Oral Presentations
Sepsis: Basic studies: 0001–0005

0001

DENDRITIC CELLS MODULATE LUNG RESPONSE TO PSEUDOMONAS AERUGINOSA IN A MURINE MODEL OF SEPSIS-INDUCED IMMUNE SUPPRESSION

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INTRODUCTION. Host infection by pathogens triggers an innate immune response leading to a systemic inflammatory response, often followed by an immune dysfunction which can favour the emergence of secondary infections. Dendritic cells (DCs) have a unique ability to link innate and adaptive immunity and may be centrally involved in the regulation of sepsis-induced immune suppression. We previously reported that polymicrobial sepsis durably affects the functions of DCs and confers long-term susceptibility to P. aeruginosa pneumonia. In this study, we assessed the contribution of DCs to lung defence towards secondary P. aeruginosa pneumonia.

METHODS. We used a murine model of sublethal polymicrobial sepsis through cecal ligature and puncture (CLP). In this model, a short course of antibiotics and volume resuscitation allows long-term survival of 70% of mice. Eight days after CLP, we induced a secondary pneumonia through intratracheal instillation of P. aeruginosa (serotype PAO1) in post-septic mice. Bone marrow-derived DCs (BMDCs) were generated through 7-day culture of medullar progenitors in medium supplemented with GM-CSF. Concomitant to bacterial inoculation, we intratracheally administrated exogenous BMDCs into post-septic mice. Bacterial lung clearance was evaluated through quantitative culture of bronchoalveolar lavage (BAL) fluid. The lung response was assessed 4 and 24 hours after instillation through quantification of protein level, inflammatory cells, myeloperoxydase (MPO) activity and cytokine levels in the BAL fluid.

RESULTS. After intratracheal instillation of $5x10^6$ CFUs of P. aeruginosa, all sham-operated mice survived while post-septic mice displayed high susceptibility with a 80-percent mortality rate. As compared to sham-operated mice, post-septic mice displayed marked lung damage with early recruitment of neutrophils, cytokine imbalance with decreased IL-12p70 production and increased IL-10 release, but no defective bacterial lung clearance. Co-administration of 10^6 exogenous BMDCs into post-septic mice challenged with P. aeruginosa dramatically improved the survival rate to 70%. Intratracheal instillation of BMDCs did not improve bacterial clearance, but delayed neutrophil recruitment and subsequently reduced the MPO activity in BAL fluid. In addition, BMDCs strongly attenuated the early peak of TNF-alpha and restored a positive Il-12p70/IL-10 balance.

CONCLUSION. Adoptive transfer of BMDCs reverses sepsis-induced immune suppression in a relevant model of secondary P. aeruginosa pneumonia. Unexpectedly, the mechanism of action of BMDCs did not involve enhanced antibacterial activity, but occurred by dampening the pulmonary inflammatory response.

GRANT ACKNOWLEDGEMENT. Supported by the ESICM Young Investigator Award 2007.

0002

PHOSPHOINOSITIDE-3 KINASE GAMMA KINASAE ACTIVITY INDUCES THE PROGRESSION OF SIRS TO PULMONARY INJURY, INFLAMMATION AND APOPTOSIS

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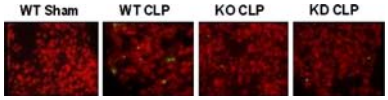
INTRODUCTION. Sepsis is characterized by the presence of a systemic inflammatory response syndrome (SIRS), which in turn leads to multiple organ failure and death. The lung is one of the primary organs prone to septic-induced injury which results, in part, due to an increase in pulmonary apoptosis. Phosphoinositide-3 kinase gamma (PI3 Kg), an isoform of the PI3K cell signalling family, has been shown to play a dominant role in the inflammatory response; however, its role in the development of septic-induced SIRS, pulmonary inflammation and apoptosis remains unknown. We hypothesized that mice lacking PI3Kg or possessing a kinase dead form of this enzyme will be protected from the progression of SIRS to lung injury, inflammation and apoptosis.

METHODS. PI3Kg wild-type (WT), knockout (KO) and kinase dead (KD) mice were randomized to undergo either cecal-ligation and perforation (CLP)-induced sepsis or a sham laporatomy. After 18 hours, plasma was collected and lungs underwent either a bronchioalveolar lavage (BAL) or fixation in OCT. The cytokine/chemokine concentrations of 22 inflammatory molecules were assessed in both plasma and BAL using a bio-plex assay, and pulmonary apoptosis was analysed via TUNEL.

RESULTS. In wild-type mice, CLP-induced sepsis caused a significant increase in all measured cytokines and chemokines in both the plasma and BAL. For 5 inflammatory molecules (MIP1a, MIP2, RANTES, MCP1 and IL10), KO and KD were protected from the increased production of in both plasma and BAL. For the other 17 molecules (IL1b, IL4, IL6, TNFa, GCSF, IL1a, IL2, IL5, IL9, IL12, IL13, IL17, IL18, KC, MIP1b, GMCSF, INFg), KO and KD showed protection in BAL fluid while they had similar levels in the plasma to WT. The percentage of apoptotic cells was significantly increased in WT CLP mice compared to sham, while were not significantly altered following CLP in KO and KD compared their respective shams (Representative figure below).



CONCLUSION. Following CLP, PI3Kg KO and KD mice have a slightly diminished systemic inflammatory response (SIRS), while show dramatic protection against the development of lung inflammation and apoptosis, each known to contribute to the development of ALI. This suggests that the kinase activity of PI3Kg plays an important role in the progression of SIRS to pulmonary injury.

GRANT ACKNOWLEDGEMENT. University of Turin.

0003

REACTIVE OXYGEN SPECIES MEDIATE LPS-INDUCED UPREGULATION OF TUMOUR NECROSIS FACTOR-ALPHA CONVERTING ENZYME ON PURIFIED PRIMARY HUMAN MONOCYTES

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INTRODUCTION. Tumour necrosis factor (TNF) is an archetypal pro-inflammatory effector and is implicated in numerous disease states, including sepsis and organ injury. TNF is initially expressed at the cell surface in a membrane-bound form which is subsequently cleaved to form soluble TNF by TNF-alpha converting enzyme (TACE). The majority of previous research into the regulation of TACE enzymatic activity was based on monocyte cell lines, due mainly to difficulties involved in obtaining purified primary human monocytes. The applicability of such research is questionable as the post-translational processing of TACE appears to differ between cell lines and primary cells. In this study, we have successfully purified primary human monocytes, and investigated the effects of LPS stimulation on TACE activity and its underlying mechanisms, with a particular focus on the potential role of reactive oxygen species (ROS).

METHODS. Negative immunomagnetic bead selection of peripheral blood mononuclear cells produced pure (85 $\sim$ 90%) monocyte populations, which were subsequently stimulated with lipopolysaccharide (LPS). TACE activity was measured by a novel cell-based assay using a fluorescence resonance energy transfer peptide with a TACE-specific, TNF cleavage sequence [Lab Invest. 2005;85(11):1440-8], while cell surface TACE expression was assessed by flow cytometry. A targeted pharmacological approach enabled us to delineate the pathways underlying upregulation of TACE activity.

RESULTS. TACE activity was rapidly (30 min) upregulated by LPS stimulation (42 ± 12 vs 116 ± 31 Fluorescence Units/min [FU/min] for 10^5 monocytes, $p < 0.01$), and was found to be independent of cell surface TACE expression. Co-incubation with N-acetyl-L-cysteine, a broad-spectrum ROS scavenger, attenuated the LPS-induced upregulation of TACE activity ($90 \pm 4\%$ attenuation, $p < 0.01$), as did pre-incubation with diphenyleneiodonium, an NADPH oxidase inhibitor ($70 \pm 6\%$, $p < 0.05$). Superoxide dismutase, a superoxide scavenger, or its cell-permeable mimic MnPyP failed to produce the same effects, implicating H_2O_2/OH- as a likely mediator. Upregulation of TACE activity following addition of H_2O_2 further supported this hypothesis (26 ± 10 vs 136 ± 52 FU/min, $p < 0.05$). TACE activity also increased with bacitracin (29 ± 2 vs 88 ± 35 FU/min, $p < 0.01$), an inhibitor of the redox-sensitive enzyme, protein disulphide isomerase (PDI), which catalyses disulphide interchange thereby influencing protein conformation.

CONCLUSION. The rapid increase in TACE catalytic activity following LPS stimulation of primary human monocytes implicates post-translational modification of the enzyme as the likely underlying mechanism. Pharmacological studies of ROS signalling pathways suggest that H_2O_2/OH-, produced by NADPH oxidase, is the mediator involved, and that it may act by releasing TACE from the influence of an inhibitory enzyme, PDI. These findings provide evidence of a novel interaction between ROS and TNF, mediated by TACE. This mechanism may allow monocytes to respond rapidly to perturbations in redox state which are so prominent in diseases such as sepsis and ischaemia reperfusion injury.

GRANT ACKNOWLEDGEMENT. Supported in part by Westminster Medical School Research Trust.

0004

LYN TOGETHER WITH PHOSPHATIDYL INOSITOL-3 KINASE CONTRIBUTE TO TOLL-LIKE RECEPTOR 2 SIGNALLING AFTER STIMULATION WITH BACTERIAL-DERIVED TRIACYLATED LIPOPROTEIN

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INTRODUCTION. Innate immunity involves the early recognition of pathogens by Toll-like receptors (TLRs). Besides the canonical MyD88 pathway, TLRs (especially TLR-2) activate the PI-3 kinase pathway to induce pro-inflammatory NF-kB transcriptional activity. Lyn, a Src kinase family member that modulates PI-3 kinase activity in B cells, has been recently recognized to play a role in TLR signalling and innate immunity (1). We investigated the role of Lyn in TLR-2 signalling after stimulation with Pam3CSK4, a bacterial triacylated lipoprotein highly conserved in a variety of microorganisms.

