients from non-university hospitals

CONCLUSION. Patients mechanically ventilated in Germany had lower SAPS II scores and a lower mortality rate compared to patients of the First International Survey on Mechanical Ventilation. This can be associated with the remarkable low mortality of surgical patients admitted to German university hospitals.
WHO MAKES THE END-OF-LIFE DECISION IF THE PATIENT IS NOT COMPETENT IN THE INTENSIVE CARE UNIT?

Rubulotta F M, Gullo A, Levy M C, Ramsay G
1Intensive Care, Gasthuisberg UZ, Leuven, Belgium, 2Intensive Care, Cattinara, Trieste, Italy, 3Intensive Care, Brown, Providence, United States, 4Hospital director, Atrium, Heerlen, Netherlands

INTRODUCTION. The objective of this study is to assess the end-of-life decision-making process in different countries.

METHODS. Questionnaire administered by the same interviewer to 50 North American physicians after an end-of-life discussion with proxies of patients admitted to a Medical Intensive Care Unit (MICU).

RESULTS. USA physicians reported a 43% of responsibility in the end-of-life decision-making process in the MICU. Italian physicians claimed 80% of responsibility in the end of life decision making process.

CONCLUSION. Physicians have different percentage of responsibility in the end-of-life decision making process according to their culture and working environment (1).

REFERENCES. 1. Sprung CL, Cohen SL, Spjokvist P, et al. End-of-life practice in European Intensive Care Units: The ETHICUS study. JAMA 2003;290:790-797

HOME CARE OF AN INCOMPETENT PATIENT: “ERR ON THE SIDE OF LIFE”

Onur Y1, Ayyoglu H, Yapakci O
1Anesthesiology and Reanimation, Karaelmas University School of Medicine, Zonguldak, Turkey

INTRODUCTION. Decision to withhold or withdraw of life-sustaining treatment for an incapacitated brain-damaged patient raises complex issues regarding legal or medical concerns. It is the main question how a “clear and convincing” evidence based decision can be constituted or who has the right to make decision in end of life for a patient living in persistent vegetative state. Here we present the care of a woman who was left in a persistent vegetative state after having a cardiac arrest.

METHODS. In 1992, the case of N.U. had a cardiac arrest triggered by a severe abruption placenta. Hypoxic-ischemic encephalopathy developed after a poor response to resuscitation. After one-year stay in ICU, she was discharged from hospital without a ventilatory support but still required tracheotomy cannula, gastrostomy tube and urinary catheter. Nursing homes caring for incapable patients are not under the cover of health insurance policy in Turkey. So the sole solution for caring Ms. U was being nourished at own home. To both improve and supply a constant care for Ms. U, her sister and her husband agreed on to “err on the side of life”: the final decision was a marriage between Mr. U and sister-in-low.

RESULTS. It perhaps seems like a moral disturbing solution at first sight, but we do not have to forget that the families commonly disagree over how best to care for a loved one. Those unfortunate circumstances need stronger bond shared by each family member, rather than a familial dispute. Participation of sibling into the care of Ms. U, of course, did not improve the neurological outcome or any cognitive function, but resulted in nearly uninterrupted care, which could be so hard to ensure in a different manner. Furthermore since 1992, artificial nutrition and hydration delivered by family without a nurse support, surprisingly maintain normal levels of hematological and biochemical parameters, measured periodically.

CONCLUSION. We believe that the acceptance of diagnosis by all family members that her condition was irreversible, and then they had submitted to her unfortunate destiny. Nevertheless, it is difficult to analyze underlying factors, which cause perhaps a compulsive marriage. This profound decision, whether reflects what the patient would want for herself or what the family would want for their incapacitated loved one, is rather debatable.

END-OF-LIFE CARE IN THE ICU: INTRODUCING HOSPICE VOLUNTEERS: EVALUATION AFTER ONE YEAR

Boles J M1, Bonmiedeine A2, Tonnelet J M1, Prat G1, L’Her E1, Boles C1, Renault A1
1Service de Réanimation médicale et Urgences médicales, La Cavale Blanche University Hospital, 2ASP Iroise, Association de Soins Palliatifs Iroise, BREST, France

INTRODUCTION. In order to help relieve conscious patients and family members from the burden of an ICU stay, we introduced in our ICU non-professional hospice volunteers (HV), trained to intervene in palliative care settings. We performed an evaluation after one year.

METHODS. After an agreement was signed with the HV association, HV’s role and hours of presence were defined and adapted between the 4 HV women and the ICU staff. An HV was on duty one afternoon every 2 weeks from 09/2003 to 03/2004 and every week from 04 to 09/2004. HV met 25 patients and 60 family members either upon request or suggestion by the staff. A special logbook could be consulted to transmit information. Evaluation was performed using questionnaires for staff and HV.

RESULTS. 1) All 49 members of the staff answered: 7 doctors, 3 residents, 20 nurses, 16 auxiliaries, 2 supervising nurses and the secretary. Information about HV’s role:67% satisfied. Hours of presence: 57% satisfied, 25% wanted more. Presence considered useful:77%. Logbook consulted:69%. HV role: soothing and moral help for the patient: 57% for each, for the family for 55% and 92%. Useful informations given about family matters:49% and psychological status:51%. Verbal exchanges with HV: enriching: 45%; necessary:35%; insufficient:29%; essential:18% and useless:10%. Improving exchanges: wished:61%. Prolonging presence: wished: 75%. 2) The 4 HV were satisfied with their new ICU experience. 3 were satisfied about welcoming in the ICU and understanding of their role. Hours of presence: satisfied 2. Presence judged useful: 4. All wished to be told by the staff who to meet. 3 said families had expressed satisfaction. 3 kept on helping patients or families after ICU stay. Exchanges with staff considered: enriching: 3, essential:3 and necessary: 1. All 4 wished to improve information exchanges with the staff and continue.

CONCLUSION. These results clearly indicate that introducing HV in an ICU is considered by a large majority of the medical and nursing staff as useful and appropriate, though some expressed reluctance to share informations with the HV. Satisfaction of patients and family members is being evaluated. A working group has proposed improvements.

COMMUNICATION BETWEEN PHYSICIANS AND FAMILIES NEEDS MORE “SPACE” IN THE ICU

Rubulotta F M, Ramsay G
1Intensive Care Unit, UZ Gasthuisberg, Leuven, Belgium, 2Hospital Director, Atrium, Heerlen, Netherlands

INTRODUCTION. The objective of this study is to evaluate communication between physicians and patients’ families inside Italian ICUs.

METHODS. Design: structured survey. Setting: Italian University and Community Hospital Intensive Care Units.

RESULTS. Italy has 472 ICUs. These include adult and pediatric units. We contacted 50 ICUs selected at random all over the country. Local ICU regulations allow family members one visit a day in 89% of cases. Only one family member can enter inside the ICU after wearing gloves, mask and gown in 73% of cases, two family members wearing the same protection in 20% of cases, and more than two people in 7% of ICUs. In 73% of cases, two family members wearing the same protection in 20% of cases, and more than two people in 7% of ICUs. ICU physicians meet the family members at admission and once a day in 90% of cases.

Reasons given for adopting these rules include- in 80% of cases a lack of physical space to receive relatives longer than 30 minutes, in 40% of cases a lack of ICU staff, in 10% of cases concern about an increased risk of infection, and in 10% of cases other reasons. All units have special rules for caring for families of terminal patients.

CONCLUSION. The communication between physicians and families in Italy could be improved first of all by more space inside the unit, second by dedicating more staff time. Families seem to be adequately supported by the ICU staff in terminal or difficult situations.
The aim of the study is to compare tissue donation refusal between organ donors and potential tissue donors.

METHODS, prospective and descriptive study of all family interviews from 2000 to 2004, through specifically designed protocol. This included epidemiological data, the manner of communication to Transplant Coordinator (TC), interview features and perceived family attitude.

RESULTS, There were 3400 deaths in this period. We evaluated as potential tissue donors 519 patients. A TC carried out the interviews with these families, 42% (217) refused donation. Over 30% were actual tissue donors. We followed 256 patients in brain death in this period. Only 142 could be organ donors, 10% of these families didn’t consent to tissue donation; so only 68% of patients could give tissue. We did 784 interviews; 6% of families were familiar with Spanish law about transplant and presumed consent, and only 2% of people carry donor cards or have made a living will.

Regarding the family ties to the deceased, in the case of organ donation the parents refused in 37% of cases, the partner in 21% , the children in 16%, siblings in 8% and 17% in the case of more distant relatives. In the case of tissue donors the refusal was from the parents in 8% of cases.the partner in 37%, the children in 40%, siblings in 10% and other relatives in 6% of cases. These differences were due, in part, to the advanced age of the tissue donors. If we relate the cultural level of the interviewed people with the refusals we find the following results. MO low cultural level 29%, average 35% and high 1% while in the tissue group , low18%, average 20% and high 5% (ns). The reasons for family refusal were as follows (MO-MT %): deceased had expressed negative attitude 28/33, family opposition 17/23, resentment of the health system 17/7, difficulties with image of the corpse 17/3, deceased’s will unknown 5/2 , contrary religious beliefs 6/1,refusals 6/12, others 11/9. Regarding reversed refusals in MO, consent was obtained in 6% of cases and in 11% of MT.

CONCLUSION, Tissue donation is still the war horse for TC. This is due to a general lack of awareness of every aspect of this subject. There remains to carry out the lengthy task of social education in this area.

INTRODUCTION. Pilot experience in Girona , teaching our teenagers about donation and transplant

METHODS, This is a descriptive study on the level of satisfaction of students who received these classes. It was carried out with 4th year students (42 students) and 6th year (81). We used a post-course questionnaire, which included level of interest, clarity and usefulness of explanation, students' environment. It was agreed by the professionals working on this project not to use audiowisuals. The lesson was structured in six parts: introduction, donation rate, difference between organs and tissues, characteristics of the waiting list, conditions to become an organ donor (brain death), discussion on transplant law and personal experiences. Sometimes, kidney recipients participated and explained their experiences.

RESULTS, During the first year (2002-2003) there were 70 classes and 91 the second. 85% of state schools and 15% of private schools. We collected 1139 questionnaires. 91% have some knowledge of the subject and only 9% had none. The usual channels of information are: 78% family, 28% friends, 14% school and 3% mass-media. Regarding the presentation: clarity/contents was qualified (5%) as: very good 30/41, good 48/45, normal 20/12, poor 1/5, very poor 1. Clarification doubts, particularly: organ trafficking, financial cost, use of animals, organs, 74% considered their doubts answered, 24% partially solved and 2% not explained. Normally, the subject is dealt with many friends (57%) of these, 81% discussed it with their family. Regarding interest in the subject, high 18%, normal 68%, low 10%. 75.6% of the students would recommend the course, 20% were indifferent and 3% would not recommend it.

CONCLUSION, We considered the experience useful and satisfying. Both the institutions and the students supported the presentation in over 95% of cases. The teachers considered the course enjoyable and accessible. We feel that we need to evaluate the level of comprehension and therefore we designed a new study with two questionnaires, one prior and one a week after the course so as to evaluate the changes in the students' sensitivity and perceptions.

INTRODUCTION. Organ transplantation activities are dependent on legislation, attitudes of the general public and health care professionals, and the organization of transplantation. Reports from countries throughout the world have emphasized the importance of positive attitudes in health workers on organ donation and transplantation, yet there is a lack of studies on this subject. Even in Spain, the leading country in organ donation rates, there is also an existing shortage of these studies. However, donation rates have not kept pace with demand, resulting in a critical deficit of available healthy organs. It has been suggested that the attitudes of medical personnel regarding organ retrieval are a key success factor to improve organ donation. The aim of this study is to examine attitudes towards organ donation in health care workers.

METHODS, We analysed a long survey, which evaluates attitudes, knowledge, roles and experience towards organ, and tissue donation and transplantation. This survey was administered to all participants before and after the post graduate courses (2003 and 2004) in organ donation.

RESULTS, 255 surveys were retrieved. Out of 255 attendants, 8 (3, 1%) were medical staff, 6 (2, 3%) were medical trainees and 189 (74, 1%) were nurses of Intensive Care Units and Emergencies Services. In the first survey, 80% of them showed a positive attitude towards organ donation, 50% towards tissue donation, and 7% of them declared a lack of knowledge about the subject. But when asked about theirs relatives organ donation only 50% of them would give theirs. 20% of participants believe the brain death is not equivalent to death. Only 25% reported the correct number of donations and transplants carried out in our hospital. The majority express the need to improve knowledge about the organ donation process. After these courses the participants revealed progress in attitudes and comfort levels around donation and demanded more training in these areas. On the other hand family refusal decrease from 33% to 8% and organ donation increased from 25 to 35 donors in 2004 in our hospital.

CONCLUSION, Continuous training of health workers is crucial for a successful organ and tissue donation program.

REFERENCES(s), I. Prog Transplant 2001;11 (2) 90–97. 2. Transplant Int 1998;11:S397-S399. 3. Journal of Clinical Nursing. 2004;13(4)430

INTRODUCTION. Phenylephrine used

Heart rate > 95 bpm

WFNS > 3

Systolic < 100 mmHg

Phenylephrine used

QT prolongation

Predictors

Glasgow scale <13

WFNS > 3

Systolic < 100 mmHg

Heart rate >95 bpm

Phenylephrine used

QT prolongation

Outcome

p

0.01-0.05

0.01-0.05

0.05-0.1

<0.05

<0.05

<0.05

Conclusion

Only systolic blood pressure 95 bpm were found to be independent factors of poor outcome. Measurements of myocardial specific enzymes and echocardiographic assessment of cardiac function have no prognosis impact in this study.
387

SLEEP ASSESSMENT IN ICU USING ACTIGRAPHY: A PROSPECTIVE STUDY

Khalil M, Doulan N, Fergusson C

ICU, Derriford Hospital, Plymouth, United Kingdom

INTRODUCTION. Polysomnography can be too expensive and cumbersome for sleep assessment in ICU. Its recording can be affected by interference from ICU monitors and ventilators. Actigraph was found to be both sensitive and accurate when compared to polysomnography in non-ICU patients. The aim of this study was to assess sleep in ICU using actigraphy, and to define the mechanisms responsible for sleep disruption.

METHODS. Sleep was monitored in 16 surgical & 10 medical, non-sedated, ICU patients for a total of 54 '24-hour' periods. Data collected is shown in table 1. There was no change in routine practice or activities in ICU during the study.

RESULTS. Average total sleep time (over 24-hour) was 16.2 hour (± 3.5). Average night sleep time was 5.76 hour (± 1.0). The mean wake bouts number was 80.7 (± 52.8) per night. There was a significant correlation (p<0.05) between total sleep time and number of wake bouts during the night. There was a significant correlation (p<0.05) between APACHE II score and length of stay in ICU and night sleep time. There was no significant correlation (p>0.05) between APACHE II score or age and sleep time or wake bouts. Using unpaired Student’s t tests, there was no significant effect (p>0.05) of window status, bed location, or ventilation on sleep duration or night wake bouts.

TABLE 1.

| Age (yr), mean (range) | 70 (14 - 85) | Proportion ventilated | 42.5% |
|------------------------|-------------|-----------------------|-------|
| % had no prior sedation | 59%         | proportion in side rooms | 31.5% |
| APACHE II & SOFA       | 18 (0-33) & 3.4 (0-7) | window presence (%) | 76.5% |

CONCLUSION. 1) Sleep in ICU is abnormally prolonged with marked fragmentation of night sleep. 2) The more the patient sleeps during the day, the more likely to have poor quality sleep at night. 3) Sleep disruption in ICU is related to the degree of illness-severity and length of stay in the unit. 4) Actigraphy is a simple method of assessing sleep that is well tolerated by patients and doesn’t interfere with nursing activities.

REFERENCE(S). 1) Oda Y, Tsutani R, Itooe T, Kasaoka S, Kawamura Y, Yamashita S, Wakatsuki P, Maekawa T. Advanced Medical Emergency and Critical Care Center, Yamaguchi University Hospital, Ube, Japan

2) Wright K, Munasinge A. Critical Care and Emergency medicine, Royal Surrey County Hospital, Guildford, United Kingdom

3) Casar-Pullicino VN, Candiani A, De Peri E, Inoue T, Kasaoka S, Latronico N. Clinical Radiology, 1998; 53:102-109.

4) Clearing the cervical spine after polytrauma: implementing unified management. Evidence has also shown that removal of the cervical spine collar in head injured patients improves venous drainage from the head and so is beneficial in managing intracranial pressure. We therefore need an approach to clearing the spine in obtunded multisystem trauma patients.

5) APACHE II & SOFA.

6) CONCLUSION. If the presence of preserved autoregulation, the non invasive estimation of CPP with TCD tends to underestimate the ‘invasive’ CPP. This phenomenon is probably due to the increase of the vascular resistances which act as a Starling resistor at the arteriolar level.

REFERENCE(S). M. Czosnyka, Basil F. Motta, Piotr Smielewski. Cerebral perfusion pressure in comatose patients in the intensive care unit. Critical Care Medicine 2000; 28: 2392-2399.

388

S100 PROTEIN, A POSSIBLE NEUROLOGICAL OUTCOME MARKER FOR CARDIAC ARREST VICTIMS

Oda Y, Tsutani R, Itooe T, Kasaoka S, Kawamura Y, Yamashita S, Wakatsuki P, Maekawa T.

“The relationship between S100 protein levels and neurological outcome of patients resuscitated from cardiac arrest”.

INTRODUCTION. It is well-known that the ischemia-reperfusion injury in patients resuscitated from cardiac arrest is a major cause of death. Recent studies have reported that neuron-specific enolase (NSE) is an useful marker for outcome prediction. The aim of this study was to compare the prognosis of patients resuscitated from CPA with levels of S100 protein and NSE in serum and cerebrospinal fluid (CSF).

METHODS. Twenty four patients resuscitated from CPA were eligible in this study. Patients were divided into two groups according to the Glasgow Outcome Scale (GOS) at three months after the initiation of therapy. Group P had the favorable neurological outcome and Group G had the poor outcome, evaluated by GOS. The blood and CSF samples were taken within 24 hours after resuscitation and the levels of S100 protein and NSE were compared between the two groups. Jugular bulb oxygen saturation levels were measured when hemodynamics were stabilized. Mann-Whitney’s U test was used for continuous variables. Correlations were tested using Spearman’s rank correlation test. A P-value less than 0.05 was considered statistically significant.

RESULTS. Six patients in Group G had unfavorable neurological outcome and eighteen patients in Group P had poor outcome. The levels of S100 protein in serum and CSF (median, 15.5 and 25.4 ng/ml, respectively) in Group P were significantly higher than those (median, 0.05 and 4.05 pg/ml, respectively) in Group G. The levels of NSE in serum and CSF (median, 99.4 and 248.1 ng/ml, respectively) in Group P were significantly higher than those (median, 0.05 and 4.05 pg/ml, respectively) in Group G. The outcome and jugular bulb oxygen saturation levels correlated with the levels of S100 protein in serum (r=0.81, P<0.005, and r=0.69, P<0.05, respectively).

CONCLUSION. The levels of S100 protein in serum and CSF correlated well with their neurological outcome, so that S100 protein would be an excellent biological predictor in patients resuscitated from CPA.

Grant acknowledgement. This work was supported by the grant 14207060 from the Japan Society for the Promotion of Science, Japan.

389

INFLUENCE OF CEREBROVASCULAR AUTOREGULATION ON THE NON INVASIVE ESTIMATION OF CPP THROUGH TCD

De Peri E, Lavinio A, Benigni A, Gasulo F, Candelari A, Latronico N.

The use of transcranial Doppler (TCD) has been proposed as a means of measuring the cerebral perfusion pressure (CPP) non invasively. This is performed through a formula based on the TCD waveform analysis of the cerebral blood flow velocity. However the precision and accuracy of this method have not been sufficiently validated in order to advise its use in clinical practice. It is known that the variations of the arteriolar resistances, induced from the mechanisms involving cerebrovascular autoregulation (CVA), modify the relation between CPP and CBF. This current study was performed to verify the influence of the CVA on non invasive estimation of CPP through use of TCD.

METHODS. In patients with acute encephalic damage, admitted to 2° ICU of Spedali Civili University Hospital of Brescia, the CPP obtained non invasively (nCPP) has been confronted with the CPP obtained from the difference between MAP and ICP measured through a ventricular catheter. The results have been grouped on the basis of the state of CVA through the Transient Hypo- or Hyperemic Response Test (THRT).

RESULTS. In 21 patients, we have obtained 371 estimations of the nCPP. The difference between CPP and nCPP was inferior to 10 mmHg in 77.13% of the extremes in the presence of conserved autoregulation and in 86.89% of those in whom the autoregulation was altered. Bias, upper and lower limits of agreement were respectively -4.13 mmHg, 11.72 mmHg and -19.98 mmHg in the group with conserved autoregulation and 0.10 mmHg, 13.70 mmHg and -13.50 mmHg in the group with altered autoregulation.

CONCLUSION. If the presence of preserved autoregulation, the non invasive estimation of CPP with TCD tends to underestimate the ‘invasive’ CPP. This phenomenon is probably due to the increase of the vascular resistances which act as a Starling resistor at the arteriolar level.

REFERENCE(S). M. Czosnyka, Basil F. Motta, Piotr Smielewski. Cerebral perfusion pressure in head injured patients: a non invasive assessment using transcranial Doppler ultrasonography. J Neurosurg 1998; 88: 802-808.
EPIDEMIOLOGICAL, DEMOGRAPHIC AND OUTCOME CHARACTERISTICS OF BURNS IN MÁLAGA

Curiel E1, Arias M M D1, Mora J J M1, Muñoz Bono J J1, Hernandez B B1
1Intensive care unit, Carlos Haya hospital, Málaga, Spain

INTRODUCTION. The major burn has less frequency in the last years but is a patient with high risk of complications and with an elevated mortality rate. There has been described many complications like infections, respiratory complications, renal failure and a severe shock phase in the first days. The outcome, both for survival and for quality of life, has improved dramatically for burn patients over the past 20 years. However, airway and respiratory complications remain a common cause of morbidity and mortality.

METHODS. We present a retrospective cohort of 59 patients admitted in the ICU for major burns between 1998 and January of 2005. We analyzed demographic characteristics and management in the ICU for the first days and their association with mortality.

RESULTS. 72.9% were male and 21.1% female. Mortality rate was 44%. The most frequently agent was thermal burn in 62.7% following for the blast burn in 20.3%. The mean body burned surface area (%BSA) was 41.37 ± 24.49%, 1% had a confirmed infection.

| Baseline characteristics | Mean | Standard deviation |
|--------------------------|------|--------------------|
| Age                      | 47.15| 18                 |
| Days in ICU              | 14.61| 6                  |
| Days in hospital         | 35.55| 17                 |
| %BSA                     | 40.88| 35                 |

CONCLUSION. Patients with more burned surface area had the most elevated mortality risk (p<0.0001). Variables like sex, age, %BSA, resuscitation in the first hours and complications like renal failure, infections, etc... only show us that %BSA was the most important risk mortality factor with an OR 1 (95% CI 1.18-1.14).

REFERENCE(S). Ryan et al. N Engl J Med 1998; 338:362-6. Hettiaratchy S et al. ABC of burns: Pathophysiology and types of burns. BMJ 2004;328(7453):1427-9.

TRAUMA AND ASPIRATION OF FOREIGN BODIES IN ICU PATIENTS

Paramythiotou E1, Katsarelis N1, Papakonstantinou K1, Stathopoulos G1, Varieri M1, Fousfoukis S1, Roussos A1, Karabinis A1
1ICU, General Gennimatas General hospital, Athens, Greece

INTRODUCTION. Aspiration of foreign bodies during trauma is a known complication. It usually concerns teeth, pieces of food etc and for their removal several procedures, invasive or not - like bronchoscopy or thoracotomy - must be undertaken. We describe three patients with foreign body aspiration in our ICU.

METHODS. Case 1. A 20 year – old male was admitted in our ICU with face trauma, a broken mandible and a broken femoral bone. A foreign body was observed in the left lower bronchus on the chest X-ray. An attempt to retrieve it with the flexible bronchoscope failed and the foreign body moved to the right lower bronchus. A rigid bronchoscope was then used with success and the foreign body was removed. It was a part of the broken mandible. The patient was discharged after two weeks. Case 2. A 20 year – old male was admitted after a road accident suffering from a severe cerebral injury, a pneumothorax and a broken lower mandible. A foreign body (piece of a broken tooth) was removed. It was a part of the broken mandible. The patient was discharged after two weeks. Case 3. A 47 year – old patient was admitted with cerebral injury and a low Glasgow coma scale, a pneumothorax and a subdural haematoma at the C2-C3 level on the right. Cerebral MRI showed dislocation with spinal cord dislocation at the C4-C5 level, and a large ischaemic right occipital brain lobe lesion that was ascribed to putative right vertebral artery thrombosis/dissection. Carotid and vertebral angiography showed bilateral VAD at the C3-C5 level with distal reopacification by collateral perfusion.

RESULTS. Severe cerebral injury may result in foreign body aspiration especially when it is accompanied by facial trauma. For comatose patients, x – ray of the chest and thorax CT scan are the main diagnostic tools for this situation. Retrieval of the foreign bodies is necessary to avoid further complications such as atelectasis, pneumonia etc. Flexible bronchoscope used through the endotracheal tube is very effective in their removal.

CONCLUSION. Medical personnel dealing with trauma patients must have a high index of suspicion for the presence of foreign bodies in the tracheobronchial tree. Flexible bronchoscopy or use of the rigid bronchoscope in case of failure, are very use-ful and safe techniques for the removal of these foreign bodies.

HYPOthalamic-pituitary-Adrenal response in patients with traumatic brain injury predicts survival

Lompar M J1, Raurich J M1, Pérez J2, Aystéran J V1, Risso M F1, Baláez J1
1Intensive Care Unit, 1Department of Laboratory, Hospital Universitario Son Dureta, Palma de Mallorca, Spain

INTRODUCTION. Hypothalamic-pituitary-adenal (HPA) function has been recently studied in patients with traumatic brain injury (TBI), but few studies have shown its relationship with outcome. The aim of this study was to analyze HPA response and its relationship to Intensive Care Unit (ICU) survival in patients with isolated TBI.

METHODS. We studied 38 consecutive patients (33 male) with isolated TBI. Norepinephrine (NE) was used to maintain cerebral pressure perfusion over 60 mmHg when necessary. At 24-48 hours following TBI, we recorded values for plasma ACTH, baseline serum cortisol and stimulated cortisol at 30 and 60 minutes after performing high-dose corticostimulation test (HDCST). Mean and SD are reported. Chi-square and logistic regression analysis were done.

RESULTS. Age was 37.5 ± 18.9 years. ISS 25.0 ± 8.7, Apache II 17.4 ± 6.5; GCS score after resuscitation 7.7 ± 3.6. Plasma ACTH was 22.2 ± 42.3 ng/ml (normal values 9-52 ng/ml). Baseline cortisol was 15.6 ± 8.9 ng/dl, stimulated cortisol at 30 minutes 27.3 ± 7.5 ng/dl and at 60 minutes 30.8 ± 7.3 ng/dl. All patients increased at least 9 ng/dl after HDCST or had a stimulated value greater than 20 ng/dl. Overall survival was 73.7% (28 patients). Univariate analysis of variables related to ICU survival showed: Age <45 years (p=0.02), Apache II <15 (p=0.01), ACTH <9 ng/ml (p=0.001), baseline cortisol < 20 ng/dl (p=0.08) use of NE (p=0.20), second-tier measures to control ICP (p=0.02), GCS > 8 (p=0.12). Logistic regression analysis revealed that no need of second-tier measures to control ICP (OR 11.9 CI95% 1.3 to 103.2) and plasma ACTH lower than 9 ng/ml (OR 37.2 CI95% 3.1 to 449.5) were significant independent predictors of ICU survival.

CONCLUSION. Adrenal gland function, assessed by HDCST, is not impaired at early stage of TBI. Traumatic patients with low levels of plasma ACTH had a high ICU survival.

UNILATERAL BI-LATERAL VERTEBRAL ARTERY DISSECTION DUE TO BLUNT CERVICAL INJURY DETECTED BY MAGNETIC RESONANCE IMAGING

Mandilla C1, Koukalitzi-Giorgi G1, Stathopoulos G1, Paramythiotou E1, Theodoropoulou G1, Karabinis A1
1ICU, General Hospital of Athens “G Gennimatas”, Athens, Greece

INTRODUCTION. We report angiographic detection of vertebral artery dissection (VAD) in two sedated patients in the Intensive Care Unit (ICU). In both cases VAD was suspected solely by the presence of ischemic lesions evident on cervical spine and brain magnetic resonance imaging (MRI).

METHODS. Two patients were intubated, sedated, and admitted to the ICU with Glasgow Coma Scores <7 after having suffered blunt head and neck injuries due to motor vehicle accidents. In the first patient computed tomography (CT) of the brain and cervical spine revealed traumatic subarachnoid haemorrhage, anterior atlas arc fracture, axis fracture, and a C3 body fracture. In addition, brain and cervical spine MRI depicted a medial commissural at the C7 level, an increased interarticual space C5-C6, and a left cerebellar hemisphere infarct. Based on these findings carotid and vertebral angiography was performed, which showed complete left vertebral artery occlusion at the C6 level with incomplete distal filling due to a hypoplastic right vertebral artery. In the second patient brain CT was normal, while cervical spine CT revealed C4-C5 dislocation with posterior slipping of C5, and a subarachnoid haematoma at the C2-C3 level on the right. Cervical MRI showed dislocation with spinal cord dislocation at the C4-C5 level, and a large ischaemic right occipital brain lobe lesion that was ascribed to putative right vertebral artery thrombosis/dissection. Carotid and vertebral angiography revealed bilateral VAD at the C3-C5 level with distal reopacification by collateral perfusion.

RESULTS. Anticoagulant therapy was not administered due to coexisting contraindications (subarachnoid haemorrhage, hemorrhagic contusions, subdural hematoma). The level of consciousness increased step-wise in both patients. While the second patient suffered bilateral VAD, his recovery was more complete than that of the first patient.

CONCLUSION. In patients with brain and cervical trauma, the coexistence of cerebral lesions due to accompanying VAD is probable. MRI can prompt further investigation by depicting ischemia of vertebral artery-dependent areas. The impact of VAD largely depends on the efficiency of collateral flow to the affected parenchyma.
395 INFLUENCE OF HYPEROXYA ON THE BRAIN TISSUE OXYGENATION AND INTRACRANIAL PRESSURE
Petrikov S V, Tsarenko S V, Karylov V V
Neurosurgical ICU, Neurosurgery, Skifosovsky Scientific Research Institute of Emergency Medicine, Moscow, Russian Federation

INTRODUCTION. Maintaining of normal cerebral oxygenation is the main goal of intensive care of patients with severe head injury. It can be achieved by different methods. One of them is hyperoxya. In this study we investigated the influence of different fractions of inspired oxygen (FiO2) on cerebral oxygenation and intracranial pressure (ICP).

METHODS. Two patients with traumatic brain injury (TBI) with Glasgow Coma Scale 7 on admission enrolled in the study. Patients had one-side lesions and underwent decompressive craniotomy. We compared FiO2 with ICP (n=30), cerebral oximetry in non-lesioned hemisphere (n=30), PtiO2 (n=29), PaCO2 (n=27), jugular bulb saturation (SjO2) (n=26), O2 extraction ratio (O2ER) (n=26), arterio-venous O2 difference (AVDO2) (n=26) and lactate concentration in jugular bulb (Lacv) (n=26).

RESULTS. FiO2 changing from 1 to 0.3 leaded to decrease in PaO2 (M±SD) (402,6±67,9 vs 109,8±43,9 torr (p=0,001)), SjO2 (76,5±8 vs 70,6±2,8% (p=0,05)), rSO2(nl) (77,3±5% vs 66,2±2,8% (p=0,01)), PtiO2(nl) (44,8±11,8 vs 9,6±4,4 torr (p=0,01)) and non-significant changes in PtiO2(nl) (26,2±17,2 vs 9,9±3,4 torr), Lacv (1,1±0,4 mmol/l vs 1,27±0,6 mmol/l), ICP (15,2±2,7 vs 14,2±4,9 torr), O2ER (0,24±0,03 vs 0,28±0,04) and AVDO2 (4,7±1,8 Vol% vs 1,8±1,8 Vol%) We found good correlation between SjO2 and PaCO2 (r=0,89 (p=0,01)), SjO2 (r=0,63 (p=0,01)), rSO2(nl) (r=0,65 (p=0,01)), PtiO2(nl) (r=0,56 (p=0,01)) and PtiO2(nl) (r=0,76 (p=0,01)). During comparing of different methods of cerebral oxygenation assessment we found good correlation between SjO2 and PaCO2 (r=0,85 (p=0,05)) and no correlation between SjO2 and PtiO2(nl) (r=0,39 (p=0,09)), rSO2(nl) and PtiO2(nl) (r=0,41 (p=0,27)), SjO2(nl) and PtiO2(nl) (r=0,39 (p=0,3)).

CONCLUSION. FiO2 is increasing is effective and quick method of cerebral oxygenation improving. ICP is not influenced by FiO2 changes.FiO2 must be noticed during interpretation of high levels of SjO2 and rSO2. Jugular oxymetry reflects the oxygenation mostly of the non-lesioned brain hemisphere. Cerebral oxygenation monitoring can be improved by combination of PtiO2 and PaCO2 methods.

396 PROPPOFOL INFUSION SYNDROME FOLLOWED BY PROBABLE CATASTROPHIC ANTIPHOSPHOLIPID SYNDROME; AN ASSOCIATION?
Paramythiotou E, Papakonstantinou K, Tsiantzouka M, Kalogeromitros A, Noutsos N, Pedonomos M, Apostolakos H, Kavournios A
ICU, George Gennimatas General hospital, Athens, Greece

INTRODUCTION. Propofol is often used as a sedative in ICU patients. Unfortunately large doses may be needed sometimes causing propofol infusion syndrome (PRIS). We are presenting a patient with this syndrome followed by manifestations compatible with a catastrophic antiphospholipid syndrome (CAPS).

METHODS. A 14 year old female was admitted to our ICU with a multiple trauma. She had many skull fractures, a subarachnoid hemorrhage and a small acute subdural hematoma. She was put to sedation with propofol. Large propofol doses were used to keep her sedated (25 – 30 ml/h of propofol infusion 2%) along with noradrenaline and corticosteroids to maintain a normal alert pressure. Three days later she developed high fever, CPK rose to 75,000 µg/l and a multiple organ failure followed by probable catastrophic antiphospholipid syndrome. The question aroused is if PRIS could have permitted physicians to perform regularly a neurological examination. Large propofol doses and changes but they can be used as screening methods of intracranial hypertension estimation.

RESULTS. In 678 patients (median age 37 ± 23 years; 72% male) 2963 paired Hb and Ht values were available. The mean Hb was 6.39 ± 1.40 mmol/L with a range from 1.3 to 10.7 mmol/L. The mean Ht was 0.305 ± 0.07, ranging from 0.061 to 0.505. Hb and Ht had a Pearson R2 of 0.99 (Figure).

CONCLUSION. In a large series of trauma patients Hb and Ht behaved as identical parameters. The idea that Ht is different from or superior to Hb is a misconception and there is no reason for determining both Hb and Ht in trauma patients.

398 NON-INVASIVE EVALUATION OF THE INTRACRANIAL HYPERTENSION
Tsarevko S V, Petrikov S V, Huseynova K T, Karylov V V
Neurosurgical ICU, Neurosurgery, Skifosovsky Scientific Research Institute of Emergency Medicine, Moscow, Russian Federation

INTRODUCTION. Invasive measurement of the intracranial pressure (ICP) is known as the best method of intracranial hypertension evaluation. Unfortunately it is associated with high equipment costs and risk of infection complications. We compared non-invasive methods of intracranial hypertension assessment with invasive ICP measurement.

METHODS. 48 patients enrolled in the study (severe head injury median of GCS ≤ 8, arterial aneurism rupture (n=1), hemorrhagic stroke (n=7), arterio-venous malformation (n=2). Average age (M±SD) 44±16, M/F ratio was 35/13. All patients were operated (26 underwent decompressive craniotomy, 13 bone-plastic craniotomy and 9 - insertion of ICP sensor only). All patients received invasive ICP monitoring (average time 4.8 ± 3 days). We used Codman intracranial pressure microsensors or ventricular ICP monitoring systems (Hanni-Set, Smith Medical). Average preoperative Glasco Coma Scale (GCS) was 8.1±2.1. All patients had head CT scan and neurological examination on admission, and dynamically in postoperative period. We compared ICP values with CT scan data (volume of zones with high and low density, signs of lateral and axial dislocation), GCS and neurological signs of brain stem dislocation.

RESULTS. Analyses of all data showed correlation between ICP and GCS (r= -0.48; p<0.00001; n=109), neurological signs of brain stem dislocation (r=0.4; p<0.0001; n=109), volume of zones with high and low density (r=0.25; p=0.016; n=95) and lateral dislocation on head CT scan (r=0.24; p=0.016; n=101). Then ICP values obtained before the mass lesion evacuation were compared with preoperative head CT scan and neurological signs of brain stem dislocation. We found good correlation between ICP and signs of axial (r=0.59; p=0.0001; n=42) and lateral dislocation (r=0.43; p-0.004; n=42) on head CT scan. We did not find correlation between ICP values and GCS (r=0.02; p=0.196; n=48), neurological signs of brain stem dislocation (r=0.27; p=0.07; n=42) and volume of zones with high and low density on CT scan (r=0.3; p=0.06; n=30).

CONCLUSION. We found that invasive ICP monitoring is the best method of intracranial hypertension assessment. Neurological examination or CT scan data can not reflect all cases of ICP changes but they can be used as screening methods of intracranial hypertension estimation.
PREDICTORS OF OPERATIVE OR NONOPERATIVE TREATMENT OF POLYTRAUMA PATIENTS WITH BLUNT LIVER INJURY

Markogiannakis H, Santidas E, Messaris E, Tsitisis D
1st Department of Propedeutic Surgery, Hippokration Hospital, Athens Medical School, University of Athens, Athens, Department of Surgical Oncology, Herakleion University Hospital, Heraklion Medical School, University of Crete, Herakleion, Greece

INTRODUCTION. Nonoperative management (NOM) is considered to be the treatment of choice for carefully selected blunt hepatic trauma patients. The objective of this study is to identify and evaluate the factors that can safely predict NOM of these patients.

METHODS. Our study is a retrospective analysis of Trauma Registry data of all 55 consecutive adult blunt hepatic trauma patients admitted in a Greek Level I Trauma Center over a 4-year period. Factors that were included in the analysis were: sex, age, mechanism of injury, initial vital signs, grade of liver injury, concomitant injuries, and injury scoring systems used for total injury severity estimation.

RESULTS. Nineteen patients (34%) were initially operated, whereas 36 (66%) were initially selected for NOM. Concomitant abdominal, pelvic and spinal cord trauma, high Injury Severity Score (ISS), low International Classification of Diseases -9th revision Injury Severity Score (ISSc), and low Probability of survival (Ps) were predictive factors for operative management of these patients. Immediately operated patients suffered statistically significantly more frequently concomitant abdominal (84.2% vs 47.2%, p=0.004), pelvic (42.1% vs 16.7%, p=0.03), and spinal cord injuries (36.8% vs 2.8%, p=0.005) than conservatively treated patients. Additionally, immediately operated patients with blunt liver injury were significantly more severely totally injured than those treated with NOM as expressed by higher ISS (27.2±3.2 vs 19±1.5, p=0.01), lower ISSc (0.49±0.04 vs 0.74±0.03, p=0.003), and lower Ps (0.7±0.04 vs 0.9±0.02, p=0.005). Moreover, the percentage of patients that were admitted in the ICU and mortality rate were significantly lower in patients treated with NOM than those treated with immediate operation (47.2% vs 78.9%, p=0.002 and 5.5% vs 21%, p=0.03, respectively). Thirty-three patients that were initially selected for NOM were successfully treated conservatively; thus, the rate of success of NOM was 92%.

CONCLUSION. NOM of blunt hepatic trauma patients is safe and efficient resulting in significant reduction of ICU admission and mortality. Concomitant abdominal, pelvic and spinal cord trauma, ISS, ISSc, and Ps are predictive factors for operative or nonoperative management of these patients.
403

NOSOCOMIAL INFECTION IN CARDIAC SURGERY PATIENTS: FROM HOSPITAL ADMISSION TO DISCHARGE

Lorente L, Huidobro S, Martín M M, Mora M L

INTRODUCTION. To determine the incidence of nosocomial infection in critically ill patients with cardiac surgery admitted in a 24-beds cardiac surgical ICU of a 650-beds university hospital. Infections were diagnosed according to CDC criteria. Statistical analysis was performed using SPSS program. Continuous variables are reported as means and standard deviation, and categoric variables as percentages.

RESULTS. Were included 235 patients (54.50% males). Mean age was 61.96±11.90 years. Mean APACHE-II score was 12.60±4.23. The admission diagnoses were the following: 116 coronary artery bypass grafting, 102 valvular, 15 coronary and valvular, 9 atrial septum defects, 3 aortic dissection, and 10 others. Death 18 patients (17 in ICU and 1 in ward). A total of 46 patients developed 81 nosocomial infections: 63 ICU-infections in 35 patients and 16 ward-infections in 14 patients (11 without previous infection in ICU and 3 with previous infection in ICU). The source of nosocomial infections were the following: 6 tracheobronchitis, 19 pneumonias, 29 catheter-related infection (5 with bacteremia), 5 primary bacteremias, 14 urinary tract infections, 6 wound surgical infection and 2 pressure sore. Were isolated 84 microorganisms: 41 gram-negative bacteria (10 Escherichia coli, 9 serratia...), 31 gram-positive bacteria (13 Staphylococcus coagulase negative, 11 Streptococcus faecalis...) and 12 fungi. The incidence density of V AP, urinary tract infections and catheter-related bacteremia were 21.76, 9.53 and 2.68 events per 1000 days of risk. There were not significant differences in the incidence of nosocomial infection and death between diagnosis groups.

CONCLUSION. In our serie, the 18% of patients developed some nosocomial infection and the 7% death, without differences between diagnosis groups.

404

NOSOCOMIAL INFECTION IN THE PATIENTS WITH BRAIN TRAUMA

Lorente L, Santacruz R, Martín M M, Mora M L

INTRODUCTION. To determine the incidence of nosocomial infection in critically ill patients with brain trauma.