METHODS. THP1 and HEK 293 cells stably transfected with TLR-2 (293-TLR2) were stimulated with Pam3CSK4 (100 ng/mL) in the absence/presence of various Lyn inhibitors (inhibitor compound PP2, dominant negative LynDK, Lyn interferent siRNA). We investigated the effect of Lyn inhibition on NF-kB signalling pathways using luciferase reporter gene assays, Western blot, immunoprecipitation, Rac pull-down assays as well as fluorescent video imaging and cytokines measurements (ELISA).

RESULTS. After Pam3CSK4 stimulation, inhibition of Lyn by PP2, LynDK and Lyn-specific siRNA decreased NF-kB activity in a dose-dependent manner. Concentrations of IL-6 and TNF-a were also decreased when Lyn was inhibited. Inhibition of Lyn abolished phosphorylation of the p65 NF-kB subunit, whereas the I-kB degradation pattern was not modified by Lyn inhibitors. Inhibition of Lyn did not alter the recruitment and activation of Rac1, nor the recruitment of the p85 subunit of PI-3 kinase to TLR-2. Conversely, inhibition of Lyn abolished both PIP3 formation and phosphorylation of Akt, suggesting that Lyn is essential to TLR-2 stimulated PI-3 kinase activity.

CONCLUSION. These data suggest that Lyn is a key regulator in TLR-2 signalling after Pam3CSK4 stimulation, as it allows transactivation of the p65 NF-kB subunit downstream of PI-3 kinase. The target of Lyn in this model remains to be identified.

REFERENCE(S). 1. Sanjuan MA, Rao N, Lai KT, Gu Y, Sun S, Fuchs A, Fung-Leung WP, Colonna M, Karlsson L. CpG-induced tyrosine phosphorylation occurs via a TLR9-independent mechanism and is required for cytokine secretion. J Cell Biol. 2006 Mar 27;172(7):1057–68.

0005

SKELETAL MUSCLE MITOCHONDRIAL MEMBRANE POTENTIAL IS REDUCED IN SEVERE SEPSIS

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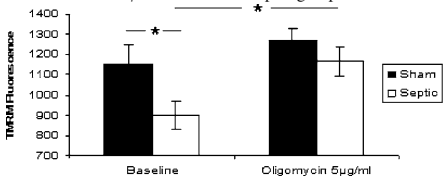
INTRODUCTION. Skeletal muscle mitochondrial function has been shown to be impaired in sepsis. To investigate the underlying changes in muscle physiology further, we have developed an ex-vivo preparation of the mouse diaphragm. The diaphragm lends itself perfectly to multiphoton confocal imaging, in which live cell imaging can be used to measure changes in mitochondrial function (membrane potential ($\Delta\psi$m) and NADH redox state), generation of reactive oxygen species (ROS) and calcium signals. Diaphragms are isolated from matched septic and sham operated animals, loaded with fluorescent indicators, and the tissue is perfused with oxygenated Krebs' solution. Here we report preliminary measurements that show that mitochondrial function is significantly altered in diaphragmatic muscle following 24 hours of faecal peritonitis in fluid-resuscitated mice.

METHODS. After 24 h faecal peritonitis (and sham-operated controls), mice ($n = 8$ per group) were sacrificed and the diaphragm removed. Mitohcondrial membrane potential was measured using a voltage-dependent fluorescent probe, tetramethylrhodamine methyl ester (TMRM) 100nM loaded into isolated, perfused diaphragm muscle. TMRM excitation was imaged using a Zeiss 510 NLO CLSM (multiphoton confocal microscope).

RESULTS. Mitochondrial membrane potential is generated by the respiratory chain whereby oxidation of substrates generates a proton gradient across the inner mitochondrial membrane expressed as a transmembrane potential difference ($\Delta\psi$m) which provides the energy that drives ATP synthesis. TMRM, a lipophilic cationic probe, accumulates within mitochondria to equilibrate between compartments with different potentials. Therefore the dye concentration within mitochondria, and the fluorescence intensity, is a function of $\Delta\psi$m. As shown in Fig. 1, TMRM fluorescence ($\Delta\psi$m) was significantly reduced in the septic group at 24 hours following the induction of sepsis (*t-test, $p < 0.05$). However, after the addition of oligomycin, $\Delta\psi$m was significantly increased in the septic tissue and there was no longer any significant difference between $\Delta\psi$m in sham and septic groups.



CONCLUSION. These results consolidate recent evidence suggesting that sepsis is associated with mitochondrial dysfunction. Further work will concentrate on the effect of the above on ATP synthesis, ROS generation and oxygen consumption.

GRANT ACKNOWLEDGEMENT. This work was funded by the Medical Research Council.

Oral Presentations
Pathophysiological approach of cardiovascular failure: 0006–0010

0006

HYPOXIC VASODILATION: A ROLE FOR NITRIC OXIDE

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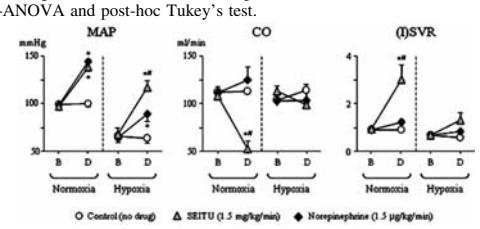
INTRODUCTION. Acute hypoxia causes systemic vasodilation, presumably related to eNOS-derived nitric oxide (NO). We speculated that blocking NO synthesis would have a greater pressor effect compared with catecholamines. Using hypoxaemia as a model of tissue hypoxia, we assessed the effects of the non-selective NO synthase inhibitor S-ethylisothiourea (SEITU) versus norepinephrine (NE) on blood pressure and cardiac function.

METHODS. Under isoflurane anaesthesia, fluid-resuscitated male Wistar rats underwent left common carotid and right jugular venous cannulation for blood pressure monitoring and fluid/drug administration, respectively. A tracheostomy was performed to secure the airway and allow manipulation of the fraction of inspired oxygen (FiO_2). Cardiac output (CO) was measured using echocardiography. During normoxia, increasing doses of norepinephrine (maximum dose 1.5 mug/kg/min) and SEITU (maximum dose 1.5 mg/kg/min) were administered to increase BP by approximately 40 mmHg. In separate experiments hypoxaemia was induced by reducing the FiO_2 to 0.125 for 30 mins and vasopressors started after 5 mins. Comparisons were drawn against those breathing room air throughout and those receiving placebo (background infusion 10 ml/kg/h n-saline).

RESULTS. Data shown as mean (± SE), B = baseline, D = drug treatment. I(SVR) is an index of systemic vascular resistance (SVR), calculated as MAP/CO. $^{*}p < 0.05$ between controls and drug-treated animals ($n = 5$), $^{\#}p < 0.05$ between NE and SEITU. Statistics: 2-way RM-ANOVA and post-hoc Tukey's test.



CONCLUSION. Under hypoxic conditions, SEITU was a more potent pressor than NE, but without the detrimental effects on myocardial function seen during normoxia. We speculate that the depressor effect on myocardial function seen with SEITU during normoxia is due to excessive coronary artery vasoconstriction that may be reversed during hypoxia. These findings reflect a crucial physiological role for NO and may also explain the adverse events observed in septic shock patients receiving NOS inhibition (1).

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GRANT ACKNOWLEDGEMENT. This work is supported by the Medical Research Council (UK).

0007

VASCULAR POTASSIUM CHANNELS ARE ACTIVATED AND OVEREXPRESSED IN SHOCK STATES

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INTRODUCTION. Vascular potassium channels play a major role as regulator of vascular tone. Their inhibition markedly improved arterial pressure and vascular reactivity in endotoxic and hemorrhagic experimental shocks. Nitric oxide (NO) seems to be a major activator of potassium channels. It remains unknown whether this channel activation is associated with an increased channel density.

METHODS. Three rats models of shock were used [(endotoxin (4 hours), peritonitis observed at 6 and 18 hours and hemorrhagic shock (4 hours)] and two pharmacological agents (dexamethasone, a NO inhibitor, and PNU-37883, a selective inhibitor of vascular ATP-dependent potassium channels. At the end of the experiments, vascular reactivity was tested with two doses of norepinephrine with and without dexamethasone and/or PNU-37883. Quantitative real time PCR and western blot were performed on aorta, mesenteric artery and resistance mesenteric arteries for studying the vascular KATP channels (KIR 6.1 and Sur 2.B) and iNOS expressions. Comparisons were done versus a control group.

RESULTS. All the models were associated with hypotension, lactic acidosis and vascular hyporeactivity. Vascular hyporeactivity was reversed by dexamethasone and PNU-37883.

In all models but at different levels, we found an overexpression of iNOS (6 x to 100 x) and potassium channels mRNA (2x to 35x). This overexpression was associated to an increase in Kir 6.1 level protein (x 2). In the peritonitis model observed after 6 hours, dexamethasone markedly decreased mRNA expression of iNOS (90 to 40) but did not change Kir 6.1 (2x to 10 x) and SUR 2 B (3x to 3.5 x) mRNA expressions and did not inhibit potassium channels protein synthesis.

CONCLUSION. Potassium channels are implicated in shock induced vascular hyporeactivity. We demonstrated herein that a part of vascular potassium channels implication is due to an increase in the channel number.

GRANT ACKNOWLEDGEMENT. Société de Réanimation de Langue Francaise (SRLF).

0008

MURINE STRAIN-SPECIFIC DIFFERENCES IN CARDIAC DYSFUNCTION INDUCED BY ENDOTOXEMIA

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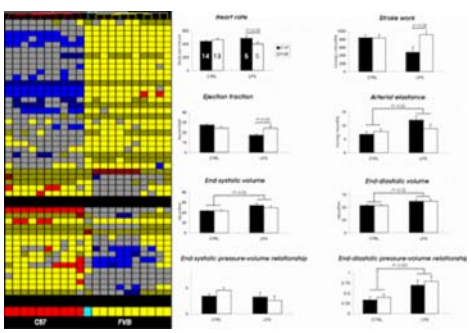
INTRODUCTION. The mechanism(s) underlying septic cardiac dysfunction remains unclear. Pharmacologic-induced heart failure has revealed strain-specific differences in the development of systolic/diastolic cardiac impairment[1]. Strain-specific heart failure patterns are predicted by distinct genomic profiles [Fig. 1]. We hypothesized that murine strains that demonstrate different physiological and genomic patterns in pharmacologic-induced heart failure should also exhibit distinct cardiac physiological profiles in septic cardiac dysfunction.

METHODS. Pressure-volume loops (1.4 Fr Millar catheter inserted via left carotid artery into left ventricle under isoflurane anesthesia) were used to compare cardiac performance and compliance in C57 and FVB wild-type mice 4 h after intraperitoneal injections with sterile saline or endotoxin (B0111:04; 2 mg/kg). Gene expression profiles unique to each mouse strain and treatment type were created using 2-way ANOVA and 2-fold filtering.

RESULTS. Distinct physiological differences were observed between C57 and FVB strains following endotoxemia, summarized in Fig. 1 [numbers of mice per group are indicated in the heart rate graph]. Stroke work was markedly reduced in C57 mice, despite impaired passive diastolic properties [increased EDPVR] in both strains after endotoxemia. Contractility (ESPVR) was similar between strains regardless of treatment. Ejection fraction was impaired only in the C57 strain. Heart rate was higher in C57 after endotoxin injection.



CONCLUSION. Physiologically significant differences exist between murine strains following endotoxemia. Genomic analyses of these strain-specific physiological differences may provide new mechanistic insights into septic cardiac pathophysiology.

REFERENCE(S). 1. Anesthesia and Analgesia 2008,106[S3], S-68.

GRANT ACKNOWLEDGEMENT. Supported by NHLBI [AJP], Intensive Care Society UK [GLA].

0009

EFFECT OF LEVOSIMENDAN ON SYSTEMIC HEMODYNAMICS AND CARDIAC FUNCTION IN A PORCINE ENDOTOXEMIC MODEL

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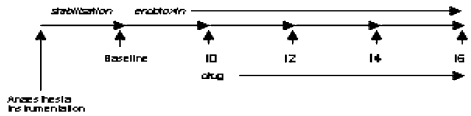
INTRODUCTION. Hemodynamic derangements and depressed cardiac function are the most severe manifestations of sepsis. Levosimendan has been proposed as an ideal inotrope in septic cardiomyopathy, where there is decreased responsiveness to B agonists. Additionally, its pulmonary vasodilatory effects have been suggested to be effective treatment for sepsis-induced pulmonary hypertension and right ventricular failure (1,2). The aim of this study was to investigate whether Levosimendan is able to improve systemic hemodynamics and cardiac function in a porcine endotoxemic model.

METHODS. 13 Landrace pigs were randomised into Endotoxin + control (Control) n = 6 and Endotoxin + Levosimendan treatment groups (Levo) n = 7. After anesthesia and instrumentation all pigs received an infusion of E.coli LPS. When systemic hemodynamics had deteriorated despite fluid resuscitation to a predetermined value, defined as mean pulmonary arterial pressure (MPAP) > 2xBaseline, or cardiac index (CI) decrease > 20% of Baseline, either Levo or control infusions were started. Hemodynamic parameters were measured using pulmonary artery and PiCCO catheters for 6 h after starting the Levo/control infusion.

RESULTS. CI increased significantly with time in both groups, peaking at t = 3, consistent with the hyperdynamic phase of septic shock, then decreased to below baseline values. The Levo group had higher CI compared to the Control group, which could be partially explained by an increased heart rate. MAP remained constant in the Control group, whereas it decreased with time in the Levo group. MPAP increased over time to the same extent in both groups. Preload indices CVP, GEDV and PCWP did not differ between groups. EVLW increased with time in both groups, with higher values in Levo animals. LVSWI, RVSWI and SVI decreased to the same extent in all animals without intergroup differences. SmvO2 decreased significantly with time with no differences between groups. A-lactate increased significantly in the Levo group. DO2i increased in both groups, with a peak at t = 3 before decreasing to values below baseline at t = 6. Similarly VO2i increased to peak at t = 3 but remained increased for the remaining duration of the experiment. There was a significant difference between groups observed at t = 3.



CONCLUSION. Levosimendan did not improve systemic hemodynamics, nor attenuate pulmonary hypertension, nor the decrease in left and right ventricular stroke work in this resuscitated model of endotoxemic shock. It increased DO2i and CI, with the latter partially explained by an increase in HR.

REFERENCE(S). Morelli A et al. Int Care Med 2005;31:638–44 Oldner A et al. Crit Care Med 2001;29;2185–93.

GRANT ACKNOWLEDGEMENT. Supported by the Nepean Hospital ICU Research Fund and the Region Skane County Council.

0010

NATRIURETIC PEPTIDES IN WEANING FAILURE FROM CARDIAC ORIGIN

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INTRODUCTION. Daily screening of respiratory function followed by spontaneous breathing trials (SBT) reduce the duration of mechanical ventilation (1). In patients failing the SBT, a prompt investigation of the posibles causes should be undertaken. We evaluate the utility of serial BNP and NT-proBNP measurements in detecting weaning failure due to cardiac dysfunction, and to determine the predictive value of natriopeptides (NP).

METHODS. Prospective observational study in a 16-bed mixed ICU in a university-affiliated teaching hospital. Patients mechanically ventilated for more than 48 h and ready to undergo an SBT with a T-tube piece (2) were prospectively included. Immediately before and after the SBT we performed an echocardiography and measured NP, arterial and central venous blood gases, and cardiac and respiratory parameters. SBT took between 30–120 min. depending on patient tolerance or medical decision. Extubation was considered successful if the patient passed the SBT and did not require invasive or non-invasive ventilation in the following 48 h. The cause of weaning failure was determined by 2 intensivists blinded to NP results.

RESULTS. A total of 85 patients were included; 29 (34.1%) failed the SBT and 56 (65.9%) were extubated, although 6 (10,7%) required reintubation within 48 h. No differences in age, SAPS II, APACHE II and sex distribution were seen between extubation failure and success groups. Patients failing SBT needed more days of mechanical ventilation (19.6 ± 16,5 vs 9.1 ± 9.4; p < 0.001) and longer stay in ICU (25.3 ± 21,4 vs 12.7 ± 9.9; p < 0.001). Weaning failure causes were cardiac dysfunction (CD) in 10 patients (34.5%); respiratory dysfunction (RD) in 17 (58.6%), and neurological in 2 (6.9%). Plasma BNP level (ng/L) before SBT was significantly higher in CD failures (CD:1320 ± 512, RD:300 ± 96; success:376 ± 68; P = .002), with a good diagnostic performance (ROC 0.75, SE 0.080, 95% CI 0.59–0.9; p = .01; cut-off = 263 ng/dL). Basal NT-proBNP did not differ between groups. Plasma BNP and NT-proBNP levels increased significantly at the end of SBT in patients with CD, with a high diagnostic accuracy of CD (BNP: ROC 0.93, SE 0.034, 95% CI 0.86–0.99, p < .001, cut-off = 32 ng/L, accuracy 81%; NT-proBNP ROC 0.79, SE 0.085, 95% CI 0.62–0.95, p = 0.004, cut-off = 19.5 ng/L, accuracy 77%).

CONCLUSION. Plasma BNP levels before SBT predicted failure due to cardiac dysfunction. BNP and NT-proBNP are non-invasive tools that may help to diagnose weaning failure from cardiac origin.

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Oral Presentations
Surviving the ICU: Clinician's perspectives: 0011–0014

0011

PATIENTS' SATISFACTION WITH COMMUNICATION AND SUPPORT DURING ICU TREATMENT COMPARED WITH STAFFS' EXPECTATIONS

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INTRODUCTION. To examine;

1. patients' satisfaction with communication and support during intensive care unit (ICU) stay
2. the relationship between satisfaction with communication and psychological distress symptoms four weeks after ICU discharge, and further
3. to compare this with the ICU medical staffs' expectations.

METHODS. In a prospective study during 2005–2007 at Ullevaal UH, 255 (67%) patients and 145 (74%) of the medical staff answered a questionnaire. The questionnaire included questions about;

- satisfaction with information and communication with nurses and physicians
- psychological distress symptoms like anxiety, depression, insomnia and concentration problems after ICU discharge
- support provided by family, nurses and physicians.

Answers were given on a five-point scale (0 = low, 4 = high). Patients' questionnaire included also Hospital Anxiety and Depression scale (HAD) and these results were compared with data from the Norwegian general population (1). Staff answered the questions about their expectations of the patients' satisfaction with information and communication, perceived support and psychological distress.

RESULTS. About 80% of the patients' responded to questions about different aspects of information, communication and support. Patient satisfaction with information was 2,8(95% CI; 2,7-3,0) and satisfaction with communication was 3,3(3,1-3,4), which was significantly higher than expected by the staff, 2,1(2,0-2,2) and 2,9(2,8-3,0) respectively (p < 0,001). Staff expected significantly higher degree of psychological distress symptoms than the patients report, 2,7(2,6-2,8) vs.1,6 (1,5-1,8) (p < 0,001). The patients scored significantly higher on HAD anxiety, 5,6 (5,1-6,2), and depression, 4,7 (4,2-5,3), compared with the population in general 4,4 (4,3-4,5) and 3,9 (3,8-4,0) respectively (p < 0,1). Patients reported to perceive support from family 3,7(3,6-3,8), nurses 3,1(2,9-3,2) and physicians 2,7(2,5-2,8) which was significantly higher than the staff expected (p < 0,05). We found no correlation between psychological distress symptoms and information, communication or support.