METHODS. It is a prospective study performed during 12 months of the patients undergoing to cardiac surgery admitted in a 12-beds cardiac surgical ICU of a 650-beds university hospital. Infections were diagnosed according to CDC criteria. Statistical analysis was performed using SPSS program. Continuous variables are reported as means and standard deviation, and categoric variables as percentages.

RESULTS. Were included 235 patients (54.50% males). Mean age was 61.96±11.90 years. Mean APACHE-II score was 12.60±4.23. The admission diagnoses were the following: 116 coronary artery bypass grafting, 102 valvular, 15 coronary and valvular, 9 atrial septum defects, 3 aortic dissection, and 10 others. Death 18 patients (17 in ICU and 1 in ward). A total of 46 patients developed 81 nosocomial infections: 63 ICU-infections in 35 patients and 16 ward-infections in 14 patients (11 without previous infection in ICU and 3 with previous infection in ICU). The source of nosocomial infections were the following: 6 tracheobronchitis, 19 pneumonias, 29 catheter-related infection (5 with bacteremia), 5 primary bacteremias, 14 urinary tract infections, 6 wound surgical infection and 2 pressure sore. Were isolated 84 microorganisms: 41 gram-negative bacteria (10 Escherichia coli, 9 serratia...), 31 gram-positive bacteria (13 Staphylococcus coagulase negative, 11 Streptococcus faecalis...) and 12 fungi. The incidence density of V AP, urinary tract infections and catheter-related bacteremia were 21.76, 9.53 and 2.68 events per 1000 days of risk. There were not significant differences in the incidence of nosocomial infection and death between diagnosis groups.

CONCLUSION. In our serie, the 18% of patients developed some nosocomial infection and the 7% death, without differences between diagnosis groups.

405

INCIDENCE OF MOST COMMON INFECTION SITE IN THE EARLY POSTOP. PERIOD AFTER NEUROSURGICAL PROCEDURES

Kogler J, Breek P

INTRODUCTION. Neurosurgical patients are particularly vulnerable and susceptible to develop an infection because of the severity of their illness, the presence of associated trauma and use of invasive technique and devices.

METHODS. In this paper 30 patients who underwent neurosurgical procedure for vascular malformations, were observed. All patients were treated in the ICU with mechanical ventilation and vital functions support, depending on patient condition. We have analyzed the possible influence of following factors: Duration of the operation, period of intubation, established IV and arterial lines, urinary catheter and preoperative infection of certain organ system

RESULTS. Of these 30 patients developed infection after a mean stay of 5.5 days in the ICU. There were 6 patients with CNS infection, 8 patients with respiratory tract infection, 6 patients with urinary tract infection. 2 patients died and other recovered well. Streptoccus viridans was the predominant organism isolated, followed by Pseudomonas aeruginosa, E.coli, Klebsiella pneumoniae, Pseudomonas species.

CONCLUSION. The goal of this paper is to establish the influence of above mentioned factors on development of infection of certain organ system in early postoperative course in the neurosurgical ICU. Some of the patients developed signs of infection which prolonged their stay in ICU and significantly postponed their recovery following the operation. This has increased the cost of their treatment.

REFERENCE(S). Berrosaum,Y, Daughtenthun L, Riegel B and all. Early onset pneumonia in neurosurgical intensive care unit patients. J Hosp Infect. 1998 Dec;40(4):275-80. Rosenthal VE, Guzman S, Orellano PW. Nosocomial infections in medical-surgical intensive care units in Argentina: attributable mortality and length of stay. Am J Infect Control. 2003 Aug;31(5):291-5.

406

PROLONGED APPLICATION OF CLOSED SUCCTION CATHETERS

Turkmen A, Turgut N, Altun A, Medetoglu A, Gokkaya S

INTRODUCTION. Airway suctioning is classically performed with disconnection of the patient from the ventilator and the introduction of suction catheter into endotracheal tube. Several authors suggest that application of closed suction catheters (CSC) in intubated patients for more than 24 h is safe and can reduce the costs associated with mechanical ventilation. Therefore, we evaluated the possible role of prolonged application of CSC in causing enhanced colonization of the lower respiratory tract.

METHODS. The prospective, randomized study included 39 mechanically ventilated patients. The CSC tips, tracheobronchial aspirates of each patient were examined for microbial growth. We analyzed the data with the Student’s test for paired samples and Fisher Exact test.

RESULTS. Application for 72 h significantly enhanced the microbial growth on the CSC tips (TABLE).

TABLE 1.

| Age mean±SD (year) | CCS 24 h (n=20) | CSC 72 h (n=19) | p |
|-------------------|----------------|----------------|---|
|                   |                |                |   |
|                   | 48.50±17.10    | 20.35±5.93     | 0.142 |
|                   | 40.16±17.60    | 20.58±5.51     | 0.592 |
| LIS (day)         |                |                |   |
|                   | 17.25±11.78    | 19.10±9.46     | 0.901 |
| APACHE II         |                |                |   |
|                   | 20.35±5.93     | 20.58±5.51     | 0.901 |
| microbrial growth on CSC tips | 9 (%) 45.0 | 15 (%) 78.9 | 0.029 |
| microbrial growth on ETT aspirates | 13 (%) 65.0 | 17 (%) 85.3 | 0.127 |

* p<0.05 significant

CONCLUSION. Usage for 3 days may lead to increase the colonization in the lower respiratory tract. Normal saline instillation in conjunction with endotracheal suctioning may lead to dispersion of microorganisms into the lower respiratory tract.
407
IMPLEMENTATION OF INFECTION CONTROL POLICIES IN ICU

Ferreira P', Santos L S', Osawa C P', Martins F', Alexio A'
'1Medical Intensive Care Unit, Hospital Infection Control Committee, São Francisco Xavier Hospital, Lisbon, Portugal

INTRODUCTION. To decrease VAP incidence in the ICU is necessary to implement infection control policies. Nevertheless that implementation is not always simple and requires effort by the ICU workers. New infection control policies were applied in our ICU in 2003. Those recommendations were adapted from the published guidelines concerning the prevention of VAP and applied to our ICU. Particular concern was made on the handwashing and contact isolation precautions. To analysed the impact of these measures the incidence of VAP was analysed before and after that implementation.

METHODS. Prospective study of all patients admitted in the ICU for more than 24 hours, between 2002 and 2004. Patients data collected included the number of ventilation days, the date of the VAP diagnosis with or without microbiological confirmation. The VAP incidence was made by new radiographic infiltrate for at least 48 h and at least two of the following criteria: fever > 38.5°C or < 35.0°C; leukocytes > 10,000/µL or < 3,500/µL, purulent sputum, or isolation of pathogenic bacteria from lower respiratory tract. The microbiological samples were collected by proximal or distal bronchial aspirated.

RESULTS. The VAP diagnosis was made on the patients receiving mechanical ventilation, 113, 164 and 166 patients during the study period.

TABLE 1.
Results
|            | 2002   | 2003   | 2004   |
|------------|--------|--------|--------|
| SAPS II (mean) | 49.1   | 50.5   | 50.9   |
| Ventilation ratio (%) | 68.1   | 76.1   | 68.5   |
| VAP incidence | 32.5   | 27.9   | 24.6   |
| Number VAP/1000 vent days | 28.2   | 22.0   | 16.6   |
| Gram negative agents (%) | 66.6   | 69.4   | 60.0   |

CONCLUSION. The SAPS II score remained elevated through the study period. After the implementation of these measures the incidence of VAP was decreased.

408
A BEDSIDE PREDICTIVE MODEL TO ASSESS HIV-PATIENT ICU OUTCOME THROUGH THE HAART ERA

Corona A', Castelli A', Rech R', Menozzi E', Donatello G', Mella L', Colombo R', Raimondi F'
'1Intensive Care Unit, Luigi Sacco Hospital, Milano, Italy

INTRODUCTION. HAART has produced a significant decrease in mortality and morbidity from HIV infection. Whether this therapy resulted in changes in outcome in HIV patients admitted to Intensive Care Unit (ICU) is still controversial.

METHODS. We reviewed the clinical notes of HIV positive patients admitted to our ICU from 1996 through 2004, collecting (i) demographics, admission diagnosis and 1st 24 hours APACHE II score (ii) HIV infection epidemiological and clinical characteristics. Statistical analyses were performed using SPSS (SPSS inc. Chicago, IL). We used Mann-Whitney non-parametric test for continuous variables and chi square test for categorical ones. Binary Logistic Regression Model (BLRM) was used 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, 131 (5.6%) HIV infected patients (76.5% males, 58.8% with AIDS), out of 2305 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) underwent admission 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 16 days (IQR 2-11) CD4+ value was 150/mm (IQR 30-400) and median viral load was 52.5x10³ (IQR 1.1-20x10³). A BLRM 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/mm (iv) HIV status (presence or not of the Acquired Immunodeficiency Syndrome). By such a model we found that taking HAART (p = 0.002, OR = 14.75 95% CI 3.8-55.9) and not developing a liver failure (p = 0.002, OR = 7.69 95% CI 1.8-33.3) are predictive factors of positive ICU outcome for HIV-infected patients.

CONCLUSION. Our data, although retrospectively collected, suggest that a taking HAART HIV-infected patient (not in liver failure), admitted to ICU has a significantly higher chance of survival if compared with those who are not. Future prospective studies are warranted to corroborate our hypothesis.

409
HAND DISINFECTION COMPLIANCE AMONG HEALTH CARE WORKERS OF OUR ICU

Theodorakopoulou M', Lignos M', Diamantakis A', Zoipa P', Stellou A', Karabekov I', Armaganidis A'
'1ICU, Nursing icu, Attiko University Hospital, Athens, Greece

INTRODUCTION. Hand hygiene is the most important action to control spread of nosocomial infections. Hand washing compliance among health care workers remains low. The objective of this study was to assess compliance of hygiene in our ICU.

METHODS. A 3 month prospective study on a 5 bed ICU of a university hospital. Antiseptic solution were placed at the bottom side of each bed and one hand washing facility was exists within the unit.3 well instructed observers recorded opportunities of hand washing, and actual performance of hand washing and hand disinfection. Observation time was set at 2 hrs. It was performed on morning and afternoon shifts all days of the week.Every observer monitored 2 beds. The staff was not informed of the study. Staff was classified according to their work status (doctors, nurses etc.).

RESULTS. 360 hrs of observations were recorded in 180 sessions. A total of 7880 opportunities for hand hygiene were observed. See Table 1 for hand washing opportunities and actual hand washing compliance among the staff. The average hand washing opportunities were 8.76 opp/hr and the average actual hand washing was 5.10 act.wash/pt/hr. Hand washing compliance was similar for doctors, nurses and nursing assistants. Medics, physiotherapist, and visiting doctors showed significant differences in actual hand washing compliance. The overall compliance rate was 4952/7880 (58.3%).

TABLE 1.
Hand washing opportunity and actual compliance among health care workers. Staff groups & No of % of opp. % of opp. % of act. hand % of wash % of compliance
|            | 2002 | 2003 | 2004 | 2002 | 2003 | 2004 | 2002 | 2003 | 2004 |
|------------|------|------|------|------|------|------|------|------|------|
| doctors    | 1805 | 22.9 | 1218(1805) | 67.3 |
| nurses     | 3002 | 38.1 | 2231(3002) | 74.3 |
| physiotherapist | 969 | 12.3 | 475(969) | 49.0 |
| nursing assis | 1127 | 14.3 | 775(1127) | 68.8 |
| medics     | 449  | 5.7  | 199(449)  | 44.3 |
| visiting doctors | 528 | 6.7  | 159(528)  | 30.1 |

CONCLUSION. Hygiene policies within the unit are respected and applied by most personnel(67%). Visiting staff do not comply with the rules. The results suggest that stricter hygiene policies need to be established for visiting personnel.

410
ANALYSIS OF ALL FUNGEMIA EPISODES IN AN INTENSIVE CARE UNIT FOR A FIVE YEAR PERIOD OF TIME

Paramythiotou E', Aggelopoulos H', Mylona - Petropoulos D', Koukoulitsios G', Vogiatou - Voudri H', Mandilas C', Hatziatzis A', Karabas A'
'1ICU, 2Microbiology, George Gennimatas General Hospital, Athens, Greece

INTRODUCTION. Fungemia is a relatively rare but often lethal infection in critically ill patients. Our purpose was to obtain information regarding the incidence, epidemiology, management and outcome of our ICU patients with blood infection from candida or other fungi as well as the risk factors involved.

METHODS. Between 1/1/2000 to 12/31/2004, we retrospectively reviewed records of patients hospitalized in our 12-bed ICU with at least one blood culture positive for fungi. Demographics, risk factors, treatment and outcome were recorded.

RESULTS. From a total of 915 patients (p), 22 (2.4%) developed fungemia (mean age 63.5 years ± 14.5). Species isolated were Candida albicans (45.5%), C. parapsilosis, C. tropicalis, C. glabrata, Cryptococcus neoformans and Aspergillus fumigatus. Mean Apache II score was 15.55±6.3 (admission) and 16.6±5.9 (fungemia onset). Time between ICU admission and fungemia: 22.4±10 d.Cause of admission was abdominal surgery (8 p.), neurosurgical operation (7 p.) and medical diseases (7 p.). Concurrent bacterial infection was noticed in 22.7% of cases. Risk factors recorded included cent: ven. catheters (100%), mech. ventilation (100%), TPN (11.8 %), broad spectrum antibiotics (85%), prior bacterial infection (75%), prior corticosteroids (13.6%) or immunosupressives (9%), renal replacement therapy (51.8%). Source of infection remained unknown in 54.5% of cases. Antifungal therapy was given to 15 p. and prophylactic to 3 p. Three patients received no therapy because the results were obtained after their death. Overall mortality was 68.8%. Three p. died from septic shock originating both from bacteria and fungemia and four from irrelevant causes.

CONCLUSION. Compared to bacterial infections fungemias are not common among our ICU patients. A high Apache II score at admission in combination with an operation should raise a high suspicion index and a prophylactic therapy should start.
COLONIZATION AND INFECTION BY PSEUDOMONAS IN ICU

INTRODUCTION. To determine the incidence of colonization and infection by pseudomonas in ICU.

METHODS. It is a prospective study during 30 months of the patients admitted in ICU during 24 hours o more. Were taken throat swab, tracheal aspirate and urine on admission and twice weekly. Were registered the colonization and infection by pseudomonas. The infections were diagnosed according to CDC criteria. The infections were classified based on the onset moment as: Early onset (EO) were those developed during the first 4 days of ICU-stay; Late onset (LO) were those developed 5 days after ICU-admission.

RESULTS. Were admitted 1582 patients, 953 males (60.24%). Mean age 57.9±18.83 years. Mean APACHE-II 13.95±9.3. Admission diagnoses were: 737 (46.6%) heart surgery, 189 cardiological (11.95%), 196 neurologic (12.29%), 185 trauma (11.69%), 120 respiratory (7.5%), 104 digestive (6.57%) and 51 intoxication (3.22%). Mortality 14.79% (234 patients). A total of 80 patients had colonization by pseudomonas, 26 patients at ICU-admission and 54 patients during the ICU-stay. Were documented 46 infections by pseudomonas (9 EO and 37 LO; 4 PE, 35 SE and 7 EX): 31 pneumonias (6 EO and 25 LO; 2 PE, 24 SE and 5 EX), 7 urinary tract infections (1 EO and 6 LO, 2 PE, 3 SE and 2 EX), 5 primary bacteremias (2 EO and 3 LO; 5 SE; 2 surgical wound infections (2 LO and SE) and 1 pressure sore infections (1 LO and SE). Death 13/46 patients (28.26%) with infection caused by pseudomonas: 9/31 (29.03 %) pneumonias, 2/5 (40 %) primary bacteremias and 2/10 (20 %) other infections.

CONCLUSION. In our serie, the most of infections caused by pseudomonas were pneumonias, had a late onset and were secondary endogenous.

COLONIZATION AND INFECTION BY FUNGI IN CRITICALLY ILL PATIENTS

INTRODUCTION. To determine the incidence of fungal colonization and infection in critically ill patients.

METHODS. It is a prospective study during 30 months of the patients admitted in ICU during 24 hours o more. Were taken throat swab, tracheal aspirate and urine on admission and twice weekly. Were registered the fungal colonization and infection. Infections were diagnosed according to CDC criteria. Infections were classified based on the throat flora as: Primary endogenous (PE) when were caused by germs that were already colonizing the throat on the ICU admission; Secondary endogenous (SE) when were caused by germs that were not colonizing the throat on the ICU admission but were acquired during the stay in ICU; Exogenous (EX) when they were caused by germs which were not colonizing the throat. The infections were classified based on the onset moment as: Early onset (EO) were those developed during the first 4 days of ICU-stay; Late onset (LO) were those developed 5 days after ICU-admission.

RESULTS. Were admitted 1582 patients, 953 males (60.24%). Mean age 57.9±18.83 years. Mean APACHE-II 13.95±9.3. Admission diagnoses were: 737 (46.6%) heart surgery, 189 cardiological (11.95%), 196 neurologic (12.29%), 185 trauma (11.69%), 120 respiratory (7.5%), 104 digestive (6.57%) and 51 intoxication (3.22%). Mortality 14.79% (234 patients). A total of 154 patients had colonization by fungal infections, 40 patients at ICU-admission and 114 patients during the ICU-stay. Were documented 48 fungal infections (8 EO and 40 LO; 4 PE, 40 SE and 4 EX) 19 urinary tract infections (3 EO and 16 LO, 3 PE, 13 SE and 3 EX), 12 pneumonias (2 EO and 10 LO; 1 PE, 10 SE and 1 EX), 9 primary fungemias (2 EO and 7 LO; 9 SE), 6 surgical wound (1 EO and 5 LO, 6 SE) and 2 pressure sore (1 EO and 2 LO, 2 SE). The 48 fungi responsible of 48 fungal infections were: 29 candida albicans, 12 candida tropicalis, 4 candida glabrata, 2 candida parapsilosis, 1 candida famata. Death 12/48 patients (25%) with fungal infection: 3/9 (33.3%) fungemias, 5/12 (41.6%) pneumonias and 4/27 (14.8%) other infections.

CONCLUSION. The most of fungal infections had a late onset, were secondary endogenous and were due to candida albicans. The urinary tract was the more frequent origin.
MEASUREMENTS OF URINARY FREE CORTISOL COMPARED WITH PLASMA TOTAL CORTISOL IN CRITICAL ILLNESS

Leditschke I, A'V, Southcott E, Gissane J, Emslin A, Hickman P, E'P, Potter J, M'1
1Intensive Care Unit, 2ACT Pathology, 3Australian National University Medical School, The Canberra Hospital, Canberra, Australia

INTRODUCTION. Recently it has been shown that total plasma cortisol measured by immunoassay may not detect elevations in plasma free cortisol in hypoproteinaemic critically ill patients. We investigated the relationship between urinary free cortisol and total serum cortisol in a group of critically ill patients.

METHODS. 5 patients were studied within 24 hours of ICU admission. Patients with neutrotauma or oliguria were excluded. Hourly total plasma cortisol and 4-hourly urinary cortisol were measured for 24 hours using routine immunoassay for the plasma samples and high performance liquid chromatography for the urine samples. Statistical analysis was performed using Graphpad Instat software.

RESULTS. Summary results for total plasma cortisol at the mid point of the urine collection and urinary free cortisol are shown in Table 1. Using a non-parametric (Spearman r) test of correlation, urinary free cortisol was found to correlate moderately well with total plasma cortisol; Spearman r = 0.7063, 95% confidence intervals 0.4533 to 0.8533, p = 0.0002.

Table 1. Summary Results Total Plasma Cortisol and Urinary Free Cortisol (nmol/L)

| Parameter | Nonresponders (n=13) | Responders (n=27) | p |
|-----------|----------------------|-------------------|---|
| MAP, mmHg | 70 [62-77] | 73 [58-81] | 0.98 |
| LVEF, %   | 20 [15-22] | 23 [18-30] | 0.14 |
| ICU stay, d | 5 [3-10] | 5 [3-8] | 0.87 |
| ICU death | 6 [4-6] | 10 [6-14] | 0.88 |

CONCLUSION. In this sample of critically ill patients, urinary free cortisol does show correlation with total plasma cortisol. Further work is required to improve our understanding of cortisol pathophysiology in critical illness.

REFERENCES. 1. Hamrahian AH, Osini TS, Arafah BM. Measurements of Serum Free Cortisol. J Clin Endocrinol Metab 86:2946, 2001. 2. Santini D, Vincenzi B, Avvisati G, et al: Pamidronate induces modifications of hormonal parameters in critically ill patients. N Engl J Med 346:653-4, 2002.

RELATIVE ADRENAL INSUFFICIENCY IN PATIENTS WITH CARDIOGENIC SHOCK

Mekontso-Dessap A', Leffoeu NV, Brochard L', Brun-Buisson C, Dubois-Randé J'P
1Medical Intensive Care Unit, 2Coronary Care Unit, Henri Mondor Hospital, Creteil, France

INTRODUCTION. Relative adrenal insufficiency has been demonstrated to be associated with increased mortality in septic shock patients. Cardiogenic shock (CS) induces a stress response involving the adrenal cortex, but functional hypoadrenalism has never been investigated in this setting. The aim of the present study was to prospectively evaluate adrenal function in patients admitted to intensive and coronary care unit for cardiogenic shock.

METHODS. 40 consecutive patients (35 men) admitted for CS, with a mean age of 66 ± 16 years were included. Patients submitted to any steroid therapy or etomidate were excluded. 4 patients needed mechanical ventilation and 4 patients were equipped with an intraaortic balloon pump. Causes of CS included acute myocardial infarction (n=14), cardiomyopathy (n=13), arrhythmia (n=3), and others (n=10). Patients underwent a high dose short corticotrophin test (SCT) and relative adrenocortical insufficiency (nonresponders) was defined by a rise in cortisol less than 90 microg/L after stimulation.

RESULTS. 13 (32.5%) patients were classified as nonresponders and 27 (67.5%) as responders. No significant difference was evidenced between responders and nonresponders concerning clinical characteristics and outcome (Table 1).

Table 1. Patients with CS classified according to the response to the SCT

| Parameter | Nonresponders (n=13) | Responders (n=27) | p |
|-----------|----------------------|-------------------|---|
| MAP, mmHg | 70 [62-77] | 73 [58-81] | 0.98 |
| LVEF, %   | 20 [15-22] | 23 [18-30] | 0.14 |
| ICU stay, d | 5 [3-10] | 5 [3-8] | 0.87 |
| ICU death | 6 [4-6] | 10 [6-14] | 0.88 |

CONCLUSION. About one third of patients with cardiogenic shock exhibit relative adrenocortical insufficiency. Further studies are needed to clarify its prognostic significance in this setting.

BIPHOSPHONATES IN THE TREATMENT OF HYPERCALCAEMIA IN INTENSIVE CARE

417

HORMONAL MEASUREMENTS IN SURVIVORS AND NON-SURVIVORS CRITICALLY ILL PATIENTS

Dimopoulou I, Stamouolis K, Lyberopoulos P, Douka E, Koptsides P, Tzanella M, Thalassinos N, Roussos C, Tsagarakis S
1Critical Care Medicine, 2Endocrinology, Athens University, Athens, Greece

INTRODUCTION. Hormonal changes are commonly observed in critically ill patients. However, it remains unclear whether endocrine alterations relate to clinical outcome.

METHODS. To further investigate this topic, we conducted a prospective study of patients admitted to a general adult ICU. Morning blood samples were taken within 24 hours of ICU admission to measure plasma cortisol, corticocortin (ACTH), dehydroepiandrosterone sulphate (DHEAS), free thyroxine (T4), tri-iodothyronine (T3), thyroid-stimulating hormone (TSH) and prolactin (PRL).

RESULTS. 150 critically ill patients (120 males) with diverse underlying diagnoses, having a median age of 50 years (range 17-84 years) were enrolled. Their median APACHE II and SOFA scores were 11 and 6 respectively. There were no differences between survivors and non-survivors in plasma cortisol, ACTH, T4, and T3. In contrast, survivors had higher median values for TSH (0.70 mcIU/l vs. 0.48 mcIU/l, p=0.04), DHEAS (1638 ng/dl vs. 995 ng/dl, p=0.04) and PRL (13 ng/ml vs. 9 ng/ml, p=0.03) compared to non-survivors.

CONCLUSION. Our data indicate that hormone concentrations differ between survivors and non-survivors acutely ill patients. Further studies are required to investigate whether endocrine measurements are helpful in predicting clinical outcome.

REFERENCES. 1. Fournier P, Boissier S, Filleur S, et al: Biphosphonates inhibit angiogenesis in vitro and testosterone-stimulated vascular regrowth in the ventral prostate in castrated rats. Cancer Res 62:6538, 2002. 2. Santini D, Vincenti B, Avvisati G, et al: Pamidronate induces modifications of circulating angiogenic factors in cancer patients. Clin Cancer Res 8:1000, 2002. 3. Wood J, Bon限期k J, Raetz S, et al: Novel antiangiogenic effects of the bisphosphonate compound zolendronic acid. J Pharmacol Exp Ther 302:1655, 2002.

INCIDENCE OF ADVERSE EVENTS FOLLOWING BIPHOSPHONATES

Ravindranathan GY, Smith GV, Roughley C, Alton P
1Haematological Medicine, Frimley Park Hospital Nhs Trust, Surrey, United Kingdom

INTRODUCTION. Biphosphonates are used in the treatment of hypercalcaemia in intensive care, malignancies such as myeloma, and cancers of the breast and prostate, malignant bone pain and treatment and prevention of osteoporosis. Reports have started to emerge about cases of jaw osteonecrosis in patients taking bisphosphonates like pamidronate and zoledronic acid. Osteonecrosis of the jaw (ONJ), normally a rare condition, presents with jaw pain and bone tissue which fails to heal post tooth extraction. There can be problems of poor healing, infections and in some patients requiring surgery. The exact mechanism is unclear though the antiangiogenic effect of bisphosphonate may be the causative mechanism.

METHODS. Retrospective analysis of 35 patients taking monthly zolendronic acid at Frimley Park Hospital, Surrey, United Kingdom

RESULTS. There were 3 cases of jaw osteonecrosis (OJN), 1 case of liver failure requiring admission to Kings liver intensive care unit, requiring liver support for 35 days, 1 case of renal failure requiring transfer to the regional renal unit for renal support

CONCLUSION. Intensivists need to be aware of the side effect profile of bisphosphonates. Fibroptic intubation in patients who have been on bisphosphonates for long periods to avoid mandibular fractures and stopping the bisphosphonate in a patient with deteriorating liver or renal function are two such measures. Further research is required to establish the mechanism for these effects and to identify the category of patients at risk. New guidelines are also needed in light of these serious adverse effects to ensure continued best clinical practice.

REFERENCES. 1. Fournier P, Boissier S, Filleur S, et al: Biphosphonates inhibit angiogenesis in vitro and testosterone-stimulated vascular regrowth in the ventral prostate in castrated rats. Cancer Res 62:6538, 2002. 2. Santini D, Vincenti B, Avvisati G, et al: Pamidronate induces modifications of circulating angiogenic factors in cancer patients. Clin Cancer Res 8:1000, 2002. 3. Wood J, Bon限期k J, Raetz S, et al: Novel antiangiogenic effects of the bisphosphonate compound zolendronic acid. J Pharmacol Exp Ther 302:1655, 2002.
**419\**

**EFFECT OF ENDOTOXIN ON MUSCLE PROTEIN METABOLISM IN HUMANS**

Vesal P I, Klade M F, Rooyackers O I, Wierummen P I

1 Department of Anaesthesiology and Intensive Care, Karlshamns Institute, Huddinge, Sweden

**INTRODUCTION.** ICU patients suffer from pronounced muscle protein depletion. This loss of muscle protein can be the result of a decreased protein synthesis, an increased protein breakdown or a combination of these. Quantitative measures of muscle protein degradation and synthesis may have the potential to give a high precision allowing future intervention studies with patient groups of practical size. Here healthy volunteers were studied following an endotoxin challenge representing the initial phase of sepsis as a standardised human model.

**METHODS.** Healthy volunteers (n=6) were studied 4 h before and 4 h after endotoxin administration (40 mg/kg body weight). D5-phenylalanine was infused during the whole experiment to assess protein kinetics. Simultaneous blood samples were obtained from an artery and the femoral vein. At the same time, leg blood flow was measured using venous occlusion plethysmography. Isotope enrichment of D5-phenylalanine was analysed by GC/MS. Whole body rate of appearance of phenylalanine was calculated and used as a marker of whole body protein degradation. Standard 2-pool calculations were used to calculate the rate of disappearance (marker for protein synthesis) and rate of appearance (marker for protein degradation) in leg skeletal muscle. Student’s T-test for paired samples was used.

**RESULTS.** The whole body rate of appearance was increased following the endotoxin challenge indicating an increased whole body protein breakdown; 8.0±1.8 vs. 9.9±1.7 mg/kg/hour (P<0.005). The decrease in rate of appearance of phenylalanine from the leg indicated a decrease in muscle protein synthesis 9.4±1.8 vs. 3.6±4.7 nmol/min/100ml leg volume (P<0.05). On the other hand the rate of appearance of phenylalanine indicated that protein degradation was not altered 15.4±2.4 vs.13.8±2.9 nmol/min/100ml (NS).

**CONCLUSION.** An endotoxin injection in healthy volunteers resulted in a decrease in muscle protein synthesis while muscle protein degradation was unaffected. Taken together this resulted in a more negative muscle protein balance. These results obtained in a human model of the initial phase of sepsis differ from what is reported in critically ill patients studied after admission to the ICU.

Grant acknowledgement. This study was supported by a grant from the Swedish Research Council.

---

**421**

**EXPENDED VS. DELIVERED ENERGY IN CRITICALLY ILL TRAUMA PATIENTS**

Gomes E I, Matos L I, Pinto E I, Menezes M I, Aragão I I

1 Unidade de Cuidados Intensivos Polivalente, Hospital de Santo Ant, Porto, Portugal

**INTRODUCTION.** Critically ill patients are in great stress, under sedation and hemodynamic instability. The assessment of energy expenditure (EE) in these patients is a challenge as their catabolic state exceeds real metabolic capability. The aim of this study was to evaluate the difference between measured expended energy and estimated delivered energy (Nutritional assessment - NA).

**METHODS.** This study was conducted in an ICU of a tertiary university hospital in trauma patients. Illness severity was evaluated using TRISS methodology, SOFA and SAPS II. Indirect Calorimetry (IC) was performed in the first 48 hours and compared with Frankenfield equation (FE) and NA. A Nutritional Assessment is performed in every patient in a routine basis in our ICU in accordance to the ESCM recommendations. It comprises physical examination, SOFA, BMI and use of drugs. Data was analyzed using SPSS.

**RESULTS.** Our sample included 31 patients, 4 women and 27 men aged 18-77 years. SOFA, ISS and SAPS II mean score were, respectively 7.0±2.3, 29.9±10.0, 33.6±12.6. Sample’s mean body mass index was 25.8±5.3 kg/m2. In this specific trauma sample FE strongly correlated with IC (r=0.807 p<0.001) whilst NA did not (r=0.593 p<0.001).

**TABLE 1.**

|                | EE, Predictive Equation | Nutritional Assessment | IC               |
|----------------|-------------------------|------------------------|-----------------|
| Indirect Calorimetry (IC) | 27.9±4.6                | 24.9±2.8               | 25.1±6.1        |
| Frankenfield Equation | 25.1±6.1                | 25.1±6.1               | 25.1±6.1        |
| NA/IC           | 0.91±0.16               | 0.91±0.16              | 0.91±0.16       |

**CONCLUSION.** Nutritional assessment (NA) is in agreement with the actual state of the art underestimating the needs in critically ill patients. In our sample there was an underestimation of 10%. Discussion is going on concerning nutrition of critically ill patients.

---

**420**

**ESTIMATION OF ENERGY EXPENDITURE VS INDIRECT CALORIMETRY IN CRITICALLY ILL TRAUMA PATIENTS**

Gomes E I, Matos L I, Pinto E I, Menezes M I, Aragão I I

1 Unidade de Cuidados Intensivos Polivalente, Hospital de Santo Ant, Porto, Portugal

**INTRODUCTION.** The assessment of energy expenditure (EE) in critically ill trauma patients is a challenge. The gold standard for evaluation is indirect calorimetry (IC). Its use is not generalized and several methods for assessment of EE in trauma patients.

**METHODS.** This study was conducted in an ICU of a university hospital during one year in trauma patients. Illness severity was evaluated using TRISS methodology, SOFA and SAPS II. EE was performed in the first 48 hours for evaluation of the EE and the estimated energy expenditure was calculated by Harris-Benedict, Fleisch, Frankenfield equations. Statistical analyses were made using SPSS.

**RESULTS.** We included 31 patients, 4 women and 27 men aged 18-77 years. SOFA, ISS and SAPS II mean score were 7.0±2.3, 29.9±10.0, 33.6±12.6. Mean body mass index was 25.8±5.3 kg/m2. A strong correlation (r=0.7) was found between several methods being the strongest between Harris-Benedict and Frankenfield equations (r=0.846 p<0.001). The method that best correlated with IC in this specific trauma sample was Frankenfield equation (r=0.807 p<0.001). Comparing IC with Harris-Benedict equation results we found a mean ratio of 1.24, as shown in Table 1.

|                | EE and Predictive Equations** | vs expressed in kcal/kg of body weight (means±SD) |
|----------------|------------------------------|-----------------------------------------------|
| Indirect Calorimetry (IC)                  | 27.9±4.6                    | 24.9±2.8                                      |
| Harris-Benedict (H-B)                      | 22.6±2.4                   | 25.1±6.1                                      |
| Fleisch                                    | 22.6±2.3                   | 25.1±6.1                                      |
| Fleisch-Iones (I-J)                        | 29.3±5.7                   | 25.1±6.1                                      |
| Frankenfield                               | 23.1±6.1                   | 25.1±6.1                                      |

**CONCLUSION.** Comparing EE evaluated using IC with estimated values obtained using predictive equations we found a positive strong correlation. Whilst other authors recommend an additional stress factor for resting EE in trauma patients of 1.3 or more, we found a lower significant value. Although IC remains as the best method to measure EE, validated predictive equations, with corrected stress factors, can be useful in clinical practice.
423 THE INFLUENCE OF AGE AND GENDER ON RESTING ENERGY EXPENDITURE IN SEVERELY BURNED CHILDREN

Mick R P1, Jeschke M G2, Barrow R E1, Herndon D N2
1Respiratory Care, Shriners Hospital for Children, Galveston Burn Hospital, Surgery, University of Texas Medical Branch, 2Surgery, Shriners Hospital for Children, Galveston Burn Hospital, Galveston, United States

INTRODUCTION. Recently, it has been shown that females burned pediatric patients have higher endogenous anabolic hormone levels and a shorter ICU stay compared to male burned patients. Our findings indicate that resting energy expenditure (REE), as a measure of the hypermetabolic response, is less in females compared to males. The purpose of this study was to compare age and gender cohorts for changes in REE from acute hospitalization through 12 months post-burn in severely burned children.

METHODS. One hundred pediatric patients with > 40% total body surface area (TBSA) burn were enrolled in a prospective study and followed by indirect calorimetry measurements. Patients were stratified first by gender than by age (<3, 3-9.9 and 10-18 years). The REE was expressed in three different ways; actual REE kcal/day, % of predicted REE and REE normalized to body mass index (BMI). Statistical analysis was performed by paired and un-paired student’s t-test as appropriate. Significance was accepted at p<0.05.

RESULTS. REE was significantly higher in males vs females at all time points, p<0.05. The percent of predicted REE was significant higher in males vs females at acute, discharge, 6 and 9 months post-burn, p<0.05. The REE/BMI showed a significant difference between males and females at the acute and discharge time period, p<0.05. There was no significant difference between males vs females in the <3 year age group. In children 3-9.9 years, the measured REE and the percent of predicted REE was significantly higher in males vs females during the acute study, at discharge and 6 months post-burn, p<0.05. In children >10 years of age, the measured REE at discharge, 9 and 12 months post-burn was significantly higher in males vs females, p<0.05. The REE/BMI index was significantly different between males and females at 9 and 12 months post-burn, p<0.05.

CONCLUSION. Our data show that female children exhibit a decreased hypermetabolic response compared to male children, which could explain improved outcome of female children. Our data further identify male children >3 years of age as an important patient population for drug intervention to attenuate hypermetabolism.

Grant acknowledgement. This study was supported by a grant from the National Institute for Disabilities and Rehabilitation Research H133A70819 and a grant from the National Institute of Health P50-GH6338.

424 NEW APPROACH TO ASSESS TISSUE LACTATE PRODUCTION UTILISING MICRODIALYSIS

Hildingsson U1, Wernerman J1, Rosvackers O2
1ECMO Centre at Astrid Lindgrens Children’s Hospital, Karolinska University Hospital, Solna, 2Anaesthesiology and Intensive Care, Karolinska University Hospital, Huddinge, Sweden

INTRODUCTION. Non-invasive techniques to study lactate production rates from singular tissues in humans are limited. The first aim of this study was to validate the combined use of labelled lactate and microdialysis measurements to estimate muscle and adipose tissue lactate production. The second aim of this study was to elucidate whether short-term starvation is accompanied by an increased lactate production from muscle and adipose tissue in humans. Short-term starvation induces increased ketone body production and glucogenescosis.

METHODS. Healthy volunteers (n=6) were studied after an overnight fast (12 hours) and after 36 hours of starvation. Studies were performed at least 2 weeks apart. A primed continuous intravenous infusion of 13C-lactate was given for 4 hours. During the last half hour, arterial plasma samples and microdialysis samples from muscle (vastus lateralis) and subcutaneous adipose tissue were obtained. All samples were analysed for lactate concentrations and enrichment. Muscle and adipose tissue lactate production were estimated from the dilution of the arterial lactate tracer measured in the microdialysis catheter (note: no measure of flow was included in this estimate). Comparisons were made with t-test for paired samples.

RESULTS. The estimated lactate production rates from muscle and adipose tissue were not changed due to the 36-hour starvation (muscle: +1.8 vs 1.5 ± 1.5mM, adipose tissue: 0.9 vs 0.3±0.3 mM). Also whole body lactate production was not increased after 36 hours of starvation (98±16 mg/kg/h vs 103±17mg/kg/h).

CONCLUSION. Combination of labelled lactate and microdialysis can be used to estimate tissue lactate production. However, an additional measure of flow will improve the accuracy of this estimate. Short-term starvation does not increase lactate production in humans measured as whole body production rates and estimates of muscle and adipose tissue production.

Grant acknowledgement. This study was supported by Grants from the Swedish Research Council

425 POSTPRANDIAL MUSCULAR FLOW OF AMINOACIDS AND INSULIN SECRETION IN SHORT BOWEL SYNDROME

Tesinsky P1, Hydra P2, Tuma P1, Svanda J, Andel M1
17ICU, Dept of Medicine 2, Dept of Biochemistry, Dept of Medicine 2, Charles University Hospital, Prague, Czech Republic

INTRODUCTION. Prediction of successful weaning from total parenteral nutrition (TPN) after significant bowel resection is poorly documented. Aim of the presented study is to evaluate the impact of bowel resection on postabsorptive and postprandial intermediary metabolism and to define factors which are responsible for muscle protein anabolic response to standardized enteral nutrition. These relationships may represent a novel approach to predict successful weaning from TPN in these patients.

METHODS. 10 patients with short bowel syndrome in a compensated stable state were included into the study. 5 patients were permanently treated with parenteral nutrition, 5 patients have been successfully weaned from TPN. The control group consisted of 10 healthy volunteers matching in crucial parameters.

The study protocol included measurement of muscle arteriovenous differences in aminoacid concentrations in forearm before and after oral administration of defined enteral feeding (300 kcal; saccharides 64%, fat 22%, protein 14%). Insulin plasma levels were evaluated simultaneously.

RESULTS. Patients successfully weaned from TPN demonstrated significantly higher postprandial insulin release in comparison with TPN dependent patients (90mU/L vs. 65mU/L; p<0.01). Insulin release in the control group did not show statistically significant difference from TPN weaned patients (92mU/L). Net output of alanin and glutamin from skeletal muscle in postabsorbative state was inhibited by oral feeding in patients weaned from TPN and in healthy controls as compared to the TPN dependent patients. Muscle uptake of valin, leucin and isoleucin was evident 60 minutes after oral feeding. Changes in aminoacid fluxes correlated with insulin levels.

CONCLUSION. Postprandial stimulated insulin release was identified as a representative marker of intestinal and splanchnic function and as a predictor of successful weaning from parenteral nutrition in patients with short bowel syndrome.

REFERENCE(S). Fleck U, Nowak W, Sefn L-Short bowel syndrome and glucose tolerance.Gastroenterol 1989;49(3):102-7

Thiesen A, Drozdowski L, Jurdace C, et al.: Adaptation following intestinal resection: mechanisms and signals. Best Pract Res Cln Gastroenterol.2003,17(6):981-95

Grant acknowledgement. Study was supported by grant IGA MZ 8043-3

426 ACID-BASE DISTURBANCE ANALYSIS: COMPARISON OF THE TRADITIONAL AND STEWART APPROACHES

Kusharto H1, Purdja I 2, Purwanto S H, Chair I, Darwis D, Latief A1
1Department of Child Health, Medical School University of Indonesia, Jakarta, Indonesia

INTRODUCTION. The new approach to acid-base balance which initially proposed by Stewart in 1978 was success to provide a new insight which more easy to understand what is the cause, the mechanism and the degree of acid-base disturbance. The purpose of the present study was to compare two different methods of analysis acid-base disturbance in patients admitted to Pediatric Intensive Care Unit.

METHODS. The study was performed in 40 patients admitted to the pediatric intensive care unit of Cip.go Mangunkusumo Hospital, Jakarta. Sodium, potassium, chloride, albumin, lactate and arterial blood gases were measured. All samples were taken from artery in every patient. The anion gap (AG) was calculated using the Nairns method (1977), the corrected anion gap (AGcorr) using the Moviat method (2003), the strong ion gap (SIG) using Kellum method (1995) and the base excess unmeasured ions (BEUA) using the Fenci-Stewart method simplified by Storry (2003).

RESULTS. The presence of unmeasured ions identified by significantly abnormal BEUA was poorly identified by SBE. Of the 40 patients included in the study, 17 (42.5%) had a different interpretation of acid-base balance when the Fenci-Stewart method was used compared with when SBE was used. There was moderate relation between SIG and AG (r = 0.612) but there was excellent relation identified by SBE. Of the 40 patients included in the study, 17 (42.5%) had a different interpretation of acid-base balance when the Fenci-Stewart method was used compared with when SBE was used. There was moderate relation between SIG and AG (r = 0.612) but there was excellent relation identified by SBE.