CONCLUSION. About 20% of the patients had no memory about information, communication or support. Patients with memory showed a high degree of satisfaction with information and communication. They suffer from more anxiety and depression symptoms than found in the general population, but we found no correlation between satisfaction about information, communication or support and psychological distress symptoms. Staff underestimated patients' satisfaction with information, communication and support and overestimated patients' psychological distress symptoms.

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0012

STRESS AND BURNOUT IN SWISS ICU CAREGIVERS: A NATIONWIDE MULTICENTER STUDY

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INTRODUCTION. Stress is an adaptive reaction that reflects a discordance between demands and resources. Burnout(BO) is a psychological syndrome in response to chronic emotional and interpersonal stressors on the job. There is increasing evidence that ICU caregivers suffer from BO that can affect quality of care and the health care system. In this multicenter study, our primary objective was to improve the knowledge about the contributing factors leading to stress and BO. The secondary objectives were to assess potential inter-professional or regional differences.

METHODS. Self-administered questionnaires including the Maslach Burnout Inventory were distributed to the 3 professional categories of caregivers (nurse-assistant(NA), nurses(N), physicians (P)) from all Swiss ICUs (French-(F), Italian-(I) and German-speaking(G) parts).

RESULTS. 4322 questionnaires were distributed to 74 out of 84 (88%) Swiss ICUs. 3052 responses were obtained (71%). The response rate by professional categories and regions were as follows (%): NA/F 63, N/F 78, P/F 69, NA/I 77, N/I 88, P/I 92, NA/G 32, N/G 70, P/G 67. High stress was expressed by 37% of Swiss caregivers. In a multivariate analysis, factors associated with increased risk of high stress were working in I, in a university hospital, in a pediatric ICU, and high mortality rate, whereas being a P, and having children decreased the risk of stress. Overall, 29% of ICU caregivers presented with high BO scores: NA 41%, P 31% and N 28%. Significantly more I (33%) and G (30%) caregivers showed high BO scores compared to F (26%)(p = 0.03). Higher levels of professional experience tended to decrease the prevalence of BO. More male presented high BO (36 vs 27%). In a multivariate analysis, the factors associated with high BO were working in G, being a NA and mortality rates, whereas being female, having children, getting older than 40 decreased the risk of high BO. There was no difference between the types of ICUs, i.e. university or not, surgical, medical or pediatric. The length of the working shifts (8 h vs 12 h) did not interact with the prevalence of BO. A significant correlation was found between expression of high stress and prevalence of high BO, and inversely (p < 0.0001). However, more G caregivers with low degree of stress suffered from high BO compared to F, I, as more males compared to female.

CONCLUSION. As many as 37% of Swiss ICU caregivers showed high stress and 30% a high BO scores. Stress and BO are influenced by age, gender, professional category, parenthood and regional factors.

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0013

ADVANCE CARE PLANNING IN A LARGE TERTIARY HOSPITAL: DIFFERENCES AMONG SPECIALTIES

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INTRODUCTION. Dying in the Intensive Care Unit (ICU) versus on non-critical wards and frequency of do-not-resuscitate (DNR) decisions are quality indicators of a hospital end-of-life (EOL) policy. In daily practice, differences in advance care planning are experienced between medical disciplines, though these are rarely published (1).

METHODS. The study was performed in the Ghent University Hospital, a tertiary hospital of 1062 beds with 54 ICU beds with all medical and surgical disciplines present, including organ and bone marrow transplantation and major oncological surgery. Data concerning EOL decisions were collected in all patients > 16 years old who died during a 12-week period (observational study) and in a one day cross-sectional study for all patients > 16 years old admitted on non-critical wards.

RESULTS. Of the 165 patients who died during the 12-week period, 95 (58%) died on non-critical wards. Eighty-six of 165 (52%) received intensive care during their final hospitalisation. Surgical patients were more often referred to the ICU at the EOL in comparison to medical patients (32/40 (80%) versus 38/125 (30%), $p < 0.001$). Eighty-five of 95 (89%) patients had a DNR decision before death. However, patients on non-critical surgical wards had a DNR option at the time of death in only 3/8 (37%) versus 82/87 (94%) patients on the medical wards ($p < 0.001$). In the cross-sectional study, a decision to limit therapy was installed in only 7% (48/676): 1% (2/258) in surgical patients compared to 11% (46/418) in medical patients ($p < 0.001$). A huge variability in frequency and timing of DNR decisions and subsequent participation of patient, family and nurses in these decisions and in ICU admission and length of stay in the ICU at the EOL was also observed between medical wards.

CONCLUSION. Transition from acute care to a more palliative approach seems to be more problematic on surgical wards compared to medical wards. There is also a huge variability in EOL practice between medical wards.

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0014

COPING STRATEGIES TO DEAL WITH STRESS AND BURNOUT USED BY THE SWISS ICU CAREGIVERS

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INTRODUCTION. ICU caregivers work in a highly burdensome environment. We showed in a previous single centre study (1) that ICU caregivers felt often stressed and almost a third presented a high level of burnout. Because the well-being of caregivers is important for the quality of care, we aimed to investigate how they cope with stress and burnout. The coping strategies refer to the cognitive and behavioural processes to manage, tolerate and reduce the stressful events.

METHODS. We led a multiple-centre study in ICUs from the French- and Italian-part of Switzerland. A self-administered questionnaire was distributed to all nurse-assistants (NA), nurses (N) and physicians (P) to evaluate the presence of stress and burnout and the personal resources to cope with stressful events.

RESULTS. 22/24(92%) ICUs participated. 1067/1372(78%) questionnaires were returned. The participation rate (%) was respectively NA 66, N 80, and P 72. This sample was representative of the Swiss actual distribution of ICU professional categories (%): NA 8, N 77, and P 16. 43% of the respondents felt often stressed and 28% had a high level of burnout. The *positive reappraisal* was the most frequent coping strategy used. The *aggressiveness* and the *self blame* were the less frequently used coping strategies. The *aggressiveness* strategy was associated with high burnout [$p = 0.017$, OR 2.18 (1.48–4.13)]. 47% of ICU caregivers took medication or substances and this consumption was significantly associated with high burnout. 59% were helped with conventional or alternative therapies. High burnout was associated with the recourse to physiotherapy [$p = 0.027$, OR 1.99 (1.08–3.67)] and psychotherapy [$p = 0.015$, OR 2.02 (1.15–3.53)]. Family or social life was the most frequent extraprofessional activity reported and decreased significantly the risk of high burnout [$p = 0.006$, OR 0.62 (0.44–0.87)]. Although the spiritual occupation was rarer, it was the most resourceful reported by the ICU caregivers.

CONCLUSION. ICU caregivers used most frequently the *positive reappraisal* to cope with difficulties at work. High burnout was associated with the *aggressiveness* coping strategy, medication consumption, recourse to physiotherapy and psychotherapy. Our results might encourage ICUs managers to find ways to support their collaborators in the future.

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Oral Presentations
ICU management: 0015–0018

0015

IS THE NURSE WORKLOAD:STAFFING RATIO ASSOCIATED WITH THE OUTCOME OF CRITICALLY ILL PATIENTS?

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INTRODUCTION. Although nursing staff account for a large part of the cost of Intensive Care there are few data examining the relationship between the nurse workload:staffing ratio and mortality.

METHODS. Prospectively collected data on severity of illness (APACHE III), nursing workload (Therapeutic Intervention Scoring System (TISS-76)), nursing manpower and hospital mortality from a cohort of patients admitted to a district general hospital ICU and a tertiary referral teaching hospital ICU were retrospectively analyzed to determine whether the nursing workload:staffing ratio was independently associated with hospital survival. Nursing workload:staffing ratio for each day as calculated from total TISS-76:average number of bedside nurses working that day. Net benefit methodology was used to determine the maximum to which the nurse workload:staffing ratio could be raised without incurring significant risk of increasing mortality, taking into account age, sex, readmissions, APACHE III score, urgency of admission, type of admission, post-operative care, acute renal failure and coronary artery bypass grafting. This threshold was then validated using multiple logistic regression on a bootstrapped sample (1000 repetitions) to assess the relationship between survival and exposure to workload:staffing ratios below and above the threshold, adjusting for APACHE III and ICU.

RESULTS. There were 925 admissions during the 6 month study period. 84 were excluded: 11 admitted for less than 4 hours; 9 transferred to another ICU; 4 aged less than 16 years and 7 had severe burns. Thus, there were 894 separate admission in the cohort representing 845 patients. Among the 894 episodes, there were 166 deaths before hospital discharge. Multilevel regression revealed that at a workload:staffing ratio of 40 there was a 5% chance that the workload:staffing ratio was associated with increased mortality and that at 52 there was a 95% chance. Using the threshold of 40, multiple regression analysis revealed that there was an interaction between APACHE III and workload:staffing such that the chance of survival was increased when workload:staffing ratios never exceeded 40 during a patient's ICU stay for those patients with APACHE III <=60. For those with APACHE III > 130 workload:staffing ratios had little impact.

CONCLUSION. Our data indicate that, at least for patients with APACHE III <=60, absence of exposure to days when the ICU is understaffed is independently associated with an improved outcome.

0016

EFFECTS OF IMPLEMENTING TWENTY-FOUR HOUR RESIDENT CONSULTANT INTENSIVIST STAFFING ON MORTALITY WITHIN A CRITICAL CARE UNIT

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INTRODUCTION. Evidence suggests quality of care and mortality rates vary widely across Critical Care Units. Organisational and process optimisation within Critical Care Units are important in relevant outcomes. The size and characteristics of the population and the organisation of the health care system in the hospital catchment area determine the number of potential Critical care patients. The effect of instituting 24 hour resident Consultant Intensivist/Anaesthetist staffing in a unit previously without resident cover has been shown to be beneficial for critically ill patients (1).

METHODS. St Bernards Hospital is a 212-bedded hospital. The Critical Care Unit is a mixed 12 bedded unit consisting of Coronary care, Medical and Surgical High Dependency and Intensive Care beds In October 2006 the medical hospital model moved from non-resident Consultant Anaesthetists to twenty four hour resident Consultant Intensivists. We retrospectively reviewed outcomes for all patients admitted to the Critical care unit between October 2003 and October 2006 before and October 2006 to October 2007 after the introduction of twenty four hour resident consultant intensivists. Mortality rates and the acuity of illness were measured.

RESULTS. Overall 3815 patients were compared with 890 patients after institution of 24 hour cover. The mix of cases, transfers to tertiary centres were not significantly different in the 2 groups. Patients under Intensivist care increased from 64 in 2003 to 81 in 2004,105 in 2005, 135 in 2006 to 181 in 2007. APACHE II scores 2006 (2-47) were not significantly different comparing with 2007(3-44). A statistically significant fall in the number of deaths was seen over the period following the introduction of the 24 hour resident cover. The mortality fell dramatically Odds Ratio 0.50 (CI 0.29-0.86) representing a 50% reduction in deaths.

TABLE 1 OVERALL MORTALITY IN CRITICAL CARE UNIT

	OCT06/07	OCT00/01	OCT01/02	OCT02/03	OCT03/04	OCT04/05	OCT05/06
Total Patients	890	446	582	621	646	764	756
Deaths	21	46	41	42	47	40	35
Odds Ratio		0.21	0.32	0.33	0.31	0.44	0.50
CI		0.12–0.36	0.18–0.54	0.20–0.57	0.18–0.52	0.26–0.75	0.29–0.86
p Value		<0.001	<0.001	<0.001	<0.001	0.002	0.012

CONCLUSION. The implementation of twenty four hour resident consultant intensivist staffing resulted in a statistically significant fall in mortality both in the Intensivists patients and the critical care unit without a change in acuity of these patients. The introduction of twenty four hour resident staffing should be compulsory for all acute hospitals and consideration should be made for these to be consultants.

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0017

ACCIDENTAL DEVICE REMOVAL IN CRITICALLY-ILL PATIENTS: ORGANISATIONAL ANALYSIS

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INTRODUCTION. Accidental device removal (ADR) is a sentinel event in ICU but few data are available. Pareto diagram analysis over 1 year of the incident reporting system in our Unit showed that ADR is the most frequent serious adverse event (SAE, 14.1%) and concerns 27.5% of the patients, with an incidence density of 17.8/1000 hospital days. The aim of the study was to identify risk factors of ADR and to propose corrective actions.

METHODS. Observational study from October 1, 2007 to March 1, 2008 including patients (pts) admitted in our ICU for more than 48hrs. For each reported ADR, circumstances and consequences were identified. Link to care management problems and how avoidable ADR was, were to be quoted on a numerical scale. Contributing factors were identified using the ALARM organisational analysis for the investigation of serious incidents (Association of Litigation and Risk Management) [1]. A risk reduction strategy was proposed. Data were expressed in means or %, as adequate.

RESULTS. 22 ADR occurred in 18 pts/*96 admitted pts*, referred to surgical ICU mostly for septic shock or oesophageal surgery (SAPS 2 = 34 *vs. 41*, age = 58 yrs *vs. 56*, LOS = 16 days *vs. 10*, mortality 16% *vs. 30%*). Devices were: 5 tracheal tubes (23%), 4 nasogastric tubes (18%), 3 chest tubes (14%), 3 abdominal drains (14%), 3 upper and lower urinary tract catheters (14%), 2 central venous lines (9%), 2 peripheral lines (9%). 75% of ADR occurred in the morning when the pt was left alone (77%). The incident was thus noticed fortuitously (65%) or on alarm activation (35%). ADR occurred during care and nursing only in 23% cases.

In 64% pts (n = 14), sedation was stopped since 2.83 days. 64% of the devices were re-inserted, without any additional morbidity. ADR led to SAE for 6 pts, of which 3 acute respiratory distress, and 1 cardiac arrest. ADR was linked to care management problems in 63% cases and considered avoidable in 68% cases. The systematic approach identified following contributing factors: pt agitation in 50% cases, absence of sedation weaning protocol (32%), defective device fixation (27%), fatigue of one of the health care providers (14%), excessive workload (14%), and equipment failure (14%). The main proposed corrective actions were to improve device fixation and to install a weaning protocol of sedation.

CONCLUSION. As outlined in the literature, ADR in ICU is a frequent event, at risk of significant morbidity and increased workload. It is generally considered preventable. ADR mostly occurs when sedation is stopped and the main identified risk factor is agitation of the patient. Correctives actions aim at improving fixation of devices and implementing guidelines for sedation weaning. Efficacy of these measures is to be monitored in our improvement quality program.

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0018

A SOFTWARE IMPLEMENTED IN INFUSION PUMPS REDUCES ERRORS IN PERFUSION RATE

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INTRODUCTION. Errors are frequent in the everyday management of pharmacological perfusions. To prevent and evaluate them at the stage of administration, we introduced a software in the infusion pumps that allows to rcord and set up soft (overruling allowed) and hard (overruling not allowed) limits in perfusion rates.

OBJECTIVES

1. To describe the effect of the software introduction in avoiding overdosing of the five drugs most frequently infused in our unit (Midazolam, Fentanyl, Nitroglicerine, Noradrenaline, Morphine).

2. To describe the effect of an educational program on the reduction of overdosing errors of these drugs.

METHODS. Observational and pre-post educational intervention study. After the implementation of the software in all pumps of our ICU, we evaluated all perfusions administered during two periods: period 1 (P1) from May to Nov 2006 and period 2 (P2) from May to Nov 2007. An educational program addressed to nurses and physicians on the proper use of the drugs studied was implemented in between the two periods. The total number of perfusions of every drug and the number of overdosing attempts (OA) was analyzed for both periods. OA were defined as any confirmed attempt to overrule the hard limit of the perfusion rate established for each drug. Since by definition hard limits cannot be overruled, OA were considered equivalent to avoided overdosing errors. Statistical analysis. OA are expressed in absolute numbers and as a percentage of the total number of perfusions of the corresponding drug for every period of study. The Fisher's exact test and de CI 95% of the difference of proportions where used to compare OA in P1 and P2.

RESULTS.

DRUG	P1 Perfusions (n)	P1 OA (n, %)	P2 Perfusions (n)	P2 OA (n, %)	Difference CI 95%	p value
Midazolam	1782	72 (4.04)	1362	32 (2.34)	0.4, 2.96	0.014
Fentanyl	569	0	867	0	- 0.42, 0.64	ns
Nitroglicerine	998	1 (0.1)	852	2 (0.23)	- 0.7, 0.3	ns
Noradrenaline	1726	0	2368	0	- 0.15, 0.21	ns
Morphine	396	23 (5.8)	448	8 (1.78)	1.28, 7.00	0.03
TOTAL	5471	96 (1.75)	5897	42 (0.71)	0.62, 1.48	<0.000

OA: Overruling Attempts (errors avoided)

CONCLUSION. 1.Overall (P1 + P2) 138 overdose errors were avoided. Errors concentrated in Midazolam and Morphine perfusions. 2. The educational and training program significantly reduced overdose errors in the second period of study.

Oral Presentations
New aspects of mechanical ventilation in acute lung injury: 0019–0023

0019

EFFECTS OF CHANGES IN POSITIVE END EXPIRATORY PRESSURE (PEEP) ON BREATHING PATTERN DURING NEURALLY ADJUSTED VENTILATORY ASSIST (NAVA)

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INTRODUCTION. NAVA delivers pressure (Paw) in proportion to the electrical activity of the diaphragm (EAdi). We investigated the breathing pattern response to PEEP changes during NAVA.

METHODS. In 20 mechanically ventilated adult patients (age 66 [54;76], median [quartiles]) years; APACHE II 21 [20;25]), an adequate NAVA level (NAVAAL) was first identified based on the response in Paw to stepwise increasing the NAVA level. Using NAVAAL the PEEP was stepwise decreased from 20 to 0 cmH_2O. Respiratory parameters were assessed during the final 5 minutes of 15 minutes on each PEEP level.

RESULTS. NAVAAL was 2.5 (2.1; 3.2) $cmH_2O/\mu V$. Stepwise reduction of PEEP from 20 to 0 cmH_2O during NAVAAL resulted in decreased oxygenation while PaCO2 remained unchanged. The patients upregulated their EAdi (resulting in a proportional increase in mean Paw above PEEP), prolonged their inspiratory time (i.e. Ti/Ttot increased), and did not change respiratory rate (RR). Consequently, the inspiratory electrical work of breathing (WOB = mean EAdi x Ti x RR), increased. There was virtually no change in EAdi during expiration in response to PEEP reduction.