CONCLUSION. In the condition of electrolyte imbalance and hyperalbinemia the Stewart approach is better than the traditional approach. But the calculation of SIG is more time-consuming, so the corrected anion gap (AGcorr) suggest to useful in clinical practice.

REFERENCE(S). Kellum JA. Metabolic acidosis in the critically ill: Lessons from physical chemistry. Kidney International 1998; 53(Suppl 6):S31-S56.

Sirker AA, Rhodes A, Grounds RM, Bennett ED. Acid-base physiology: the ‘traditional’ and the ‘modern’ approaches. Anaesthesia 2002; 57:348-356.
427 ACTIVATION OF IMMUNE CELLS IN ICU PATIENTS DETERMINED BY IN VIVO PROTEIN SYNTHESIS MEASUREMENT

Januszkiewicz A, Klaude M1, Lore K1, Andersson J, Ringdén O, Rosyackers O, Wernerman J1
1Dept of Anaesthesiology and Intensive Care, Division of Infectious Diseases, Dept of Medicine, Dept of Clinical Immunology, Karolinska University Hospital, Huddinge, Karolinska Institutet, Stockholm, Sweden

INTRODUCTION. Insufficient function of the immune system contributes to a poor prognosis in intensive care unit (ICU) patients. However, the immune system function is not easily monitored and evaluated. In vivo fractional protein synthesis rate (FSR) determination in immune competent cells offers a possibility to quantify immunological activation. The aim of this descriptive study was to determine the FSR in immune cells of ICU patients during the initial pro-inflammatory phase of the critical illness.

METHODS. Patients (n=20) on ventilator treatment in the general ICU were studied during their first week of ICU stay. The FSR was determined in circulating T lymphocytes, mononuclear cells and the whole population of blood leukocytes, as well as in stationary immune cells of palatine tonsils during a 90-min period by a flooding technique. Healthy, adult subjects (n=11), scheduled for elective ear, nose, and throat surgery served as a control group.

RESULTS. The FSR in unfraccionated leukocytes of ICU patients was 8.9 ± 4.4 %/24 h (mean ± SD) and was significantly higher in the control group 3.2 ± 1.2 %/24 h (p<0.001). Also mononuclear cells of ICU patients showed the enhanced FSR 21.6 ± 7.4 %/24 h as compared to 10.8 ± 2.8 %/24 h (p=0.001) in the healthy patients. In contrast, the FSR of circulating T lymphocytes in ICU patients was not different from that of the control group, 12.5 ± 5.5 %/24 h vs 10.7 ± 4.5 %/24 h, respectively. Neither unfraccionated immune cells of the palatine tonsils showed differences between the ICU patients and healthy subjects having the FSR values of 27.9 ± 11.4 %/24 h and 22.8 ± 5.7 %/24 h, respectively.

CONCLUSION. The ICU patients showed a distinct polarization of metabolic responses during the initial phase of the critical illness. The in vivo rate of protein synthesis was high in the circulating mononuclear cells and leukocytes, reflecting enhanced metabolic activity in these cell populations. Determination of the in vivo protein synthesis rate may be used as a tool to obtain additional information on activation of the immune system.

REFERENCE(S). Januszkiewicz et al. Response of in vivo protein synthesis in T lymphocytes and leukocytes to an endotoxin challenge in healthy volunteers. Clin Exp Immunol, 2002, 130: 263-270.

428 INCREASED PREVALENCE OF BLOOD NEUTROPHILS EXPRESSING CD97 AND EMR2 IN PATIENTS WITH SIRS

Lewis S M1, Treacher D P1, Campbell-Stevens L S1, Davies P1, Stacey M1, Gordon S1, Hamman F1, Brown K A1
1Cardiovascular Biology and Medicine, GKT, Intensive Care Unit, St Thomas' Hospital, London, UK

INTRODUCTION. Neutrophils are believed to occupy a prominent position in the pathogenesis of organ failure that arises from the systemic inflammatory response syndrome (SIRS). The epidermal growth factor-like 7-transmembrane (EGF-TM7) family of molecules are a group of glycophorins whose structure suggests a dual role in cell adhesion and intracellular signaling. Two members of this family, hCD97 and the EGF molecule-containing mucin-like hormone receptor (EMR2) are expressed on human monocytes and macrophages. The aim of this study was to examine the expression of hCD97 and EMR2 on neutrophils from patients with SIRS and ascertain if they were associated with sepsis or the clinical course of disease.

METHODS. The expression of CD97 and EMR2 on neutrophils was determined by flow cytometric analysis. Whole blood samples were obtained from 30 ICU patients with SIRS and 20 healthy control subjects. Eighteen of the SIRS patients had sepsis as defined by positive cultures from blood, central venous catheters, urine, peritoneal cavity or lung. A number of the patients were monitored sequentially over a 2-week period.

RESULTS. With comparison to the control subjects, the patients with SIRS had a greater distribution of neutrophils bearing CD97 (mean 58% vs 46%; p<0.05) and EMR2 (mean 43% vs 15%; p<0.001). Patients with sepsis had a higher prevalence of neutrophils expressing CD97 than SIRS patients without infections (mean 69% vs 28%; p=0.01). A high APACHE II score (>16) was also associated with an increased distribution of CD97+ve neutrophils with relation to SIRS patients with a lower (<16) APACHE II score (mean 66% vs 45%; p<0.05). The sequential study of 6 patients with SIRS revealed that the distribution of neutrophils expressing CD97 and EMR2 was associated with the clinical course of the disease.

CONCLUSION. To our knowledge, this is the first report showing EMR2 to be expressed on human neutrophils. The observation that the numbers of blood neutrophils bearing CD97 and EMR2 were increased in SIRS introduces the consideration that monitoring their distribution may be of prognostic and pathological significance.

Grant acknowledgement. This work was supported by the Henry Smith Charity and the British Heart Foundation.

429 SOLUBLE FORM OF ENDOTHELIAL PROTEIN C RECEPTOR: DIVERGENT VARIATIONS IN TRAUMA AND SEPTIC SHOCK

Leone M1, Camoin-Jau L2, Wang Y1, Visinini P1, Albamezer P, Dignat-Gérente F, Martin C1
1Anesthesiology and Intensive Care medicine, Centre Hospitalo-Universitaire Nord, Department of Hematology, INSERM U3608, UFR Pharmacie, Université de la Méditerranée, Marseille, France

INTRODUCTION. Endothelial protein C receptor activates protein C whereas the soluble form of this receptor (sEPCR) inhibits its activation. The objective of the study was to assess the plasma concentration of sEPCR in septic and trauma patients.

METHODS. In patients admitted to intensive care unit (ICU) for trauma (Injury Severity Score >16), severe sepsis, and septic shock (ACCP/SCCM), sEPCR was assessed with an ELSA method. The first sample was collected during the first four hours of the disease, and the second sample on day 3. On day 1, plasma concentrations in intercellular cell adhesion molecule-1 (sICAM-1) and sE-selectin were measured as surrogate of inflammatory response. Blood donors were used as controls (healthy volunteers). Comparisons were done with nonparametric tests. A value of P<0.05 was considered as significant.

RESULTS. The concentrations in sICAM-1 and sE-selectin were significantly higher in the patients with septic shock and severe sepsis than those found in the healthy volunteers and in the patients with trauma. Compared to healthy volunteers, the sEPCR plasma concentration was significantly decreased in trauma patients (n = 17) on day 1 and 3. The sEPCR plasma concentration was stable over the study period in severe sepsis patients (n = 9). In contrast, the sEPCR plasma concentration was significantly increased in septic shock patients (n = 28) on day 3, only. No correlation was found with the standard coagulation parameters.

CONCLUSION. The plasma concentration of sEPCR increased on day 3 in the septic shock patients, which may perhaps induce delayed thrombosis in these patients. This receptor decreased in the trauma patients as soon as they admitted in the ICU. The clinical implications associated with these variations are still unknown.

430 CYTOKINE LEVELS IN THE BLOOD OF PATIENTS WITH NUCLEATED RED BLOOD CELLS IN BLOOD

Stachon A1, Bolului O1, Holland-Letz T1, Krig M1
1Institute of Clinical Chemistry, Transfusion and Laboratory Medicine, BG University-Hospital Bergmannsheil, Department of Biometry, Ruhr-University Bochum, Bochum, Germany

INTRODUCTION. The appearance of nucleated red blood cells (NRBC) in the circulation is associated with a variety of severe diseases, and indicates a relatively poor prognosis. Whether a malfunction of the bone marrow leads to this phenomenon is as unknown as the possible role which cytokines could play in this process.

METHODS. We analysed erythropoietin, interleukin-3 (IL-3), interleukin-6 (IL-6), and interleukin-12p70 (IL-12p70) in the blood of 301 patients (controls n=250) with circulating NRBCs.

RESULTS. In-hospital mortality of NRBC-negative and NRBC-positive patients was 1.2% (5/250) and 22.6% (68/301; P<0.001), respectively. In-hospital mortality increased with the NRBC concentration (Figure 1). 85.7% (12/14) of patients with more than 500 NRBCs/μl in the peripheral blood died. Multiple logistic regression revealed a significant association between the appearance of NRBCs in the blood and age (odds ratio 1.019; 1.009-1.030; P=0.001), erythropoietin (odds ratio 1.017; 1.007- 1.027; P=0.001), IL-3 (odds ratio 1.293; 1.180-1.417; P<0.001), and IL-6 (odds ratio 1.138; 1.016-1.275; P<0.05), respectively. Gender and IL-12p70 were not significantly associated with the appearance of NRBCs in the blood.

To estimate the red blood cell production in the bone marrow the increase in the reticulocyte concentration in blood was measured. The reticulocyte concentration in NRBC-positive patients was 69±26%, being significantly higher than in NRBC-negative patients (60±29%; P<0.01). Furthermore, in the course of hospitalization the increase in the reticulocyte concentration in NRBC-positive patients was significantly higher (24±26% vs 22±4) than in NRBC-negative patients (11±9% vs 12±8; P<0.01).

CONCLUSION. An association of the appearance of NRBCs were found with increased levels of erythropoietin, IL-3, and IL-6, respectively. Therefore, NRBCs in the circulation could be an indicator which summaries hypoxic and inflammatory injuries. Thus, generally the appearance of NRBCs in blood is a valid parameter to identify patients at high moral risk. Moreover, the increased number of reticulocytes in the blood of NRBC-positive patients may indicate that the appearance of NRBCs is not associated with disturbed bone marrow function as far as the erythropoiesis is concerned.

Grant acknowledgement. Sysmex Europe Corp.
431
MELATONIN PLASMA CONCENTRATION CHANGES IN SEPTIC PATIENTS

Borkowski J1, Siemiatkowski A1, Wołczyński S2, Czaban S3, Jedynak M1
1Department of Anaesthesiology and Intensive Care, 2Department of Gynecological Endocrinology, Medical University of Białystok, Białystok, Poland

INTRODUCTION. Melatonin is well known hormone responsible for human circadian rhythm and periods of sleep and awareness. During the last few years there are studies showing that melatonin action is more complicated than we think. Its receptors are found in peripheral tissues and vessels. They are responsible for the vascular tone, inhibitions of INOS expression induced by bacterial lipopolysaccharide and modulate immune system.

The aim of our study was to determine the melatonin plasma concentration changes according to severity of sepsis and outcome.

METHODS. 21 males with severe sepsis (19-71 yr old, median=57) admitted to the general ICU of an urban tertiary care medical centre in 2002 were enrolled into the study. 10 of them died (25-70 yr old, median=60.5), another 11 patients survived (19-71 yr old, median=52.9). Average stay on ICU was 24.4 days. All patients included into study had recognized severe sepsis according to consensus of American College of Chest Physician and Society of Critical Care Medicine. 10 patients with severe pancreatitis and 11 with peritonitis as a complication of abdominal surgery were studied. 14 healthy volunteers constituted a control group (23-58 yr old, median=39.5). We measured the melatonin plasma concentrations, APACHE II, APACHE III, MODS and SOFA scores at admission, on the 1st, 2nd, 5th and 10th day of stay.

RESULTS. Significant differences were not observed between septic patients and controls in melatonin plasma concentration (median=4.25 pg/ml and 3.95 pg/ml respectively). At the same time melatonin plasma concentration was significantly lower in nonsurvivors (median=4.25 pg/ml) accordingly to survivors (median=8.8 pg/ml; p=0.03). On the other hand it was positive correlation between APACHE II score and melatonin plasma concentration in patients with poor outcome (R=0.51; p=0.001).

CONCLUSION. According to our results we are able to say that lower or higher melatonin concentrations corresponded to higher mortality rate and melatonin plasma concentration might have prognostic value in septic patients, but more studies are necessary to understand the role of this hormone in sepsis.

432
COMPARATIVE ANALYSIS OF THE KINETICS OF INFLAMMATORY MARKERS

Marton S1, Mohár V2, Tóth I1, Ittás B1, Kanizsai P1, Garai J2, Köszegi T1, Bogár L1
1University of Pécs, Medical Faculty, Department of Anaesthesiology and Intensive Care, 2University of Pécs, Medical Faculty, Department of Clinical Chemistry, Pécs, Hungary

INTRODUCTION. Macrophage migration inhibitory factor (MIF) was originally described as a T-lymphocyte derived cytokine that inhibits the migration of the macrophages at the site of inflammation(1). Subsequently it was also identified as a stress induced hormone released from the anterior lobe of the pituitary in response to some pro-inflammatory stimuli(2). The glucocorticoid counterbalancing proinflammatory actions of MIF have been thoroughly documented.

METHODS. Our study compared postoperative changes in serum MIF levels of patients undergoing bowel and liver resections. 28 patients were recruited in our descriptive study. Patients in the first group (B) comprised of patients who have had bowel resection with surgical bowel opening. The other group (A) comprised of patients who had had bowel resection with surgical bowel opening. MIF, IL-1β, IL-8, prealbumin, albumin, α fibrinogen and C-reactive protein levels were measured before and immediately after the operations and also for three consecutive days. To evaluate organ functions the MODS-test was used. Statistical analysis was carried out by means of SPSS for Windows, applying the Mann-Whitney test.

RESULTS. A higher level of MIF (4505 pg/ml 1489-7148) was found in group A compared to that of group B immediately after the operations, that proved to be significant. Other parameters monitored in this study were not statistically different between the two sets of patients.

CONCLUSION. Higher elevations in MIF levels with liver resections compared to bowel resections might be attributable to MIF release from damaged liver cells. The presumably minimal endotoxin exposure during the bowel surgery was either insufficient or inefficient to induce relevant MIF elevations in our patients.

REFERENCE(S). (1) Beishuizen A, Thijs LG, Haenen C, Vermes I. Macrophage Migration Inhibitory Factor and Hypothalamo-Pituitary Function during Critical Illness. J Clin Endocr Metab 2001; 86:2811-2816. (2) Gando S, Nishihira J, Kobayashi S, Morimoto Y, Matsushita M, Kemeny O. Systemic macrophage migration inhibitory factor release following hepatic resection. Surg Today 2001; 31: 605-609

433
SEVERE SEPSIS. PLASMA LEVELS OF CYTOKINES AND CRP; RELATION WITH MORTALITY. RESULTS OF A SPANISH MULTICENTER STUDY

Muriel A1, Blanco J2, Arranz M2, Mayo A3, Sagredo V4, Taboada P3, Gandía P3, Tamayo L1, Guerra J5, Grupo G.R.E.C.I.A.6
1Grupo Intensiva, Análisis Clínicos, 2H. U. Río Hortega, 3D. de Estadística, U. de Valladolid, Valladolid. 4Grupo de Estudio y Análisis en Cuidados Intensivos, G.R.E.C.I.A., Spain, Spain

INTRODUCTION. There are no data available about the evolution of levels of inflammatory mediators and their relation with the mortality in severe sepsis in the Spanish ICUs. Objectives: To know the evolution of IL-1beta, IL-6, IL-10 and CRP through the sequential determination of their plasmatic levels and their association with mortality in septic patients.

METHODS. Prospective, observational, multicenter, cohort study carried in 14 ICUs of 13 hospitals of Spain during a six months period of 2002. 311 non-cardiologic patients with a first episode of severe sepsis (1) were included. Blood samples were drowned at days 1, 3 and 7 from diagnosis in a random sample of 145 patients. IL-1beta, IL-6, IL-10 and CRP levels were recorded. The ICU and hospital discharge date, or the death date and the location of patient at this moment, were also recorded. Median values of plasmatic levels were calculated for survivors and non-survivors. A Mann-Whitney test was used in order to contrast their statistic significance. The results are expressed as medians, absolute numbers or percentage.

RESULTS. Median values for each biomarker analyzed and the p values for comparison of plasmatic levels at day 1 between survivors and non survivors are showed in table 1.

TABLE 1.

| Biomarker   | Survival (n=67) | Day 1 | (66.2 %) | Day 2 | (53.8 %) | Day 3 | (53.8 %) | Day 7 | (53.8 %) | Day 33 (53.8 %) |
|-------------|-----------------|-------|----------|-------|----------|-------|----------|-------|----------|---------------|
| IL-1beta    | 4.9             | 4.9   | 4.9      | 4.9   | 4.9      | 4.9   | 4.9      | 4.9   | 4.9      | 4.9           |
| IL-6        | 66.9            | 34.35 | 33.1     | 257.5 | 134      | 63.6  | 0.0007   |       |          |               |
| IL-10       | 9.6             | 6.55  | 7.1      | 14.1  | 12.9     | 10.05 | 0.009    |       |          |               |
| CRP         | 213             | 156   | 117      | 218   | 198      | 173   | 0.4284   |       |          |               |

CONCLUSION. 1. In the first day from diagnosis, the IL-1beta, IL-6 and IL-10 plasmatic values were significantly higher in non-survivors. There were no differences in days 3 and 7 of evolution. 2. No differences were found in the CRP values between survivors and non-survivors.

REFERENCE(S). (1) Bone RC et al, Chest 1992; 101:1644-55

434
PLASMA CHROMOGRAININ B (CGB) IN PATIENTS WITH SEPTIC SHOCK AND IN HEALTHY SUBJECTS

Lavigne T1, Giron P2, Aunis D2, Metz-Boutrigue M2, Schneider F3
1Medical Intensive Care Unit, CHU de Strasbourg, 2INSERM U575, Centre de Neurochimie, Strasbourg, France

INTRODUCTION. Chromogranins are prohormones, precursors of numerous peptides displaying various biological activities. Some even have antifungal and antibacterial properties. As catecholamines, they result from secretory granules of the chromaffin cells in adrenal medulla. Aims of the study: to analyze the physiological secretion of CGB and its derivatives in healthy subjects; and to compare its characteristics with those of patients undergoing the stress of septic shock.

METHODS. 4 healthy voluntaries and 3 patients with septic shock were included. Samples of serums were taken at several times to establish a kinetic of secretion. Serum proteins were studied by mono- and two-dimensional electrophoresis with anti-CGB specific immunodetection, using polyclonal antibodies; and by chromatography (RP-HPLC) with specific immuno-detection of each eluted sample, and then by mass spectrometry (MALDI TOF) and antimicrobial tests.

RESULTS. The healthy subjects’ electrophoretic profiles are identical. We did not find fragments of molecular weights (MW) lower than 20 kDa. But patients’ profiles show a great number of short fragments. There were no qualitative modifications of monodimensional electrophoresis profile over time in healthy subjects, whereas for patients, we observed the disappearance of a 37 kDa band and of short fragments of weak MW. This modification occurs 4 hours after the end of the infusion of noradrenaline. RP-HPLC chromograms show strong similarities between controls and patients. However the peaks of albumin (HSA) and transferrin are higher in healthy controls. For the whole population, we observed at the end of the chromatogram, 2 immuno reactive peaks: the peak of HSA (immuno reactive zone which corresponds to an association of CGB and HSA); and an isolated peak after HSA peak.

CONCLUSION. This is the first study of CGB secretion in human serum. We show noticeable differences between healthy controls and patients with septic shock. The clinical improvement of a patient corresponds to the modifications of the electrophoretic profile (backwards to the profile of a healthy control). For the first time, an association is also shown between the HSA and the CGB. In septic shock, the free CGB seems to be more abundant.

Grant acknowledgement. This study was completed with the partial financial support of the PHRC 2003 n° 3150
**435**

**SERUM VASOPRESSIN CONCENTRATIONS IN CRITICALLY ILL PATIENTS**

Jochberger S, Mayr V, Luckner G, Kastner H, Pajk W, Wenzel V, Hasibeder W, Dürrs M W

1General and Surgical Intensive Care Medicine, Innsbruck Mecial University, Innsbruck, Austria

**INTRODUCTION.** Arginine vasopressin (AVP) has been hypothesized to reverse AVP deficiency in vasodilatory shock. To correctly interpret AVP serum levels in intensive care unit (ICU) patients with inadequately low blood pressure, measurement of AVP levels in an ICU population would be of interest to improve management of vasodilatory shock. This prospective study examined serum AVP levels 24 h after admission in 239 ICU patients, and assessed the incidence of relative and absolute AVP deficiency.

**METHODS.** From Mar 2003 to Jan 2004, all patients admitted to a general and surgical ICU were included in the study unless they were <19 years, pregnant, suffered from central nervous system pathology, were discharged or died within 24 h, or already received an AVP infusion. 24 h after admission to the ICU serum AVP levels were determined. Demographic data, hemodynamic variables, vasopressor drug requirements, blood gases, multiple organ dysfunction score, and patient outcome were recorded. Univariate regression models, an independent sample t-test, as well as Chi² tests were used for statistical analysis.

**RESULTS.** AVP serum levels were 11±19 pmol/L. Males had higher AVP levels than females (9±18 vs. 14±19 pmol/L, p=0.014). Patients with hemodynamic dysfunction had higher AVP levels than patients without hemodynamic dysfunction (8±10 vs. 13±25 pmol/L, p=0.042). Patients after cardiac surgery (n=96) had significantly higher AVP levels when compared to patients admitted for other diagnoses (n=143; p<0.001). AVP levels were significantly associated with length of stay in the intensive care unit (p=0.002). There was no detectable correlation between AVP levels and the incidence of shock or specific hemodynamic parameters such as mean arterial pressure or vasopressor requirements. Four (1.7%) of the 239 study patients met criteria for an absolute, and 39 (16.3%) criteria for a relative AVP deficiency.

**CONCLUSION.** AVP serum levels 24 hours after ICU admission were slightly elevated in this mixed ICU population. A lacking correlation between AVP serum levels and hemodynamic parameters suggests a complex dysfunction of the vasopressinergic system in critical illness. Relative and absolute AVP deficiencies are infrequent entities during acute critical illness, mostly remaining without significant effects on cardiovascular function.

**436**

**COMBINED DETERMINATION OF BIPHASIC APTT WAVEFORM AND PROCALCITONIN LEVELS IN SEPSIS**

Zakariah A N, Cozi S M, Van Nuffelen M, Clau L, Pradier O, Houdijk W, Vincent J L

1Dept of Intensive Care, Dept of Haematology, Erasme University Hospital, Brussels, Belgium, BioMérieux, Boxtel, Netherlands

**INTRODUCTION.** Identifying sepsis in intensive care unit (ICU) can be difficult. We assessed the utility of the biphasic APTT waveform (BPW) and procalcitonin (PCT) determinations, alone or combined, for the diagnosis of sepsis in ICU patients.

**METHODS.** This prospective observational study included 200 adult patients admitted to a 31-bed university hospital medical-surgical ICU during a 3-month period. The presence of sepsis, severe sepsis or septic shock was determined on the day of admission by standard clinical and laboratory criteria, without knowledge of APTT or PCT. APTT transmittance waveforms (BioMérieux MDA System) and PCT levels (BRAHMS PCT Lumitest) were determined on the day of admission. Threshold values for the prediction of any form of sepsis were assessed by receiver operating characteristic (ROC) curves. The BPW was detected when the slope of the pre-coagulation phase (slope_1) exceeded the threshold value (i.e., became more negative).

**RESULTS.** At admission, 29 patients (14.5%) were septic. At an APTT slope_1 threshold of -0.075 %T/sec, 37 of 200 patients (18.5%) had a BPW and 23 of these (62.2%) were diagnosed with sepsis. Of the 163 patients with normal APTT waveforms, only 6 (3.7%) were septic. This gives a sensitivity of 79.3%, a specificity of 91.8%, a positive predictive value (PPV) of 62.2% and a negative predictive value (NPV) of 96.3% (positive likelihood ratio 9.8, negative likelihood ratio 0.2). Using a PCT threshold of 1 ng/ml, 60 patients had elevated PCT levels and 24 of these (40.0%) were diagnosed with sepsis. Of the 140 patients with normal PCT levels, only 5 patients (3.6%) were septic (sensitivity 82.8%, specificity 78.9%, PPV 40.0% and NPV 96.4%; positive likelihood ratio 3.9; negative likelihood ratio 0.2). When combining the measurements, 32 patients exhibited both a BPW and an elevated PCT level. Of these, 25 (78.1%) were septic. Of the remaining 168 patients without the combination, only 4 patients (2%) had sepsis (sensitivity 86.2%, specificity 95.9%, PPV 78.1% and NPV 97.6%; positive likelihood ratio 21.5, negative likelihood ratio 0.1).

**CONCLUSION.** The combined assessment of APTT transmittance waveforms and PCT levels provides a rapid means of identifying septic patients on ICU admission.

Grant acknowledgement. This study was sponsored by BioMérieux.

**437**

**DIFFERENTIAL DIAGNOSTIC VALUE OF PROCALCITONIN IN SURGICAL AND MEDICAL PATIENTS WITH SEPTIC SHOCK**

Clec’h C, Fosse J, Karoubi P, François V, Choufah P, Hamza L, Cohen Y

1Intensive care unit, Hôpital Avicenne, Bobigny, France

**INTRODUCTION.** Procalcitonin (PCT) is probably a reliable diagnostic marker for septic shock. However, the best cutoff value remains unclear. Studies focusing on medical patients found values of 1 ng/ml whereas values up to 8 ng/ml have been observed in patients with a normal postoperative course (1, 2). Our aim was to determine whether different diagnostic cutoff values should be considered in surgical and in medical patients.

**METHODS.** Patients with septic shock or non infectious SIRS within 48 hours of admission were included and allocated to the following groups according to usual criteria: group 1 (surgical patients with septic shock), group 2 (surgical patients with SIRS), group 3 (medical patients with septic shock) and group 4 (medical patients with SIRS). PCT at study entry was compared between groups 1 and 2 and between groups 3 and 4 to determine the diagnostic cutoff value for septic shock in surgical and in medical patients respectively.

**RESULTS.** One hundred forty-three patients were included: 31 in group 1, 36 in group 2, 36 in group 3 and 40 in group 4. Median PCT levels (mg/ml [interquartile range]) were significantly higher in group 1 than in group 3 (34 [7.1-76] vs 8.4 [3.6-24.7], p = 0.01). In surgical patients, the best diagnostic cutoff value was 9.7 ng/ml, with sensitivity of 91.7% and specificity of 74.2% (AUC = 0.835). In medical patients, the best diagnostic cutoff value was 1 ng/ml, with sensitivity of 80% and specificity of 94% (AUC = 0.92).

**CONCLUSION.** These data indicate that the diagnostic performance of PCT can be improved by defining a higher cutoff value in surgical than in medical patients. Thus, PCT could avoid delayed or unnecessary antibiotic therapy.

**REFERENCE(S).** 1. Clec’h C, Ferriere F, Karoubi P et al.: Diagnostic and prognostic value of procalcitonin in patients with septic shock. Crit Care Med 2004; 19: 973-976.

**438**

**TIME COURSE OF CRP AND PCT CONCENTRATIONS IN SEPTIC PATIENTS**

Van Nuffelen M, Abraham A, Zakariah A, Vincent J L

1Intensive care medicine, Erasme University Hospital, Brussels, Belgium

**INTRODUCTION.** Both C-reactive protein (CRP) and procalcitonin (PCT) concentrations have been proposed to monitor sepsis in acutely ill patients. The aim of this study was to study their time course in septic ICU patients.

**METHODS.** The study included 97 infectious episodes (mean age: 60 years, ratio M:F-2:1), as defined by standard CDC criteria. Patients were divided into two groups, depending on their evolution: favorable (clinical and white blood cell count) or unfavorable (need for additional procedure and/or change in antibiotic regimen). CRP was measured daily by direct immunoturbimetry and PCT by immunoluminometric assay.

**RESULTS.** Evolution was favorable in 74 patients and unfavorable in 23 patients. Changes in CRP and PCT were as follows (median values):

| TABLE 1. |  |
| Day 0 | Day 1 | Day 2 |
| CRP favorable evolution (mg/dl) | 15.6 | 16.9 | 14.9 |
| CRP unfavorable evolution (mg/dl) | 13.9 | 16.4 | 19.1 |
| PCT favorable evolution (ng/dl) | 0.62 | 0.84 | 0.71 |
| PCT unfavorable evolution (ng/dl) | 1.99 | 2.12 | 6.87 |

where Day 0 represents the day where antibiotics were started.

**CONCLUSION.** CRP and PCT kinetics in septic patients show no significant trend in patients who respond favorably to therapy. However, an increase in these variables indicates a poor response.
439  
PROCALCITONIN A NEW PROGNOSTIC MARKER IN NON-INFECTION PATIENTS IN THE MEDICAL ICU

Koning J, Ritter S, Hersberger M, Maggiorini M
1 Intensive Care Unit, Department of Internal Medicine, 2Institute for Clinical Chemistry, University Hospital, Zurich, Switzerland

INTRODUCTION. Procalcitonin (PCT) is an established marker of inflammation in systemic bacterial infections. Various conditions other than infection have also been reported to induce PCT elevation. PCT has not been evaluated as a prognostic marker in non-infected patients. Therefore, we prospectively measured PCT and C-reactive protein (CRP) blood values in an unselected population of critically ill patients admitted to our medical intensive care unit (ICU) during a 4 months period and correlated them with ICU mortality.

METHODS. We analyzed blood samples taken during the first 3 days in the ICU. Patients hospitalized for >3 days before admission to our ICU and those with clinical evidence of infection were excluded from the study. To assess the prognostic value associated with PCT and CRP plasma levels, patients were stratified according to their maximum PCT and CRP level, and monitored until ICU discharge. The SAPS II score was calculated for each individual patient. Where appropriate values are given as the median with interquartile range (IQR).

RESULTS. During the 4 months observation period 371 patients were screened and 223 were included into the study. Hundred and sixty-five of the 223 patients had a cardiovascular disease (CD). The median age of the entire population was 60 years (51-73). PCT was above normal (≥0.5 ng/ml) in 40 (18%) and CRP ≥50 mg/l in 87 (39%) of the 223 patients. Among patients with a PCT ≥0.5 ng/ml ICU mortality was 37% (15/40) compared to 4% (8/183) in those with a PCT <0.5 ng/ml (p=0.002), whereas in patients with a CRP ≥50 mg/l and those with a CRP <50 mg/l it was 17% (15/87) and 6% (8/136), respectively (p=0.007). The median SAPS II score in those patients with a PCT ≥0.5 ng/ml was 41 (31-60) and in those with a CRP ≥50 mg/l 22 (18-45). Patients with a PCT ≥0.5 ng/ml and a CD had an ICU mortality of 42%, compared to 29% in those with other diagnosis. ICU mortality in patients with a CRP ≥50 mg/l and a CD was 16%, compared to 22% in those without CD.

CONCLUSION. In non-infected patients admitted to a medical ICU PCT plasma levels ≥0.5 ng/ml are frequent and associated with elevated ICU mortality. Cardiovascular compared to non-cardiovascular patients with a PCT ≥0.5 ng/ml are at a high risk of death. Our results suggest that PCT is a valuable marker for the selection of the sickest patients with a high risk of death.

440  
PROCALCITONIN AS A SEPSIS MARKER IN PATIENTS WITH SEVERE BURN INJURY

Lavrentieva A V, Kontakiotis T N, Kousmis P, Voutsas V, Lathiris D, Bitzani M
1 Intensive Care Unit, General Hospital G.Papanicolaou, Thessaloniki, Greece

INTRODUCTION. The differential diagnosis between sepsis and SIRS is of considerable importance in burn patients. Delay in the initial adequate treatment increases the mortality rate.

The aim of this study was to assess whether plasma Procalcitonin (PCT) level was related to sepsis, burn size and organ failure in severely burned patients over the entire clinical course.

METHODS. Forty one patients, mean age 53 ± 23 (SD), range (18–80 years), mean burn size 43.7 ± 22 (SD) % of body surface area (BSA), (range 18% - 95 % BSA) were included in this study. All patients were classified daily in one of the following three categories: negative, SIRS, sepsis according to the definitions of the ACCP/SCCM. A total of 227 patient days were evaluated: negative (n: 162), SIRS (n: 28), sepsis (n: 37). Measurement of PCT levels and evaluation of organ function by SOFA score were performed daily until discharge from ICU.

RESULTS. Admission PCT levels were significantly higher in patients with burn size >60% of BSA than in those with burn of less than 60% of BSA (0.57 mg/ml vs 2.6 ng/ml, p<0.01). PCT plasma concentrations differed among the three diagnostic classes and were higher in sepsis than in SIRS (Table 1). A statistically significant correlation was observed between PCT levels and SOFA score (r= 0.49, p<0.001 (Pearson’s bivariate correlation)).

| TABLE 1.  |
|-----------------|-----------------|-----------------|-----------------|
| PCT plasma concentrations (ng/ml) in sepsis, SIRS and negative days after | | |
| | PCT | SIRS | sepsis |
| | 0.64 (±1.15) | 0.63 (±0.4) | 12.4 (±15) |

CONCLUSION. Increased level of plasma PCT is a useful biochemical marker of sepsis and organ dysfunction in patients with severe burn injury.

Poster Sessions
Airway management 441-453

441  
LARYNGEAL MASK-AIRWAY VS ENDOTRACHEAL INTUBATION DURING PERCUTANEOUS TRACHEOTOMY IN THE ICU

Fernandez-Ortega P, Arevalo-Villatoro F, Herrera-Gutierrez M, Bessa-Centeno G, Seller-Perez G, Curiel-Balsera E, Quereda-Garcia G
1 Intensive Care Unit, 2Anaesthesiology, Hospital Universitario Carlos Haya, Malaga, Spain

INTRODUCTION. Percutaneous tracheotomy (PT) is frequent in the ICU to help wean patients from MV. We compared the effectiveness and airway management of laryngeal mask-airway (LMA) vs endotracheal intubation (EI).

METHODS. We included 40 consecutive intubated adult patients in the ICU who required PT, randomized into two groups of 20. One group had a ProSeal LMA and the other underwent laryngoscope-assisted partial withdrawal of the endotracheal tube. Ventilator settings in both groups were: volume-control ventilation, FiO2 1, minute volume 8.8 l, PEEP 0. Arterial blood gas pressure was measured before the start of each PF and before insertion of the tracheotomy tube. Data were recorded concerning the duration of the procedure from commencing airway manipulation to insertion of tracheotomy tube and airway complications.

RESULTS. 67% of patients were men (median age 55 years). Reasons for tracheotomy were a low PaO2/FiO2 in 50% of patients, a PaO2/FiO2 <150 in 30% of patients and a CD had an ICU mortality of 42%, compared to 29% in those with other diagnosis. ICU mortality in patients with a CRP ≥50 mg/l and a CD was 16%, compared to 22% in those without CD.

CONCLUSION. LMA is as effective as EI to maintain adequate airway ventilation during PT. (2) Both techniques require a similar time. (3) The LMA group had fewer airway complications than the EI group.

442  
EARLY TRACHECTOMY VERSUS PROLONGED ENDOTRACHEAL INTUBATION IN ICU PATIENTS

Nitenberg G, Laplanche A, Chastrue J, Similowski T, Blot F, Biostatistics Unit, Institut Gustave Roussy, Villejuif, Intensive Care Unit, 2Pulmonary Intensive Care Unit, Hôpital Pitié Salpêtrière, Paris, France

INTRODUCTION. The optimal timing of tracheotomy in critically ill patients requiring prolonged mechanical ventilation (MV) is debated. Recent studies suggest that early tracheotomy could substantially reduce both infectious morbidity and mortality. In a prospective, randomized, study we compared early tracheotomy with prolonged endotracheal intubation in ICU patients needing prolonged ventilatory support.

METHODS. Patients projected to need ventilatory support for > 7 days were prospectively randomized to either early (open or percutaneous) tracheotomy within 4 days (ET) or prolonged intubation (PI) with or without delayed tracheotomy. The primary end-points were: 28 days mortality and cumulative incidence of nosocomial pneumonia, and number of ventilatory free days between day 1 and 28. Time in the ICU and on MV, 60 days mortality, number of septic episodes, accidental extubation and amount of sedation were recorded as secondary end-points. A sample size of 470 patients was determined for a reduction of the 28 days mortality from 45% to 32% (two-sided, power=0.8).

RESULTS. The study was prematurely closed because of poor accrual, after 123 patients (ET=61, PI=62) had been included. No difference was found between the 2 groups for any of the primary (Table 1) or secondary end-points. In addition, laryngeal or tracheal damage and time for resuming ventilatory parameters, duration and complications of PT

| TABLE 1. | | |
|-----------------|-----------------|-----------------|
| | LMA | EI | p |
| Difference pH | -0.05 (±0.06) | -0.05 (±0.05) | ns |
| Diff pH 2 mm Hg | 0.35 (±0.96) | -0.30 (±0.93) | ns |
| Diff pH 2 mm Hg | 0.75 (±0.96) | 7.26 (±7.48) | ns |
| Duration mm | 30.45 (±13.07) | 26.65 (±14.45) | ns |
| Complications | 3/20 (15%) | 10/20 (50%) | <0.05 |

CONCLUSION. Taking into account that the study remained underpowered, no benefit neither any trend to benefit of ET over PI has been demonstrated in a general population of surgical and medical ICU patients. This discrepancy with recent studies suggests that the potential advantage of practicing ET may be restricted to selected groups of patients.

Grant acknowledgement. TRACHEA trial group. Grant of the Délégation à la Recherche Clinique (PHRC 2002).
Early PDT has several advantages when long-term mechanical ventilation is indicated. However, in patients suffering from TBI, one major concern is increased intracranial pressures (ICP). During PDT, decrease of venous return and hypercapnia might seriously compromise ICP. Therefore, changes in ICP’s during videobronchoscopic guided PDT were measured.

METHODS. 40 patient with TBI treated at our neurosurgical intensive care unit, required long-term mechanical ventilation. Reduced laryngeal anatomical alterations, reduced inspiratory work, nursing and better patient’s tolerance are advantages compared to endotracheal intubation. Aim of study: to determine the current practice patterns of difficult airway management among Croatian anesthesiologists.

RESULTS. In the period 2003–2005 we performed a prospective, randomized trial in 27 critically ill patients (age 63±12 M/F 17/10) enrolled in three groups Fantoni (n = 9), Griggs (n = 9) and PercuTwist (n = 9). We focused on ‘Procedure time’, ‘time from incision to successful placement of the endotracheal tube (cuff-leak% = 100 x (ETVi – ETVd) / EVTi)’, ‘Mean ICP before PDT in mmHg (range)’, ‘Mean operation time in minutes (range)’, ‘Complications’, ‘Mean ICP before PDT in mmHg (range)’, ‘Mean ICP after PDT in mmHg (range)’, ‘Mean operation time in minutes (range)’, ‘Minor bleedings at the skin incision’, and ‘Total complications (%)’. All data were given as means ± SD. Student-Newman-Keuls Multiple Comparisons Test was performed and cut-off level of P < 0.05 was accepted as statistically significant.

CONCLUSION. Shortest ‘Procedure time’ was achieved using the Griggs technique. This study showed no significant differences in clinically relevant complications and for this reason the three techniques seem equally reliable, safe and easy. In difficult airway situations, following laryngoscopy, the technique of choice was the laryngeal mask airway followed by the gum elastic bougie. For anticipated difficult intubations, 54% performed sedated awake intubation, and 29% used the flexible bronchoscope. While the ASA difficult airway algorithm was used by 42% of respondents, 25% stated that they used an internally developed algorithm. Per respondent per year, an average of 975 anesthetics were performed, with 638 patients having endotracheal intubation. The most frequently preferred laryngoscope blade was Macintosh (75%) followed by Miller (21%) and McCoy (4%) 83% indicated they rarely failed an intubation using a conventional laryngoscope. In difficult airway situations, following laryngoscopy, the technique of choice was the laryngeal mask airway followed by the gum elastic bougie. For anticipated difficult intubations, 54% performed sedated awake intubation, and 29% used the flexible bronchoscope. While the ASA difficult airway algorithm was used by 42% of respondents, 25% stated that they used an internally developed difficult airway protocol.

CONCLUSION. Current difficult airway management techniques are being taught and used in Croatia. Laryngoscopy and sedated awake intubation are used more frequently than fiberoptic bronchoscopy. The ASA difficult airway algorithm was used by 42% of the anesthesiologists surveyed.
447

EMERGENCY CIRCUITRYTHOMY: COMPARISON OF TWO TECHNIQUES AND OF TWO PERFORMER-GROUPS

Staatsen M1, Blesker C P1, Van der Hoeven J G1, Marres H A M1, Fikkers B G1
1Intensive Care, 2Anesthesiology, 3ENT, Radboud University Nijmegen Medical Centre, Nijmegen, Netherlands

INTRODUCTION. Does the new Portex Emergency Cricothyroidotomy Kit compare favourable to the Quicktrach (1)? Which device should be chosen in the hospital situation or on the battlefield?

METHODS. In a randomized crossover trial, 25 special forces (s-f) medicals of the Royal Netherlands Army and 19 residents in anesthesiology performed circuitrythomies using two different emergency airway devices on larynges from freshly slaughtered pigs(1). We compared the Quicktrach with the Portex Emergency Cricothyroidotomy Kit. All data were analyzed using SPSS version 11.0 (Wilcoxon test for non-normally distributed 2-paired comparison and McNemar test for nominal values).

RESULTS. The Quicktrach-technique was done significantly faster than the Portex-technique in both groups. Intratracheal placement of the cannula was achieved by 14 (56%) s-medics and 12 (65%) residents using the Portex-technique and using the Quicktrach-technique by 18 (72%) s-medics and 15 (79%) residents.

|                   | Portex   | Quicktrach | p-value |
|-------------------|----------|------------|---------|
| Time (sec)        | 158±54   | 83±20      | <0.05   |
| Total compl.      | 21 (84%) | 10 (40%)   | <0.05   |
| VAS               | 4.6±2.0  | 2.3±1.6    | <0.05   |

CONCLUSION. The Quicktrach-technique was easier and more successful than the new Portex-technique. This may be related to the design of the latter, as it uses more complicated. Moreover, the tube and dilator are straight and rigid. 2. Residents were faster in both techniques, but performed only slightly better than s-medics, so more training is necessary for both. 3. Neither of two kits are ideal, considering the high complication rate with the Portex and the impossibility to ventilate with the Quicktrach.

REFERENCE(S). (1) Emergency circuitrythomy: a randomized crossover trial comparing the wire-guided and cather-over-needle techniques. Fikkers BG et al. Anaesthesia. 2004;59:1008-11.

Grant acknowledgement. The circuitrythomy sets used in this study were provided free of charge by Smith Medical Nederland B.V. and Endomed B.V. the Netherlands.

449

EPIDEMIOLOGIC CHARACTERISTICS OF CRITICALLY ILL PATIENTS SUBMITTED TO CONVENTIONAL TRACHEOSTOMY

Mendes C L1, Holmes U1, Almeida H B M1, Vieira B M1, Amorim I P1, Moreira CL R1, Moura E Q R1, Marchi M V D1, Luz S1
1Intensive Care Unit, Hospital Universitário, João Pessoa, Brazil

INTRODUCTION. Tracheostomy is a very usual procedure in critically ill patients, yet we did not have data about this issue in our setting, so we decided to perform a prospective trial in order to observe the main characteristics of tracheostomies made in critically ill patients in two of our centers: a general ICU and a trauma ICU.

METHODS. We have performed a prospective and observational trial during the period between 05/28/2004 and 12/16/2004 in two Intensive Care Units of two tertiary hospitals.

RESULTS. During this period, 601 patients were admitted: 291 pts in the trauma ICU and 310 pts in the general ICU. 66 pts (10.98%) were submitted to tracheostomies in the two centers, 40 (60.6%) in the trauma ICU and 26 (39.4%) in the general ICU. 44 (66%) were male. Acute stroke (ischaemic or haemorrhagic) was the main cause of admission to the ICUs among the tracheostomized patients (28.8%), followed by brain trauma (21.2%). The major cause of admission in the general ICU was respiratory insufficiency (38.4%) and brain injury (32.5%) in the trauma unit. The mean Glasgow, SOFA and APACHE II score at the day of tracheotomy were 7.5±3.19, 5.4±2.01 and 19.2±5.46, respectively. The main indication to tracheostomy was prolonged invasive ventilation (90.9%). The tracheostomies were exclusively performed by an experienced Head and Neck Surgeon in the two centers. Tracheostomies were performed inside the ICU setting in the Trauma ICU and in the operation room in the other. There were no differences in the rate of complications between the two centers. The rate of intraoperative and early complications was very low. There were 3 minor bleeding complications (4.5%). The mean time of invasive ventilation was 20.9±10.5 days. The mean time in the ICU was 22.7±10.39 days. Mortality rate was 31.8% and none of the deaths was related to the tracheostomies.

CONCLUSION. Despite the fact that it was a procedure performed in very critically ill patients, tracheostomy was associated with very few minor complications in this sample. We hypothesized that this low rate of complications is due in part to the very high expertise of the operators involved in the realization of conventional tracheostomies in the two centers.

Grant acknowledgement. The authors are indebted with Dr. Ederlon A. C. Rezende for his support and suggestions.

448

LONG-TERM FOLLOW UP AND QUALITY OF LIFE IN PATIENTS RECEIVING A TRACHEOTOMY

Kiessling A H1, Igozo F1, Skuras J1, Lehmann A1, Pieper S1, Saggau W1
1Klinikum Ludwigshafen, Cardiac Surgery, 2Klinikum Ludwigshafen, Anaesthesiology, Ludwigshafen, Germany

INTRODUCTION. Tracheotomies are routinely performed for severely ill patients with respiratory failure. The procedure facilitates the weaning procedures by reducing dead space and decreasing airway resistance, by improving secretion clearance and by decreasing the risk of aspiration. This intervention is correlated with a poor survival rate. The aim of the investigation was the evaluation of the quality of life scores (QOF) and outcome after cardiac surgical procedures.

METHODS. The retrospective, non-randomized follow up study was performed in a single surgical intensive care unit in 49 patients after cardiac procedures and surgical tracheotomy. Preoperative data and items were collected and outcomes analyzed after a mean follow up period of 2.9 years. A written questionnaire for the documentation of the SF 36 score and Beck depression scale were used. In addition to the test battery, healing outcome and vocal function were components of the questioning.

RESULTS. The mean age was 67.3 ± 9.3 years (range: 37-80 / median 69 ys). 77 % of all patients had a preoperative NYHA class of III or IV and a diabetes in 45 %. In 80 %, a coronary artery bypass graft (CABG) was performed. 16 % received a valve procedure and 4 % a combination of both. The mean stay on ICU was 18.4 ± 15.1 days. Tracheotomy was performed 13.5 ± 3.9 days after the primary intervention. The intrahospital mortality was 40.8 %, 9 patients (18%) died after clinical discharge. The survivors were content with their daily situation in 75 %, 65 % reflect the life positive. Body-nursing, eating and sanitation was performed autonomously in 80 %. In comparison to standard population data, the SF 36 score and Beck score was reduced significantly. Especially the physical function is affected by the length of ICU stay. Vocal function was preserved in all patients.

CONCLUSION. The study demonstrates a high mortality rate in patients after cardiac surgical operations in combination with respiratory failure. The surgical tracheotomies were performed after 14 days. The procedure can be performed safe. The quality of life in the survivor group is satisfying. In this series, no data are available for early and percutaneous dilatational tracheotomy. Maybe these two parameters can improve the clinical outcome.

ENDOTRACHEAL TUBE CUFF PRESSURE MEASUREMENT IN INTENSIVE CARE UNITS: IS IT MANDATORY?

El Kamel M1, Jaber S1, Moneer K1, Chanques G1, Sebbane M1, Cazottes S1, Perigaud P1, Eledjam F1
1Intensive Care Unit DAR B, University Hospital of Montpellier, Montpellier, France

INTRODUCTION. Overinflation of the endotracheal tube cuff (> 25 mmHg) may cause tracheal damage and complications such as tracheal stenosis and tracheo-esophaegalis fistula. We have surveyed the practice of tracheal cuff pressure measurement in our medical-surgical intensive care unit (ICU) and evaluate the impact of a regular cuff pressure monitoring program (CPMP) on reducing cuff overinflation.

METHODS. Cuff pressure have been evaluated over three periods (P1 = before CPMP, P2 = 3 months after CPMP and P3 = 3 years after CPMP) obtained in 100 measurements in 35-40 patients each period. The CPMP consists of regular cuff pressure monitoring twice a day.

RESULTS. Comparing to the first period, mean cuff pressure decreased in the second period from 42±22mmHg to 26±11mmHg (<p = 0.001) and the rate of overinflated cuffs from 77% to 24% (<p = 0.001). In the third period, mean pressure was in the normal range (21±19 mmHg) but there was a significant increase in underinflated cuffs. However, in these patients, the operator hasn’t noticed any leakage around the tube cuffs.

CONCLUSION. A regular cuff pressure monitoring program can reduce significantly the overinflation of tracheal cuffs in ICU and this may lead to prevent subsequent complications. ICU medical stuff may also maintain this protocol by a regular education of the nurse team in order to always keep endotracheal tube cuff pressures in the normal range preventing over (tracheal damage) and underinflation side effects (nosocomial pneumonia). Further studies are needed to evaluate this educational procedure on the outcome of the ICU patients.

Grant acknowledgement. University Hospital of Montpellier
451
FUNCTIONAL AND VITAL CHARACTERIZATION OF A SUBPOPULATION SUBMITTED TO TRACHEOSTOMY
Ribeiro J M, Bento H, Silva J S, Silva Z C, Franca C
*Intensive Care Medicine - SMI, Hospital Santa Maria, Lisbon, Portugal

INTRODUCTION. Tracheostomy (TS) has been universally performed in intensive care units (ICUs). However, the functional and vital prognoses in different subgroups of patients, and the presumed benefit from tracheostomy, have not been well defined.

METHODS. Retrospective analysis of all 46 patients that had TS performed in a medical-surgical ICU from January 2002 to December 2003.

RESULTS. Forty-three patients (27 men, 16 women) with a mean age of 54.8 and a mean simplified acute physiology score (SAPS) II of 49.3 were studied. Three patients were excluded because of insufficient data. TS was done because of traumatic brain injury with persistent Glasgow Coma score <8 (nineteen patients), unsuccessful weaning - failure of spontaneous breathing trial in 2 or more occasions (8 patients), hypoxic encephalopathy (6 patients) and prolonged invasive ventilation (6 patients). In the subgroup of 8 patients with unsuccessful weaning, spontaneous breathing could be achieved in seven patients by day 1 to day 7 (mean of 3.0 days) after TS. In 24 patients, TS has been considered an adjuvantive intervention for the weaning process, and in these patients, spontaneous breathing was achieved in 17 patients and BiPAP ventilation in 3 patients. Thirty nine patients could be discharged from ICU (mean of 8.1 days after TS) in spontaneous breathing (36 patients) or BiPAP ventilation (3 patients). Mortality rate was evaluated: among a total of 18 deaths (four in the ICU, 9 during hospital stay and 5 after hospital discharge at six months). In patients with hypoxic encephalopathy, five deaths were observed during hospital stay. Complication rate was low, with local haemorrhage in seven patients.

CONCLUSION. Our study revealed that TS was useful as an adjunctive therapy in the weaning process in the majority of patients and could reduce ICU stay; however, the subgroup of patients with hypoxic encephalopathy did not benefit from TS and should be considered for alternative strategies of airway protection.

452
A CASE SERIES OF SUBCUTANEOUS EMPHYSEMA AND PNEUMOTHORAX AFTERTRACHEOSTOMY TUBES INSERTION
Tobin Y Y, Russell W W C, Flint N J, Liaw D D, Greif J M
*Intensive Care Department, Leicester Royal Infirmary, Leicester, United Kingdom

INTRODUCTION. Despite surgical percutaneous emphysema is a recognised complication following percutaneous tracheostomy [1], it is not usually reported with a fenestrated tracheostomy tube as the direct case[2]. The rationale to use a fenestrated tube when performing percutaneous tracheostomy is to eliminate the need to change the tube when the patient is weaned from mechanical ventilation.

METHODS. Report of a cluster of complications associated with fenestrated tracheostomy tubes placed percutaneously. In our trust (3 hospitals) within a 4 week period 8 patients developed subcutaneous emphysema (one with an associated pneumothorax). The cases were performed by experienced doctors. All using Portex Blue Rhino kits, with the insertion of Tracoe-Twist fenestrated tracheostomy tubes (using the non-fenestrated inner cannula); Bronchoscopic guidance was used in all of the cases. We also have performed a bench top study on the fenestrated tubes to find the source of leak.

RESULTS. Eight patients developed subcutaneous emphysema (one with an associated pneumothorax). The emphysema was immediate in some, but only becoming apparent several hours after insertion in the majority. In at least two, the emphysema was so extensive that it compromised the patients’ airway making exchanging the tracheostomy impossible and oral enteral nutrition difficult. Fortunately there were no directly attributable deaths or hypoxic injuries. The bench top study revealed air can track between the inner and outer cannulae at quite low pressures.

CONCLUSION. Surgical percutaneous emphysema is a complication following percutaneous tracheostomy using fenestrated tubes which can lead to pneumothorax and airway compromise. It seems that the fenestrations can remain in the pre-tracheal fascia with air tracking between the inner and outer cannula leading to the development of subcutaneous emphysema. We have now changed our practice to insert only non-fenestrated tubes for percutaneous tracheostomies.

REFERENCES. 1. Douglas WE & Flabouris A. Surgical emphysema following percutaneous tracheostomy. Anaesthesia and Intensive Care 1999; 27: 69 72. 2. Fikkers et al. Emphysema and pneumothorax after percutaneous tracheostomy.Chest 2004; vol. 125: 1805-14.

453
BALLOON FACILITATED PERCUTANEOUS TRACHEOSTOMY: DOES IT REALLY WORK?
Zgoda M, Byhahn C
*Pulmonary and Critical Care Medicine, Univ. of Kentucky, Lexington, United States

INTRODUCTION. Tracheostomy has evolved from a surgical procedure into the percutaneous approach. A novel technique-Balloon Facilitated Percutaneous Tracheostomy (BFPT) is catching the attention of intensivists/anaesthesiologist in both Europe and the United States; but does it work?

METHODS. We report a prospective case series of 10 successful percutaneous tracheostomy procedures in the critically ill without complication. The balloon-tracheostomy tube apparatus (Image 1) was placed overwire then inflated to form the stoma, then deflated. The tracheostomy tube followed the deflated balloon into the airway. Almost no anterior tracheal compression took place. The average procedure time from puncture to tube placement was 4-6 minutes.

RESULTS. Ten ICU patients underwent BFPT. Six of the 10 patients had a successful tube placement after only 1 balloon dilation. The rest had successful tracheostomy placement after a second dilation. One of these 10 patients had a previous tracheostomy and the procedure was successful with 2 balloon dilation attempts at the site of the previous tracheostomy. Two were coagulopathic with INR>2 and/or platelet count(s) of less than 50K. The average estimated blood loss was less than 2ml. One patient had an obvious tracheal ring fracture without immediate clinical significance. There was no posterior tracheal wall damage, no pneumothorax, and no obvious damage to the anterior neck.

CONCLUSION. Thus far, there have been 10 consecutive tracheostomy tubes placed without bleeding complications, or damage to the posterior tracheal wall but more study is needed. BFPT is an easy and effective means of placing an elective tracheostomy tube at the bedside in the ICU.

REFERENCES. 1. Zgoda M , R. Berger. Balloon Facilitated Percutaneous Tracheostomy Tube Placement A Novel Technique. Chest Meeting Abstracts, Oct 2003;124:130-131.

454
FROM EVIDENCE TO CLINICAL PRACTICE: IMPLEMENTATION OF THERAPEUTIC HYPOTHERMIA AFTER CARDIAC ARREST
Oddo M, Schaller M, Fröhl P, Lauder L
*Medical Critical Care Division, ‘Division of Pathophysiology, Centre Hospitalier Universitaire Vaudois, Lausanne, Switzerland

INTRODUCTION. Therapeutic hypothermia (TH) improves outcome after cardiac arrest (CA) due to ventricular fibrillation (VF). However, due to lack of protocols and to technical difficulties inherent to its practical application, this treatment has not been widely implemented in daily practice. We evaluated whether TH could be effectively introduced in ICU practice and assessed its impact on patient outcome.

METHODS. We retrospectively analyzed 110 comatose patients resuscitated from out-of-hospital CA due to VF and non-VF rhythms (aerostolic or pulseless electrical activity). From June 2002 to December 2004, patients were treated with TH (to a central temperature of 33.0°C, using an external cooling method). Efficacy (time to target temperature) and safety (rate of complications) were first analyzed. Survival and neurological outcome at hospital discharge of 55 consecutive patients treated with TH was compared to that of 55 well-matched patients treated (from June 1999 to May 2002) with standard resuscitation (SR). Good neurological outcome was defined as no or moderate disability, allowing the patient to be discharged at home and live independently.

RESULTS. Time to target temperature was 4.8 +/- 2.1 hours (mean +/- SD of 55 patients). The rate of complications (mainly pulmonary infections and arrhythmia) was similar between the two treatment groups (TH and SR). Following CA due to VF, 24/43 patients (56.0%) treated with TH survived, as compared to 19/43 treated with SR (p=0.13); 24/43 patients (55.8%) treated with TH had good neurological outcome, as compared to 11/43 patients (25.6%) treated with standard resuscitation (p=0.004). In patients with circulatory shock before initiating the treatment, TH was also beneficial (4/10 patients had good outcome vs 0/9 patients treated with SR, p=0.03). In contrast, TH had no impact on the outcome of survivors of CA due to non-VF rhythms (2/12 patients in the TH group survived with good neurological outcome vs 1/12 in the SR group).

CONCLUSION. Therapeutic hypothermia can be safely and efficiently introduced in ICU practice for the treatment of all comatose patients resuscitated from cardiac arrest with a major impact on the outcome of patients resuscitated from CA due to VF, independently from their hemodynamic status. In contrast, our data do not support the use of therapeutic hypothermia after cardiac arrest due to asystole or pulseless electrical activity.

Grant acknowledgement. Supported by grants from the Medical Critical Care Division, Lausanne University
545  OUTCOME AFTER OUT-OF-HOSPITAL CARDIAC ARREST: CAN EARLY PREDICTION OF OUTCOME BE JUSTIFIED?

Hené I Z, Oudemans-van Straaten H M, Bosman R J, Van der Spoel F W, Wester J P J,1 Zandstra D F1
1Intensive care unit, Onze Lieve Vrouwe Gasthuis, Amsterdam, Netherlands

INTRODUCTION. Predicting clinical outcome of comatose patients after resuscitation because of out-of-hospital cardiac arrest (OHCA) is difficult. In 1995 Grubb et al. proposed a prognostic scoring system to predict the outcome of OHCA patients directly after hospital admission (1). The aim of this study was to evaluate Grubb’s scoring system prospectively.

METHODS. We prospectively collected the following data of all patients admitted to the ICU after OHCA: neurological outcome, Grubb score, in-hospital mortality, SAPS II and APACHE II predicted mortality. The Grubb score consisted of the following variables: presenting rhythm (other than VT or VF: +3), resuscitation by health care professional (no: +1), Glasgow Coma Scale (GCS) on admission (GCS=5: +1, GCS3: +2).

RESULTS. From August 2003 until February 2005, the Grubb score was prospectively collected in 89 patients admitted to the ICU after OHCA. All comatose patients were treated with mild hypothermia to mitigate post-anoxic encephalopathy.

| PM predicted mortality, CI | 95% confidence interval |
|-----------------------------|------------------------|
| Grubb score 0               | 4 (0-14)               |
| Grubb score 1               | 10 (5-15)              |
| Grubb score 2               | 50 (17-83)             |
| Grubb score 3               | 54 (37-70)             |
| Grubb score 4-6             | 24 (7-92)              |
| all                         | 89 (55-64)             |

CONCLUSION. In patients with a Grubb score >2, the observed mortality was significantly lower than predicted by Grubb’s system and always less than 100%. Hence, withholding active treatment of OHCA survivors directly after hospital admission cannot be justised using this scoring system. A more precise scoring system should include GCS, Neuro Specific Enolase, somatosensory evoked potentials and electromyography after 24-48 hours.

REFERENCE(S). 1. Grubb NR et al. In-hospital mortality after out-of-hospital cardiac arrest. Lancet. 1995. 346:417-21.

546  ACUTE ORGANOPHOSPHATE INSECTICIDE POISONING – MANAGEMENT IN THE ICU

Herbert J, Reis P, Amaro A, Campello G, Sarmento A, Granja C1
1Intensive Care Dpt, Hospital Pedro Hispano, Matosinhos, Portugal

INTRODUCTION. Several organophosphate (OP) compounds are currently available to use as insecticides. In Portugal they may be easily bought, and as thus are one of the most important causes of suicide attempt by poisoning. We report our experience on the management of OP insecticide poisoning within ICU setting.

METHODS. Retrospective analysis of all patients admitted with acute OP poisoning in our ICU, between 1997 and 2004. Diagnosis was based on the clinical history and on measurement of pseudocholinesterase plasmatic levels. Collected data included age, gender, history of psychiatric disease, previous suicide attempts, mode of exposure, toxicity of the OP compound, muscarinic and nicotinic signs and symptoms, plasmatic pseudocholinesterase level, APACHE II, length of ICU stay, total doses of atropine and of obidoxime, complications and ICU and hospital mortality.

RESULTS. A total of 30 patients with OP poisoning were admitted from which 19 were male. Median age was 51 years old. 19 patients had previous history of psychiatric disease, predominantly depression. All patients had volunteered ingested the OP. 11 patients ingested intermediate toxic OP and 6 ingested low toxic OP. 18 patients presented predominantly muscarinic signs and symptoms and 11 predominantly nicotinic. Median value of plasmatic pseudocholinesterase level at ICU admission was 200 U/L. All patients received atropine in a mean total dose of 51.3 mg. All patients except one received obidoxime in a mean total dose of 1941 mg. Median APACHE II was 14. 21 patients needed mechanical ventilation and mean ventilatory time was 5 days. Median ICU length of stay was 3 days. The most frequent complications were: acute renal failure (20%), aspiration pneumonia (20%), nosocomial/associated to the ventilator pneumonia (20%), ARDS (20%), cardiac arrest (15%). Four patients (13%) died in the ICU. Patients who died were significantly older, had a significantly higher APACHE II and had no significant differences in plasmatic pseudocholinesterase levels. All patients died in the first 72 hours after ICU admission. No patients died after ICU discharge. Intermediate ICU treatment was registered in 2 patients. Complications rate and mortality were lower than those described by other authors.

CONCLUSION. Acute OP insecticide poisoning is a serious condition that requires rapid diagnosis and treatment. This study suggests that management of these patients in the ICU may decrease complications and mortality.

257  PROGNOSIS OF COMA AFTER CARDIOPULMONARY RESUSCITATION: RELIABILITY OF SERUM NEURON-SPECIFIC ENOLOASE

Peters R1, Oudemans-van Straaten H M, Van der Spoel J, Bosman R J, Wester J P J,1 Zandstra D F1
1Intensive Care Unit, Onze Lieve Vrouwe Gasthuis, Amsterdam, Netherlands

INTRODUCTION. Elevated levels of serum neuron-specific enolase (sNSE) in patients comatose after cardiopulmonary resuscitation (CPR) have been reported to indicate poor neurological outcome (NO). Earlier we found that none of these patients admitted to the ICU with a single NSE level > 25 µg/l required consciousness1. However, sNSE can also be elevated in non-neurological conditions, such as pulmonary disease. The aim of this study was to investigate prospectively whether sNSE > 25 µg/l reliably predicts poor NO in patients comatose after CPR.

METHODS. From February 2001 until March 2005, all patients, admitted to the ICU in coma after out of hospital CPR, were enrolled in the study. Therapeutic hypothermia after CPR was applied since January 2002. Serum NSE was measured on admission, and subsequently daily for 3 days, unless patients were discharged earlier. Endpoint of the study was NO at hospital discharge.

RESULTS. This study included 118 patients (mean age 63, range 31-86). Fifty-four patients (46%) had at least one sNSE > 25 µg/l. Thirteen of these patients (24%) survived until hospital discharge. Their highest sNSE had a mean of 44 µg/l (range 26-79). NO was favourable in all of them, except for one patient, who remained moderately disabled (focal epilepsy and myoclonia). In these thirteen patients (mean age 53, range 31-85) the mean Glasgow Coma Scale on admission was 4 (range 3-6). All received therapeutic hypothermia. Cardiac arrest was caused by myocardial infarction (n=9), drowning (n=2), and primary ventricular fibrillation (n=2). Previous lung disease was absent. However, chest X-rays showed pulmonary edema in eleven, and alveolar consolidation in one patient.

CONCLUSION. Contrary to earlier results, a cut-off value of 25 µg/l for sNSE is not a reliable indicator for NO in patients admitted to the ICU with coma after CPR. Pulmonary pathology may be a confounder in interpreting sNSE. In contrast with our previous cohort, therapeutic hypothermia was applied in this study.

REFERENCE(S). 1. Meynaar I et al. Serum neuron-specific enolase predicts outcome in post-anoxic coma: a prospective cohort study. Intensive Care Med. 2003;29:189-195. 1. Clossos J et al. Measurement of the serum tumor marker neuron-specific enolase in patients with benign pulmonary diseases. Am J Respir Crit Care Med. 1994;150(1):143-145.

548  THE NORTHERN HYPOThERMA REGISTRY

Nielsen N1, The Northern Hypothermia Network Steering Group
1Anesthesia and Intensive Care, Helsingborgs lasarett, Helsingborg, Sweden

INTRODUCTION. Two studies have shown that treatment with induced hypothermia protects from neurological sequelae and death after out-of-hospital cardiac arrest. We believe that it is imperative to implement these findings under strict control of treatment safety and outcome. The Northern Hypothermia Registry is a database on the Internet designed to enable evaluation of patients treated with intensive care after cardiac arrest.

METHODS. Patient and cardiac arrest characteristics are collected in the Utstein-style. Hypothermia treatment data, safety aspects and general intensive care parameters are registered. Outcome is documented as neurological score at ICU and hospital discharge and at six months using the Cerebral Performance Category (CPC) scale: CPC 1-2 representing good outcome and 3-5 bad outcome. Descriptive data are presented as frequencies or medians and interquartile range.

RESULTS. 31 centres in Denmark, Iceland, the Netherlands, Norway and Sweden are enrolled. The Registry has been open since Oct 04. In Apr 05 185 patients were registered with a median age of 63 (54-74) years, 69% were men and 85% had an out-of-hospital arrest. The initial rhythms were VF 63%, asystole 30% and PEA 7%. Time from arrest to CPR by medical personnel was 6 (3-10) min and from arrest to return of spontaneous circulation 17 (10-29) min. Time from arrest to initiation of hypothermia treatment was 75 (60-115) min and from arrest to target temperature reached 220 (150-320) min. Target temperature 35/36°C and 24 hours on target temperature were used in all cases. 67% survived to ICU discharge. At hospital discharge 49% of the patients had a good outcome, 47% of the patients were dead (CPC 3), 6% were in coma (CPC 4) and 4% were conscious but with severe neurological disability (CPC 3). Data at 6 month is not yet sufficient for full evaluation but the trend is that those with good outcome at hospital discharge stay in the good outcome group. Data on background characteristics, adverse events and use of ICU resources will be presented as well as analysis of outcome in the subgroups of different initial rhythm.

CONCLUSION. The Northern Hypothermia Registry will provide an easy and powerful way of evaluating the safety and outcome aspects of hypothermia treatment after cardiac arrest and to strengthen treatment inclusion criteria. Furthermore it will generate ideas on where to focus future clinical trials in the field of therapeutic hypothermia.

Grant acknowledgement. Scandinavian Society of Anaesthesiology and Intensive Care Medicine
459
PREDICTIVE ACCURACY OF SOMATOSENSORY EVOKED POTENTIALS IN UNCONSCIOUS CARDIAC ARREST SURVIVORS

Madi C, Baurer E, Kitzberger R, Funk G, Holzinger U, Fuhrmann V, Kramer L, Sterz F. Department of Internal Medicine IV, ICU 1381, 2Dep. of Emergency Medicine, Medical University of Vienna, Vienna, Austria

INTRODUCTION. Somatosensory evoked potentials (SEP) is the method with the highest prognostic reliability in unconscious cardiac arrest survivors. A review of 18 studies revealed that all patients with bilaterally absent cortical SEP N20 peaks did not awake from hypoxic coma. Additional recording of the SEP N70 peak increases prognostic accuracy. In this study we assessed the prognostic accuracy for the N20 peak and for different critical cut-off points of the N70 peak.

METHODS. SEP were recorded within 24 and 72 hours after cardiac arrest. We included 305 unconscious and mechanically ventilated patients (207 male, median age 57) after successful cardiopulmonary resuscitation. Final outcome was assessed 1 year after cardiac arrest (no or mild disability was defined as favourable outcome, severe disability, persistent vegetative state and death were defined as bad outcome) Sensitivity (bad outcome which was classified correctly), specificity (favourable outcome which was classified correctly), positive predictive value (PPV) and negative predictive value (NPV) were calculated.

RESULTS. Within 1 year after cardiac arrest, 232 patients (76%) were classified as bad outcome and 73 patients (24%) as favourable outcome. 95 patients (31%) had a bilateral loss of the N20 peaks. 131 patients (43%) had a bilateral loss of the N70 peaks. The predictive accuracy of an absent N20 peak and of different cut-off points for the N70 peak are shown in the table.

| N20 absent | Sensitivity | Specificity | PPV  | NPV  |
|------------|-------------|-------------|------|------|
| 1.0        | 0.39        | 1.00        | 0.32 |      |
| N70 cut-off 118ms | 0.42    | 0.92        | 0.42 | 0.92 |
| N70 cut-off 150ms | 0.96    | 0.64        | 0.98 | 0.46 |
| N70 cut-off 170ms | 0.99    | 0.58        | 0.99 | 0.43 |

CONCLUSION. Recording of SEP N20 peak predicted correct outcome in 31% of cardiac arrest survivors only. Predictive accuracy of SEP could be increased by the N70 peak. A N70 peak <118ms predicted favourable outcome with a specificity of 0.92, whereas a N70 peak >150ms or absent predicted bad outcome with a sensitivity of 0.96.

460
CHANGES OF PROCALCITONIN AND S100B AFTER VENTRICULAR FIBRILLATION AND PULSELESS ELECTRICAL ACTIVITY

Mohar T1, Kiszegi T2, Bogar L, Szakmany T1.1 Department of Laboratory Medicine, University of Pecs, Pecs, Hungary

INTRODUCTION. It has been proposed, that procalcitonin (PCT) might be used as a prognostic factor for outcome after cardiac arrest (1). To date no studies addressed the question whether PCT levels are different after VF and PEA induced in-hospital cardiac arrest.

METHODS. 45 consecutive patients were studied following cardiac arrest. PCT levels were measured on ICU admission (T0), post-arrest. For statistical analysis Mann-Whitney U test and chi-square test were used with SPSS 11.5. Data are presented as median and interquartile range.

RESULTS. Of the 45 patients 37 suffered PEA and 8 VF arrest. There was no significant difference between the groups regarding age, male/female ratio and anoxic time and time to ROSC. Mortality was 77% vs. 12.5% in the PEA and VF groups, respectively, p<0.01. Serum PCT levels were significantly higher in the PEA group (Table 1). S100B levels did not differ significantly between the groups in the PEA and VF groups, respectively, p>0.05. Serum PCT levels were defined as bad outcome) Sensitivity (bad outcome which was classified correctly), specificity (favourable outcome which was classified correctly), positive predictive value (PPV) and negative predictive value (NPV) were calculated.

| PCT levels in ng/ml | T0 | T14 | T24 |
|---------------------|----|-----|-----|
| PEA                 | 1.55 (0.1-8.99) | 9.33 (1.77-38.71) | 9.39 (2.80-22.70) |
| VF                  | 0.12 (0.08-0.16) | 0.57 (0.22-8.88) | 0.82 (0.13-3.22) |

CONCLUSION. Significantly lower inflammatory response was detected in patients initially in VF arrest, with significantly better survival compared to PEA arrest, although anoxic time and time to ROSC was similar in the two groups as reflected by nearly identical S100B levels. However, patients with PEA arrest often have long, undetected hypoxic period, which may trigger the release of inflammatory markers such as PCT. The significantly higher PCT and S100B values in the non-survivor group of PEA patients may indicate the potential prognostic value of such measurements.

REFERENCE(S). 1. Fries M, Kunz D, Gressner AM, Rossaint R, Kuhlen R: Procalcitonin serum levels after out-of-hospital cardiac arrest. Resuscitation. 2003; 59:105-9.

462
WORKLOAD AND OUTCOME WITH A CENTRALIZED TRANSFER SERVICE FOR CRITICALLY-ILL ADULTS

Lavery G V, Hickland B, Caddell P, Dillon M, Northern, Ireland Intensive Care Society Audit Group; 1Regional Intensive Care Unit, Royal Hospitals Trust, Belfast, United Kingdom

INTRODUCTION. Since October 2000, a centralized service has facilitated the interhospital transfer (IHT) of over 1400 critically-ill adult patients using a standard ambulance and mobile ICU equipment. Quality of escort is an important factor in the transport of all potentially unstable patients (1,2) and so all IHTs are performed by an experienced ICU team (1 doctor and 1 nurse). The aim of this project was to assess the use and the quality of this service.

METHODS. Information regarding the indications for, and conduct of, IHT was recorded prospectively for all patients transferred by the service over 1 yr (03/04-02/05). IHTs prospectively collected data including admission APACHE II score and ICU (and hospital) outcomes. All data were entered on a central database (MS Access).

RESULTS. In 12 months, 335 IHTs were performed involving 17 hospitals. No deaths occurred during transfer and 99% of patients received mechanical ventilation. Only 91 IHTs (27%) occurred during normal working hours and 232 IHTs (69%) occurred because the referring hospital had no ICU or no available ICU bed. Median admission APACHE II score was 18 (range 3-42). ICU survival was 79% (205/263). Five patients remain in hospital and 37 patients died in hospital after ICU care. The remaining 224 patients were discharged. The IHT were performed by a total of 20 ICU doctors (median 15 transfers each) and 25 nurses (median transfers each).

CONCLUSION. A centralized service, using a standard ambulance with appropriate escort and equipment can provide safe IHT for critically-ill adults. With such a service, large numbers of IHT are performed by a small number of ICU staff using the same equipment on all occasions. The inability to provide any ICU care was the commonest reason for IHT.

REFERENCE(S). 1. Beckmann U, Gillesies DM, Berenholtz SM, Ww AW, Pronovost P: Incidents relating to the intra-hospital transfer of critically ill patients. An analysis of the reports submitted to the Australian Incident Monitoring Study in Intensive Care. Intensive Care Med. 2004; 30:159-85. 2. Price SJ, Sutner N, Aspas AR. Have ATLS and national transfer guidelines improved the quality of resuscitation and transfer of head-injured patients? Injury. 2003; 34: 834-8.

REFERENCE(S). 1. Horn J, Zandbergen E, Bos GF, Verlooy P, Van Dijk G W, Vroom M B, Hijdra A1, 2 Department of Intensive Care, Amsterdam, Netherlands; 2Department of Neurology, UMC, Nijmegen, Netherlands; 3Department of Neurology, UMCG, Groningen, Netherlands; 4Department of Neurology, UMCU, UTrecht, 5Department of Neurology, AMC, Amsterdam, Netherlands

INTRODUCTION. After cardiopulmonary resuscitation (CPR) many patients develop post-anoxic encephalopathy (PAE) often accompanied by myoclonic seizures or epilepsy.(1,2)Treatment is often difficult, several strategies have been advocated.(3,4) In this study we investigated the medication used in these patients.

METHODS. From the database of the Propac study, a prospective cohort study in PAE patients, we selected patients with myoclonic or epileptic seizures. Medication used to treat these conditions was extracted from the records.

RESULTS. In 188 patients, 97 showed myoclonic seizures or epilepsy. Records of 76 patients could be retrieved. Differentiation between myoclonus and epilepsy was difficult, we used the description as found in the records. Eleven patients received no medication. Treatment was started in 65 patients (86%) in 58 (89%) a benzodiazepine, in 35 (54%) another antiepileptic drug, in 32 a combination of both. Clonazepam was used most often (56%, 62%). Valpripoc acid was used in 19 patients (54%), phenytoin in 16. Seventeen patients (out of 65) received propfol and in 14 patients a second benzodiazepine was administered. Outcome after 1 month: 66 had died (87%), 7 were in coma, vegetative state or severely handicapped (9%) and 3 were moderately handicapped or completely recovered.

CONCLUSION. Dutch neurologists prefer benzodiazepines in patients with seizures in post-anoxic encephalopathy, often combined with an antiepileptic drug. Myoclonic status reacts poorly to medication, however, treatment is often started because of problems in daily care or mechanical ventilation. In this study we found that the different types of seizures were often not specified in the records, despite the consequences on prognosis. We suggest to use the definition proposed by Wiklicks et al for myoclonus status I in this study epileptic or myoclonic seizures in patients with post-anoxic encephalopathy seemed to be related to poor outcome, as 96% had a poor outcome.

REFERENCE(S). 1.Wiklicks EF et al Ann Neurol 1994:35:239-43. 2.Kneuholz A et al. Neurology 1988:38:401-5. 3.Wiklicks EF. J Neurol Neurosurg Psychiatry 2002:73:94-5. 4.Vincent FM et al. Ann Intern Med 1986:104:586.
463
STROKE AND PREGNANCY
Kaddour C, Baccar K, Boubaker M, Ouargouni H, Gidouna W, Lamroux M, Souissi R, Sallem B*
1 Anaesthesiology and Resuscitation, National University Institute, 2 Anaesthesiology and Resuscitation, Aziza Othmana hospital, Tunis, Tunisia

INTRODUCTION. Cerebrovascular strokes can be a cause of morbidity and mortality during pregnancy.

METHODS. We conducted an etiologic study among parturients presenting a cerebrovascular stroke. The aim was to determine the frequency of the various types of vascular accident and their moment of origin, to underline the factors of risk and to estimate the prognosis of vascular accidents in this population. P-values <0.05 were considered to be statistically significant.

RESULTS. Among our 25 patients, 17 had an ischemic accident, 12 of which had venous origin, 5 an arterial origin and 8 had an hemorrhagic accident. The majority of damage occurs in the 3rd quarter of pregnancy or in the post-partum. Five of our patients had no risk factor and 20 had several risk factors. As for the arterial accident, the etiologic inquiry was not decisive for four patients. They had however several risk factors of thrombosis vascular. Five patient with an ischemia died and three of the patients having a bleeding died. Uni-varied logistic regression did not find statistically-significant result concerning mortality in relation with the age, the terms gestational or the type of accident.

CONCLUSION. Cerebrovascular strokes complicating the evolution of a pregnancy remain an unknown entity. They can cause sequelae and have fatal issues. Studies including a larger number of patients are requested in order to decrease the incidence and the important morbidity-mortality. They are also meant to find out all risk factors, take them in consideration and therefore work on their mechanism.

464
ACIDOSIS IMPAIRS THE COAGULATION SYSTEM
Engström M, Schott U, Reinstrup P*
1 Anaesthesiology and Intensive Care, Lund University Hospital, Lund, Sweden

INTRODUCTION. Acidosis has been found to be a predictor of worse outcome in trauma patients suffering from exsanguination. It has, however, not been studied if acidosis may be a causal factor in the development of coagulopathy. Rotational thromboelastography (ROTEG) is a coagulation monitoring tool that is gaining increasing popularity as it seems to be more sensitive and specific than routine coagulation tests in detecting defects of the coagulation system. Clot formation time (CFT) and Alpha Angle are ROTEG parameters primarily dependent on the rate of fibrin formation and the platelet activity.

METHODS. 5 blood samples of 5 ml each were obtained from 6 healthy volunteers. One sample was obtained in each of the following conditions: pH 7.0, 7.2, 7.4, 7.2 with 75 µL of HCl added and 7.4 with 30 µL of tromethamol (THAM) added. After adaptation of the pH to the desired level, ROTEG was performed to study the coagulation system.

RESULTS. We found a strong correlation between decreasing pH levels and an impairment of the coagulation (p<0.00001)(Figure 1). The impairment of the coagulation caused by the acidosis was reversible by readdition of the buffer (THAM). The addition of 75 µL of HCl and then reversed to a pH of 7.4 by addition of 30 µL of tromethamol (THAM) 3.3 mmol/ml. After adaptation of the pH to the desired level, ROTEG was performed to study the system.

TABLE 1. Coagulation indices at different levels of pH

| pH   | Clot Formation Time (s) | Alpha Angle (°) |
|------|------------------------|-----------------|
| pH 7.4 | 96 (65-103)              | 73 (70-78)      |
| pH 7.2 | 138 (106-186)           | 65 (59-69)      |
| pH 7.0 | 174 (149-213)           | 60 (55-65)      |
| pH 6.8 | 257 (181-262)           | 50 (37-60)      |
| pH 7.4 (reversed with THAM) | 136 (103-159) | 69 (65-73) |

CONCLUSION. Acidosis significantly impaired the coagulation. The degree of impairment was severe enough to probably be of clinical importance. The effects of lowering pH from 7.4 to 7.15 in this study were almost identical to the effects of decreasing the temperature from 36°C to 32°C in a recent study by Kettner et al.

465
THE EVALUATION OF THE VOLUME REGULATION DISTURBANCES IN SEVERE BRAIN TRAUMA
Bubnova I D, Dobrinina I N, Astakhov A A*
1 Anaesthesiology and Reanimatology, Ural Postgraduate Medical Academy, Chelyabinsk, Russian Federation

INTRODUCTION. One of the ways for the cerebral perfusion support in severe brain trauma (SBT) patients is the cardiac output optimization. But we must know whether the decreasing of hypovolemia range be better for brain protection or not in each case. This study we tried to reveal if the the topic level of central haemodynamic regulation disturbances (CHRD) can determine the response on the volume load (VL).

METHODS. In the previous works we showed that the patients with SBT may have different types of CHRD, but the specific type of CHRD has not been determined yet. This study we examined 52 patients with 3 main regulatory types. All patients were under artificial ventilation and had 11 and less GCS. For the estimation of the type and topic level of CHRD we compared the absolute data and the variability (spectral power (SP) in 0 – 0.5 Hz band) of blood pressure (BP), heart rate (HR), peripheral vessels pulse (PVP), and stroke volume (SV), determined by the biopedsedam methods. Also we determined the variability of EEG amplitude in the alone bifazetal channel. All comparisons were made before and after infusion of 500,0 ml of 6% Stabisol. Univarited analysis were paid to the PV (0.5-0.075 Hz) and P (0.2-0.05 Hz) bands of SV, which reflect the hormonal, more often ADH activity (P2) and predominantly connect with patients breathing (P4). Last findings showed it may be used as a marker of hypovolemia.

RESULTS. The patients with the worst type of regulation (a result of brain stem dysfunction) responded on the VL by the SV increasing in 87.5% cases. But they showed a decreasing SP of P4 only in 43.7%, and SP of P2 increased in 62.5%. In cases of hypothalamic dysfunction (type 2) the SV grew in 63.5% patients, and SP of P4 decreased in 62.5% and P2 increased in 60% of patients. The patients with the best adaptive type of regulation (type 1) responded on the volume load only in 42.8%, but had SP of P4 decreasing in 78.5% and low growth of P2 (21.4%). Surprisingly, in some cases we revealed the great decreasing of variability of HR, BP, PVP and EEG amplitude as a transformation from type 1 to 2 to 3 after infusion.

CONCLUSION. In SBT the VL partly compensates hypovolemia, but creates an exerction in regulatory system, especially in case of significant CHRD. So we need to find out the predictive marker of response on the VL in different level of brain damage.