Median (quartliles)	PEEP level 19 (19;20)	(cm H_2O) 10 (9;11)	5 (5;6)	0 (0;1)	p ANOVA
SaO2 (%)	98 (97;99) §,#	96 (95;99) §,#	95 (92;96)	94 (91;97)	<0.001
PaO2/FiO2	224(191;285) §,#	199(169;258) §,#	170 (137;241)	166 (124;219)	<0.001
PaCO2 (mmHg)	34 (32;39)	33 (31;40)	35 (33;38)	36 (32;38)	0.114
mean insp. EAdi (μV)	3.6 (2.1;5.4) §	3.6 (2.6;5.2) §	4.5 (2.6;6.0)	5.2 (3.2;6.9)	0.008
mean insp. Paw above PEEP	8.5 (6.7;11.4) §	8.8 (6.5;12.8) §	10.4 (7.5;13.7)	12.3 (8.8;16.7)	0.008
Vt (ml/kg PBW)	8.5 (7.1;10.3)	9.3 (6.4;9.9) §	9.4 (6.6;10.1)	8.3 (6.1;9.9)	0.044
RR (bpm)	23 (18;33)	21 (19;31)	24 (17;33)	25 (20;34)	0.088
Ti/Ttot (sec)	0.31(0.28;0.36)§	0.31(0.29;0.36)§	0.33(0.31;0.37)	0.34(0.30;0.38)	0.005
electrial WOBinsp (μVxsec/min)	63 (38;127) §	69 (44;99) §	84 (54;129)	96 (70;156)	0.006

Tukey post hoc analysis: § p < 0.05 vs. PEEP 0; # vs. PEEP 5. PBW = predicted body weight

CONCLUSION. The magnitude and duration of EAdi, and hence the pressure delivered during NAVAAL, increases in response to PEEP reduction, such that changes in respiratory system mechanics are compensated for. In consequence, Vt, RR, and PaCO2 remain virtually unchanged. We found no evidence for relevant changes in the expiratory EAdi during PEEP reduction. Delivering assist proportional to the patient's respiratory demand, as reflected by EAdi, may prove helpful in preserving ventilation and in preventing collapse of lung areas during reduction or removal of PEEP.

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0020

PROPORTIONAL ASSIST VENTILATION WITH LOAD ADJUSTABLE GAIN FACTORS VS. PRESSURE SUPPORT IN CRITICALLY ILL PATIENTS

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INTRODUCTION. It is not known if proportional assist ventilation with load-adjustable gain factors (PAV +) may be used as a main mode of support in critically ill patients. The aim of this study was to examine the effectiveness of sustained use of PAV + in critically ill patients and compare it with pressure support (PS).

METHODS. Two hundreds and eight critically ill patients ventilated on controlled modes (CMV) for at least 36 hours and meeting certain criteria were randomized to receive either PS (n = 100) or PAV + (n = 108). Specific written algorithms were used to adjust the ventilator settings in each mode. PAV + or PS was continued for 48 hours unless the patient met predefined criteria either for switching to CMV (failure criteria) or for breathing without ventilator assistance.

RESULTS. Failure rate was significantly lower in PAV + than that is PS (11.1% vs 22.0%, p = 0.040, OR 0.443, 95% CI 0.206-0.952). The proportion of patients meeting criteria for un-assisted breathing did not differ between modes (53.7% in PAV + vs. 46.0% in PS, p = 0.33, OR 0.73, 95% CI 0.43-1.27). Airway pressure immediately after end-inspiratory airway occlusion during CMV (OR 10.42, p < 0.001) and the mode of support (OR 4.24, p < 0.04) served as independent predictors of failure. The proportion of patients exhibiting major patient-ventilator dyssynchronies was significantly higher in PS than that in PAV + (37.0% vs. 5.6%, p < 0.001).

CONCLUSION. Patients ventilated with PAV + 1) had higher probability of remaining on spontaneous breathing (assisted or un-assisted) and 2) exhibited better patient-ventilator synchrony than these with PS.

0021

EFFECT OF GAIN LEVEL DURING NEURALLY ADJUSTED VENTILATORY ASSIST (NAVA) ON RESPIRATORY PATTERN: COMPARISON WITH PRESSURE SUPPORT VENTILATION (PSV)

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INTRODUCTION. Neurally Adjusted Ventilatory Assist (NAVA) is a new ventilation mode in which the assistance is delivered in proportion to the electrical activity of the diaphragm, as assessed by series of esophageal electrodes. The assistance level can be modified by setting the NAVA gain as a multiplier of Eadi (\muV). With this study we aim to explore the effects of the assistance level on respiratory pattern during PSV and NAVA.

METHODS. We studied 10 patients undergoing PSV. All the patients had the NAVA catheter in place. We applied NAVA and PSV in random order; during NAVA we applied increasing gain levels, from 0.5 to 5 (0.5, 1, 1.5, 2, 2.5, 3, 4, 5 cmH_2O/\muV), for 10 minutes. During PSV we applied 4, 8, 12 and 16 cmH_2O in in sequence. Pressure, flow, volume and Eadi waves were recordered on a P.C., and the Eadi peak was used as an indicator of the respiratory effort. Respiratory Rate (RR), Tidal volume (TV), Minute volume and Eadi peak breath by breath were analyzed for the last 5 min of each support level.

RESULTS. 3 patients did not tollerated the two higher level of gain and 1 did not tolerate the lower level because of evidence of respiratory distress. The data analysis shows that when the assistance level increases the minute volume does not change in both ventilatory modes. In NAVA mean RR and the mean TV do not change significantly; on PSV TV increases from 337 ± 85 ml at PS 4 to 596 ± 203 ml at PS 16 ($p < 0.01$) (on NAVA from 319 ± 74 ml to 395 ± 153 ml, $p = NS$); respiratory rate decreases from 22 ± 8 on PS 4 to 13 ± 8 on PS 16 ($p < 0.01$) (on NAVA from 24.64 ± 7 to 28.8 ± 9, $p = NS$). We observe a significant variation on Eadi peak that decreases from a mean value of 8 ± 2.7 \muV at gain 0.5 to 4.27 ± 2.2 \muV at gain 5 ($p < 0.01$) and from 7.7 ± 4.5 \muV at PS 4 to 3.3 ± 2.3 \muV at PS 16 ($p < 0.01$).

CONCLUSION. This study shows a different behaviour of two ventilatory modes: to maintain a costant minute volume a patient in NAVA reduces the mioelectrical diaphragm activity in response to increase assistance level and does not change the respiratory pattern; under PSV, as expected, the TV increases proportionally to the pressure level while proportionally reducing RR.

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0022

VENTILATION WITH LOWER TIDAL VOLUMES AS COMPARED WITH CONVENTIONAL TIDAL VOLUMES FOR PATIENTS WITHOUT ACUTE LUNG INJURY – A PREVENTIVE RANDOMIZED CONTROLLED TRIAL

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INTRODUCTION. Recent cohort studies have identified ventilator settings as a major risk factor for development of lung injury in mechanically ventilated patients who do not have acute lung injury at the onset of mechanical ventilation. However, randomized controlled trials have not been performed.

METHODS. To compare pulmonary inflammation and development of lung injury during mechanical ventilation with conventional or lower tidal volumes in patients without acute lung injury we performed a randomized controlled non–blinded preventive trial on patients without acute lung injury at the onset of mechanical ventilation. Patients were randomly allocated to mechanical ventilation with a tidal volume of 10 ml per kilogram of predicted body weight or a tidal volume of 6 ml per kilogram of predicted body weight.

RESULTS. The trial was stopped after 150 patients were enrolled because development of lung injury was higher in the group treated with conventional tidal volumes as compared to the lower tidal volume group (13.5% vs. 2.6%, $P = 0.01$). Analysis of the lavage fluid cytokine profiles revealed no differences over time between the two ventilation groups. The relative risk of acute lung injury for patients ventilated with conventional tidal volumes was 5.1 (95% CI 1.2 – 22.6).

CONCLUSION. Mechanical ventilation with conventional tidal volumes contributes to development of lung injury.

0023

THE INFLUENCE OF AN AUTOMATIC CONTROL OF PRESSURE SUPPORT VENTILATION ON TOTAL VENTILATION TIME - PRELIMINARY RESULTS OF A RANDOMIZED CONTROLLED TRIAL

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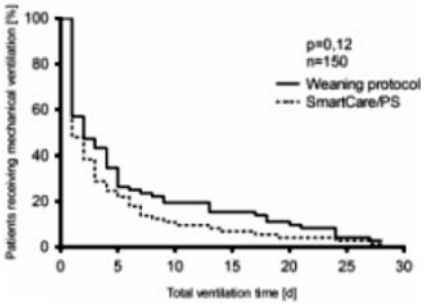
INTRODUCTION. SmartCare/PS (SC, Dräger Medical AG & Co. Kg, Lübeck, Germany) provides an automatic control of the pressure support level in assistedventilated patients [1]. A recent study showed a significant reduction of total ventilation time (TVT) by SC in a selected patient population when compared to local weaning protocols [2]. The aim of our study was to verify this result in an unselected patient population ($n = 300$) and to assess the efficacy of SC in the daily clinical routine (clinicaltrials.gov ID00445289).

METHODS. After IRB approval and written informed consent, patients ventilated for longer than 9 hours were included when none of the following exclusion criteria was fullfilled: cerebral surgery/trauma, age < 18 yrs, do-not-resuscitate order, preventilation time > 24 hours. Patients were randomly assigned to be weaned either using SC or according to a weaning protocol. A p value < 0.05 was considered statistically significant.

RESULTS. This preliminary analysis was performed after inclusion of 150 patients. Baseline characteristics (age, gender, APACHE II score, preventilation time) showed no significant difference. Mean TVT was 96 ± 146 hours (mean ± sd) in the SC group and 139 ± 187 hours in the control group, respectively. A Kaplan-Meier analysis of TVT did not detect significant differences between the studied groups ($p = 0.12$; Fig. 1).



CONCLUSION. These preliminary data contradict the results of the study by Lellouche et al. which, however, was performed in a more selected group of patients[2]. Our results indicate, that the electronically implemented weaning protocol of SC is as quick as a conventional protocol in weaning patients in the daily clinical routine.

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Oral Presentations
New dimensions in nursing: 0024–0028

0024

EVIDENCE-BASED GUIDELINES FOR PREVENTING SURGICAL SITE INFECTION: RESULTS OF A KNOWLEDGE TEST AMONG 650 FLEMISH INTENSIVE CARE NURSES

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INTRODUCTION. Surgical site infection (SSI) is common in intensive care units (ICUs). This study aimed to determine Flemish ICU nurses' knowledge of evidence-based guidelines for SSI prevention.