466
SAH ON THE NICU: DEMOGRAPHIC FEATURES, TREATMENT AND OUTCOME
Sheikhi S I, Bajovic S, Molyneux A, Kears C, Millo J*
1 Neurointensive Care, 2 Neurosurgery, 3 Neurvascular Research, Radcliff Infirmary, Oxford, United Kingdom

INTRODUCTION. In subarachnoid haemorrhage (SAH), old age and high clinical grade at presentation are poor prognostic factors. Treatment for these patients has been largely conservative. With endovascular coil embolisation a less invasive treatment option has become available. This study focuses on elderly and high grade patients admitted to the NICU.

METHODS. Retrospective analysis of 167 patients with aneurysmal SAH. Demographic features, WFNS grade at presentation, treatment and outcome according to age group, 54 (33.3%) patients were in Fisher grade 3, 87 (53.7%) in Fisher grade 4. 22 patients not treated. 20 (35%) of 57 patients above the age of 60 years were in high grade. 22 (38.6%) elderly patients made a good recovery, 31 (54.3%) patients had a poor outcome and 4 patients were lost to follow-up. Of 20 elderly high grade patients, 7 (35%) made a good recovery.

TABLE 1. Age <50 yrs | Age 51-60 | Age 61-70 | Age >71 | Total n (%)
|-----------------|----------|----------|----------|----------|
| WFNS (1,2) | n=43 (26.5%) | 27 (16.6%) | 23 (14.2%) | 12 (7.4%) | 105 (64.8%)
| WFNS (3-5) | 18 (11.1%) | 15 (9.3%) | 13 (8.0%) | 9 (5.6%) | 55 (33.9%)
| Clipping | 10 | 4 | 2 | 1 | 17 (10.4%)
| Coiling | 47 | 31 | 26 | 14 | 118 (72.3%)
| Rankin 0-2 | 32 | 14 | 15 | 7 | 68 (41.7%)
| Rankin 3-6 | 28 | 27 | 19 | 12 | 86 (52.7%)

CONCLUSION. Our data suggest that favourable outcomes (Rankin score 0-2) can be achieved in elderly patients with high grade (WFNS 3-5). SAH: 35% of 20 high grade patients >60 years made a good recovery. This may be due to the less invasive nature of coil embolisation and careful patient selection.

REFERENCE(S). Molyneux A, Kerr R, Stratton I, et al. Lancet 2002;354:1267-1274
EVALUATION OF CENTRAL VEIN CATHETER THROMBOSIS IN ICU PATIENTS

Bahar M, Etkin A, Haci I, Ergil D
1 General Intensive Care, VKV American Hospital, Nisantasi, Turkey

INTRODUCTION. Asymptomatic catheter-related central vein thrombosis (CVT) which is
diagnosed by venographic studies is mentioned to be as high as 66 % (1). Moreover, when thrombosis
occurred, the risk of catheter related sepsis was declared to be 2.6 % higher (2). In this prospective
study we aimed to diagnose CVT early as possible, its incidence and risk factors.

METHODS. ICU patients that needed a central venous access for at least 48 hours were included in
this prospective study. The catheters were inserted via internal jugular or subclavian vein at bedside
under aseptic conditions using the Seldinger technique. Diagnosis of vein thrombosis was detected by
color Doppler ultrasound examination performed in less than 24 h after catheter removal. The
protocol was approved by the ethic committee.

RESULTS. One hundred and thirty three patients (56 F, 77 M), mean 59.2 years old (18-91 years),
were included in the study. Catheters mean duration time was 11.2 days and duration of insertion
mean time was 6.06 min (4-20 min). In 116 patients catheter insertion was performed with a single
puncture, in 14 patients with double and in 5 patients with 3 puncture. Catheter localization in the
patients were as follow: in 101 patients right subclavian vein, in 21 patients left subclavian vein, in 8
patients right internal jugular vein and in 2 patients left internal jugular vein. Catheter related
thrombosis was diagnosed in 5 patients (3.75%) while catheter infection was seen in 1 patient (0.8%).
Generally the chemotherapeutic agents administered via the central vein catheter have thrombogenic
effect (2). When we study our CVT diagnosed 5 patients we found out that all of them were over 50
years old, the mean catheter duration time was 8.8 days. But these results were not statistically
significant when compared with the other patients under 50 years old and more than 8.8 days of mean
catheter duration time. Out of 118 patients who were not under anticoagulation therapy 4 had CVT
while 15 patients who had anticoagulant therapy 1 had CVT diagnose which was found statistically
insignificant (p>0.05).

CONCLUSION. We suggest that in order to get clinical significance of the causes that effect CVT,
more sensitive investigations with higher number of patients must be studied.
471
THE IMPACT OF PERIOPERATIVE ALLOGENIC BLOOD TRANSFUSION ON OROPHARYNGEAL CANCER OUTCOME

Sakamaki Y1, Dode M2, Dempsey G2, Lowe D3, Rogers S N1
1Department of Anaesthetics, 2Regional Maxillofacial Unit, University Hospital Aintree, Liverpool, UK

INTRODUCTION. Perioperative blood transfusion is reported to be related to cancer recurrence and reduced survival. To date, little is known about the effects of blood transfusion on outcome in oropharyngeal cancer. We undertook this study to test the hypothesis that perioperative blood transfusion has an adverse effect on survival of patients with oropharyngeal cancer.

METHODS. 557 patients undergoing oropharyngeal cancer resection were evaluated from Jan 1992 to December 2002. Transfusion rate, units of blood transfused and tumour stage were recorded. The primary outcome measure was oropharyngeal cancer death within two years. Cox logistic regression was used to assess the association between cancer death and blood transfusion. Data are presented as median (interquartile range).

RESULTS. Overall transfusion rate was 65% (362/557), units of blood transfused 3 (1-5). Mortality was 20.1% (112/557). Mortality was significantly higher in the transfused group (Table 1). However, in the Cox regression analysis only tumour size, stage and clear resection margins were predictive of survival. After stratification of patients for these predictors, transfusion did not affect disease specific survival.

Table 1.

| Transfused | Not Transfused |
|------------|----------------|
| Survived n (%) | 271 (74.9) | 174 (49.2) |
| Died n (%) | 91 (25.1)* | 23 (10.8)* |

*p< 0.05

CONCLUSION. Although mortality was significantly higher in transfused patients, regression analysis showed that perioperative allogenic blood transfusion did not have a significant impact on outcome in oropharyngeal cancer patients.

REFERENCE(S). 1. Werther K, Christensen JI, Nielsen H. Danish RANX05 Colorectal Cancer Study Group. The association between preoperative consumption of soluble vascular endothelial growth factor, perioperative blood transfusion, and survival in patients with primary colorectal cancer. Eur J Surg. 2001; 167:287-92.

472
FIXATION OF TRACHEOSTOMY TUBE USING DETACHABLE CLIP IN PATIENTS REQUIRING NECK WOUND MANAGEMENT

Motisaki Y1, Sugiyama M1, Kosuge T1, Toyota H1, Iwadita M1, Nakamura K1, Tahara Y1, Suzuki N1
1Critical Care and Emergency Center, Yokohama City University Medical Center, Yokohama, Japan

INTRODUCTION. In patients who are supported by mechanical ventilation with tracheostomy and who undergo neck surgery because of the neck trauma or neck infection, there is some risk of dislocation of the tracheostomy tube, contamination of the fixation device during daily surgical wound management and daily nursing care. The object of this study is to clarify the usefulness and safety of our technique of easily detachable fixation of tracheostomy tube with small clip in these patients.

METHODS. 5 patients who underwent this technique were examined. We detach the clip fixing the tracheostomy tube during daily surgical wound management and attached it as soon as finishing wound management.

RESULTS. We did not experience dislocation of the tube during daily surgical management and daily nursing care in all cases. We easily protected contamination of fixation device of the tracheostomy tube during surgical wound management.

CONCLUSION. Our technique of fixing the tracheostomy tube using detachable small clip is useful and safe in patients who are supported by mechanical ventilation with tracheostomy and who undergo neck surgery because of the neck trauma or neck infection.

473
CORRELATION OF H-PF4 ANTIBODIES WITH PLATELET COUNT AND DEVELOPMENT OF HITTS IN ICU PATIENTS

Koutoukou A1, Papagiotsiopoulos A1, Chatzidrissi M1, Stefanou J1, Romanou V1, Michalis M2, Michalis C1, Glova-Molyvdas P1
1ICU, THRIASSIO General Hospital of Eleusis, Athens, Greece

INTRODUCTION. Prospective observational study of the incidence of antibodies that bind to heparin-platelet factor 4 complexes (H-PF4 antibodies) in a multidisciplinary ICU, seeking a correlation with the use of Unfractionated Heparin (UFH), Low Molecular Weight Heparin (LMWH), platelet count and development of Heparin-Induced Thrombocytopenia Thrombosis Syndrome (HITTS).

METHODS. 211 patients hospitalized in our ICU over a 20 month period were studied. Platelet count and H-PF4 antibodies titer were obtained on admission and repeated every 7 days. The presence of H-PF4 antibodies was tested with ELISA. We compared the patients that never had H-PF4 antibodies (group 1), those that were H-PF4 positive on admission (group 2) and the ones that developed them during their ICU stay (group 3) on terms of gender, age, APACHE II score, outcome, length of ICU stay and platelet reduction. For the statistical analysis Pearson chi2, Fisher exact and two-sided t-test were applied where appropriate.

RESULTS. 142 patients never had H-PF4 antibodies. 24 patients presented with such antibodies on admission and 45 developed them during their ICU stay. Group 2 patients were mostly female (p<0.05) and older than the other two groups (p<0.01). Overall the H-PF4 positive patients (groups 2 and 3) were sicker (APACHE II: 21.5 ± 6.6 vs 17.9±6.5, p<0.001) and stayed longer in the ICU (16.9± 15.4d vs 29.8±7.5d, p<0.001). There was no difference in outcome. No difference in the incidence of H-PF4 antibodies between patients receiving LMWH and UFH was observed. There was a marked difference in PLT count (<100 000 or reduction of >50% between group 29.3%) and group 3 (1.24%, p<0.001). Surprisingly, the platelet counts corresponding to the periods that the patients were H-PF4 positive were higher than counts during periods that the patients were H-PF4 negative (337110±154450 vs 300453±148231, p<0.001). No patient developed HITTS.

CONCLUSION. The monitoring of H-PF4 antibodies (at least with the method used) seems to predict neither platelet reduction nor clinical HITTS development. Female and sicker patients seem more prone to be H-PF4 positive. The patients that developed H-PF4 antibodies had a longer ICU stay. The higher platelet count corresponding to positive H-PF4 antibodies remains to be investigated.
GASTROINTESTINAL FAILURE AND INTRAABDOMINAL HYPERTENSION IN MEDICAL AND SURGICAL ICU PATIENTS.

Reintam A', Panm P', Kern HP’, Starkeoo P’
1 General ICU, Tartu University Clinics; 2 Clinic of Anaesthesiology, University of Tartu, Tartu, Estonia.

INTRODUCTION. We investigated whether the impact of gastrointestinal failure (GIF) and intraabdominal hypertension (IAH) on ICU outcome is related to patients’ profile (medical vs. surgical).

METHODS. 295 adult critically ill patients (149 medical and 146 surgical) were prospectively studied. GIF was defined as presence of at least 2 of following symptoms: absence of peristaltic, bowel distension, gastrointestinal bleeding, gastric aspirate >500mL/24h. Intraabdominal pressure (IAP) was measured in 113 patients using standardised protocol and revised closed system measurement technique. IAH was defined as mean IAP>12mmHg.

RESULTS. Mortality was 33.3% in medical and 24.3% in surgical patients (p=0.116). The ICU stay and SOFA max were different between survivors and nonsurvivors in both groups, the difference in IAP mean was evident only within medical patients (Table 1). GIF occurred in 57 of 295 (19.3%) and IAH in 52 from 113 patients (46%). Mortality of medical patients with GIF was 86.7% compared to 27.1% without GIF (p<0.001; OR 13.0, 95% CI 3.105-55.30). Mortality of surgical patients with GIF was 51.7% vs. 17.1% without GIF (p<0.001; OR 3.34; 95% CI 1.80-6.19). IAH was correlated with mortality in medical patients (90.9%) with IAH vs. 12.0% without IAH (p<0.001; OR 9.2; CI 2.4-36.0), but not in surgical patients (29.6% vs. 22.6%; p=0.121; OR 1.4; CI 0.9-2.1).

CONCLUSION. GIF increases the risk of death both in medical and surgical patients, but IAH correlates with mortality only in medical patients. Different approach might be needed for clinical evaluation of gastrointestinal dysfunction in medical and surgical patients.

Grant acknowledgement. Estonian Science Foundation, grant no 5304

GASTROINTESTINAL FAILURE AND INTRAABDOMINAL HYPERTENSION AFTER OPEN ABDOMEN DUE TO PERITONITIS

Hahn R', Spiss C’, Stortecy S’, Wild P’
1 Anaesthesiology and Intensive Care Medicine, Surgery, Medical University of Vienna, Vienna, Austria.

INTRODUCTION. The management of patients with a laparostoma due to peritonitis is a challenge for every surgeon and intensivist. The goal of this study was to compare two different treatment strategies for the open abdomen: abdominal dressing (AD) and conventional therapy (CT).

METHODS. Medical records of surgical patients between 2001 and 2005 with laparostoma were reviewed. Demographic data, co-morbidity, indications for open abdominal wall management, resulting complications, and intensive medical data such as Apache II and SOFA score were collected. In the Vacuum Assisted Closure (V.A.C.) group a perforated polyethylene sheet (abdominal dressing) is placed over the bowel and under the fascial edges. Over this a sponge is placed. As suction is activated the sponge shrinks, pulling the edges of the wound towards the middle. The procedures used in the control group for the temporary closure included placement of toweils, of wattertight drape and classic V.A.C.

RESULTS. Between 2001 and 2005 we identified 60 patients who had to be treated with a laparostoma due to peritonitis. 42 patients were conventionally treated, 18 patients with V.A.C. abdominal dressing. Apache II Score, Mamebrnt Peritonitis Score and sex showed no difference between the groups. In the AD Group the SOFA score showed a clear decrease between days one to five. However, there was a significant difference in age between the two groups. The mortality was 4/ 18 (22.2%) in the AD group vs. 22 / 42 (50%) in the CT group (p=0.05, chi-square test, relative risk reduction 50%). There was no significant difference in the length of ICU stay: 50.3±38.8 days in the AD Group and 46.0±35.7 days in the CT Group Corrected for survivors Ad: 71.0±50.9, CT: 60.4±43.8.

CONCLUSION. We found a reduction of mortality in the V.A.C. abdominal dressing group by 50% (Ad: 22% vs. 45%). Although we could identify a difference in age in our retrospective study, we believe that V.A.C. assisted abdominal dressing is the important factor for the different clinical outcome. These first results indicate the need for further prospective evaluation of the V.A.C. abdominal dressing therapy.

ASSOCIATION OF LOCAL SIGNS OF INFLAMMATION AND CENTRAL VENOUS CATHETER INFECTIONS

Saager LV, Wiesner E, Schönfeldt F, Pestel G, Rothhammer A
1 Institut für Anaesthesiologie und Intensivmedizin, Leopoldina Krankenhaus, Schweinfurt, Germany, 2Klinik und Poliklinik für Anaesthesiologie, Inselspital, Bern, Switzerland

INTRODUCTION. Central venous Catheters are used with increasing frequency. Catheter related bloodstream infections (BSI) are associated with significant morbidity, mortality and costs (1). An average 5.3 per 1000 catheter days and an attributable mortality of 18% is assumed for BSI in the US(2). We investigated the association of CVC-infection indicators at site of insertion based on a risk management concept.

METHODS. All CVC’s placed by our Dept. in the year 2002 were included in this study. Placement was documented on a separate record and data was completed by an experienced anaesthesiologist during CVC-visits every second day. The insertion site was rated for signs of infection and body temp. was recorded. We used closed catheter systems and strive for peripheral placement if medical reasons required no specific insertion site. Correct placement was verified via atraic IVC’s were replaced at first suspicion of inflammation.

RESULTS. A total of 1861 CVC’s with 12,505 catheter days could be included in our study. Tab.1 shows the results. Catheters were left in place for a mean of 6.9±4.6 days. At time of removal 96% of patients had no signs of infection. IAH was correlated with temperature below 36.8°C. There were no significant differences in length of placement or temperature at removal between suspicious and incompious catheters.

REFERENCE(S). 1)Mermel,AnnInternMed132:391-402 2000
2)CDC, AmJInfectControl26:522-533 1998

REFERENCE(S). 1)Mermel,AnnuInternMed132:391-402 2000
2)CDC, AmJInfectControl26:522-533 1998

SECURITY OFDEXMEDETOMIDINE IN INFUSIONS LONGER THAN 24 HRS.

Camarena-Alejo G1, Villalobos-Silva J A2, Morales-Muñoz G3, Chaparro J M4, Zinko-Espino E5, Poblanos-Morales M1, Aguirre-Sanchez J S2, Martinez-Moreno F 3, Valero-Castillo C4, 1Anaesthesia, The IRC Medical Center, Mexico, Mexico

INTRODUCTION. In the Intensive Care Unit, security and comfort of the patient as well as an adequate sedation and analgesia are of main concern. With the prolonged use of regular medications that delay exublation, prolong intrahospitalary stay, and increase the need of tracheostomy, an adequate sedative and analgesic is required. Dexmedetomidine is an Alpha 2 adrenergic agonist, with sedative and analgesic properties.

METHODS. A retrospective study was performed in the Intensive Care Unit. Heart rate (HR), mean arterial pressure (MAP), SOFA, central venous pressure (CVP), diuresis, leukocyte count, norpinephrine, vasopressin, were measured before infusion at 24,48 and 72 hrs. Chi2 and SD were calculated and ANOVA to search for statistical differences between groups and a Tukey test to variability between groups. A p-value <0.05 was considered statistically significant.

RESULTS. We included a total of 39 patients: 24 p were male (61.5%) and 15 (38.5%) female, SD: 17.25. 31 patients (79.49%) received mechanical ventilation (MV). El mean time of MV was 7.5 days. 26 patients (66.6%) were on NIV. The mean time of NIV was 11.5 days. At admission 10 (25.6%) patients had a body temperature below 35°C. 2 patients (5%) had a body temperature below 33.5°C. No significant differences in length of placement or temperature at removal between suspicious and incompious catheters.

REFERENCE(S). 1)Mermel,AnnuInternMed132:391-402 2000
2)CDC, AmJInfectControl26:522-533 1998

REFERENCE(S). 1)Mermel,AnnuInternMed132:391-402 2000
2)CDC, AmJInfectControl26:522-533 1998
INTENSIVE POSTOPERATIVE CARE IN UNITS MANAGED BY ANAESTHESIOLOGISTS OR INTENSIVISTS IN CATALONIA
Canet J, Mayoral V, Sahal S, Gomar C
1 Anaesthesiology, Hospital Universitari Germans Trias i Pujol, Badalona. 2 Anaesthesiology, Hospital de Bellvitge, Hospitalat de Llobregat. 3 Anaesthesiology, Fundació Puigvert, 4 Anaesthesiology, Hospital Clinic, Barcelona, Spain

INTRODUCTION. Spain has two ways to obtain accreditation in intensive care medicine (ICM): as a primary intensivist (Pl saturn) or as an anaesthesiologist (Anaes). During recent years, Spanish Anaes have become more involved in postoperative ICM. Within an extensive survey of anaesthetic activity in Catalonia in 2003 (ANESCAT), we characterised patients requiring intensive postoperative care (IPOC) and studied what specialist managed them.

METHODS. We designed a prospective, cross-sectional survey to collect information from Anaest with a questionnaire for every anaesthetic procedure performed on 14 randomly selected days in 2003. All public and private hospitals (131) in Catalonia (6,704,146 inhabitants) participated. Need of IPOC and whether or not the IPOC unit was managed by an Anaes were recorded. We performed bivariate comparison for age, sex, ASA status, anaesthesia duration, surgery and whether the procedure was urgent or elective and the facility private or public, analysing if patients received IPOC from a Pl saturn or an Anaes. In a multivariate analysis, a multiple logistic regression model was constructed.

RESULTS. A total of 23,136 questionnaires were collected, this extrapolates to 603,189 anaesthetic procedures performed in Catalonia in 2003. The proportion of patients needing IPOC was 7.7%, which represents 44,273 patients (0.66% of the population). The number of surgical patients managed by Anaes yearly was 30,165 (69.3%) and by Pl saturns 13,374 (30.7%). The logistic regression model showed the following significant factors associated with admission to an Anaes unit (odds ratio): public vs private 10.7; elective vs urgent 3.8; ASA 0.54; duration of anaesthesia (min) 0.09; kind of surgery (vs cardiac) orthopaedic 18.9; general 6.8; urology 12.1; neurosurgery 2.1; vascular 4.2; thoracic 6.3; gynaecology 8.7; ENT 18.3.

CONCLUSION. More than two thirds of patients needing IPOC in Catalonia are admitted in units managed by Anaes which receive mainly patients from elective and non-cardiac surgery and are in public facilities. This high commitment of Catalan Anaes to perioperative medicine and particularly IPOC entails a challenge for Anaest that affects accreditation in ICM and organization of human resources, given the foreseeable increase in patients needing this kind of care.
**483**

**MORTALITY AND MORBIDITY IN PATIENTS WITH ONE OR TWO CONSECUTIVE VAP EPISODES**

Zolotukhin K N, Galeev F S

ICU, District Hospital, ICU, Medical university, Ufa, Russian Federation

**INTRODUCTION.** Ventilator-associated pneumonia (VAP) is associated with the greatest mortality among nosocomial infection. Death rates associated with Pseudomonas aeruginosa or with late-onset VAP seem higher. We looked for mortality and morbidity in patients with one or two consecutive VAP episodes.

**METHODS.** In a 12 bed surgical intensive care unit, at a 400 beds surgical complex of district hospital, we studied prospectively all patients with VAP clinical and bacteriological (quantitative endotracheal aspirate culture, Protected Specimen Brush) diagnosed from January 2002 to January 2004. We looked for demography, APACHE – II score, mortality, attributable mortality for VAP days on mechanical ventilation (MV), and ICU stay length. Population groups: A (n=29) with two VAP episodes in the same admission period; B (n=32) single VAP episode for Pseudomonas; C (n=44) patients with single VAP episode without Pseudomonas.

**RESULTS.** In group B had a great prevalence of COPD. Patients with two VAP episodes had the first one earlier (32,4 days 1,6%), the second one later (10,4 days 5,2%) and spent more days on MV (25,6 days 14,7), than group B (6,7 days 3,8 and 19,9 days 7,8%) respectively. There were no significant statistical differences between groups in mortality: A (41,6%); B (57,8%; C), 34,5%); or VAP attributable mortality (A: 35%; B: 21,6%; C: 44%). Overall ICU mortality during the studied period was 15%. The ICU stay length was different between and within groups: A: 40,2 days (SD 24,1); B: 22,1 (SD 11,5); C: 13,4 (SD 6,3) (ANOVA-test p=0,001). Gram-positive flora predominated in first VAP episode vs second one. Polymicrobic cultures were near 50% in groups B and C and in the second VAP episode, with 28% in the first VAP episode (p<0,05)

**CONCLUSION.** We found no differences in mortality between patients who developed two VAP episodes re-lated to patients with single VAP due to Pseudomonas or single VAP without Pseudomonas. The days under mechanical ventilations and ICU stay length were longer (with significant statistical differences), in patients with two VAP episodes related to patients with VAP for Pseudomonas, and from the latter to patients with VAP without Pseudomonas. Gram-positive flora were predominant in first VAP episode, and Gram-negative in second one.

**484**

**ULTRASONIC GUIDED THORACENTESIS: COMPARISON BETWEEN TWO METHODS OF DRAINAGE**

Graziani A1, Fanciulli A1, Gambierini E1, Moogaggi F1, Praticò F1, Bonarelli S2

1Medicina d’Urgenza, 2Terapia Intensiva, Ospedale Maurizio Bufalini, Cesena, Italy

**INTRODUCTION.** Ultrasound guided pleural aspiration is a safe and accurate method of obtaining fluid in pleural effusion, caused by several mechanisms (pneumonia, cancer, congestive heart failure etc). Drainage could improve pulmonary ventilation and allow the laboratory examination of the fluid, useful for the differential diagnosis. Pneumothorax (Penco) is the principal consequence of thoracentesis. For this reason, five years ago, the Emergency Department of this hospital, adopted the Plastic Catheter (PC) use for IV infusion in order to perform a pleural drainage. The aim of this study was to evaluate the effectiveness of this method compared with the more common Metallic Needle (MN) contents in the set for thoracentesis.

**METHODS.** From January to December 2004 we evaluated 19 patients with pneumonia (15 male 4 female age 54,7 +/- 12,9 years) admitted to Emergency Department guard or Intensive Care Unit (ICU), randomly assigned to pleural drainage with MN (16 Gauge; 7 patients) or PC (Abbocath 16 Gauge; 12 patients). Patients in ICU were alert and collaborative, in spontaneous breathe or mechanically ventilated by tracheotomic device. Each patient was examined in a sitting position. Ultrasonography (Hitachi h 21); 3,5-5 MHz convex probe) was used to assess the point of drainage: where insert the needle. After a local injection of anesthetic lidocaine, one of the two needles was chosen. In particular, for the PC, after the insertion, the metallic core was removed and only the plastic tube was left in place and connected to the drainage system. Pleural aspiration was removed when the patient had thoracic pain, cough or fluid flow ceased. By ultrasonography, at the point of drainage, was measured the space between the two pleural layers and this was considered a parameter of drainage entity: the lower the space, the greater the drainage. Results were analised on a statistical manner by test of Student for impaired data.

**RESULTS.** Patients who underwent thoracentesis by PC had more complete thoracic drainage (pleural space 5,8 +/- 3.2 cm vs 12,7 +/- 4,2 cm; p < 0,05) without case of Pnx (0 vs 1).

**CONCLUSION.** Ultrasound is more accurate than plain chest radiography for estimating pleural fluid volume and aids thoracentesis. Chest drainage by plastic catheter increases efficacy and safety.

**REFERENCE(S).** 1.BTS Guidelines for the management of pleural disease Thorax 2003; 58 Suppl II

**485**

**VENTILATOR ASSOCIATED PNEUMONIA**

Rsovac S N, Vanjak N F, Kos R V1, Medjo B S2, Kalanj J C3

1Pediatric intensive care unit, 2PICU, University Children’s Hospital, Belgrade, Yugoslavia

**INTRODUCTION.** To determine frequency, causative microbiological agents and outcomes in pediatric intensive care (PICU) patients with ventilator associated pneumonia.

**METHODS.** A prospective cohort study was conducted at patients admitted to University children’s hospital PICU from January 2004 to January 2005. New ventilator associated pneumonia (all diagnostic criteria for ventilator associated pneumonia fulfilled).

**RESULTS.** There were 8 episodes of ventilator associated pneumonia in 8 patients of total 250 admitted patients (3.2%) and 105 patients who required mechanical ventilation support (7.6%). The mean ventilator associated pneumonia rate was 15.6/1000 ventilator days. Leading causative agents detected in our PICU patients were Pseudomonas aeruginosa (3.8%), Enterococcus (2.8%) and Staphlococcus aureus (0.8%). All patients with ventilator associated pneumonia survived.

**CONCLUSION.** Ventilator associated pneumonia occurs at significant rate among mechanically ventilated PICU patients.

**REFERENCE(S).** 1. Garner JS, et al. CDC definitions for nosocomial infections. In: Olmsted RN ed. ACP infection control and applied. Epidemiology: principles and practice. St. Louis: Mosby, 1996: A-1-20

2. Richards MJ, et al. Nosocomial infections in pediatric intensive care units in United States. Pediatrics, 1999;103: 339.

3. Fayan MJ et al. Nosocomial respiratory infections. Am J Respir Crit Care Med 1997;155: 162-9.

4. Elward AM, et al. PICU ventilator-associated pneumonia. Pediatrics 2002;109:758-64.

5. Black SM, et al. Nosocomial pneumonia in the PICU (Abstract K-452). In: 40th Interscience Conference on Antimicrobial Agents and Chemotherapy, Toronto, September 17 to 20, 2002. Washington DC: American Society for Microbiology, 2002.

6. Elward AM. Pediatric ventilator-associated pneumonia. Pediatr Infect Dis J, 2003;22:443-446.

**486**

**INFLUENCE OF GASTRIC AND UPPER RESPIRATORY TRACT COLONIZATION BY PPMO ON THE DEVELOPMENT OF VAP**

Tamowicz B, Wronka K1, Mikstacki A1

1Department of Anesthesiology and Intensive Therapy, Regional Hospital, University of Medical Sciences, Poznan, Poland

**INTRODUCTION.** VAP (ventilator-associated pneumonia) is the most frequent nosocomial infection in intensive care units. Colonization through gastroesophageal reflux plays a basic role in VAP pathogenesis. The aim of the study was to assess the influence of gastric and upper respiratory tract colonization by PPMO (potential pathogenic microorganisms) on the development of VAP.

**METHODS.** Prospective randomized study included 40 enterally fed patients with an expected mechanical ventilation period of at least 6 days. The diagnosis of VAP was based on clinical, radiological and bacteriological criteria. Qualitative and quantitative bacteriological study of microorganisms isolated from gastric content as well as from upper and lower respiratory tract was carried out on the 1st, 4th and 6th day of the therapy. Material from lower respiratory tract was taken by protected specimen brush (PSB) using bronchoscope.

**RESULTS.** The study included 40 patients - 9 females and 31 males aged 15-70 years. VAP was diagnosed in 11 patients. In 10 of them (90.9%) the microorganisms isolated from gastric content, and from upper and lower respiratory tract were the same. From patients with confirmed VAP the following microorganisms were isolated:

- from gastric content: P. aeruginosa, A. baumannii, P. mirabilis, E. aerogenes, E. coli, E. faecalis, MSSA, MSSB, from upper respiratory tract: P. aeruginosa, A. baumannii, P. mirabilis, E. aerogenes, E. coli, E. faecalis, MSSA, MSSB, Streptococcus spp.;
- from lower respiratory tract: P. aeruginosa, A. baumannii, P. mirabilis, E. aerogenes, E. coli, E. faecalis, MSSA, MSSB, Streptococcus spp.;
- from upper respiratory tract: P. aeruginosa, A. baumannii, P. mirabilis, E. aerogenes, E. coli, E. faecalis, MSSA, MSSB, Streptococcus spp.;
- from lower respiratory tract: P. aeruginosa, A. baumannii, P. mirabilis, E. aerogenes, MSSA.

**CONCLUSION.** Enteral nutrition in mechanically ventilated patients is associated with gastric colonization by PPMO. Gastric and upper respiratory tract colonization by PPMO has an influence on the development of VAP.

**REFERENCE(S).** 1. Alcon A, Fabregas N, Torres A. Hospital-acquired pneumonia: etiologic considerations. Infect Dis Clin N Am 2003; 17: 679-695.
487 CYCLIC STRETCH MODULATES TLR2 EXPRESSION AND RESPONSIVENESS TO ITS AGONIST IN LUNG EPITHELIAL CELLS

Charles P E1, Tissières P2, Dufour J3, Dunn I4, Pagin J5
1Intensive care medicine, University hospital of Geneva, Geneva, Switzerland

INTRODUCTION. Mechanical ventilation may alter lung defenses by modifying the expression of molecules of the innate immunity in airway cells. Bacterial lipopeptides (BLP) are molecular patterns found in the wall of bacteria, and activate cells through Toll-like receptor-2 (TLR2). Cyclic stretch could modify the expression and function of TLR2 in human airway cells.

METHODS. Human bronchial BEAS-2B and type II-like A549 cells were cultured on BioFlex® plates. Cells were submitted to a 24 h cyclic stretch (FlexCell 3000 Strain Unit®). Cells were then stimulated with BLP. Interleukin (IL)-6 and IL-8, human β defensin-2 (HBD-2), and TLR2 mRNA levels were quantified by RT-PCR. IL-6 and IL-8 concentrations were measured in conditioned supernatants by ELISA. TLR2 protein expression was assessed by FACS.

RESULTS. Cyclic stretch induced a prompt (4 h), 10-fold TLR2 mRNA increase. The TLR2 mRNA upregulation was abrogated by a p38 MAP kinase inhibitor. The TLR2 receptor protein was found to be expressed intracellularly in the only stretched cells. Twenty-four h cyclic stretch induced a synergistic increase in the release of IL-6 and IL-8 and HBD-2 after BLP stimulation (Figure).

CONCLUSION. Cyclic stretch markedly increased lung epithelial cell responsiveness to BLP. This occurred most likely via an upregulation of TLR2 through p38 MAPK activation. These data suggest that airway distension may “prime” lung epithelial cells to become hyperresponsive to a bacterial stimulus. Understanding the molecular mechanisms underlying these changes may help design strategies for lung-protective ventilatory strategies.

REFERENCE(S). Hertz C1, Activation of Toll-like receptor 2 on human tracheobronchial epithelial cells induces the antimicrobial peptide human β-defensin-2. J Immunol 2003, 171:6820-6826

Grant acknowledgement. Funds of A.O.R.I.C. and “Institut Lilly infectiologic”

488 CAN UPPER AIRWAYS SAMPLES (UAS) AT THE TIME OF ICU ADMISSION GUIDE ANTIMICROBIAL THERAPY IN VAP?* 1

Mates J1, Hamrouche Y2, Piracchio R2, Lakaszewicz A3, Sanson-Le Pors M4, Payen D5
1Anesthesia and Critical Care Unit, 2Microbiology Lab, Lariboisiere Hospital, Paris, France

INTRODUCTION. VAP is a frequent nosocomial infection. Since delayed appropriate antimicrobial therapy worsens prognosis, broad-spectrum antibiotics are frequently administered. Early clues on potential microorganisms involved could help select a more focused antimicrobial therapy. The known relation between VAP and upper airways colonization prompted us to determine if UAS at the time of ICU admission (Day 1) could accurately identify microbial agents involved in early VAP (within the first 5 days following tracheal intubation).

METHODS. 136 consecutive ICU patients who had a Clinical Pulmonary Infection Score (CPIS) ≥4 were recruited. Upper airway samples were obtained at Day 1 for all patients, and specific pathogens (other than normal oropharyngeal flora) were cultured. Pulmonary plugged specimen (PPS) were obtained whenever needed.

RESULTS. Concordance for at least one microorganism species was observed in 74.5% of paired UAS at Day 1 and PPS. Full concordance (all isolated pathogens similar) was observed for 70% of paired samples. Staphylococcus Aureus, Acinetobacter and Pseudomonas were associated with higher concordance (respectively 79%, 75% and 81%). The rate of concordance between samples was not correlated with diagnosis at admission, previous hospitalization, or previous antibiotic therapy.

CONCLUSION. In patients with early VAP, UAS and PPS were concordant in 74.5% of cases, and even more for hospital multiresistant bacteria. UAS results could reasonably be used for the choice of initial antibiotic therapy and, thus, reduce the delay for appropriate treatment and decrease the use of broad spectrum antibiotics.

REFERENCE(S). Bubela T, Sirois M, Hoth S, Bolger AC, et al. Semin Respir Infect 2004; 19:261-267

Grant acknowledgement. ECDG SANCO/F/4

489 ESTIMATION OF THE EFFECT OF ICU-ACQUIRED PNEUMONIA ON MORTALITY USING A MARGINAL STRUCTURAL MODEL

Mertens K1, Vanlaethem S2, Suetsens C3, Goetghebeur E1
1Epidemiology unit, Scientific Institute Public Health, BRUSSELS, 2Applied Mathematics and Informatics, Ghent University, Ghent, Belgium

INTRODUCTION. Despite the apparent negative effect on a patient’s health status, the quantitative assessment of the attributable effect of Nosocomial Pneumonia (NP) on mortality – i.e. the mortality risk due to the presence of NP – remains a controversial topic. In this study, we rely on recently published “causal” methods to estimate this effect.

METHODS. We use data generated by the surveillance of Nosocomial Infections in Belgian ICUs. This surveillance follows the HELICS protocol, and collects next to baseline variables (taken at ICU admission) also the daily exposure to a set of 10 therapeutic variables (e.g. ventilation or catheter use) during a patient’s stay in the ICU. First we show by means of causal diagrams that the stratification based methods used so far in the literature on this topic – such as Logistic Regression (LR) or Proportional Hazards regression (PHR) – yield biased effects whenever time-dependent intermediate variables exist that both predict NP and mortality and are affected by NP. Second we fit a Marginal Structural Model (MSM, ref. 1) to cope with this type of time-dependent confounding. Instead of adding confounders as extra covariates in the model, a MSM weights subjects according to their probability of acquiring NP. These probability weights are estimated using all available baseline and time-dependent confounders.

RESULTS. From 1070 ICU admissions of patients staying more than 24h in the ICU, 100 (9.4%) patients acquired one or more NP episodes. Of these, 32 persons (32%) died as compared to 103 deaths (10.6%) that occurred in 867 (89.6%) patients remaining NP-free. The Marginal Structural Survival Model yields a hazard for mortality ratio of NP versus non-NP exposure of 1.01 (95% CI 1.54-1.88).

CONCLUSION. While it is generally agreed that intermediate information collected during a patient’s stay in the ICU improves considerably the estimation of attributable effect of NP on mortality, standard regression models can yield biased estimates because of their incapacity to handle time-dependent confounding. When applying methodology that is known to handle this type of confounding correctly, the data used in this example did not show a significant attributable mortality effect of NP.

REFERENCE(S). [1] Robins, J.M., Hernán, M.A. and Brumback, B. (2000) Marginal Structural Models and Causal Inference in Epidemiology. Epidemiology, 11, 550-560.

490 ICU-ACQUIRED PNEUMONIA IN EU COUNTRIES: RESULTS FROM THE HELICS-ICU SURVEILLANCE

Palomar M1, Suetsens C2, Savey A3, Blesmayr M1, Gomes da Silva E1, Gastmeier P2, Van der Hof S1, Schmutz JC1
1ICU, VU, Brussels, Belgium, 2ICU, H, Lisboa, Portugal, 3ICU, Berlin, Germany, 4ICU, Amsterdam, Netherlands, 5ICU, Luxembourg, 6ICU, Barcelona, Spain

INTRODUCTION. The establishment of a large reference data for Nosocomial Infections in European ICUs is an achievement of the HELICS IV. We present the indicators of ICU acquired pneumonia (IAPN) from the pilot database from 2000-2004

METHODS. Data were obtained from national networks representing 659 ICUs in 8 countries:AT, BE, DE, ES, FR, LI, NL and PT. Inclusion criteria in the surveillance and definitions are given in the HELICS-ICU protocol (http://helics.univ-lyon1.fr). Surveillance was patient-based in all the countries except Germany(unit-based).

RESULTS. In level Iunit-based:6.8%(95% CI 6.6-6.9%)of patients stayin >2d, acquired at least one episode of IAPN. The percentage varied strongly according to the country (4.0 to 15.5%) and type of ICU (7% in mixed,5.5% in medical and 4.6% in surgical ICUs) and percentage of intubation. The median n of patients acquired one or more NP episodes. Of these, 32 persons (32%) died as compared to 103 deaths (10.6%) that occurred in 867 (89.6%) patients remaining NP-free. The Marginal Structural Survival Model yields a hazard for mortality ratio of NP versus non-NP exposure of 1.01 (95% CI 1.54-1.88).

CONCLUSION. While it is generally agreed that intermediate information collected during a patient’s stay in the ICU improves considerably the estimation of attributable effect of NP on mortality, standard regression models can yield biased estimates because of their incapacity to handle time-dependent confounding. When applying methodology that is known to handle this type of confounding correctly, the data used in this example did not show a significant attributable mortality effect of NP.

REFERENCE(S). [1] Robins, J.M., Hernán, M.A. and Brumback, B. (2000) Marginal Structural Models and Causal Inference in Epidemiology. Epidemiology, 11, 550-560.

Grant acknowledgement. ECDG SANCO/F/4

| TABLE 1. | D 3-5 | D 5-6 | D 7-13 | >=D14 | TOTAL % |
|----------|-------|-------|--------|--------|---------|
| S aureus% | 8.0   | 18.8  | 16.8   | 14.9   | 16.8    |
| MRSA/SA % | 18.2  | 18.8  | 33.7   | 52.8   | 33.0    |
| P aeruginosa% | 9.1   | 11.9  | 15.4   | 23.0   | 17.9    |
| PACePatEicar/R | 9.2   | 13.9  | 17.8   | 29.5   |         |

CONCLUSION. Despite an important variability among participating countries, the first European indicators of IAPN have been established.

Grant acknowledgement. ECDG SANCO/F/4
491

COMPARATIVE ANALYSIS OF PATIENTS WITH EARLY-ONSET AND LATE-ONSET VENTILATOR-ASSOCIATED PNEUMONIA

Tejero E, Frutos-Vivar F, Esteban A, Anzueto A, Soto L, Palazón P, González M, Elizalde J; 1ICU, Hospital Universitario de Getafe, Getafe, Spain; 2ICU, University of Texas Health Science Center, San Antonio; Texas, United States, 3ICU, Hospital de Cruces, Zaragoza, Spain; 4ICU, Hospital Universitario de Canarias, Santa Cruz de Tenerife, Spain; 5ICU, University of Navarra, Pamplona, Spain; 6ICU, Hospital de Navarra, Pamplona, Spain; 7ICU, Hospital Clínico de Navarra, Pamplona, Spain

INTRODUCTION. Specific subgroups of early-onset and late-onset ventilator-associated pneumonia (VAP) have been previously evaluated only by few reports. To determine the influence of timing of onset of VAP, we compared clinical outcomes between patients with early-onset VAP (≤ 5 days (D)), late-onset VAP (> 5 D) and patients without VAP.

METHODS. We used a database of the prospective, cohort of 5183 patients who received mechanical ventilation (MV) > 12 hours (H) in March, 1998 at 361 ICUs from 20 countries. We excluded those patients whose reason of MV was pneumonia (N=721) and patients with a duration of MV < 48 H (N=1505). 438 patients developed VAP: Early-onset VAP developed in 361 patients (82.4%) and late-onset VAP in 77 patients (17.5%). We used the chi-square test and the Student-Newman-Keuls test.

RESULTS. There was no statistically significant difference in ICU mortality between early-onset VAP, late-onset VAP and the group without VAP (36%, 45% and 34%, respectively; p intergroups=0.63). Late-onset VAP significantly prolonged duration of MV [median (M) 17 D (interquartile range (IR): 11.5, 22.6)] compared to early-onset VAP [M 8 D (IR: 6.141)] and compared to the group without VAP [M 5 D (IR: 3.7)]. And, late-onset VAP also significantly prolonged duration of ICU length of stay [M 23 D (IR: 15.36, 5)] compared to early-onset VAP [M 14 D (IR: 9.23)] and compared to the group without VAP [M 8 D (IR: 5.14)]. Moreover, early-onset VAP also significantly prolonged duration of MV and of ICU length of stay compared to the group without VAP.

CONCLUSION. Timing of VAP did not significantly influence mortality. But, early-onset and late-onset VAP prolonged duration of MV and ICU length of stay.

REFERENCES. Esteban A, Anzueto A, Frutos F, Alia I, Brochard L, Stewart TE, Benito S, Epstein SK, Apezteguia C, Nightingale P, Arroliga AC, Tobin MJ. Characteristics and outcomes in adult patients receiving mechanical ventilation. A 28-day international study. JAMA 2002; 287:345-355.

492

AEROSOLIZED COLISTIN FOR THE TREATMENT OF VAP, DUE TO MULTIDRUG-RESISTANT GRAM-NEGATIVE BACTERIA.

Moulopoulos E, Pasavantiotou M, Tsivtitadou M, Katsanoulas C, Assimaki M, Lampiri C, Papazafiriou E, Karabanos K, Georgiou N; 1ICU, Hippokration General Hospital Thessaloniki, Thessaloniki, Greece

INTRODUCTION. Ventilator-associated pneumonia (VAP) due to multidrug-resistant (MDR) Gram-negative bacteria has high mortality rate among ICU patients. There is evidence that aerosolized colistin might prove beneficial, as supplemental therapy.

METHODS. During a six months period, we studied prospectively 10 patients (8 male, 2 female) with VAP due to MDR Gram-negative bacteria (mean Clinical Pulmonary Infection Score, CPIS, was 8.4±1.35), who received aerosolized colistin (daily dose 3.4 million IU, divided to 3 doses), as adjunctive therapy to intravenous antimicrobial treatment.

RESULTS. Mean age was 49.6±18.8 years, APACHE II score on admission and on day 1 of aerosolized colistin administration was 23.5±16.3 and 19.8±9.1 respectively. CPIS was more than the cut-off value of 6, indicative of definite VAP diagnosis, in all patients. Sepsis-related Organ Failure Assessment (SOFA) was 7.9±2.49 on day 1 of aerosolized colistin administration. Multidrug resistant Gram negative bacteria (5 Acinetobacter baumanii, 4 Pseudomonas aeruginosa) were isolated and considered responsible for VAP. Acinetobacter baumanii (n=5) and Pseudomonas aeruginosa (n=2) strains were sensitive only to colistin. VAP responded to treatment in 8 patients, 2 patients died from septic shock and multiple organ failure. None of the patients showed any side effects attributable to colistin administration.

CONCLUSION. Aerosolized colistin appears to be a safe and effective adjunctive therapy in the management of VAP due to MDR-negative bacteria in critically ill patients.

REFERENCES. 1) A Michalopoulou, S Kasaikou, Z Mastora, et al: Aerosolized colistin for the treatment of nosocomial pneumonia due to multidrug-resistant Gram-negative bacteria in patients without cystic fibrosis. Critical Care 2005; 9:53-59
2) D. Hauer: Treatment of Nosocomial Pneumonia and Tracheobronchitis Caused by Multidrug-Resistant Pseudomonas aeruginosa with Aerosolized Colistin. Am J Respir Crit Care Med.2000;162:328-330

493

RISK FACTORS FOR VENTILATOR ASSOCIATED PNEUMONIA IN PATIENTS WITH PROLONGED MECHANICAL VENTILATION

Díez P, Gandía F, Castroreda JF, Martínez F, Andaluz D, Pérez F; 1Department of Critical Care, Epidemiology and Preventive medicine, Hospital Clínico Universitario, Valladolid, Spain

INTRODUCTION. We conducted a study to describe the clinical characteristics and to determine some risk factors to develop ventilator associated pneumonia in ICU patients who require prolonged mechanical ventilation.

METHODS. Data were derived retrospectively from our 11-bed teaching ICU. All consecutive patients ventilated a 3 days were assessed for VAP. We studied demographic and clinical data: age, sex, premorbid illnesses, Apache II, involvement and thoracic injury, days in mechanical ventilation, ICU length of stay (LOS), number of complications, presence of ventilator associated pneumonia (VAP) and death. Statistical analysis: t-test to compare independent samples, chi-square to analyze categorical data, and multivariable logistic regression for variables.

RESULTS. A total of 458 patients were included. For these, 168 patients had ventilator associated pneumonia (36.6%). There was significant differences between patients with or without ventilator associated pneumonia in respect to: LOS (29.1±17 vs 11.7±8 p<0.001), days in mechanical ventilation (25.3±16 vs 9.4±6), number of complications (3.1±1.2 vs 1.5±1.2), presence of septic shock (52.4% vs 25.2% p<0.001), thoracic trauma (16.7% vs 10% p=0.041), renal failure (23.2% vs 11% p<0.001), need of inotropics (66.6% vs 23.1% p=0.003), and pneumonia (61.9% vs 24.5% p<0.001). There were not differences in respect to Apache II (18.6±5.4 vs 18.5±6.2 p=0.917), extrins (42.8% vs 36.9% p=0.23) and premorbid illness (2.2±1.5 vs 2.1±1.5 p=0.536). Logistic regression analysis identified two factors independently associated with development of VAP: thoracic trauma on ICU admission (OR 1.974 (95% CI 1.11-3.48) p=0.019) and duration of mechanical ventilation (OR 1.14 (95% CI 1.10-1.18) p<0.001)

CONCLUSION. In our study the presence of ventilator associated pneumonia is not associated with increased mortality. The only independent factors to develop ventilator associated pneumonia were presence of thoracic trauma and length of mechanical ventilation.

494

HEAD OF BED ELEVATION REDUCES THE INCIDENCE OF VENTILATOR ASSOCIATED PNEUMONIA IN SAH PATIENTS

Schulz-Stibner S, Bellinger A, Heine C, Hata S, Howard M, Thiers R; 1Anesthesia and Critical Care, University of Iowa Hospitals and Clinics, Iowa City, United States, 2Neurosurgery, RWTH Aachen University Hospital, Aachen, Germany, 3Anesthesia and Critical Care, University of Iowa Hospitals and Clinics, Aachen, Germany, 4Neurosurgery, University of Iowa Hospitals and Clinics, Iowa City, United States

INTRODUCTION. VAP is a major cause of morbidity in intensive care units and HOB (>30°) has been shown to reduce the rate of VAP in a general surgical population. Prior clinical trials have excluded neurosurgical patients because of varying positioning strategies. With IRB approval we evaluated neurosurgical patients with subarachnoid hemorrhage (SAH)to test the hypothesis that HOB elevation reduces the incidence of nosocomial pneumonia.

METHODS. This retrospective cohort study included 50 patients with SAH requiring more than 48 hours of mechanical ventilation from the Neurosurgical ICU of the University Hospital of Aachen, Germany (group G) and 25 patients of the Surgical ICU at the University of Iowa (group I) in 2003 and 2004. Standard treatment in group G included HOB 30 degrees, DVT prophylaxis with LMWH, i.v. nimodipine, no prophylactic antibiotics for ventilicitosse. Standard treatment in group I included HOB flat, DVT prophylaxis with pneumatic compression devices, p.o. nimodipine, vancomycin/gentamicin for the duration of ventilicitosse. Ventilator management strategies followed the CDC guidelines for the prevention of VAP in both groups. VAP was diagnosed according to the CDC-criteria and the infection rate (IR) was calculated as IR = (episodes of VAP/days with ventilatory support) x 1000 for both groups and compared with the 2002 national reference databases NNIS for the US and KISS for Germany.

RESULTS. The mean APACHE II score was slightly higher in group G (21 versus 18). Hunt and Hess admission scores were higher in group G but Glasgow outcome score was not significantly different in both groups. The infection rate in group G was 29.38 per 1000 ventilator days compared to 40.3 in group I. The incidence of symptomatic DVT in group G was 0 versus 8% in group I while PE's occurred in 2% in each group.

CONCLUSION. The lower infection rate for VAP indicates that HOB 30 degrees positioning reduces the incidence of VAP in patients with SAH requiring mechanical ventilation. This is especially important given the higher risk of VAP for SAH patients compared to the national average of neurosurgical patients (10.9 per 1000 ventilator days in Germany and 11.2 per 1000 ventilator days in the US) demonstrated in this cohort.
Recent randomized clinical trials have shown that management protocols governing sedation and analgesia, lung protective ventilation, hypoglycemia control, and the use activated protein C for severe sepsis improve the outcome of the critically ill. Between 2002 and 2003 we introduced management protocols pertaining to these 4 areas of our ICU practice. Although the impact of each protocol on patient outcome has been well described, the overall impact of introducing multiple evidence-based protocols on patient outcome has not been carefully studied. This latter was the aim of this report.

METHODS. In this retrospective, cohort study, we reviewed the APACHE III database of a 24-bed ICU. We considered the years 2000 and 2001 as the pre-protocol period, 2002 and 2003 as the transition period and 2004 as the protocol period. We obtained demographic data, Acute Physiology Score (APS), Acute Physiology and Chronic Health Evaluation (APACHE) III score, predicted hospital mortality rate and patient outcome. We created a multiple logistic regression model by entering hospital mortality as a dependent variable and the predicted hospital mortality rate and the three periods as independent variables.

RESULTS. A total of 7,450 were included in the study: 2,585 in the pre-protocol, 3,167 in the transition and 1,698 in the protocol periods. The mean APS, APACHE III score and predicted hospital mortality rates were 46.4, 59.9 and 21.1%, respectively. There were no significant differences in demographics and in the mean predicted hospital mortality rates between the pre-protocol (20.7%), transition (21.3%) and protocol periods (21.2%). In contrast, the observed mortality rate declined significantly from 19.5% and 18.9% to 15.4% over the same time span. Accordingly, the standardized mortality ratios (95% confidence intervals) were 0.94 (0.86-1.03), 0.88 (0.81-0.96) and 0.73 (0.64-0.82) for the pre-protocol, transition and protocol periods, respectively. The logistic regression model showed the odds ratio for hospital mortality was 0.68 (95% CI, 0.57-0.83) for the protocol period using the pre-protocol period as reference.

CONCLUSION. While comparisons of outcomes to historic data can never establish cause and effect, our observations support the hypothesis that introducing best practice algorithms save lives.

Grant acknowledgement. Mayo Clinic Clinical Practice Innovation Program

INAPPROPRIATE REFERRALS TO THE INTENSIVE CARE UNIT

Georgiou A P, Whaley A
1Intensive Care, The Bristol Royal Infirmary, Bristol, United Kingdom

INTRODUCTION. Given the demand for intensive care unit (ICU) beds and the increased mortality amongst appropriately referred patients refused admission to ICU, a senior intensivist must base the decision on whether to admit all referred patients on the ward or in A&E. We undertook the following study to identify inappropriate referrals to ICU and the time taken for assessment, during which the unit may be unnecessarily and dangerously understaffed by senior intensivists.

METHODS. Every referral made to the ICU of the Bristol Royal Infirmary between 15/7/03 and 5/8/03 was assessed by means of detailed questionnaire by the SpR or consultant involved.

RESULTS. 48 referrals were received, 55% of which were deemed appropriate, 38% inappropriate and 7% were equivocal. 66% of referrals resulted in senior ICU staff being absent from the unit for up to 1 hour. Fulfilling one or more of the criteria for calling the MET team had a sensitivity of 81% and a specificity of 36% for being an appropriate referral. The referral of patients who had been investigated with >4 basic techniques (venous or arterial blood, CXR, urinary catheter, IV fluids if appropriate, cannula sited, central line) was significantly more appropriate than those who had received <3 investigative techniques (p=0.003). Discussing the patient with the responsible consultant prior to referral increased the appropriateness from 44% to 70%. Combining consultant discussion with >4 investigations resulted in an 80% appropriate referral rate; not discussing with their consultant and carrying out <3 investigations resulted in a 29% appropriate referral rate.

CONCLUSION. Of the 2.3 referrals received by our ICU each day 38% were deemed inappropriate, the factors contributing to which being: not discussing the patient with the responsible consultant, inadequately investigating patients prior to contact with ICU and not fulfilling one or more of the calling criteria for the MET team (together accounting for 89% of inappropriate referrals). By using this data as a framework, it is hoped that hospital teams may significantly improve the appropriateness of ICU referrals, averting dangerous understaffing of ICU by senior intensivists.

REFERENCE(S). 1. Metcalfe MA, Sloggett A, McPherson K. Mortality among appropriately referred patients refused admission to intensive care units. Lancet 1997;350:7-11.
2. Medical Emergency Team, Liverpool Hospital, Australia.
499

POST-INTENSIVE CARE MORTALITY
Cambra P V, Mourelo P M; Rascado P P; Solla P M; Alvarez-Lata P R; Mosteiro P P; Gonzalez-Chani P B; Alvarez-Rocha P L
1Intensive Care Unit, Juan Canalejo University Hospital, A Coruña, Spain

INTRODUCTION. To analyze the post-ICU mortality rate of our hospital comparing with other methods and to identify associated factors.

METHODS. Prospective cohort study of 1307 patients from March 2003 to August 2004 admitted in intensive care unit (ICU). We analyzed demographic characteristics, comorbidities, APACHE II/ICU evolution and hospital ward. Quantitative variables were compared by t-test and for categorical variables we used x2-test. Logistic regression was used for other independents factors. A p<0.05 was considered statistically significant.

RESULTS. During the period study 1307 patients were admitted in our ICU: 68.5% male, 54.6 years old. Accreditation is an internationally recognized process through which healthcare organizations are able to improve the safety and quality of services delivered to patients. The focus of accreditation is to help organizations understand what they are doing well and what opportunities are available for improvement. In a hospital accreditation there is emphasis on structure, documentation, the clinical process and outcomes of care. Although patients in ICUs occupy between 5% and 10% of the hospital costs there are few published data about the role of critical care unit director in a hospital accreditation process.

498

500

CRITICAL CARE WITHOUT WALLS-A LEVEL OF CARE STUDY FOR THE GREATER MANCHESTER CRITICAL CARE NETWORK
Kapila I, Murphy P
1Critical Care, Greater Manchester Critical Care Network, Manchester, United Kingdom

INTRODUCTION. In 2000 an expert working group reviewed the provision of Critical Care Services across the UK(1) and advocated a hospital wide approach to 'Critical Care Without walls'. This report described a change in organizational thinking and introduced the idea of Levels of Care. The Greater Manchester Critical Care Network consists of 12 NHS hospital critical care units. The Greater Manchester Critical Care Network describes a change in organizational thinking and introduced the idea of Levels of Care. The Greater Manchester Critical Care Network is a hospital wide approach to 'Critical Care Without walls' (NHPR). We analyzed those HPR actions and subdivided this group as critical care-specific (CCS); critical care-related (CCR) and non-critical care (NCC) actions into two groups named as healthcare provider-related (HPR) and non-healthcare provider-related actions. A list of actions to be taken in order to achieve compliance with accreditation standards was made and those actions were divided into two groups named as healthcare provider-related (HPR) and non-healthcare provider-related (NHP). We analyzed those HPR actions and subdivided this group as critical care-specific (CCS); critical care-related (CCR) and non-critical care (NCC) actions.

RESULTS. 6199 patients were surveyed and their level of care assessed. The results were as follows: Level 0 = 4535 patients (73.15%); Level 1 = 1354 patients (21.84%); Level 2 = 232 patients (3.74%); Level 3 = 78 patients (1.25%). Greater Manchester Critical Care Network has a General Adult Critical Care bed stock of 73 level 2 beds, 82 level 3 beds. The Critical Care Network has 73 level 2 beds and the audit identified 232 level 2 patients (55.68% of these patients the time of the audit could not access a Level 2 bed) despite their condition warranting care in an HDU area. The care delivered to this group of patients is therefore by staff trained for a Level 0/1 area. With 82 level 3 beds, capacity for level 3 patients was appropriate on this day with 5 beds available. The Networks patient transfer activity for 2004 was 450 Medical transfers and 300 Clinical Transfers.
503 WORLDWIDE RESEARCH PRODUCTIVITY IN CRITICAL CARE
Michalopoulos A, Bliziotis F, Rizos M, Rellios K, Dimitriadou E, Bourouinis V, Falagas M* ICU, Internal Medicine, Henry Dunant Hospital, Athens, Greece

INTRODUCTION. The number of publications and the impact factor of journals are accepted estimates of the quantity and quality of research productivity. The objective of this study was to assess the worldwide scientific contribution in the field of Critical Care Medicine.

METHODS. All research studies published between 1995 and 2003 in medical journals that were listed in the 2003 Science Citation Index (SCI®) of Journal Citation Reports under the subheading Critical Care and also indexed by PubMed database were reviewed in order to identify their geographical origin.

RESULTS. Of 22976 critical care publications in 14 medical journals, 17630 were originated from Western Europe and the USA (76.7%). A significant increase in the number of publications originated from Western European countries was noticed during the last 5 years of the study period. Scientific publications in Critical Care Medicine increased significantly (25%) from 1995 to 2003, accompanied with an increase of the impact factor of the corresponding journals (47.4%). Canada and Japan had the better performance based on the impact factor of journals.

CONCLUSION. A significant scientific progress in Critical Care research took place during this period. Leaders of research productivity were Western Europe and USA. Publications in the field of Critical Care Medicine originated from Western European countries significantly increased in quantity and quality within the study period.

504 POSTGRADUATE EDUCATION: IS THERE A RIGHT POINT OF TIME FOR SEPSIS SIMULATION COURSES?
Rau J, Schröder T, Bosse G, Volk T, Spies C* Klinik für Anästhesiologie und operative Intensivmedizin, Charité Campus Mitte, Berlin, Germany

INTRODUCTION. Sepsis is one of the leading causes of death in intensive care medicine (ICM). The rapid diagnosis and management of sepsis is critical to successful treatment. Since 1999 we have integrated diagnostic and treatment feature of severe sepsis into our Berlin Simulation Training in order to optimize team functions. Lectures and interactive simulation scenarios are combined and discussed. Participants are postgraduates with differing professional experience in ICM (PE).

METHODS. To evaluate the structure, content and impact of those courses participants of four simulation courses in 2004 were given anonymous questionnaires both in advance and immediately after the course. 28 pairs of items were defined to measure the acquirement of knowledge in sepsis and the impact of several teaching.

METHODS. Participants were also asked whether the course content should have been given earlier or later during their postgraduate training. Answers were given on a five point scale (Likert-like) and results are given as median and interquartile range (IQR).

RESULTS. Participants’ PE in ICM varied from two months to 14 years. All participants expressed benefits from the course. Both lectures and scenarios were evaluated helpful to identify sepsis patients earlier. Most of the participants thought that the course was at a right point of time during their postgraduate training (PT) (n=15, median of ICM/PE 1.5a, IQR 1-4a) and 12 participants thought that this course would have been even more helpful if had been given earlier during their PT (n=12, PE 2.5a (1.5-5.5a)).

CONCLUSION. Simulation courses to train early identification and timely treatment of septic patients are very helpful and appreciated at every stage of PE in ICM. Simulation courses should be integrated as early as possible.

505 CRITERIA INVOLVED IN THE DECISION TO ADMIT OLDEST OLD PATIENTS IN ICU FROM THE EMERGENCY DEPARTMENT
Boumedien A, Avéert P, Garrouste-Orgeas M, Patéon D, Somme D, Guerit B* U707, INSERM, Bioréactoplaque, Hôpital A Paris, Réanimation, Hôpital St-Joseph, Paris, Urgences, Hôpital Jean Verdier, Bondy, *Gériatree, HEGP, Réanimation, Hôpital St-Antoine, Paris, France

INTRODUCTION. There is no published recommendation regarding specifically admission of oldest old patients to intensive care (ICU). Patients over 80 years need a specific evaluation in acute care setting, therefore not only diagnosis should be involved in the decision to admit an oldest old patient to ICU. General recommendations are made for intensivists, however the first triage occurs in the emergency department. This study aimed to evaluate criteria involved in the decision of emergency physicians to propose oldest old patients to ICU and in the decision of intensivists to admit those patients to ICU.

METHODS. A panel of experts made a list of 12 elements that should be involved in the decision to admit or refuse an old patient with a diagnosis or clinical sign requiring ICU admission. The analytic hierarchy process was used to aggregate opinion of emergency physicians and intensivists on relative importance of those elements. Intensivists and emergency physicians of 15 centers involved in a multicenter study on admission of oldest old patients to ICU were provided with a 66 items-long questionnaire. Physicians had to compare elements involved in the decision pairwise and had to express their judgment by giving a real number from 1 to 9, 1 corresponding to equity and 9 to extreme dominance of an element.

RESULTS. 163 questionnaires were returned, 60% were completed by emergency physicians. Emergency physicians ranked “severity” as the most important element involved in their decision followed by “patient wishes”, “autonomy”, “dementia”, “debilitating illness”, “nutrition”, “locomotion”, “decubitus ulcer”, “recent hospitalization”, “family wishes”, “treatment”, “social support” being the less important. Intensivists ranked “dementia” as the most important element involved in their decision followed by “autonomy”, “patient wishes”, “severity”, “debilitating illness”, “locomotion”, “decubitus ulcer”, “family wishes”, “nutrition”, “social support”, “recent hospitalization”, “treatment” being the less important.

CONCLUSION. In this declarative survey, both ICU and emergency physicians consider the same 4 items to decide whether an oldest old patient should be proposed/admitted to an ICU, dementia being the strongest element to deny ICU admission for ICU physicians.

Grant acknowledgement. This study was granted by the french ministry of health (PHRC AOM 03/055)

506 IS THERE ADEQUATE CRITICAL CARE BED PROVISION? A NEEDS ASSESSMENT
Jermin S P*, Kapila P, Dyson M* Critical Care, South Manchester University Hospital, Manchester, United Kingdom

INTRODUCTION. There is a recognised shortage of ICU beds in the UK. Critical care outreach services help reduce pressures on critical care by providing clinical support, increasing staff skills and by providing educational support. Early identification of sick patients may lead to a reduction in number of admissions to ICU, length of time in hospital and ICU stay. This study aims to compare the level of care all inpatients on a normal ‘in hours’ day/week/day/weekend with those of all inpatients on an average winter ‘out of hours’ day (Sunday).

METHODS. Data was collected from every inpatient in the hospital (excluding psychiatric, paediatric and long-term rehabilitation patients) on an average Tuesday in April 2004 between the hours of 0900-1600 and then on a Sunday in January 2005 between the hours 0900-1600. Data consisted of level of caring UK Intensive Care Society definitions (3) during both periods but also included demographic details (for the second period Presence of respirator/ventilator as an index of deterioration) recording was also noted for the second period.

RESULTS. 641 patients were studied in April 2004 and 642 patients in January 2005. Levels of care for both periods are shown in the table below.

| LEVEL OF CARE | TOTAL | LEVEL 0 | LEVEL 1 | LEVEL 2 | LEVEL 3 |
|---------------|-------|---------|---------|---------|---------|
| APRIL 2004    | 614(1,00%) | 375(58.41)% | 205(31.93)% | 53(8.26)% | 9(1.40)% |
| JANUARY 2005  | 614(1,00%) | 375(58.41)% | 205(31.93)% | 53(8.26)% | 9(1.40)% |

CONCLUSION. The current complement of level 2 and 3 beds in the hospital is 18 and 20 respectively on staffing levels respectively. Despite some flexibility in using level 3 beds for level 2 patients and assuming an 80% bed occupancy, there is a considerable need for more level 2 capacity particularly during the winter period. Expansion of the current theatre recovery area into a 4 bedded post-operative HDU could provide additional beds. Outreach services would also need to be vastly extended.

REFERENCE(S). 1. DoH UK 2000 Comprehensive Critical Care. 2. Critical Care 2003;327;7422; 104. 3. UK Intensive Care Society Levels of Care.
507 PROSPECTIVE ANALYSIS OF NURSE WORKLOAD IN ICU - WORK UTILIZATION RATIO

Santos L S, Ferreira P P, Pinheiro F L, Aleixo A
*Medical Intensive Care Unit, São Francisco Xavier Hospital, Lisboa, Portugal

INTRODUCTION. The objective of this study was to evaluate the use of human resources in ICU comparing the planned level with the operative level.

METHODS. Prospective study involving all the patients admitted in the ICU between 2001 and 2004. Simplified Therapeutic Intervention Scoring System (TISS 28) was used to assess nurse workload in the ICU. Provision of resources was measured as the number of nurses per ICU bed (patient nurse ratio – P/N). The operative level of care was calculated dividing the measured TISS points equal to the nursing activities of one nurse per shift. The efficiency in the use of nursing manpower was based on the number of available nurses, the amount of work that one nurse can perform per shift and the level of TISS during the study. The work utilization ratio was calculated. Severity of illness was evaluated by the APACHE II score.

RESULTS. During the study period 161, 222, 263 and 277 patients were admitted to the ICU in 2001, 2002, 2003 and 2004 respectively.

|                   | 2001   | 2002   | 2003   | 2004   | p    |
|-------------------|--------|--------|--------|--------|------|
| APACHE II (mean)  | 22.9   | 23.0   | 23.1   | 25.1   | 0.04 |
| Mortality (%)     | 32.9   | 36.0   | 38.6   | 35.7   |      |
| TISS 28 (mean)    | 30.1   | 29.0   | 30.9   | 31.9   | <0.001|
| Planned Level of care (P/N) | 2.1   | 2.1   | 2.1   | 2.1   |      |
| Operative Level of care (P/N) | 1.51  | 1.51  | 1.51  | 1.51  |      |
| Work utilization ratio (%) | 110  | 110   | 111   | 111   |      |

CONCLUSION. The APACHE II score remained elevated through the study period. The measured TISS was higher than planned and as a result the workload utilization ratio was above 100%. Nevertheless the number of patients admitted increased every year and the mortality remained lower than the expected by the APACHE II score.

508 QUALITY PROOF CONTROL IN ICU MEDICAL INTERVENTIONS

Efstathiou E1, Zaka M1, Farmakis M1, Kambolis C2, Denaxa A1, Livadiotou M1, Fountoulis A1, Basile A1, Tsioligla A1, Pragastis D
*Intensive Care Unit, Metaxa Oncologic Hospital, Piraeus, Intensive Care Unit, Euroclinic Athens, Athens, Greece

INTRODUCTION. Performing every interventional procedure strictly lege artis is of significant importance not only to the patient, but also to the medical personnel. Ensuring the maximum alertness to stay strict to the rules and performing by book leads to minimal complications, more wise decisions and reduction of the cost as it minimizes the single use material waste.

METHODS. In our polyvalent six bed ICU we installed cameras providing full surveillance of each patient. The surgical team reviewed the collected videos every 5 days. We totally registered 62 central vein catheterizations, 5 bronchoscopies, and six chest drainage procedures. All procedures were performed every interventional procedure strictly lege artis is of significant importance not only to the patient, but also to the medical personnel. Ensuring the maximum alertness to stay strict to the rules and performing by book leads to minimal complications, more wise decisions and reduction of the cost as it minimizes the single use material waste.

RESULTS. Of 344 patients admitted from medical ICU between May and October 2003, 48 (13.4%) were hospitalised because of almost one organ failure related to ADR. 31% of cases ADR were potentially avoidable. Coma, seizures with acute respiratory failure and metabolic life-threatening disorders were the most frequently avoidable ADR and linked to drugs prescribed in a short delay before admission. Artificial life support was required in 83% of cases. Vasopressives drugs were prescribed in 12 cases, hemodialysis in 5, non-invasive ventilation in 12, and mechanical ventilation was needed in 16 cases. The mean of Simplified Acute Physiologic Score II of work load Omega score, of length of stay and the rate of mortality were not significantly different between patients with or without ADR.

CONCLUSION. Serious ADR were a frequent reason of admission (13.4%) and were often potentially avoidable if cautions of prescriptions would have been taken into account. Measures are needed to improve ADR detection and reduce drug-induced morbidity.

REFERENCE(S). Bates DW, et al. Incidence of adverse drug events and potential adverse drug events: implications for prevention. JAMA 1995;274:29-34.

Duchy B, et al. Iatrogenic diseases as a reason for admission to the intensive care unit. Arch Intern Med 1999;159:71-78.

510 CORRELATION BETWEEN SEVERITY OF ILLNESS AND ICU COSTS IN GERMAN UNIVERSITY HOSPITALS

Moerer O1, Brock E2, Schneider I2, Burchardi H1
1Dept. Anaesthesiology, Emergency and Intensive Care Medicine, University Hospital Goettingen, Gottingen, Germany; 2HealthEcon AG, Basel, Switzerland

INTRODUCTION. Australian experiences with existing DRG systems have shown the adequate reimbursement of intensive care services costs in large teaching hospitals to be problematic [1], thereby increasing providers’ financial risk considerably [2]. In future, reimbursement in Germany will be based on a special procedure (OPS 301) which may be quantified through a specific, patient-dependent cost predictor score. The aim of this study was to develop and validate such a score capable of predicting the total direct costs of intensive care services in large teaching hospitals.

METHODS. Individualized clinical as well as economic information was collected for all consecutive patients across 15 mostly surgical ICUs in 10 university hospitals across Germany during a 2-month period. Resource consumption covered hotel and personnel costs, medication, laboratory tests, diagnostic and invasive procedures. Resources were valued with local costs through bottom up costing. An "ICU cost predictor score" (ICU-CPS) was devised by combining a routine measure of severity of illness (daily SAPS II score without GCS) with a daily measure of selected medical interventions (10 highly rated parameters of TISS-28: mechanical ventilation, multiple actions outside ICU) during the entire ICU stay.

RESULTS. Based on a preliminary analysis of 892 patients from 12 ICUs, the ICU-CPS demonstrated a strong positive correlation of 0.871 (p < 0.01, 2-tailed) with total ICU costs. This coefficient varied from 0.778 to 0.921 between ICUs. The correlation of the ICU-CPS score with costs was better than that of SAPS II (without GCS) (0.850, p<0.01, 2-tailed). The mean ICU-CPS per day was 37 ± 15 (mean ± SD). Average costs per day were €1,272 ± 611. On average, each score point of the ICU-CPS thus corresponded to a cost of €34.

CONCLUSION. The preliminary results of this study indicate that intensive care services may be adequately reimbursed on the basis of the ICU-CPS predictor score, taking into account patients’ acute severity of illness as well as required medical interventions.

REFERENCE(S). 1. Duckett SJ. Med J Aust 1998;169:17-21. 2. Hansen D, Braun J. fduk 2003;20:156-16

Poster Sessions
Pharmaceutical and costing issues 509-522

509 ADVERSE DRUG REACTION INDUCED ORGAN FAILURE AS A REASON FOR ADMISSION TO INTENSIVE CARE

Grenouillet M C1, Molimard M1, Moorse N1, Harambura F1, Begad B1, Guisset O2, Gabinski C1
1Medical intensive care, Bordeaux University Hospital, Pharmacology U873 INSEERM, Bordeaux, V. Segalen university, Bordeaux, France

INTRODUCTION. Adverse drug reactions (ADR) are common in hospitalised patients, but few empirical data are available regarding patients with serious ADR requiring intensive medical care. As morbidity linked to ADR remain underestimated, delay for diagnosis may contribute to organ failure requiring artificial life support. The aim of this study was to determine the proportion of admissions related to serious ADR and potential avoidability.

METHODS. We have prospectively included all adult patients coming from university hospital admitted in a 14-bed medical intensive care unit (ICU) in a french university hospital in Bordeaux, France, during a 6-month period. For each patient, we have determined if serious ADR have contributed to organ(s) failure(s) requiring admission by follow-up and with 2 independent clinical pharmacologists. Clinical pharmacologists have estimated the strength of relationship between drug(s) prescribed in hospital and potential avoidable ADR as the cause of organ failure.

RESULTS. Of 344 patients admitted from medical ICU between May and October 2003, 48 (13.4%) were hospitalised because of almost one organ failure related to ADR. 31% of cases ADR were potentially avoidable. Coma, seizures with acute respiratory failure and metabolic life-threatening disorders were the most frequently avoidable ADR and linked to drugs prescribed in a short delay before admission. Artificial life support was required in 83% of cases. Vasopressives drugs were prescribed in 12 cases, hemodialysis in 5, non-invasive ventilation in 12, and mechanical ventilation was needed in 16 cases. The mean of Simplified Acute Physiologic Score II of work load Omega score, of length of stay and the rate of mortality were not significantly different between patients with or without ADR.

CONCLUSION. Serious ADR were a frequent reason of admission (13.4%) and were often potentially avoidable if cautions of prescriptions would have been taken into account. Measures are needed to improve ADR detection and reduce drug-induced morbidity.

REFERENCE(S). Bates DW, et al. Incidence of adverse drug events and potential adverse drug events: implications for prevention. JAMA 1995;274:29-34.

Duchy B, et al. Iatrogenic diseases as a reason for admission to the intensive care unit. Arch Intern Med 1999;159:71-78.
511

THE SHUTTLE WALKING TEST AND CRITICAL CARE COSTS POST OESOPHAGOGASTROTECTOMY

Whiting P C 1, Murray P, Hutchinson S P, Stoddard C J, Akroyd R, Edbrooke D L J, Negrini D
1 Anaesthesia and Critical Care, General Surgery, 3MERCS, Sheffield Teaching Hospitals, Sheffield, United Kingdom

INTRODUCTION. The Shuttle Walking Test (SWT) has been previously shown to correlate well with patient’s maximal oxygen uptake (VO2max)(1,2,3). Older et al demonstrated that an Anaerobic Threshold (AT) of <11ml/min/kg, in patients undergoing major abdominal surgery, was an excellent predictor of mortality from cardiorespiratory causes(4). Our aim was to assess the value of a preoperative SWT in trying to identify postoperative critical care utilisation.

METHODS. Of the 93 patients listed for oesophagectomy between April 1st 2002 and 31st March 2005, 51 undertook a SWT as a standard part of their preoperative assessment. Routine anaesthesia, surgery and critical care was provided guided by clinical requirements. Critical care usage was noted and critical care costs calculated(5).

RESULTS. 51 patients undertook a SWT, had surgery and went to critical care. No patient with a SWT of greater than 350 metres died within 30 days of surgery. Patients with a SWT of <350 metres had a 30-day mortality of 56%. Logistic regression was used to calculate a SWT of 350 metres, a distance that would predict a 50% probability of remaining on ICU at day 30. The average attributable critical care costs in those with a SWT of <350 metres were £15098 per admission compared with £4852 in those managing >351 metres. The average length of critical care stay also differed being 15.7 days in the <350 metre cohort, compared with 7.4 days in the >350 metre cohort.

CONCLUSION. A SWT of 350 metres appears to be a sensitive marker of increased postoperative mortality and critical care utilisation in this particular patient population. This finding is consistent with Lewis’s(2) data correlating SWT distance with VO2max and Older’s(4) work on anaerobic threshold and perioperative outcome. Further evaluation is required, but using this simple, cheap and reliable non-invasive preoperative test may help risk stratify patients undergoing high-risk surgery and allocate critical care resources appropriately.

REFERENCE(S). 1. Morales FJ et al. Am Heart J. 1999; 138: 291-298. 2. Lewis ME et al. Heart 2001, 86: 183-187. 3. Singh SJ et al. Eur Resp J. 1994; 7: 104-20. 4. Older P et al. Chest 1999; 116: 355-362. 5. Edbrooke D et al. Anaesthesia 1999; 54: 110-120

512

PROJECTED IMPACT OF EARLY GOAL DIRECTED THERAPY (EGDT) ON HOSPITAL RESOURCE UTILIZATION

Bartlotta K 1, Seccy K 1, Sawyer R G 2, Elharb M 1, Osborn T M 1
1 Department of Emergency Medicine, 2 Department of Surgery, Surgical-Trauma Critical Care, Department of Emergency Medicine, Surgical-Trauma Critical Care, University of Virginia Health System, Charlottesville, United States

INTRODUCTION. EGDT has shown significant reduction in mortality and health care resource consumption and is recommended by the Surviving Sepsis Campaign(1). This study assessed data from severe sepsis and septic shock patients prior to implementation of an EGDT program and projected the potential impact on resource utilization at our hospital.

METHODS. We queried the clinical data repository and found 1081 emergency department ED/patients admitted from Jan 2002-Dec 2004 meeting search criteria including: patients >18 years, hospital admission from the ED with documented infection, antibiotic treatment and requiring vasopressors (day 0.1), ventilator assistance (day 0.1), new dialysis (day 0.7) or a serum lactate >4mmol/L. Exclusion criteria were admission GI bleed or traumatic injury. Based on resource utilization data from the Henry Ford Health Systems corporate data stores, percent differences between EGDT and non-EGDT groups were calculated and applied. Assuming constant mortality, the projected impact on hospital resource consumption and costs was assessed.

RESULTS. Cost savings was associated with survivors. Increased costs were noted in non-survivors. Cost benefit favored EGDT.

TABLE 1.

|          | Alive | Dead | Sub-Total | Alive | Dead | Sub-Total | Alive | Dead | Sub-Total |
|----------|-------|------|-----------|-------|------|-----------|-------|------|-----------|
| ICU      | 16,239,857 | 6,423,886 | 22,663,743 | 6,317,304 | 8,473,106 | 14,790,410 |
| Non-ICU  | 8,546,423 | 1,376,651 | 9,923,074 | 9,793,778 | 988,406 | 10,782,723 |
| Total    | 24,786,280 | 7,800,537 | 32,586,817 | 16,111,082 | 9,462,501 | 25,573,533 |

CONCLUSION. EGDT can improve hospital resource utilization as well as improve patient outcomes. Further analysis and verification of EGDT cost effectiveness is warranted.

REFERENCE(S). 1. Rivers E., et al. Early Goal-Directed Therapy in the Treatment of Severe Sepsis and Septic Shock. NEJM 2001;345(19):1368-1377. 2. Dellinger RP, et al. Surviving sepsis campaign guidelines for management of severe sepsis and septic shock. Crit Care Med 2004; 32(3):858-872

513

ANALYSIS OF TREATMENT COST COMPONENTS OF SEVERE SEPSIS IN HUNGARY

Cosmos A 1, Hoffer G 2, Fuleczi B 2
1 Anaesthesiology and Intensive Care, Markhot Teaching Hospital, Eger, 2 Contract, Health Economist, 3 Anaesthesiology and Intensive Care, Medical University, Debrecen, Hungary

INTRODUCTION. The aim of our study was to analyse variable cost determinants of severe sepsis treated in intensive care units in Hungary.

METHODS. We selected a non-random sample of 6 intensive care units. Each unit identified 10 patient retrospectively, who were treated with severe sepsis. The resource use of variable costs were collected on a daily basis (for day 1-3) from medical and nursing documents. These costs were divided into disposables, radiology, biochemistry, blood products and drug&fluids. Personnel costs were calculated from annual salary report and the indirect costs were calculated by the financial directors.

RESULTS. The mortality of severe sepsis in our sample (n=60) was found to be 61.6 %, with average length of stay 15.9 (SD 9.2). Mean ICU cost per day of severe sepsis was 429 Euro. There were no differences found between day 1-3 cost of radiology, biochemistry and blood products, however, disposables had much higher cost on day 1 (p=0.002). Drug&fluids costs were higher on day 1 only for those patients who did not survive. Analysing drug&fluids by grouping them into 7 categories, we found that colloid use was significantly higher on day 1 in those, who died later (1013 ml vs. 1244 ml, p=0.045). There was no correlation found between APACHE II scores and any cost components.

TABLE 1.

|          | SURVIVED (n=23) | DIED (n=37) | p value |
|----------|-----------------|-------------|---------|
| Drugs&fluids Day 1 | 103.6 | 152.8 | 0.035 |
| Disposables Mean per day | 66.9 | 144.3 | 0.007 |
| Drugs&fluids Mean per day | 39.8 | 88.5 | 0.004 |
| Disposable Mean per day | 113.4 | 137.4 | 0.286 |

CONCLUSION. The mortality of sepsis is very high in our sample. Invasive monitoring is responsible for higher disposables cost in those, who died. More colloid use on day 1 for those who did not survive reflects the severity of hypovolaemia in these patients.

REFERENCE(S). 1. Bloomfield EL. The impact of economics on changing medical technology with reference to critical care medicine in the United States. Anesth Analg. 2003; 96: 418-25.

514

A COMPARISON OF ICU PHYSICIAN STAFFING COSTS AT THE 3 MAYO CLINICAL SITES

Blomfield EL 1, Divertie G 1, Burger C 1, Larson J, Patel B 1, Rady M 1, Johnson M 1, Brown D 1, Murray M 1
1 Department of Anesthesia and CCM, Mayo clinic Jacksonville, Jacksonville Florida, United States, 2 Department of CCM, Mayo clinic Jacksonville, Jacksonville Florida, 3 Department of CCM, Mayo Clinic Scottsdale, Department of CCM, Mayo clinic Scottsdale, Scottsdale Arizona, 4 Department of CCM, Mayo Clinic Scottsdale, Scottsdale, 5 Department of CCM, Mayo Clinic Jacksonville, Jacksonville Florida, 6 Department of Anesthesia and CCM, Mayo Clinic Rochester, Rochester Minnesota, United States

INTRODUCTION. The cost of health care in the USA has increased to overall amounts in excess of 1.5 trillion dollars. ICU care is one of the highest.(1) We sought to determine the provider cost of administering ICU physician services on a 24/7 basis comparing 3 different staffing models for ICU coverage. We then compared the costs of using house staff versus nonphysician providers (NPP).

METHODS. Data was collected on total staff composition and number of beds in the ICUs at the 3 Mayo clinic sites. National average staff salaries were used to determine total staffing costs per ICU bed per year at each site. Medicare medical education reimbursements were also taken into account.

RESULTS. Costs per ICU bed per year for physician staffing were $13,757 in Rochester, $37,515 in Jacksonville, and $32,593 in Scottsdale. Substitution with NPPs for house staff resulted in a costs per bed of $52,864 in Rochester, $61,291 in Jacksonville, and $32,593 in Scottsdale. Incremental costs per ICU bed using NPPs were $39,107 in Rochester, $23,776 in Jacksonville, and $25,797 in Scottsdale.

CONCLUSION. Utilization of residents and fellows in ICU staffing at a major tertiary health center is more cost efficient than use of NPPs. This could have implications for the cost of physician services in community hospitals and the methods by which care is provided.