METHODS. Survey using a validated multiple-choice questionnaire based on CDC guidelines[1]. Knowledge of 9 nursing-related strategies was evaluated. The questionnaire was distributed and collected during the Flemish Society for Intensive Care Nurses' annual congress (Ghent, 2007). Demographics included gender, ICU experience, number of ICU beds and acquisition of a specialized ICU qualification.

RESULTS. We collected 650 questionnaires (response rate 80.3%). Forty-five% of the respondents knew that it is recommended to protect a primarily closed incision for 24 to 48 hours, and 39% knew that the appropriate time to shower or bathe with an uncovered incision is unresolved. Only 10% knew that postoperative surveillance by itself succeeds in reducing the incidence of SSI, and 35% that elective operations on patients with remote site infections should be postponed until the infection has resolved. The correct classification of SSI in superficial incisional, deep incisional and organ/space SSI was known by 7% only, while 46% knew that stitch abscesses are not to be reported as SSI. Only 2% were aware that 30 days is the time frame in which emerging superficial incisional infections are classified as SSI. Twenty-six% knew that preoperative hair removal should take place immediately before surgery, and 50% knew that electric clippers are recommended. The average score was low (2.61/9). Males performed significantly better than females and nurses' gender showed to be independently associated with better test scores. No significantly different scores were found related to the other demographic data.

CONCLUSION. Flemish ICU nurses lack knowledge about guidelines on SSI prevention. Their schooling and continuing education should include support from current evidence-based recommendations.

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GRANT ACKNOWLEDGEMENT. S. Labeau holds a doctoral grant from University College Ghent.

0025

ARE NURSES COMFORTABLE WITH FAMILY PRESENCE?

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INTRODUCTION. The topic of family presence during medical procedures is an ongoing issue for the last two decades. Families, as well as patients, are now more aware of their rights and request the presence of family during care. In Israel similar tendencies can be seen. The purpose of this study was to assess the attitudes of nurses concerning the subject of family presence during invasive procedures.

METHODS. Registered nurses filled out a questionnaire with demographic data and questions about their attitudes towards presence of family members during invasive procedures (IP) or resuscitation (R) (Mangurten, et al., 2005). The questionnaire comprises 10 questions with "yes or no" answers, one question with 3 possible answers and one open question, concerning benefits or barriers of the two situations.

RESULTS. Of the 142 nurses 40% were born in Israel and 60% were immigrants. Most of them were female (85%), married (72%), had 1 to 6 children (62%) who were still living at home (92%). Almost a third (31%) worked in intensive care units, while the rest worked in surgery or internal wards, pediatrics or the emergency room. Nurses working in pediatrics, units or wards, made up 22% of the sample. Almost half (43%) were certified as intensive care nurses, 45% had a bachelor's degree and 23% had a master's degree.

The nurses stated that psychosocial support to family members was part of their work (IP 83% and R 68%) and that they felt comfortable to provide support during IP (74%) but less during R (48%). When family members were present, nurses reported to feel uncomfortable to perform (IP 69% and R 90%). Few nurses thought that family members should be given the option to be present (IP 48% and R 14%). However, nurses working in pediatrics and nurses born in Israel were more in favor of giving families the option to be present ($p = 0.047$ for both). About half of the nurses, especially nurses in pediatrics ($p = 0.047$), had been asked by family members to participate in IP, but only 16% had been asked for R. A written protocol was supported by 45% of the nurses for IP, but only 15% were in favor of a written protocol in cases of R. Nurses perceived giving support to patients and family members as the most important benefit. Regarding benefits of family presence during IP of the 95 comments only two were negative. Whereas only half of the sample gave examples of benefits in case of resuscitation, of which 35% were negative. Barriers to family presence included adding to the stress of the team or the patient.

CONCLUSION. Even though we can see a tendency for pediatric nurses to include family members during certain procedures a substantial resistance is reported by nurses in adult care.

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0026

EVALUATION OF A NEW NURSE-DRIVEN INTENSIVE CARE UNIT BLOOD CULTURE PROTOCOL: A PILOT STUDY

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INTRODUCTION. Culturing blood is the only method to detect bloodstream infection (BSI). Besides fever, indications for blood cultures (BC) are varied and not standardized. This study aimed to evaluate the relative value of potential indications (i.e. hypothermia, hypotension, shivering, CVC change after interhospital transfer, unexplained drowsiness, intubation because of suspected HAP or VAP, and physicians' request) for performing BCs in ICU patients.

METHODS. A 15-month prospective interventional pilot study. A new validated and reliable protocol including an extended list of indications for sampling blood for culture was developed and introduced (July 1st 2006) at the adult ICU of the Ghent University Hospital, a 1062-beds university-affiliated teaching hospital in Belgium. Culturing "after physicians' request" was retained as an indication: 1) to cover all other possible signs suggestive for a beginning sepsis that were not included in the protocol, and 2) to keep it manageable. Educational sessions for the staff were organized to draw attention to the indications, and procedure to follow when performing BCs. Above, ICU nurses were authorized to autonomously perform BCs in case a patient met respectively one or a combination of the indications as proposed in the protocol. Indications were automatically recorded in an electronic ICU data management system and linked to the results of the microbiological lab.

RESULTS. 1864 BCs were sampled from 783 patients (57.9 ± 16.5 yrs) of which 54.7% were of female gender. Of these, 280 (15.0%) cultures yielded a microorganism, however, after correction for contaminants ($n = 91$), 189 cultures (10.1%) were considered as a true BSI. Fever was found the most common reason for culturing (55.5%), followed by physicians' request (24.0%), and CVC change after secondary transfer (12.6%), respectively. E. coli ($n = 34$), coagulase-negative staphylococci ($n = 31$), and Staphylococcus aureus ($n = 15$) were isolated most frequently. Of cultures sampled because of fever, 9.1% led to the diagnosis of true bacteremia. This number increased up to 16.7% and 28.1% in case cultures were sampled because of shivering or hypotension, respectively. No difference was found in terms of positive BCs performed because fever vs. any other indication (49.7% vs. 50.3%, $p = 0.525$).

CONCLUSION. Besides fever, other indications suggestive for BSI should also be considered for culturing blood in ICU patients. However, further evaluation is needed to confirm these preliminary findings.

0027

LONG TERM OUTCOME AND QUALITY OF LIFE OF ICU PATIENTS

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INTRODUCTION. The reduction of ICU and hospital mortality and morbidity is the principal goal of ICU care. Less is known on the mortality and quality of life (QOL) after ICU discharge. The aim of our study was to evaluate the in hospital and the after hospital discharge mortality and QOL of ICU patients.

METHODS. We evaluated the in hospital mortality, the mortality after hospital discharge and the QOL six months after hospital discharge of all ICU patients hospitalized for more than 48 hours during a six-month period. A telephone interview with the EUROQOL-EQ5D questionnaire evaluated the mobility (MO), autonomy (AU), the usual daily activities (DA), the presence of discomfort or pain (DP), anxiety or depression (AD) in three levels of severity (1 = no problem, 2 = moderate disability, 3 = severe disability) and the patients overall health status in a scale from 0 to 100. Demographic data, APACHE score, length of ICU and hospital stay and ICU mortality were recorded for each patient. Non parametric variables were analyzed using a x2 test and the parametric variables with the Mann-Whitney test ($p < 0.05$).

RESULTS. We evaluated 118 patients (82 M and 36F) aged 61 ± 15 years (mean ± sd). Of these patients, 13 (11%) died in the ICU and 22 (18%) died in the hospital after ICU discharge. Of the 83 patients discharged alive from the hospital, 8 (9%) died during the first six months. The 75 patients who were alive six months after ICU discharge, estimated their overall health status as high as 63% of the previous health status. 6% had severe reduced MO, 7% had limited AU, 19% had alteration in DA, 18% expressed AD and 7% had DP. Of the patients who worked prior to ICU admission, 58% had returned to work. A statistical significance was found between dead and alive patients in age (67 ± 13 vs 55 ± 18 years) and APACHE score (19 ± 3 vs 14 ± 2), but not in the hospitalization days (12 ± 28 vs 14 ± 13) or the time of death (in hospital 19 ± 5, at home 20 ± 5 days). Factors associated with poor QOL at six months were prolonged ICU stay but not greater disease severity on admission.

CONCLUSION. Although the in hospital and the after hospital discharge mortality remains the same, QOL six months after ICU discharge seems to be satisfactory and less impaired in comparison with other studies.

0028

EFFECTS OF EDUCATION IN A CARE BUNDLES' COMPLIANCE FOR THE PREVENTION OF VENTILATOR ASSOCIATED PNEUMONIA (VAP)

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INTRODUCTION. The objective of the study was to assess the adherence to a 5 element care bundle after providing educational sessions over a fortnight period.

METHODS. Multicenter, prospective, interventional study. A 5 element care bundle (Hand Hygiene (HH), Pcuff Monitoring (CM), Oral Hygiene (OH), Sedation adjustment (SA), Avoid Ventilator Circuit Changes (AC)) was applied to all intubated patients in 5 hospitals, 3 times a day over a 3 month period. Educational sessions were held in each unit over a 15 days period prior to initiate the intervention phase, leaflets and posters were handed to staff.
The interventions carried out were registred in a check list.
The compliance with the interventions was analysed individually and globally.
The global compliance with all 5 element and every individual interventions (HH, CM, OH, SA, AC).
Continuous variables were compared with student st test, Mann-Whitney and Fisher test.