REFERENCE(S). 1. Bloomfield EL. The impact of economics on changing medical technology with reference to critical care medicine in the United States. Anesth Analg. 2003; 96: 418-25.
515
PHARMACY COSTS AND THEIR EVOLUTION, IN A MULTIDISCIPLINARY ICU OF A REFERRING TEACHING HOSPITAL
Abizanda R1, Nicolás-Pico J2, Mateu-Campos L3, Curregui-Tusón R4, Sánchez-Morán P1, Mas-Fort S1, Ferrándiz-Sellés A1
1Intensive Care Department, Hospital Universitari Associació General de Castelló, CASTELLÓ, Spain

INTRODUCTION. When no ICU specific analytical accounting is available, the only indicators of direct costs are the number of ICU stays per patient, and pharmacy costs. It is usually accepted that these pharmacy costs represent between 10 and 15 % of total costs, and that they are very much influenced by therapeutic attitudes of the attending teams and the introduction of new pharmacological options or the change in the already existing ones. Our aim is to analyze the changes in pharmacy costs occurred during the interval between 1996 and 2003.

METHODS. This is a retrospective analysis performed on a multidisciplinary 19 beds ICU activity, in a teaching referral hospital. The analysis has been performed through data coming from the managerial departments and the Pharmacy Service, and costs have been classify as related to therapeutic group (Pharmacy instructions from the Spanish National Health System) and to individual active drugs. The analysis collects information raised from the ICU daily patients chart.

RESULTS. Pharmacy costs amount ranged between 16.8 % in 1996 and 12.3 % in 2002. Since then a slight increment in pharmacy costs has been detected up to 14.6 %. The reasons for cost increments are linked to the progressive control on albumin use and antibiotic policies. By the contrary, increasing percentages are associated to the introduction of new sepsis therapeutic approaches (drotrecogin) and the routine introduction of antplatelet agents in non elevated ST coronary syndromes. The “top twenty” drugs cost evolution is presented, and in a constant fashion the two first places represent the use of sedatives (propofol) and fibrinolytic agents in AMI (tegacyalase).

CONCLUSION. Facts that allow or avoid to keep the stability of what pharmacy costs represent are strictly linked to changes in physician attitudes (abandon of non demonstrable efficacy of certain agents – albumin - , the incorporation of new options – drotrecogin, antplatelets – and the maintenance of consolidated practices – fibrinolytic agents, sedatives, nutritional strategies. Physician teams are obliged to keep this information “alive” in order to avoid unnecessary raises in direct costs.

516
WHAT ARE THE INTENSIVIST’S DECISIONS THAT DETERMINE THE COST PER PATIENT DURING THE ICU STAY?
Sauna P1, Ortiz D2, Peer I2, Fernández R2, Artigas A2
1Critical Care Center, Hospital de Sabadell, Sabadell, Spain, 2Critical Care Center, Hospital de Sabadell, Sabadell,

INTRODUCTION. The role of ICU staff on cost containment is a matter of debate being drugs consumption, diagnostic test and fungible the main able to be improved. We hypothesised that these items could have the major impact in cost variability per patient in the ICU. Our objective was to prospectively evaluate the relative role of these variables compared with other classical items as length of stay, quality of life, age, severity of illness.

METHODS. Design: Prospective cohort study

Setting: 26-bed Intensive care unit

Patients: 200 consecutive patients with a length of stay longer than 24 hours.

Measurements: We prospectively recorded: demographic data, SAPS II score and Diagnostic Related Group on admission, length of ICU stay, Health-related quality of life (Euroqol 5D), and consumption of fungible, pharmaceutical and diagnostic procedures. The costs of the fungible, pharmaceutical and diagnostic tests were recorded from the hospital administrative database as cost per unit. We elaborated a multivariate linear predictive model in order to analyse the variables causing the variability of the cost per patient.

RESULTS. Patient’s age was (values expressed as mean [95% confidence interval]) 57.9 [54.7-61.2] years, 46% were male. The SAPS II score was 35.2 [30.2-35.9]. In a multivariate analysis the associated cost in euros (values expressed as coefficient value [95% confidence interval]) was only significantly related to: interventional radiologists procedures (3982.2 [3198.4-4766], days of stay (174.2 [159.6-188.8]) and dialysis procedure (824.6 [184.3-1464.9]). The model explained the 84% of the total variance of the cost per stay.

CONCLUSION. Unexpectedly, in our model the length of stay was the only variable affected by clinician’s decisions able to reduce the cost per patient. Drugs or diagnostic tests did not significantly influence the cost per patient.

Grant acknowledgement. FIS 02/1524

517
ENTERAL FEEDING DISCONTINUATIONS IN CRITICALLY ILL PATIENT: PATIENT- VS. MANAGEMENT-RELATED PROBLEMS
Cotogni P1, Bini R2, Forno G3, Porta C4, Alifiti S5, Rainini V M6, Pittiruti M7
1Anestesia e Rianimazione, 2Chirurgia d’Urgenza, 3School of Nursing, University of Turin, Turin, 4Chirurgia Generale, Catholic University, Rome, Italy

INTRODUCTION. Enteral nutrition (EN) is the preferred method for nutrient delivery in ICU critically ill patients. Nonetheless, there is always a significant gap between prescribed and delivered feed. This is partly due to ‘patient-related’ problems, e.g. gastrointestinal (GI) intolerance to EN, but also by logistic ‘management-related’ events which imply transient nutrient delivery interruptions, which are often mandatory but sometimes avoidable. The aim of this study (prospective, descriptive study of EN delivery in 4 teaching hospital ICUs) were (a) to analyze the causes for EN transient interruptions; (b) to assess whether a specific nurse training might be associated with better nutrient delivery.

METHODS. In two ICUs (group A), all nurses had been previously trained in EN through a 16 h education module, while nurses of other ICUs (group B) had not. Over a period of 30 months, we studied all ICU pts receiving EN (either alone or combined to parenteral nutrition). Pts receiving EN for < 7 days were excluded. EN was administered as a continuous (24/24 h) intragastric infusion of a standard polymeric diet. We recorded any transient interruption of nutrient delivery lasting more than 15 min, noting the duration and the cause.

RESULTS. We examined 244 pts fed by EN accounting for 2537 EN days (10.4±2.6 days/p). In the groups, patient populations were similar in SAPS, diagnosis on admission to ICU, complications, days of mechanical ventilation and mortality. The main causes of transient EN delivery discontinuation were mechanical (11%), or secondary to diagnostic and therapeutic procedures (59%), or related to true GI intolerance to EN (30%). Comparing groups, we found that group A was characterized by a lower incidence of discontinuations for mechanical causes (p<0.01), as well as by a shorter duration of interruption due to mechanical causes (p<0.01), to procedures (p<0.01), or to intolerance (p<0.01). Also, the difference between prescribed and delivered feed was significantly lower in group A (p<0.001).

CONCLUSION. Our study shows that (a) the majority of discontinuations of EN delivery is secondary to ‘management-related’ causes and not to patient’s intolerance; (b) a specific training in artificial nutrition of the ICU nurses may be effective in increasing nutrient delivery by reducing incidence and duration of those EN discontinuations which are not ‘patient-related’.

518
MORTALITY OF ICU PATIENTS TRANSFERRED FROM OTHER HOSPITALS
McCrossan L1, Walker J2, Harper J3, Wenstone R2, Mawston G4
1Intensive Care, Royal Liverpool University Hospital, Liverpool, United Kingdom

INTRODUCTION. Patient transfer between hospitals is associated with increased mortality (1), and patients transferred from intensive care unit (ICU) to ICU have also been shown to have increased mortality(2). The aim of our analysis was to compare our mortality figures with those of published data.

METHODS. A retrospective analysis of 2,481 patients admitted to a 13-bedded unit in a university teaching hospital over a 6-year period. We compared those patients admitted from our own hospital (INTERNAL) with patients transferred from other ICUs (EXTERNAL ICU) and those transferred from other hospitals from an area outside ICU (EXTERNAL OTHER). We compared ICU mortality with APACHE II predicted mortality and calculated the standardized mortality ratio (SMR).

RESULTS. Over the 6 year period, 2,481 patients were admitted into the ICU. Forty-nine(2%) were transferred from another ICU. 124(5%) were transferred from areas outside the ICU in other hospitals and 2308 (93%) were admitted from our own hospital. Mortality figures are shown in the table.

| TABLE 1. | Number | Mean Age (range) | Mortality % | APACHEII Inmean +/- SD (range) | Mortality Prediction % | SMR | Mean length of stay (days) |
|----------|--------|------------------|-------------|-------------------------------|-----------------------|-----|--------------------------|
| EXTERNAL | 49     | 50 (17-75)       | 13/45 (29%) | 15/6 (4-32)                  | 11 (24%)              | 1.18| 16                       |
| ICU      | 124    | 54 (16-83)       | 61/115 (57%)| 17/6 (31 - 27)              | 37 (5-37)             | 1.47| 8                        |
| OTHER    | 2308   | 56 (16-91)       | 585/2141 (27%)| 161/7 (1-47)               | 471 (22%)             | 1.24| 8                        |

CONCLUSION. Patients transferred from other hospitals had a significant increase in mortality compared with INTERNAL admissions (p<0.05). Those admitted from other ICUs had comparable mortality figures (NS). In contrast to some published data, transfers between ICUs do not seem to confer increased risk of death.

REFERENCE(S). 1. Boyle LC et al. Elective intrahospital admissions versus acute interhospital transfers to a surgical intensive care unit: cost and outcome prediction. J Trauma. 1991 31(7): 915-8. 2. Combes A et al. Adverse effect on a referral intensive care unit’s performance of accepting patients transferred from another intensive care unit. Crit Care Med 2005; 33:705-710.
519 M lizolam tolerance during sedation of critically ill ventilated patients. Eleven year follow-up
Chamorro C, Swiera M A, Ortega A, Valdivia M, Balandin B
1Intensive Care Unit, Hospital Puerta de Hierro, Madrid, Spain

INTRODUCTION. The appearance of sedative tolerance during mechanical ventilation makes difficult the management of mechanically ventilated patients. However, this phenomenon’s incidence and characteristics are little known. The aim of this study is to evaluate midazolam tolerance incidence and characteristics during its administration as a sedative on a continuous basis.

METHODS. Prospective and descriptive study in patients admitted to our ICU from 1993 to 2003. We defined tolerance as the need to use more than 0.23 mg/kg/h of midazolam to obtain a 3 to 5 level on the Ramsay scale (1). The appearance of tolerance in the first 48 hours was considered as tachyphylaxis or early therapeutic failure to this sedative.

RESULTS. During this time, we administered 4,886 patients, 2,294 of them needed mechanical ventilation and in 1,872 we administered continuous analgesic and sedative infusions. Continuous midazolam infusions were administered in 746 patients (40% of the sedated patients), 550 of them received midazolam during more than 48 hours (58% of the patients that were sedated during more than 48h). Tolerance development was observed in 139 patients, which means 25% of those whom received midazolam for more than 48 hours. Tolerance appeared on 6th ± 5 day of treatment (median 4; range 1-31 days). Early therapeutic failure was observed in 5.2% of midazolam sedated patients.

CONCLUSION. The incidence of midazolam tolerance in patients sedated more than 48 hours was 25%, appearing on the 6th ± 5 day of sedation. The incidence of early therapeutic failure was 5.2%.

521 Costs of sepsis treatment between survivors and non survivors. Does it matter?
Beltran-Sogayar A C, Silva E, Cal R, Beer I, Akamine N
1Intensive Care Unit, Hospital Albert Einstein, Sao Paulo, Brazil

INTRODUCTION. Sepsis has been considered a major healthcare problem, uphold by the resources consumed and it’s high incidence and mortality rate associated. The difference in costs sepsis treatment between survivors and non survivors is an economic analysis that can provide more reliable and interchangeable data. The objective of this study is to access direct costs of sepsis treatment in Brazilian intensive care units, comparing survivors and non survivors.

METHODS. Patients admitted with sepsis underwent to clinical, epidemiological and prognostic (using the SOFA score) evaluation. Hospital costs related to intensive care unit stay were also estimated. The concept of direct costs was established considering clinical support service (as pharmacy, physiotherapy, radiology and laboratory service), consumables (drugs, fluids, nutrition, blood and blood products), and staff (medical, technicians and nursing staff). The Kruskal-Wallis test was performed for test for differences in the medians of costs among groups defined according quartiles of length of stay and tertiles of SOFA.

RESULTS. 524 patients were enrolled. The mean age was 60.5 and 58% were male. The overall mortality was 43.8% and the median SOFA score was 7.6. Considering length of stay, survivors and non survivors had similar found (median 15 and 10, respectively; p=0.097). Costs did not differ significantly (median costs $952 for survivors vs $1,011 for non survivors; p=0.763). However when comparing costs between survivors and non survivors, dividing length of stay in quartiles, we have found an statistical significant difference between both groups (p=0.0001), even considering SOFA score when divided in tertiles, mainly comparing SOFA survivors < 7 (p=0.05).

CONCLUSION. This century seems to become the century of biotechnological advance in healthcare. Our data reveal an expected reality, that we have differences in costs between survivors and non survivors, mainly comparing length of stay. Moreover, we should access specifics areas that have more impact in these direct costs to apply strategies that will offer a better outcome in septic patients.

520 Drug labelling in intensive care units: a telephone survey of current practice within the UK
Barker G N, Bahu R
1Anaesthetics, Mayday Hospital, London, United Kingdom

INTRODUCTION. Accidental drug administration is a recognised potential hazard in clinical environments including critical care areas. Syringe labelling has been advocated as one technique aiming to reduce this risk (1) and, as part of a D.O.H drive to minimise drug administration errors the Councils of the Royal College of Anaesthetists and the Intensive Care Society recommended the adoption of the International Colour Coding System for Syringe Labelling in May 2003(2). Hospital operating theatres were the first areas to adopt this trend (3) however, critical care units remain an area where drug errors potentially exist with serious sequela to patient care.

METHODS. We undertook a telephone survey of 65 random Critical Care Units to establish the current labelling protocols. We interviewed senior charge nurses and asked them the following questions: 1. Are you aware that the colour coding of the drug labels has changed? 2. If yes, have you implemented this system? 3. Which system is available in your unit at present? 4. What is your departmental protocol for labelling syringes/infusions, lines & infusions drugs. 5. Do you use the same labelling system as your operating theatres?

RESULTS. 36(55.3%) were aware of the new system, with 32(88%) having implemented this. Only 13(20.6%) used a colour coded label for syringe labelling and 34(46%) were still using the old Medilabel scheme. 22(34%) units labelled infusion lines with a colour coded pre printed label, 1(1.5%) using the old colour scheme. For infusion drugs 30(46.1%) used the new colour code labels, 5(7.6%) the old and 8(12.3%) attach drug ampoules to the syringes. Of all units contacted, 26(40%) were using a different system to their operating theatres.

CONCLUSION. These results suggest that whilst implementation of the new system have occurred across the UK, considerable variation still exists. We strongly recommend widespread adoption of International Colour Coding System by critical care units.

522 An experience with remifentanil as the sedo-analgesic strategy in critically ill ventilated patients
Chamorro C, Swiera M A, Valdivia M, Ortega A, Balandin B
1Intensive Care Unit, Hospital Puerta de Hierro, Madrid, Spain

INTRODUCTION. Remifentanil (REM) has been the latest marketed drug for analgesia and sedation in critically ill ventilated patients. The aim of this study is to describe our experience using this drug as the sedo-analgesic strategy in this population.

METHODS. We have performed a prospective, descriptive study including all ventilated patients admitted from January 2003 to March 2005 and who received REM as the sedo-analgesic strategy. We analysed the criteria for using REM, treatment length and doses employed, need of association with another sedative, as well as sedation quality attained and possible administration-related complications.

RESULTS. During the above-mentioned period, 939 patients were admitted to our ICU; 500 of them needed mechanical ventilation and 418 sepsis analgesia on a daily basis. Ninety-four patients received REM; in 36 it was used as the sole sedo-analgesic treatment and in 58 for the sequential sedo-analgesic strategy (in 17 as the initial, in 12 for dynamic sedo-analgesia and in 29 as the final strategy to begin ventilation weaning). The treatment length was 41 ± 42 hours (range 2-216). The average administered doses were: 7.8 ± 2.9 μg/kg/h on the first day, 8.9 ± 2.9 μg/kg/h on the second day, and 9.1 ± 2.9 μg/kg/h on the third day. Eleven patients (12%) needed an another sedative association (propofol in all cases). In one patient, REM failure was observed. Most of the assessable patients could be managed with sedation degrees 3-4 on the Ramsay scale. Sixty patients were extubated after discontinuing REM or during the REM descending protocol; 6 of them (10%) needed reintubation. Two patients experienced self-extubation and one patient underwent respiratory arrest which was solved with manual ventilation. We did not observe any other REM related-complications.

CONCLUSION. In our series, REM was preferred both as the sole sedo-analgesic strategy and as the sequential form to begin weaning. Most patients could be managed within degrees 3-4 of the Ramsay scale. Except for one respiratory arrest we did not observe any complications directly related to this drug.
525

RISK FACTOR FOR LOW BIRTH WEIGHT INFANTS IN UKRAINE

Nadraha O1, Chiranjib N1

1Department of Pediatrics, Lviv National Medical University, Lviv, Ukraine

INTRODUCTION. Low birth weight and preterm birth has been described as the most profound problem of children today. Low birth weight here is used as a proxy for preterm delivery, because the data on low birth weight are more accurate than the data on premature births — in the Ukraine each year, approximately 5% of infants are low birth weight (less than 2499 g) and 4.2% are premature. According official information in 2003 year in Ukraine the birth weight less 1000 g was in 1128 newborns was and less 2499 g in 21558 neonates.

METHODS. Since 1999 we have studied the the risk factors for prematurity and low birth weight. 2371 low birth weight infants in Department of Neonatology Lviv Regional Hospital during last 5 years were kept under observation. The mean gestation age was 32.1±6.29 weeks, 16.5% infants were born <29 weeks' gestation. The mean morbidity rate was 98.31% and the mean hospital mortality rate was 15.24%. Information was gathered including demographic factors, socioeconomic status, home and work environments, drug and alcohol use, smoking and medical history.

RESULTS. We identified 9 risk factors in an logistic regression model among 117 variables: low family income (OR; 95% CI: 3.24; 1.11 - 8.65), low levels of perinatal care (5.12; 2.03 - 9.33), previous preterm labour (3.10; 1.96-12.45), previous low birth weight (2.14; 1.05-8.51), age >30 years and < 17 years (4.32; 2.55 - 5.38), smoking alcohol and drug use during pregnancy (2.02; 1.15 - 3.52), diabyt tract infection (4.30; 1.48 - 13.90) of the placenta (6.25; 1.00 - 24.76) and working during pregnancy (1.83 1.40 - 5.92). But, approximately 40% of preterm births occur in women without apparent risk.

CONCLUSION. Some risk factors cannot be modified (previous preterm labour, low birth weight and UFI, while preventive efforts should be directed towards reduce pregnancy rate between teenagers, modifying working conditions during current pregnancy and appropriate perinatal care.

524

RESPIRATORY DISTRESS SYNDROME AND POLYMORPHISM OF SURFACTANT PROTEIN B GENE IN NEONATES FROM RUSSIA

Danilko K V1, Victorova T V1, Bogdanov R Z1, Paryshova A P1, Viktorov V V1

1Genomics, Institute of biochemistry and genetics, Genomics, 2Bashkir State Medical University, Ufa, Russia; 2Federation, Genomics, 2Bashkir State Medical University, Ufa.

INTRODUCTION. Neonatal respiratory distress syndrome (RDS) is the major cause of mortality and morbidity in premature infants. It has been well established that deficiency of pulmonary surfactant (a lipoprotein complex) leads to RDS. The surfactant proteins (SP) play important roles in the function of surfactant and genetic variations in the SP may explain differences in susceptibility to RDS. SP-B is essential for lung mechanics and its gene may contain some polymorphisms. The objective of this study was to determine whether polymorphism within intron 4 of the SP-B gene are related to the incidence of RDS in newborns from Ufa.

METHODS. We analyzed genomic DNA by means of polymerase chain reaction and SSCP assay in 102 all preterm and 95 healthy term neonates from Ufa in order to identify SP-B intron 4 and exon 4 polymorphisms.

RESULTS. The frequency of 4 intron 4 variations did not differ between ill and healthy patients: 7.9 % and 12.6 %. A total number of individuals with intron 4 wild type was similar in both groups (92.1%, 87.4% respectively). There were only 0.5% allele Dl individuals with approximate length of band 300 bp in RDS group and 3.7% in healthy neonates group, but the differences was not confirmed statistically (p=0.06, χ2=3.51). Besides we detect two patients with unknown mutations in exon 4 SP-B gene in RDS group by SSCP analysis. We are going to do sequence analysis of this two fragments.

CONCLUSION. We suggest that polymorphism in intron 4 of the surfactant protein B gene does not modify the course of neonatal respiratory distress syndrome.

526

ECHOCARDIOGRAPHICALLY-GUIDED TRANSCATHETER DEVICE OCCLUSION OF PDA

Meraji S M1, Davari P N1, Shahmohammadi A1, Aarabi M Y1, Janzani K S1

1Pediatric Department, Shahed Rajaeey Heart Hospital, Tehran, Iran (Islamic Republic of)

INTRODUCTION. Routinely a left catheterism is done during Device implantation to size the PDA by injection in the Aorta to choose appropriate device size, and to confirm efficacy of the device before its releasing. Especially in infants and young children, an arterial access can be harmful. Instead of left angiography, we have used echocardiography to size the duct and to confirm device efficacy. In this study we compare results of the procedures done by this method with the procedures done classically by left angiography.

METHODS. Echocardiography in dactul (high short-axis parasternal) and long-axis suprasternal views used to size the PDA dimensions (the narrowest and widest diameters) and to examine for residual shunt, coarctation of Aorta or LPA stenosis before releasing the device. The devices used consist of Cook Cook Detachable PDA Cil (William Cook Europe), Amplatz Duct Occluder (AGA Medical Corporation), and Nit-Occlud PDA Occlusion System (pfm Medical). Follow up echocardiography was done 1-2 days after the procedure and then monthly.

RESULTS. Patients of the Anglo group (27) were older, heavier and more male than of the Echo group (61). PDA size and Pulmonary Artery pressure have not significant differences between two groups. Early and late residual shunts were higher in Echo group (especially early residual shunts), but the differences were not statistically significant. There was one case of COA in Echo group (1.6%) and none in the Anglo group. There was one case of left pulmonary artery stenosis after the procedure in Anglo group and two in Echo group (3.7 and 3.3%, respectively). There were two cases of device embolization to LPA in Echo group.

CONCLUSION. Patients of the Anglo group (27) were older, heavier and more male than of the Eco group (61). PDA size and Pulmonary Artery pressure have not significant differences between two groups. Early and late residual shunts were higher in Echo group (especially early residual shunts), but the differences were not statistically significant. There was one case of COA in Echo group (1.6%) and none in the Anglo group. There was one case of left pulmonary artery stenosis after the procedure in Anglo group and two in Echo group (3.7 and 3.3%, respectively). There were two cases of device embolization to LPA in Echo group.
527
THE OPTIMAL DEPTH OF CHEST COMPRESSION FOR CPR OF KOREAN CHILDREN

Lee M1, Lee K2, Jung C1, Kim J1, Bae S2
1Anesthesiology, Seoul National University Hospital, Seoul, South Korea

INTRODUCTION. In neonates, compression depth is recommended as 1/3 of the depth of the chest during CPR. In infants, compression depth is approximately 1/3 to 1/2 of the depth of the chest which seems to be about 0.5 to 1 inch (1.5 - 2.5 cm) at CPR guideline 2000 by ILCOR. However, they conclude these values are not really exact. We hypothesize that there might be a difference between the percentage of the chest AP diameter and the measured length. Therefore, we aimed at measuring neonates and infants chest antero-posterial (AP) diameter by CT and chest X-ray to compare the exact length with the percentage of the chest AP diameter.

METHODS. During January to March, 2004, 31 neonates and 65 infants’ CT and chest X-ray were checked. Chest AP diameters from sternum to anterior border of the vertebral body and to the back were measured, respectively.

RESULTS. It has shown that 1.5 - 2.5 cm depth was equal to 1/3 to 1/6 the depth of the neonates’ chest and 1/6 to 1/4 the depth of the infants’ chest. It was less than compression depth of CPR guideline 2000 by ILCOR, which was the 1/3 to 1/2 of the depth of chest. The average vertebral widths were 2.1cm in neonates and 3.0cm in infants.

TABLE 1. Average(A) Korean neonates’ and infants’ chest AP diameter (cm)

|          | Neonate (n = 31) | Infant (n = 65) |
|----------|-----------------|-----------------|
| A ± SD   | 7.3 ± 1.3       | 9.6 ± 1.2       |
| A/2      | 3.7             | 4.8             |
| A/3      | 2.4             | 3.2             |
| A/4      | 1.8             | 2.4             |
| A/5      | 1.5             | 1.9             |
| A/6      | 1.5             | 1.6             |

SD: standard deviation

CONCLUSION. We assume that the wider range of recommended compression depth might cause potentially deeper compressions in infants and children. When cardiac compression is performed too deeply on the infant’s chest during CPR, major organ injury and rib fracture may occur. If enough circulation can be obtained by compressing effectively with a safe guideline, Post-CPR complications may be minimized.

528
VALIDATION OF EXTRA VASCULAR LUNG WATER (EVLW) MEASUREMENT IN SMALL CHILDREN

Lemson J1, Backx A2, Daniels O2, Bouw M3, Van der Hoeven J G2
1Intensive Care Medicine, Pediatric Cardiology, Radboud University Nijmegen Medical Centre, Nijmegen, Netherlands

INTRODUCTION. Quantification of pulmonary oedema is clinically important. A simple bedside technique based on transpulmonary single indicator thermocardiography (TPTD) has been developed (PiCCO, Pulsion Medical Systems). Because the accuracy of this technique has not been determined in children we compared TPTD EVLW measurement with the transpulmonary double indicator dilution technique (TPDD) as the clinical gold standard reference method.

METHODS. Measurements were performed at our catheterisation laboratory in seven children with a bodyweight of 5 – 13.1 kg. EVLW was measured with the COLD system (COLD, Pulsion Medical Systems) incorporating both TPTD and TPDD techniques. Ice-cold indocyanine green was injected close to the right atrium. Changes in temperature and dye concentration were measured using a special catheter located in the distal aorta.

RESULTS. Mean cardiac index (Cl) was 4.1 l/min/m2 (SD 0.9) and mean EVLW-TPTD was 11.9 ml/kg (7.5 – 22.0). Repeatability (1.96 x SD of the difference between repeated measurements) for Cl, EVLW-TPTD and EVLW-LTTPD were 0.52 l/min/m2, 1.63 ml/kg and 2.1 ml/kg respectively. The bias between the two methods was 2.36 ml/kg with a precision of 1.89.

CONCLUSION. Transpulmonary thermocardiography appears to be an adequate method to measure EVLW in children. Children may have higher normal values of EVLW compared to adults.

REFERENCE(S). Schiffman H, Eidlenbruch B, Singer D, et al. Assessment of cardiac output, intravascular volume status, and extravascular lung water by transpulmonary indicator dilution in critically ill neonates and infants. J Cardiothorac Vasc Anesth 2002;16:592-7.

529
REPRODUCIBILITY OF TRANSPULMONARY THERMODILUTION MEASUREMENTS IN CRITICALLY ILL CHILDREN

Lemson J1, Hemelaar A E1, Van de Sant H N1, Van der Hoeven J G1
1Intensive Care Medicine, Radboud University Nijmegen Medical Centre, Nijmegen, Netherlands

INTRODUCTION. Cardiac output (CO) measurement in critically ill children is cumbersome, but may improve hemodynamic management. Several authors have used the transpulmonary single indicator thermocardiography technique (TPTD) but the reproducibility has not been fully determined. Because unnecessary measurements could lead to unacceptable volume loading we conducted a study to investigate the number of TPTD measurements necessary to acquire a reliable CO in critically ill children.

METHODS. We prospectively studied 12 mechanically ventilated and sedated children with a mean weight of 11 kg (5 - 18 kg) at our paediatric intensive care unit using the PiCCOplus system (Pulsion Medical Systems). Four consecutive TPTD measurements were performed with ice-cold saline. The volume of the injectate varied between 3 and 5 ml depending on bodyweight. The mean of 4 consecutive measurements with a normal TD curve and injectate temperature lower than 11° Celsius was considered as the gold standard.

RESULTS. A total of 117 quadruple measurements fulfilled the quality control criteria. Mean cardiac index (Cl) was 4.45 l/min/m2 (SD 1.5). The mean coefficient of variation (percentage of the SD of the mean) for quadruple TPTD measurements of CI was 10.5% (SD 6.6). The table shows the differences between 1 measurement, the mean of 2 and the mean of 3 measurements in comparison with the mean of 4 measurements.

REFERENCE(S). Tibby SM, Hatherill M, Marsh MJ, et al. Clinical validation of cardiac output measurements using femoral artery thermocardiography with direct Fick in ventilated children and infants. Intensive Care Med 1997:23:987-91.

530
AXILLARY APPROACH FOR INSERTION OF CENTRAL VEIN CATHETER IN PAEDIATRICS – A NOVEL APPROACH

Lee T2
1Children Intensive Care Unit, KK Hospital, SIN, Singapore

INTRODUCTION. A common approach for insertion of central venous catheter is to access the subclavian vein via subclavian approach. This approach is associated with arterial puncture and air leak 1,2. Local pressure is difficult to apply as the vein runs under the clavicle. We describe an axillary approach to access the subclavian vein in paediatric patients.

METHODS. Patients were selected for this approach when conventional approaches for central venous access were exhausted or contraindicated. The patient’s arm is kept abducted with slight external rotation perpendicular to the thorax with the dorsum of the palm flat to the bed. Head is turned to the contralateral side. The axillary artery is palpated and followed as it inserts into the apex of the axilla lateral to the teres minor when it becomes the subclavian artery. The axilla vein runs in the axilla and is targeted towards the axilla apex. The needle is punctured 1-2 cm to the skin and limited to the apex of the axilla. Confirmation of venous access is made by free flow of blood. The catheter is inserted using the Seldinger technique and secured. Chest X-ray done to confirm placement.

RESULTS. 5 paediatric patients were selected for this approach. Arterial puncture was made in one patient and hemostasis secured with direct local pressure and subsequent insertion was successful. Access required a mean of 2.2 attempts. One patient hand was swollen 6 days after the line inserted but Doppler study did not reveal any venous thrombosis and the line left in situ. Routine limb neurovascular and vascular assessments were made. No malposition or air leak was seen on CXR. No local or line related infections were documented. Catheters were removed after 8.3 days. Follow up (mean of 2 weeks) after the catheter was removed showed normal hand power and movement in all patients.

CONCLUSION. Axillary approach maybe a novel alternative to central venous catheter insertion in paediatric patients when conventional approaches are not possible.

REFERENCE(S). 1. Agee KR, Balk RA et al Critical Care Clinics 1994; 8: 677 2. Bone RC et al J Critical Illness 1988; 3:61 3. Upper Lim Anatomy. In: Last’s Anatomy, 2000 Ed p 546-7
PERCUTANEOUS NEONATAL LONG LINES AND BACTERIOLOGICAL COLONISATION - A 5 YEAR REVIEW

Philip R K,1 Elivan H1
1Paediatrics, Regional Maternity Hospital, Limerick, Ireland

INTRODUCTION. Long line related sepsis is an outstanding problem in neonatal intensive care units. Colonisation of long lines could lead to fulminant sepsis, particularly among the very low birth weight neonates, when lines remain in-situ for longer periods and in those receiving broad spectrum antibiotics or parenteral nutrition. We aimed to quantify and classify the bacterial colonisation of long lines with special reference to sensitivity pattern and concurrent laboratory indicators of sepsis.

METHODS. A retrospective microbiological laboratory record review from Jan 2000 to Dec 2004 of all logged neonatal long line culture requests from tertiary care regional neonatal unit. Incidence of colonisation, types of bacteria, sensitivity and resistance pattern, presence of other abnormal body fluid cultures and inflammatory markers were studied. Clinical characteristics, morbidity of infants or the reasons for line removal analysed in the remit of this study.

RESULTS. 52 of 100 (52%) long line cultures yielded positive growth of which 47 (90%) were coagulase negative Staphylococcus, 3 candida albicans and 2 alpha haemolytic Streptococcus. Based on colony forming units, sensitivity pattern could be determined in only 21 samples all of which (100%) were sensitive to Teicoplanin, 13 to Erythromycin, 7 to Gentamicin and 6 to Pudicic acid. 19 growths were resistant to Fluoxacillin and 12 to Gentamicin. Only in 8 / 47 (17%) of coag. negative Staph. grew mixed growths of coagulate positive Staph. RESULTS. They all had abnormal inflammatory markers - blood white cell and platelet counts as well as CRP.

CONCLUSION. Despite more than half of all neonatal long lines at removal being colonised with bacteria, sensitivity pattern could be yielded only in 21% and laboratory evidence of systemic inflammatory or sepsis respose noted in 8% of neonates. However, such microbiological audits are invaluable in assisting the antibiotic selection guidelines of individual neonatal units as well as in the staff training in aseptic techniques.

REFERENCE(S). Crump JA, Collington PJ. Intravascular catheter associated infections. Eur J Clin Microbiol Infect Dis. 2000 Jan;19:1-8

BACTERIAL AND FUNGAL NASOCOMIAL INFECTIONS IN A PEDIATRIC INTENSIVE CARE UNIT

El-Nawawy A A,1 Abdel Fatah M M,2 Merwally M H, Barakat S S1, Hassan I M1
1Paediatrics, Microbiology, Faculty of Medicine Alexandria University, Alexandria, Egypt

INTRODUCTION. Patients in Pediatric Intensive Care Units (PICU) are 3-4 times prone to nosocomial infections (NIs) with high mortality rates & increase fiscal costs. The aim of the present study was to determine incidence, characteristics & risk factors associated with NIs in Alexandria University PICU.

METHODS. A one year prospective & observational study included all admissions (n=216) until 48h after discharge. Cultures for bacteria and fungi and antibiotic sensitivity tests (19 antibiotic using Bauer-Kirby disc diffusion method) were obtained on admission [ blood, stool, urine & cerebrospinal fluid] and repeated on suspicion of NIs. All cannulae, endotracheal tube (ET) aspirates & tips, nasogastric tubes & different catheters were cultured. All PICU health care workers (HCWs) were subjected to throat & under-finger nails culture as well as inanimate objects , both on bimonthly basis. The referral place (ward or emergency), PRISM III score, length of stay (LOS) & fate, were recorded.

RESULTS. Patients, whose age ranged 1-23 months, showed that 23% of them had NIs with infection rate 49/1000 days. A significantly high rate of mortality, LOS & PRISM III score were encountered among patients with NIs (52% vs 43%; 9.4±4.8 vs 5.4±2.2 days; 14.4±7 vs 11.8±6 respectively). The descending order of frequency of NI was blood stream infection(BSI) (47%),urinary tract infection (UTI) (28%),ventilator associated pneumonia (VAP) (16%) & meningitis(9%).Gram –ve bacilli accounted for 76.7%; Gram +ve cocci 13.3%( with satisfactory sensitivity to cephaline , imipenem &meropenem ) and Candida albicans 10% of all NIs. The rate of NIs/1000 device days were: 18.7% for BSI, 10.9% for VAP & 25.5% for UTI. Vulnerable age groups were:<6 m for VAP & >6 m for meningitis. Multiple logistic regression analysis identified PRISM III score, LOS and referral from wards as predictors of NIs acquisition (odds ratio and 95% confidence interval: 1.537,1.423-1.659; 1.073, 1.041-1.105 & 0.206, 0.178-0.405 respectively). Bimonthly interval: 1.537,1.423-1.659; 1.073, 1.041-1.105 & 0.206, 0.178-0.405 respectively). Bimonthly scores, LOS and referral from wards as predictors of NIs acquisition (odds ratio and 95% confidence interval: 1.537,1.423-1.659; 1.073, 1.041-1.105 & 0.206, 0.178-0.405 respectively). Bimonthly microbiological audits are invaluable in assisting the antibiotic selection guidelines of individual neonatal units as well as in the staff training in aseptic techniques.

REFERENCE(S). Microbiol Infect Dis. 2000 Jan;19:1-8

TRANSPORT OF CRITICALLY ILL CHILDREN IN THE NORTHERN WESTERN REGION OF THE NETHERLANDS: COMPARISON BETWEEN AN EXPERIENCED AND NEW CENTER

De Gast-Bakker D H,1 Blom D J M2, Knevel R C P3, Peper J A K4, Bos B A P5, Pölz F B1
1Pediatric Intensive Care, VU University Medical Center, 2Pediatric Intensive Care, AMC University Medical Center, Amsterdam, Netherlands

INTRODUCTION. The policy memorandum of the ministry of public health (January 2002) and reports of the Dutch society of pediatrics concerning transport and stabilizing critically ill children, resulted in a reorganization of the transport of critically ill children in the Netherlands. As of February 2004, all children in the Northwestern region of the Netherlands requiring mechanical ventilation were transported by pediatric intensive care teams of the VU and AMC University Medical Centers. These teams consist of a pediatric intensivist or anesthesiologist (in training) and pediatric intensive care unit (PICU) nurse and were on call 24 hours, 7 days per week. The objective is to report the first year results and to compare an experienced (AMC) and a novice (VUmc) center.

METHODS. Demographic data, diagnosis at admission and severity of illness score (PRISM) and duration of transport (preparation, travel time, intervention in other hospital and complications during transport) were prospectively collected. All data were analyzed per center and in total in order to identify any difference between both PICU-teams. Transport frequency was divided according to PICU- capacity (40% VUmc and 60% AMC). Statistical analysis included student t-test for continuous variables and chi2 test for dichotomous variables.

RESULTS. In total 101 patients were transported by either PICU-team. Half of the transports took place during the evening or night. Demographics, PRISM-score and admission diagnosis were comparable. Mean transport time was 2 hours and 17 minutes. There was a significant difference in preparation time . Results concerning other transportation variables are similar for both clinics. Neither PICU-team reported complications during transport.

CONCLUSION. A continuous PICU transport system carried out by two specialized centers is feasible and efficient. Apart from a difference in preparation time, which may be influenced by a multitude of factors, there were no differences concerning other transport variables between an experienced and inexperienced team.
Clinical trials can be stopped early based on interim analyses or sequential analyses. Sequential analyses could also be applied to decide if more trials have to be performed (1). In a number of clinical trials, high frequency ventilation has been compared with conventional mechanical ventilation in premature neonates with BPD.

**METHODS.** The last five of clinical trials used high frequency oscillatory ventilation and applied a high lung volume strategy in the high frequency oscillatory ventilation group and a lung protective ventilation strategy in the conventional mechanical ventilation group. Death or chronic lung disease was the clinical outcome of interest.

**RESULTS.** After including the first study of the last five trials in a sequential meta-analysis, the boundary of no effect was crossed for the outcome, death or chronic lung disease. A sensitivity analysis using the lowest estimate of effect showed the same result after two trials.

**REFERENCE(S).** (1) Whitehead A, Whitehead J. A general parametric approach to the meta-analysis of randomized clinical trials. Stat Med 1991; 10(11):1665-1677.

**INTRODUCTION.** Clinical trials can be stopped early based on interim analyses or sequential analyses. Sequential analyses could also be applied to decide if more trials have to be performed (1). In a number of clinical trials, high frequency ventilation has been compared with conventional mechanical ventilation in premature neonates with BPD.

**METHODS.** The last five of clinical trials used high frequency oscillatory ventilation and applied a high lung volume strategy in the high frequency oscillatory ventilation group and a lung protective ventilation strategy in the conventional mechanical ventilation group. Death or chronic lung disease was the clinical outcome of interest.

**RESULTS.** After including the first study of the last five trials in a sequential meta-analysis, the boundary of no effect was crossed for the outcome, death or chronic lung disease. A sensitivity analysis using the lowest estimate of effect showed the same result after two trials.

**REFERENCE(S).** (1) Whitehead A, Whitehead J. A general parametric approach to the meta-analysis of randomized clinical trials. Stat Med 1991; 10(11):1665-1677.

**INTRODUCTION.** Clinical trials can be stopped early based on interim analyses or sequential analyses. Sequential analyses could also be applied to decide if more trials have to be performed (1). In a number of clinical trials, high frequency ventilation has been compared with conventional mechanical ventilation in premature neonates with BPD.

**METHODS.** The last five of clinical trials used high frequency oscillatory ventilation and applied a high lung volume strategy in the high frequency oscillatory ventilation group and a lung protective ventilation strategy in the conventional mechanical ventilation group. Death or chronic lung disease was the clinical outcome of interest.

**RESULTS.** After including the first study of the last five trials in a sequential meta-analysis, the boundary of no effect was crossed for the outcome, death or chronic lung disease. A sensitivity analysis using the lowest estimate of effect showed the same result after two trials.

**REFERENCE(S).** (1) Whitehead A, Whitehead J. A general parametric approach to the meta-analysis of randomized clinical trials. Stat Med 1991; 10(11):1665-1677.

**INTRODUCTION.** Clinical trials can be stopped early based on interim analyses or sequential analyses. Sequential analyses could also be applied to decide if more trials have to be performed (1). In a number of clinical trials, high frequency ventilation has been compared with conventional mechanical ventilation in premature neonates with BPD.

**METHODS.** The last five of clinical trials used high frequency oscillatory ventilation and applied a high lung volume strategy in the high frequency oscillatory ventilation group and a lung protective ventilation strategy in the conventional mechanical ventilation group. Death or chronic lung disease was the clinical outcome of interest.

**RESULTS.** After including the first study of the last five trials in a sequential meta-analysis, the boundary of no effect was crossed for the outcome, death or chronic lung disease. A sensitivity analysis using the lowest estimate of effect showed the same result after two trials.

**REFERENCE(S).** (1) Whitehead A, Whitehead J. A general parametric approach to the meta-analysis of randomized clinical trials. Stat Med 1991; 10(11):1665-1677.

**INTRODUCTION.** Clinical trials can be stopped early based on interim analyses or sequential analyses. Sequential analyses could also be applied to decide if more trials have to be performed (1). In a number of clinical trials, high frequency ventilation has been compared with conventional mechanical ventilation in premature neonates with BPD.

**METHODS.** The last five of clinical trials used high frequency oscillatory ventilation and applied a high lung volume strategy in the high frequency oscillatory ventilation group and a lung protective ventilation strategy in the conventional mechanical ventilation group. Death or chronic lung disease was the clinical outcome of interest.

**RESULTS.** After including the first study of the last five trials in a sequential meta-analysis, the boundary of no effect was crossed for the outcome, death or chronic lung disease. A sensitivity analysis using the lowest estimate of effect showed the same result after two trials.

**REFERENCE(S).** (1) Whitehead A, Whitehead J. A general parametric approach to the meta-analysis of randomized clinical trials. Stat Med 1991; 10(11):1665-1677.
A METHOD TO EXPERIMENTALLY INDUCE SOLITARY LOBE ATELECATASIS

After cardiac surgery it is not uncommon that a solitary collapse of a lobe, e.g., the left lower lobe develops. It has been difficult to experimentally study therapeutic interventions for lobar atelectasis due to lack of suitable animal models. The aim of this study was therefore to develop a reproducible model in pigs.

METHODS. 10 anesthetized pigs were tracheotomized and ventilated VCV, FiO2 1.0, PEEP 10 cmH2O, VT 8 ml/kg. This ventilation was maintained under the experiment except during the lung recruitment maneuver (LRM). A bronchial blocker (Cook C-ABHS-7.0) was inserted in the right lower lobe (about 50 cm from the ETtrachea opening) by the use of a fiberoptic bronchoscope. To ensure a correct position, the balloon of the blocker was inflated shortly and thereafter deflated under inspection via the bronchoscope. Thereafter, a LRM (PCV with peak pressure of 40 cmH2O, PEEP 10 cmH2O, EE 1.1 and RR of 6/min during 2 min) was performed to optimize the lung volume history after which end-expiratory lung volume (EELV), quasiastatic compliance of the respiratory system (Crs) were measured and blood gases (mixed venous and arterial) were obtained. The balloon of the bronchial blocker was inflated, the air of the isolated lobe exsufflated and measured (“lobe volume”). Thereafter the lobe was selectively lavaged (with a “lobe volume” of 37°C 0.9% NaCl) using a syringe 15 times or until no frothing of the lavaged fluid was seen. EELV, Crs and blood gases were obtained. In one pig CT thorax was done and another pig was thoracotomized and the lungs were inspected. Statistics:Wilcoxon.

RESULTS. The “lobe volume” was 66±21 ml (mean±SD). After the selective lobe lavage, EELV decreased from 886±170 to 698±166 (p<0.002), PaO2 from 76±9 to 40±14 (p< 0.004) and crs decreased from 326±22 to 22±7 (p<0.002). Both CT and the inspection of the lung showed atelectasis of the right lower lobe.

CONCLUSION. A reproducible experimental lobe atelectasis can be obtained by selective lobe lavage in pigs. This method may be used experimentally for studying methods treating atelectasis.

Grant acknowledgement. Danish Medical Research Council (no. 22-03-0299, 22-04-0420), The Clinical Institute, Aarhus University (no 100301) and the Danish Heart Foundation (no. 04-10-B152-A230-22194)

ICU OUTCOME OF ADULT PATIENTS OPERATED ON FOR GROWN UP CONGENITAL HEART DISEASE (GUCH)

Jacquet L1, Rubay F1, Vancanegem O2, Laurbaun F1, Lovat R1, Nonnemacher P1
1Cardio-vascular intensive care, 2Cardio-vascular surgery, Saint-Luc University Hospital, Brussels, Belgium

INTRODUCTION. Many patients with complex congenital heart disease, the majority having been operated on during their first years of life, are now adults and pose unusual problems for cardiologists, surgeons and intensivists caring for adult patients.

METHODS. We have reviewed the charts of patients >15 years old who were admitted in our cardio-vascular ICU after operation for GUCH from January 2000 to December 2004 in order to describe their specific outcome.

RESULTS. During this 5 years period, data from 38 pts (15 males,12 females and 1 XXXY karyotype) were collected. The mean age was 31 y (range 15-59).Among these, 35 had tetralogy of Fallot and had already operated before, 17 having had 2 previous surgical procedures. The main indication for surgery was pulmonary insufficiency and 34 pts received a pulmonary homograft.

| TABLE 1. MAIN RESULTS |  |
|---|---|
| Number | Percentage |
| Deaths | 1 | 2.7 |
| Pts receiving inotropes | 13 | 35 |
| Pts transfused | 6 | 16 |
| Arrhythmias | 11 | 30 |
| Pneumotorax | 4 | 10 |

| TABLE 2. |  |
|---|---|
| Duration of Intubation | 7.5 hours | 0.48 |
| pO2/FiO2 on admission | 375 | 280-410 |
| pO2/FiO2 at extubation | 403 | 310-510 |
| Thoracic drainage | 605 ml | 160-1480 |
| Lobar drainage | 1407 ml | 600-2000 |
| Stay in ICU | 35.7 h | 16-75 |

CONCLUSION. The immediate post-operative outcome of GUCH patients is particularly good even though half of them already had 2 previous surgical interventions. The most frequent complications are conduction and rhythm disturbances and pneumothorax, probably because many of these are resperations.
PULSE TRANSIT TIME OF PATIENTS AT THE ICU AFTER CARDIAC SURGERY

Paling A J, Burggraaf F, De Wilde R B P, Janzen J R C, Van den Berg P C M
1ICU, LUMC, Leiden, Netherlands

INTRODUCTION. It has been suggested that the pulse transit time (PTT) may be a good measure for nociception before and during surgery (1). The response of PTT to the post-operative cessation of sedation has not been investigated. Therefore a study was performed to study the influence of controlled cessation of propofol/sufentanil sedation in patients after cardiac surgery.

METHODS. The study was performed in 10 patients after cardiac surgery with CPB. After surgery the patients were mechanically ventilated and therefore sedated with individualised propofol/sufentanil IV infusion. After the patients were clinically stable and rewarmed at the ICU, the sedation was stopped in a controlled manner in order to elucidate the patients. First the propofol infusion was stopped and thereafter the sufentanil was gradually decreased. Apart from the routine monitoring, EEG measurements were made using a bispectral index (BIS) monitor and PTT was measured as the time interval between the R-wave of the ECG and the arrival of the pulse wave in an peripheral artery using the signal from the pulse oxymeter. In addition, PTT was also measured during a pain stimulus as used for the control of the depth of sedation when assessing the Ramsay score.

RESULTS. At the start of the reduction of the sedative drug regimen at the ICU all patients had a Ramsay score of 6, the mean (SD) BIS was 53 (13) and the mean PTT was 297 (35) ms. In 7 of the 10 patients the relatively rapid reduction (mean: 80 (17) min) of sedation was successful and well tolerated. In 1 patient the controlled cessation of sedatives was prematurely stopped because of restlessness and in 2 patients the Ramsay score remained high with a concomitant low BIS while the sedation was completed stopped. The mean PTT decreased over the observation period by 46% but the response was highly variable among patients. Moreover, the average response in PTT pain stimuli was 1.5 (5.5) ms which was non-significant (p=0.8).

CONCLUSION. Cessation of sedation in post-operative patients may result in a slight decrease of PTT but application of a noxious stimulus during this period did not result in an appreciable response in PTT. This may be due to post-operative dysfunction of the autonomic nervous system. Further investigation is needed to define the role of the PTT as a tool to assess nociception during the post-operative period.

REFERENCE(S). (1Smith RP et al. Thorax 1999;54:452-458

IMPACT OF OBESITY ON OUTCOMES AND ICU STAY FOLLOWING CORONARY ARTERY BYPASS GRAFTING

Samalavicius R, Misuriene V, Norkiene F, Juozaitis M, Bablytys A
1Department of cardiac anaesthesia, Vilnius University Hospital, Vilnius, Lithuania

INTRODUCTION. Obesity is one of the risk factors for adverse outcomes of major surgery. We assessed the influence of obesity on outcomes of CABG in our institution.

METHODS. The data of 3178 consecutive patients, who underwent coronary artery bypass grafting at Vilnius University Heart Surgery Clinic between January 1, 2000 and December 31, 2004 were analysed. Obesity was defined as body mass index > 30.0 kg/m2. Obese patients (n=887) were compared to remaining group of patients. Preoperative risk factors, postoperative outcomes, mortality rates were analysed. Associations between obesity and postoperative outcomes were analysed.

RESULTS. Preoperative and intraoperative variables were collected and checked for homogenity of the groups. Obese patients had lower mortality rate (2.7% vs.3.7%) and shorter ICU stay (2.1 vs. 2.4 days).

TABLE 1. Postoperative morbidity

| Obese patients (n=887) | Non obese patients (n=2291) |
|------------------------|---------------------------|
| IABP support           | 32 (3.6%) (p<0.05)         | 18 (6.9%) (p<0.05) |
| Mechanical lung ventilation | >24h 46 (5.2%)          | 138 (6.0%)         |
| Stroke                 | 14 (1.6%)                 | 38 (1.66%)         |
| Renal failure          | 4 (0.5%)                  | 31 (1.36%)         |
| Reoperation for bleeding | 38 (4.3%) (p<0.05)    | 138 (6.0%) (p<0.05) |

CONCLUSION. The perception that obesity predisposes to various postoperative complications with CABG is not supported by our data. ICU following CABG was not prolonged in obese patient group.

OVERWEIGHT NOT NECESSARILY INCREASES MORTALITY IN HEART SURGERY

Hagen H, Funovits V, Koher A, Hessema M, Koning H
1Division of Cardiothoracic Anaesthesia, Medical University Vienna, Vienna, Austria

INTRODUCTION. Overweight increases the risk of comorbidities known to reduce life expectancy.[1] Increased blood sugar level and increased blood pressure are prominent risk factors and more common in patients with higher BMI. Therefore we hypothesized that BMI increases mortality in cardiac surgical patients.

METHODS. To estimate the effect of increased BMI on outcome of cardiovascular surgery we conducted a retrospective cohort study at our department looking at patients being operated from Dec 2000 to Oct 2004. We included all patients of any age having CABG or valve surgery or a combined procedure.

RESULTS. 2896 patients underwent a cardiac surgical procedure as described. The overall mortality is 7.39%. The mean age is 59 ± 19 years. The mean BMI is 27 ± 3.9 kg/m2. Patients with normal BMI (20-25 kg/m2) and patients with more than normal weight(above 25 BMI) had a similar outcome. (Fig.1) We ruled out that younger age compensates for a possible higher mortality in heavier patients.However, the age turned out to be similar in the different BMI groups and cannot be held accountable for lack of increased mortality in patients with more than normal weight. (Fig.2).

CONCLUSION. BMI does not show to increase mortality in cardiac surgical patients, despite of possible increased comorbidities.

REFERENCE(S). 1. Peeters, A. et al. Ann Intern Med, 2003

IMPACT OF NUTRITIONAL RISK ON OUTCOME IN CARDIAC SURGERY

Matias M, Rubes D, Kunyrf J, Lips M, Blaha J, Koutlak T, Kubatova J, Slutsky M
1Anaesthesiology and Intensive Care, General Teaching Hospital, 2Anaesthesiology and Intensive Care, General Teaching Hospital, Prague, Prague, Czech Republic

INTRODUCTION. 20 to 30% of patients coming to hospital are in nutritional risk. Impaired nutritional status leads to increased amount of complications, impedes mobilization and wound healing.

METHODS. In a prospective observational study we assessed nutritional status of 211 consecutive cardiac surgery patients with a nutritional risk screening form, which contained BMI, food intake, weight lost and stress factor. We evaluated mortality, ICU stay and frequency of impaired healing in the groups in nutritional risk and with normal nutrition.

RESULTS. We identified 54 from 211 (25,6%) patients in as nutritional risk. Both groups did not significantly differ in age, BMI, left ventricle function, preoperative serum albumin level, prevalence of chronic renal failure or perifery vascular disease. There were significantly more diabetics (51.9% vs. 34.2%, p<0.05) and patients with COPD (30.8% vs. 10.3%, p<0.001) in risk group. We found out the rate of complicated wound healing 12,3% (all sites and grades). There was significantly higher rate of complicated wound healing (28,3% vs. 7% p<0.0001) and longer ICU stay (51.6 vs. 24.2 hrs., p<0.01) in group in risk compared to group without risk. There was trend to higher mortality in risk group, statistically nonsignificant(9,4% vs. 3,2%). We identified diabetes, COPD and nutritional risk as to be preoperative independent risk factors of impaired healing in elective cardiac surgery by multivariate analysis.

CONCLUSION. Cardiac surgery patients have a similar prevalence of nutritional risk as general population of patients. Simple screening form is able to identify group of patients in increased risk of impaired healing.

REFERENCE(S). Isabel M, Correia TD, Waitzberg DL. The impact of malnutrition on morbidity, mortality, length of hospital stay and costs evaluated through a multivariate model analysis. Clin Nutr 2003;22:235-9.
Kondrup J, Johansen N, Plum LM. Incidence of nutritional risk and causes of inadequate nutritional care in hospitals. Clin Nutr 2002;21(6):461-8.
Kondrup J, Rasmussen HH, Hamberg Ö. Nutritional risk screening (NRS 2002): a new method based on an analysis of controlled clinical trials. Clin Nutr 2003;22:321-356.
547

IMPROVEMENT OF SOFA’S PREDICTIVE POWER FOR DEATH WHEN ASSOCIATED WITH SCVO2.

Nogueira P M, Rouge A P, Gomes R V, Fernandes M O, Aranha F G, Campos L A A, Rocco J R, Dohmann H R

Surgical Intensive Care Unit, Pró-Cardiaco Hospital, ´Internal Medicine, UFRJ, Rio de Janeiro, Brazil

INTRODUCTION. Central venous oxygen saturation (ScVO2) as well as SOFA, has been considered important parameters in the management of critically ill patients (pts). The objective of this study is analyze the impact of ScVO2 on the postoperative (PO) period of cardiac surgery, for the in-hospital mortality predictive power of SOFA.

METHODS. A cohort of 132 pts selected from Jan/04 to Aug/04 and divided into the following 2 groups: GI, death (n=11, 8.3%) and GII, survivors. Blood samples were collected through the central venous catheter. The ScVO2 measurements were taken in the postoperative period as follows: immediately (SVI), after 6 hours (SVI), and after 24 hours (SVII). A mean of the 3 measurements was calculated (mSVI) and identified the lower ScVO2 in each pt at the first 24 hours of PO (SVL).

SOFA score was also registered at the first day of PO. In-hospital mortality was considered when death occurred at any time during hospitalization. The statistical analyses: Student t test, logistic regression (LR), classification table and a ROC curve.

RESULTS. In the total of the sample amount (132 pts), the mean SOFA score was 4.03±2.35 considering a GI value of 5.78 and a GII value of 3.8±2.2 (p=0.032). ScVO2 mean values and its the Student t test results of GI compared with those of GII were as follows: respectivly: SVI 54.8±12.6 X 65.4%±8.9% (p=0.0001), SVI 56.6%±7.3 X 68.5%±5.9 (p=0.001), SVII 61.1%±7 X 69.5%±5.3 (p<0.001). SVm 57.3%±7.8 X 67.7%±4.9 (p=0.001) and SVIL 50±10% X 62±7.6% (p=0.001). The distribution of variation of ScVO2 was normal. After the LR and the classification table predicted a 50% mortality, the isolated SOFA score obtained a 91.7% accuracy (AUCROC 0.683, p=0.045, CI 0.494-0.867). From all the tested variables in LR with SOFA score, the one which obtained a greater accuracy was SVII (93.9%). A ROC curve was made using the created model (SOFA + ScVO2) with an AUCROC 0.846 (p=0.001, IC 0.737 – 0.954). Considering the best curve value, the model shows a sensibility of 73% and specificity of 79%, with a likelihood ratio (+) 3.52 and (-) 0.34.

CONCLUSION. The association between SOFA and ScVO2 collected at the 24th hour of PO creates a prognostic model with better accuracy for predicting death at the 1st day of cardiac surgery PO.

549

SOFA SCORE ASSESSMENT TO MORBIDITY AND MORTALITY AFTER CARDIAC SURGERY

Pitála T, Vento A, Kukkonen S, Petrelli V, Suojaraanta-Ylitalen R

1Department of Cardiothoracic Surgery, 2Department of Anesthesiology and Intensive Care Medicine, Helsinki University Hospital Meilahti, Helsinki, Finland

INTRODUCTION. Organ dysfunction evaluation using SOFA scoring system has been proposed to predict outcome in critically ill patients. The purpose of this study was to evaluate the function of SOFA in prediction of mortality and morbidity in postoperative cardiac surgery patients.

METHODS. A prospective study of 857 consecutive patients entering in a single adult cardiac postoperative intensive care unit during the year 2004 were assigned in the study excluding heart or lung transplantation patients. Euroscore were calculated all the patients preoperatively. The SOFA score was calculated daily until seven days or ICU discharge. deltaSOFA scores, highest SOFA scores and mean SOFA measures were calculated. Length of ICU stay, ICU mortality and 60 day mortality were assessed.

RESULTS. The preoperative Euroscore correlated in the first three days SOFA score (p=0.000). Maximum SOFA during first three days (maxSOFA3d) and deltaSOFA between first and third postoperative days (deltaSOFA31) revealed to have strongest correlation to mortality (p=0.005, ROC area 0.793 and p=0.006, ROC area 0.878 respectively). The maxSOFA3d of 15 points corresponded to mortality with sensitivity of 0.600 and specificity of 0.512. MaxSOFA3d correlated to the ICU stay (p=0.01).

CONCLUSION. The sequential assessment of organ dysfunction during the first three days postoperatively is an independent predictor of mortality and morbidity in cardiac surgery patients.

Grant acknowledgment. Supported by Clinical Research Grant of Helsinki University Meilahti Hospital

548

HAEMOSTATIC PROFILE OF PATIENTS DURING CARDIOPULMONARY BYPASS MEASURED WITH THROMBOELASTOGRAPHY

Hájek R, Rúžicková P, Zelená R, Fluger P, Nimec P, Jarokvský J, Nemethová D

1Cardiac Surgery, University Hospital Olomouc, Olomouc, 2Center of Bioanalytics, Masaryk University, Brno, Czech Republic

INTRODUCTION. Thromboelastography (TEG) is reliable and extensively used method of haemostasis monitoring. Using TEG as a bedside method, we are able to detect a coagulation disorders, especially hypercoagulation and fibrinolysis

METHODS. In prospective randomized study two groups of elective cardiac surgery patients were compared. Patients of Group A (n=144) were monitored both conventional lab tests and simultaneously with TEG. The following TEG measurements were performed: 1st –baseline after the anesthesia induction, 2th- at rewarming on CPB (with heparinase) and 3th-immediately after ICU admission (both nativ and heparinase). Patients of Group B (n=146) were monitored only using lab tests. Pre and postoperative coagulation status, incidence of thrombocytopenia, fibrinolysis, blood loss , transfusion therapy, surgical reexploration were evaluated. Changes of haemostatic profile using TEG diagnostic algorithm and also changes of pre- and postop-lab tests were evaluated

RESULTS. Both groups were comparable by age (66,1/67,4), male gender (72%,7/ 68,5%) and both groups before surgery. No difference between both groups were recorded in : average blood loss during and postoperative, incidence of surgical reexploration because of bleeding , red blood cell, fresh frozen plasma and platelet transfusion and using of aprotinin. In both groups lab values of Quick test, platelet count and fibrinogen were lower and aPTT and TT were higher after surgery. The changes of TEG parameters characterised by coagulation index : Ci/C1:C2, Ci:C3:C1. Frequency of coaugulation patterns: TEG 1 : enzymatic hypercoaguableity 14.1%, platelet hypercoag. 13.3%, sec.fibrinolysis 9.4%. TEG 2 : low platelet function 14.1%, primary fibrinolysis 14.1%, low clotting factors 7.8% TEG 3 (heparinase): enzymatic hypercoag. 9.4%, platelet hypercoag. 9.4%, low platelet function 9.4%. Only one parameter- Quick test value(%) correlated with ECC duration (R- 0.23, p=0.01) in both groups.

CONCLUSION. This study shows no difference of therapy between groups monitored with TEG compared with conventional lab tests. Most of patients in TEG group showed the signs of hypercoagulation on TEG before and after elective surgery.

Grant acknowledgement. Sponsored by grant IGA MZ CR NA/ 7478-3

550

GLYCEMIC CONTROL IN DIABETIC PATIENTS DURING CARDIAC SURGERY WITH CARDIOPULMONARY BYPASS.

Panagiota P, Perez A, Campos J M, Maestre M, Revuelta M, Martinez A, Galan J, Litvan H

1Anesthesiology, 2Endocrinology, Hospital de la Sta creu i sant Pau, Barcelona, Spain

INTRODUCTION. To achieve a better glucose control in diabetic cardiac surgery patients a three to five-fold increase of basal insulin dose has been suggested (1). Our objective was to determine whether three or five-fold increase in basal insulin-dose during hypothermic CPB makes a better glycemic control without risks.

METHODS. 74 type II diabetes patients were included in this prospective study. Two hours before surgery a continuous endovenous insulin infusion was started to achieve the target glucose level

RESULTS. (Median+/-SD)29 pts were excluded due to off-pump surgery. One due to continuous hypoglycemia. ITG showed lower blood glucose levels160 ±43 mg/dl(1than CCI)194±46mg/dl(1) during intraoperative period (p<0.05). 35% of ITG and 12% of CG patients presented at least one blood glucose level. Mean time with blood glucose levels.

CONCLUSION. In Type II diabetic patients scheduled to cardiac surgery a five-fold increase in insulin dose at the beginning of CPB achieved intraoperatively safe and better glycemic control than three-fold increase (2). Patients with better glycemic control had less infections and shorter hospital stay as it was also demonstrated by others (2). This results give support to stabilize Insulin protocols that allow a tight glycemic control in the peroperative setting.

REFERENCE(S). 1. Jacober SJ,Sowers JR.An update on perioperative management of diabetes.Arch Intern Med 1999;159:2405-11.
2. Van den Berge G, Wouters P, Weekers F, Verwaest ch, Bruyninckx F, Schetz m, Vlasselaers D, Defrance P, Lawers P. Bouillon R. Intensive insulin therapy in critically ill patients. The New England Journal of Medicine. 2001;345:1359-1367.
The purpose of this research was to develop a predictive model for the early identification of sepsis using the currently recommended physiologic parameters that are continuously or frequently monitored in the critical care setting.

METHODS. Data from the Project IMPACT® international dataset were used to assess whether a combination of the physiologic parameters of heart rate, mean arterial blood pressure, body temperature and respiratory rate could distinguish between critically ill adult patients with a diagnosis of sepsis and those without a diagnosis of sepsis in the first 24 hours of intensive care unit admission.

RESULTS. All four predictor variables used in the analyses (respiratory rate, heart rate, mean arterial blood pressure, and temperature) differed significantly between the septic and nonseptic patient groups. However, using logistic regression, only two out of the four predictor variables (mean arterial blood pressure and temperature) were independently associated with being septic. According to Hosmer and Lemeshow goodness-of-fit tests, the logistic regression model was a good fit and explained between 10.2% and 13.6% of the variance. Using the significant predictors of temperature and mean arterial blood pressure, the odds ratio for having sepsis was 2.126 times greater if the temperature was less than 77°F and mean arterial blood pressure less than 70mmHg. In addition, the odds of having sepsis were 4.63 times greater if the patient had both of these physiologic conditions present.

CONCLUSION. The results of this research provide support for the use of some of the currently recommended clinical monitoring guidelines for patients with sepsis. However, the results also underscore the limitations of using these variables for sepsis monitoring, since this group of variables alone was not sufficient for discriminating between critically ill patients with and without sepsis. More work needs to be done to see if these variables would perform better if different cut-off values were used.

REFERENCE(S). Rivers, E., Nguyen, B., Havstad, S., Ressler, J., Muzzin, A., Knoblich, B., et al. (2001). Early goal-directed therapy in the treatment of severe sepsis and septic shock. New England Journal of Medicine, 345(18), 1360-1377.

Grant acknowledgement. American Association of Critical Care Nurses

552
THROMBOCYTOPENIA IN CRITICALLY ILL PATIENTS: PLATELET TRANSFUSION IS A PREDICTOR OF ADVERSE OUTCOME
Shankar Hari M1, Barrera Groba C2
1Department of Anaesthesia, Guys and St Thomas Hospitals, Department of Anaesthesia, University Hospital Lewisham, London, United Kingdom

INTRODUCTION. We hypothesized that platelet transfusion is associated with an adverse outcome.

METHODS. Patients admitted to ICU, from January to December 2004, who had platelet count of 80,000/ml or less were studied.

RESULTS. 41 of the 85 patients received platelet transfusion. Length of ICU stay was significantly longer in the transfused group (p=0.028). Platelet count recovery was delayed and was reduced in the transfused group. The platelet count recovery in non survivors was delayed (fig1)

CONCLUSION. Platelet transfusion is associated with longer ICU stay and 15% increased risk of death.

553
CEREBROVASCULAR AUTOREGULATION’S CHANGES IN SEPSIS SYNDROME
Zubani F1, De Peri E2, Raso F3, Candiani A, Latronaco N1
1Intensive Care Unit, Spedali Civili, University Hospital of Brescia, Brescia, Italy

INTRODUCTION. More than 70 percent of patients with sepsis syndrome or septic shock present altered mental status manifested by decreasing attention, disorientation, agitation, obtundation and in worst cases profound stupor and coma (Sepsic Encephalopathy). We don’t know the exact pathophysiological mechanism which cause SE; but many clinical studies have shown that cerebral blood flow (CBF) is reduced in these patients.

The current study was performed to evaluate the behaviour of cerebrovascular autoregulation during systemic inflammatory response syndrome (SIRS), sepsis syndrome, septic shock and multiple organ failure (MOF).

METHODS. We have studied all patients with SE admitted into the Intensive Care Unit of the Spedali Civili University Hospital of Brescia from January 2004 to September 2004. Cerebral autoregulation has been evaluated bilaterally in the MCA territory with the Transient Response Test (THT).

RESULTS. Twelve patients were included in this study and 50 THT have been totally performed. Cerebral autoregulation was impaired in 64% of THT; the two conditions most associated with worst cerebrovascular response are sepsis (66.6%) and MOF (80%); patients with septic shock have shown unexpectedly the best autoregulatory response. In patients with infections caused by gram-negative organisms cerebral autoregulation was impaired in 100% of measurements: there are many evidences in literature about endotoxin’s ability to influence cerebral blood flow. Another important factor able to influence the behaviour of cerebral blood vessels is PaCO2: the effect of hypercapnia is more evident in patients with sepsis syndrome and with MOF; particularly, the share of patients with septic shock with cerebral autoregulation completely impaired, was hypercapnic in 100% of measurements.

CONCLUSION. Cerebral autoregulation was impaired in the most part of measurements. Gram-negative organisms and hypercapnia play a fundamentally roll in the loss of this mechanism.

REFERENCE(S). Matta B F. Sepsis-induced vasoparalysis does not involve the cerebral vascular autoregulation but reflects other systemic factors in septic shock. Intensive Care Med, 2001; 27: 1758-1764.

Grant acknowledgement. Dr. A. Rudiger was supported by the Swiss National Research Foundation and the Stiefel-Zangerle Foundation
**555** 
NOCTURNAL MELATONIN CONCENTRATION CORRELATES WITH ILLNESS SEVERITY IN PATIENTS WITH SEPTIC DISEASE

Perras B, Kurowski V, Doel C

Department of Internal Medicine I, University of Luebeck, Luebeck, Germany

INTRODUCTION. Animal studies suggest that melatonin plays an adjunctive role in defense mechanisms to overcome severe illness and, accordingly, melatonin seems to affect morbidity and mortality. We report on correlations between nocturnal melatonin serum levels and measures of illness severity in 302 patients consecutively admitted to a medical critical care unit.

METHODS. On the day of admittance at 02:00 h am blood for the determination of serum melatonin levels was obtained and illness severity was assessed according to the Acute Physiology And Chronic Health Evaluation score (APACHE) and the Therapeutic Intervention Scoring System (TISS).

RESULTS. For the entire study group there was a weak negative correlation between TISS and nocturnal melatonin concentration ($r = -1.22$, $p<0.04$) while such correlation was not observed for melatonin and APACHE. Subgroup analysis revealed that in patients with sepsis both APACHE and TISS scores correlated negatively with nocturnal melatonin concentrations ($n = 14$, APACHE: $r = -0.656$, $p<0.02$; TISS: $r = -0.544$, $p<0.05$). Such correlation did not occur in other disease entities like coronary syndromes or intoxications.

CONCLUSION. Our study indicates that melatonin is specifically affected by serious infectious disease and low melatonin levels may contribute to the adverse outcome of sepsis.

**556** 
REVIEW OF NASOGASTRIC FEEDING TUBES USED IN CRITICAL CARE

Jukes A L, Saayman A G

Critical Care Directorate, University Hospital of Wales, Cardiff, United Kingdom

INTRODUCTION. Enteral feeding is the preferred method of nutritional support in the critically ill patient (Jolliett et al., 1999). The enteral feeding protocol within our unit advocates prompt replacement of wide-bore tubes with fine-bore feeding tubes once enteral tube feeding is established to maximise patient comfort and safety. The aim of this review was to compare the current fine-bore feeding tube used within the critical care directorate (CCD), Medicina (Entralmed, 7Fr) or ENG with that manufactured by Merck, (Costflo, 8F or CNG). It was hypothesised that as a result of the specific features of the CNG tube, it would be easier to aspirate; reduce the incidence of occlusions; and have increased radio opacity when compared with the ENG.

METHODS. An audit proforma was completed for 41 patients who had a fine-bore feeding tube placed within the CCD: 20(ENG), 21(CNG) placed. The patients were followed until feeding was stopped due to a complication, or no longer required. Chest x-rays were reviewed by a consultant at the end of the study, unaware of NG type.

RESULTS. All nasogastric feeding tubes were placed by medical staff. Very few measured the tube length required to insert prior to placement. Auscultation, was used in 24% of tubes placed. Aspiration of gastric contents was attempted in 68% of tubes but only obtained in 10/24 tubes (7 ENG, 3CNG). Only 5 of these had a pH of 4 or less, confirming gastric placement. All patients received a chest x-ray, visibility comparable (17 ENG and 16 CNG clearly visible on x-ray). There were 5 occlusions (4 ENG, 1 CNG). Many tubes were accidentally displaced or pulled out by patients (6 ENG, 11 CNG). The majority of tubes (76%) remained in situ for 14 days or less (14 ENG, 17 CNG).

CONCLUSION. The results of the review did not warrant a change in the type of nasogastric feeding tube used within the CCD. It has highlighted that education and training of doctors is required within the CCD regarding the placement, and appropriate methods used to confirm correct NG position. Radiological confirmation of NG tube position is advised on initial placement in critically ill patients. However, attempts should be made to aspiration and pH test to assist subsequent confirmation, avoiding unnecessary x-rays.

REFERENCES. Jolliett P et al. Enteral Nutrition in Intensive Care Patients: A Practical Approach. Clin Nutr 1999;18(1),47-56

**557** 
ENDOCRINE AND HEMODYNAMIC RESPONSE DURING WEANING FROM MECHANICAL VENTILATION IN PATIENTS WITH COPD

Baykara N, Aydemir E, Solak M, Toker K

Anesthesiology and Reanimation, University of Kocaeli, School of Medicine, Kocaeli, Turkey

INTRODUCTION. The purpose of the present study to assess changes in adiuretic hormone (ADH), growth hormone (GH) levels and hemodynamic response during a standart weaning protocol in patients with COPD.

METHODS. This study was carried out in 15 patients undergoing ventilatory treatment with synchronized intermittent mandatory ventilation (SIMV)+PEEP for respiratory failure due to COPD. Their durations of mechanical ventilation (MV) were between 3-7 days. Exclusion criteria were: abnormal left or right ventricular function, abnormal liver or renal function, diabetes mellitus, CNS disease or MV exceeding one week. Weaning was carried out in 3 stages of 60 min each, from $\nu/2$ of the initial rate of SIMV ($SIMV/2$)+PEEP, to continuous positive airway pressure (CPAP), to spontaneous breathing. Systolic blood pressure, diastolic blood pressure, heart rate, central venous pressure, pulmonary capillary wedge pressure, cardiac output, hourly urine output, plasma osmolality and ADH, GH were measured during at each ventilatory condition.

RESULTS. Hemodynamic parameters did not change significantly among the ventilatory conditions. ADH concentrations during SIMV+PEEP and SIMV $1/2$+PEEP were similar and were significantly higher than during spontaneous breathing. ADH concentration during CPAP was not significantly different from spontaneous breathing. Even though statistically insignificant, hourly urine output was higher during CPAP and spontaneous breathing than during SIMV+PEEP and SIMV $1/2$+PEEP modes. GH level did not change significantly among ventilatory conditions.

CONCLUSION. Accordingly, weaning appears to be well tolerated from a hemodynamic standpoint in COPD patients with normal cardiac function after short term MV. CPAP is the ventilator mode causing the least ADH secretion in patients with COPD.

**558** 
HEMODYNAMIC AND RESPIRATORY EFFECTS OF A LIPID EMULSION ENRICHED WITH W-3 FATTY ACIDS

Sabater J, Masclans J, Sacanell J, Sabín P, Chacón P, Planas M

Servei Medicina Intensiva, H Vall d’Hebron, Servei Medicina Intensiva, Servei Medicina Intensiva, Servei Medicina Intensiva, Servei Farmacia, Servei Soport Nutricional, H Vall d’Hebron, Barcelona, Spain

INTRODUCTION. Administration of lipid solutions to critically ill patients may be associated with changes in laboratory and gas exchange parameters. Lipid solution composition may impact in these changes.

METHODS. Investigate gas exchange and hemodynamic changes in patients with ARDS treated with a lipid solution enriched with w-3 fatty acids. Prospective, randomise, double blind study of parallel groups. Sixteen patients with ARDS within 48 hours of diagnosis were randomised in two groups. Group A (n=8) received lipid solution Lipoplus (20% B.Braun Medical (50% MCT, 40% LCT, 10% w-3) and group B (n=8) Intralipid (100% LCT). Lipid solution was given over 12 hour at 0.12 mg/kg/h. Hemodynamic and gas exchange parameters were analysed before treatment and at 12 and 24 h of lipid solution infusion.

RESULTS. Both groups were comparable regarding baseline and main characteristics. Statistically: BMDP, Wilcoxon and Sign tests.

RESULTS. The following table shows the percentage of change after lipid solution infusions compared with baseline levels.

| TABLE 1. | PS | HR | CO | CVP | PVP | PaO2/FiO2 |
|----------|----|----|----|-----|-----|-----------|
| A-Lipoplus | -9% | +10% | +10% | -23% | -4% | +17% |
| B-Intralipid | 0% | -3% | +3% | +6% | -16% |

CONCLUSION. Lipid solutions enriched with w-3 fatty acids are safe, well tolerated in patients with ARDS, and without changes in the hemodynamic or gas exchange of these patients.
EFFECT OF IMMUNONUTRITION ON BLOOD LOSS AND NEED OF BLOOD TRANSFUSION
Klingbacher E, Schöninger-Hekele A, Hesmay M
Department of Cardiothoracic Anaesthesia and Intensive Care Medicine, General Hospital of Vienna, Vienna, Austria

INTRODUCTION. Immunonutrition is a balanced nutritional support containing immune enhancing substances like arginine and omega-3 fatty acids. The aim of this study is to find out if immunonutrition can reduce the number of blood transfusions and blood loss in cardiac patients.

METHODS. In this prospective and double-blind study we randomised 130 patients who either received immunonutrition or an isocaloric placebo. Comparison of the group was done with repeated-measures ANOVA.

RESULTS. We could not find a difference concerning postoperative blood loss and blood transfusions.

CONCLUSION. We could not prove a significant advantage of immunonutrition as reported in the literature.

STANDARD HEMODIALFILTRATION DOES NOT IMPROVE SURVIVAL COMARED TO IHD IN SEPTIC ACUTE RENAL FAILURE
Vincent C, Camus C, Costa de beaugerard M, Klouche K, Boulou T, Landais P, Chiche F, Dhaunaut P
Burn Care Unit, Cochin Hospital, Paris, 3ICU, Pontchaillou Hospital, Rennes, 4ICU, Tenon Hospital, Paris, 4ICU, Lapeyronie Hospital, Montpellier, 5ICU, La source Hospital, Orleans, 6Biostatistics, Necker Hospital, 7ICU, Cochin Hospital, Paris, France

INTRODUCTION. Standard hemofiltration is reported to improve hemodynamics and survival in animal models of septic or endotoxic shock. In humans, despite the lack of convincing data, hemofiltration is thought to be the gold standard to treat acute renal failure (ARF) in case of septic shock. We compared survival of septic ARF treated with IHD or continuous veno-venous hemofiltration (CVVHDF) in the prospective randomised Hemodiafe study.

METHODS. We performed post-hoc analysis of data from a prospective, multicenter (21 centers) randomised study. Patients with ARF (area > 35 ml/min) or serum creatinine > 310 micromol/l or oliguria) associated with MODS (LOD > 5) and needing renal replacement therapy were enrolled. They were randomised to receive IHD or CVVHDF performed with the same membrane (polyacrylonitrile, AN69) and a bicarbonate based buffer. Guidelines to improve hemodynamic tolerance and efficiency were provided. Primary endpoint was 60-day survival evaluated in an intention-to-treat analysis. Septic ARF was defined if any sepsis was diagnosed before the occurrence of ARF. Data are presented as means±SEM.

RESULTS. Among the 560 patients enrolled in Hemodiafe, the overall septic population consisted of 224 pts (46±13 y.o.), M164/F60, SAPS II 65±14, LOD score 9.8±2.4 randomised in the IHD (n=126) or in the CVVHDF group (n=134). Eighty-nine percent of patients had septic shock and 97 % were under mechanical ventilation. Mean serum urea and mean serum creatinine were respectively 6.6±62.1 (p 0.34). 2hCrCl correlated well with 24hCrCl (coefficient 0.72, p<0.001) and less well with differences were detected in both groups.

CONCLUSION. Standard CVVHDF does not offer any survival benefit compared to IHD to treat septic ARF associated with MODS.

REFERENCE(S).
1. Mortality was equal in “I” and “F” patients, but higher than “R” group (p < 0’0001) and lower than “Fo” (p < 0’0001). 2. LOS was similar in “RIFF” 3. “Fo” LOS was longer than “RIF” LOS. 4. “Fo” group suffered more severe complications and developed acute renal failure as a part of multi-organ dysfunction syndrome (MODS), which needed multiple organ support therapy (MOST).

VALIDATION OF 2 HOURS SAMPLING CREATININE CLEARANCE IN ICU POPULATION, INCLUDED UNSTABLE PATIENTS
Selin-Pérez G, Herrera-Gutiérrez M, Banderas-Braño E, Muñoz-Bono J, Fernández-Ortega J, Lebrós-Gallardo M
Critical Care and Urgencies, Complejo Hospitalario Universitario Carlos Haya, Málaga, Spain

INTRODUCTION. Methods for evaluation of glomerular filtration rate –GFR– (24-hours creatinine clearance –24hCrCl– or Cockcroft-Gault formula –CG–) are not well suited for critically ill patients: 24hCrCl requires a steady state and CG has not been completely validated. Short time CrCl can be used but this method has not been evaluated in unstable patients. We intend to demonstrate that 2-hours CrCl (2hCrCl) is similar to 24hCrCl even in unstable patients.

METHODS. Prospective study on adult ICU patients. We calculate 2hCrCl, 24hCrCl and CG estimate. 2hCrCl was measured at the beginning of the 24hCrCl interval. Age, sex, weight and diagnosis were recorded and for the 24 hours period registered SOFA, nutrition, diuretics, nephrotoxics, hypotension or hypoxemia, use of vasopressors and regularity of urine flow. We defined two groups: patients recently admitted (less than 24 hours) and in stable condition and expected stable renal function. Statistical analysis: Paired T-test, Pearson Correlation Coefficient and Partial Correlation Coefficients.

RESULTS. 91 patients, 41 (44.1%) on admission and 52 (55.9%) in stable condition. In 2 cases (2.2%) 2hCrCl was lost and in 11 (11.8%) 24hCrCl because methodological problems. 80 patients completed the protocol (43 stable and 37 on admission) and were included for analysis. No differences were detected in both groups.

CONCLUSION. 2hCrCl correlates well with 24hCrCl, is easier to obtain, is most reproducible and eliminates unnecessary delays and methodological problems complicating 24hCrCl. 2hCrCl can be a good estimate of GFR in ICU, even in unstable patients.
INTRODUCTION. The appearance of ARF in patients with end-stage liver disease (ESLD) is generally a factor with a fatal prognosis. For those on waiting list for liver transplant (LTx), the complication precludes the stay on the Tx program. In this condition an artificial support for both kidney and liver dysfunction might correct the metabolic derangements, getting time for Tx.

METHODS. The P system is a plasmafiltration treatment coupling plasmadsorption and hemodialysis. After separation through an albumin-permeable membrane, plasma enters a secondary circuit where protein-bound toxic substances are removed by two adsorbers (p01, a neutral resin, and p02, an anion exchanger. Plasma is then returned to the venous blood line, where a high-flux hemodialyzer removes water-soluble substances. We tested the P system in 8 ESLD pts (5 virus C-related hepatitis, 2 primary biliary cirrhosis, 1 relapsing hepatitis on LTx) all of them on waiting list for LTx. All the patients were severely hyperbilirubinemic, hypercholemic and hyperammoniemic, and presented various degree of kidney insufficiency.

RESULTS. Twenty sessions were performed, 2.5/patient, each lasting 340+21 mins, at alternate day interval. As main parameters of efficiency for the treatment of liver failure, we considered the pre-to-post session reduction of: bilirubin, -31.8+14.3, ammonium, -64.3+9.5%, cholic acid, -57.7+21% and 7enodesossicholic acid, 29.3+22%. Urea removal rate was 57.3+17, uric acid 55.2+9,5%, phosphate 51.6+11%. A significant reduction was observed in the circulating level of the soluble receptor for Interleukin 2 (-15.5%, p=0.002); Interleukin 8 and TNF as well showed an important reduction (-53.4% and -29.6%, respectively), even though not significant. Five patients received LTx.

CONCLUSION. The P system proved able to control the metabolic derangements of both kidney and liver insufficiency. The ability to remove some cytokines raises the possibility that P might reduce the splanchnic vasodilatation typical of ESLD. In the MELD era (model for ESLD) for the organ allocation, with creatinine and bilirubin having a leading role, the importance of such a system is expected to be growing, widening the indications to patients otherwise excluded from a transplant program.