RESULTS. A total of 1282 intubated patients were included during a 180 day period, representing 11672 mechanical ventilation days. The reason of admission was in a 51.4% medical, 37.5% surgical and 11.0% trauma.
The compliance per intervention was: avoid ventilator circuit changes (95.8%), adjustment of sedation (90.8%), Oral hygiene (82.7%), Pcuff measurement (82.2%) and Hand Hygiene (71.9%).
The global compliance to all the 5 elements was 64.5%, with a progressive monthly reduction: 70% (month1), 68% (month2), 55, 3% (month3).
The global compliance fortnightly is shown in Table 1.

TABLE 1 CARE BUNDLE FORTNIGHT COMPLIANCE

	1–15 July	16–31 July	1–15 August	16–31 August	1–15 September	16–30 September
Percentage	75.5	65.5	69.3	66	63.6	53

CONCLUSION. Bundle Compliance declined progressively during the study period. Educational sessions have been insufficient to maintain an optimal compliance level. More educational sessions or health care feedback through the period might improve compliance.

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Poster Sessions
Various: 0029–0042

0029

QUALITY OF LIFE AFTER SURGICAL INTENSIVE CARE UNIT DISCHARGE

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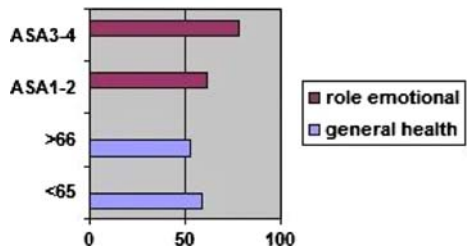
INTRODUCTION. Patients discharge postsurgical critical care unit suffer several changes in their quality of life (QoL). The aim of our study is to assess the QoL of these patients after to be discharged of this unit and relate these results with several clinical factors.

METHODS. We conducted a retrospective cohort study. 311 patients that was admitted to the surgical ICU for longer than 48 hours between October 2002 and February 2006 were included. The Medical Outcome Study SF-36 was used to measure the QoL one year following discharge from the unit. From 172 survivor patients, 100 completed the questionnaire by phone. Demographics data, length of stay, admission diagnosis, severity of illness (APACHE II score), previous state of health (ASA), multiorganic dysfunction syndrome, sepsis and mechanical ventilation use were registered. Data were analysed using the SPSS v.15.

RESULTS. The mean age was 61.45 ± 13.93. The mean score of APACHE II was 9.15 ± 6.72. Patients had lower scores in physical functioning, role physical, vitality and general health scales. Mental health scale was less affected, and bodily pain, role emotional and social functioning scales had better scores, however, we have not found any significance relation between any clinical factor during the stay in surgical ICU and these results. Statistical significance was found between the following data:



CONCLUSION. The survivor patients have bad scores regarding physical scales. Role emotional and social functioning scales are less affected. The clinical factors analysed do not seem to influece the QoL although it remains seriously affected even one year later. Previous state of health correlates well with that results.

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0030

OPTIMIZING CRITICAL PATIENT'S AIR TRANSPORT. PATIENTS WITH ICU ADMISSION CRITERIA

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INTRODUCTION. Aeromedical Evacuation in Argentina is in charge of Private Flights Companies, using aircrafts designed for executives flights as much as sanitary ones, and the regulation does not contemplate mechanical ventilator as a basic requirement, even in cases of critical patients with Intensive Care Units admission criteria. Our Institution has developed a new strategy to assure high quality in critical patient's transport. Our objective is to prove that Aeromedical Evacuation organized and developed for Health Institutions decreases the impact of secondary injuries on critically ill patients.

METHODS. Desciptive, prospective and interventional study. Critical patient Aeromedical Evacuation's protocol. We included flights made between september 2005 and september 2007. Age, sex, Glasgow, APACHE II, Blood Pressure (BP), Heart Rate (HR), Oxygen Saturation (OS), costs, timing, coincidence between telephonic data vs bedside. Immediate complications: Emesis, hypotension, hypertension, changes on HR, tube's occlusion or losses, desaturation. Later complications (24 hs post transfer): atelectasis, pneumothorax, etc.

RESULTS. 46 adults patients has been transferred, mean age 48, 40 men, APACHE II 18 (only 40% registered). Immediate complications: desaturation 97% during takeoff and landing without symptoms, below 7% from basal level. BP changes were lower than 10% from the beginning of flight. One patient suffered severe shock on landing caused by massive epistaxis and was stabilized before arrive to the Institution. Conicidence between telephonic data vs. Bedside was in 65% of the cases. Most frequent difficulties were: the absolute ignorance in relation to protocols of critical air transport and communication failures. The cost is aproximately 15% higher even though prices in private companies are variables.

CONCLUSION. Critical patient's Aeromedical Evacuation made by trained intensive care physicians decreases secondary injuries risks. There should be in Argentina guidelines of critical air transport. Regulation should be established from our Scientific Society to improve this activity. Perhaps this society should make a concerted effort with the Ministry of Health.

0031

PHYSICIANS' ATTITUDES AND PERCEPTIONS REGARDING THE CRITICAL CARE AND CRITICAL CARE SPECIALTY

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INTRODUCTION. The aim of this study is to evaluate the attitudes and perceptions of the doctors of a hospital regarding critical care and the speciality of intensive medicine.

METHODS. Design: Prospective, descriptive study during 3 months.
Setting: Insular University Hospital in Gran Canaria, Canary Islands, Spain.
Subjects: Medical specialists and residents.
Intervention: Anonymous survey.
Main variables: Demographic data of the interviewed doctors were collected and they were asked about their labour or personal previous relation with the Intensive Care Unit, the attitudes of the critical care doctors' of their hospital and their perceptions regarding the critical care specialty.

RESULTS. We interviewed 116 doctors, 75 staff and 41 residents. Less of the third part believed that the UCI was a ward for potentially critical patients. A high percentage of the doctors whom had been refused some admission were not to agree with the arguments that they received. More than 40% of the interviewed ones affirmed hadn't requested bed in the UCI for any patient who had benefited from it, especially because they were thinking that the admission would be refused. Some doctors think that the professionals employed at the UCI are doctors of different specialities. The speciality of intensive medicine is perceived by a high level of stress among the professionals.

CONCLUSION. We detect the ignorance of other professionals about the function of a Service of Intensive Medicine and the model of UCI of our country. Also we find high rates of dissatisfaction among the professionals who was refused some admission in the unit, because of we believe that clinical guides about the criteria of admission must be elaborated and to announce them among the doctors of the hospital. The professionals perceive that we suffer a high level of stress.

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0032

CONTINUOUS DRAINAGE OF PLEURAL EFFUSIONS IN MEDICAL INTENSIVE CARE UNIT

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INTRODUCTION. Pleural effusion(PE) is common in ICU. The causes of PEs are various. Large amount of PE affects the respiratory physiology, especially in ventilated patients, and needs to drain. But effects of continuous drainage of PE on clinical consequences have not been studied.

We analyzed the characteristics of patients with PE to have needed continuous drainage.

METHODS. We reviewed the medical records of patient with newly developed PEs drained continuously after admitting medical ICU of tertiary care hospital from 1st JAN to 31st DEC 2007. PEs are continuously drained with 16 F central venous catheter that inserted under ultrasonography guide. PE amount was checked daily until the draining amount was below 50 ml/day. The PEs are classified to transudates and exudates by Light's criteria. Albumin, protein, and LDH of serum and PE were checked.

RESULTS. 24 patients had Pleural effusion that were continuously drained among 352 ICU admitted patient (6.8%). PEs with pulmonary diseases are 16 out of 24 (66.7%). Transudates are 15 out of 24(62.5%). 11 patients had bilateral PE (45.8%). The median day to take to drain PE was 14 days. The median draining day was 9.5 days. The draining PE amount at 1st day was 685 ± 481 ml. The mean draining amount of PE was 417 ± 387 ml/day. Serum albumin was 2.7 ± 0.5 mg/dl. Mean fluid balance in ICU before PE drainage was 830 ± 1262 ml/day. The mortality of patients with PE that drained continuously was 50%. There was no significant correlation between mortality and other conditions above mentioned.

CONCLUSION. PE to need continuous drainage is not uncommon in medical ICU. The patients with continuously drained PE have positive fluid balance, low serum albumin level and high mortality rate. The clinical significance to affecting prognosis of the patients in medical ICU according to characteristics of PE with continuous drainage remains to be determined.

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0033

MASSIVE PULMONARY EMBOLUS: A TEN YEAR SINGLE CENTRE REVIEW

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INTRODUCTION. Massive pulmonary embolus (PE), (PE associated with hypotension or shock) is a condition with a mortality rate in excess of 50%1. The optimal treatment for massive PE remains controversial1. The majority of studies to date have studied medical therapy2, case series of surgical pulmonary embolectomy have also been reported2. No studies directly comparing mortality between medical and surgical therapies have been published. In our institution both medical and surgical therapies are used in the treatment of massive PE.

METHODS. Medical records from 1 January 1996 until 31 December 2006 were included if there was an ICD-9 diagnosis of pulmonary embolus and a review of notes indicated that the criteria for massive pulmonary embolus were met. Data were collected using prospective definitions onto specific data collection forms.

RESULTS. 54 patients with massive PE are described in Table 1. Of those who presented in cardiac arrest, 1 managed with embolectomy survived, 1 managed with thrombolysis survived and 2 patients treated with heparin survived. There were no statistically significant differences in outcome between the three groups presented in Table 1. 21 patients received no definitive treatment, of these 16 presented in cardiac arrest, 16 had disseminated malignancy and 15 had a contraindication to other therapies. All patients who received no definitive therapy died.

TABLE 1

	Embolectomy n = 9(%)	Thrombolysis n = 10(%)	Anticoagulation n = 14(%)
Mean age	62	68	61
Treatment Modifying Factors			
Intracranial Pathology	4(44)	0(0)	5(36)
Recent Surgery	9(100)	4(40)	6(43)
Recent Haemorrhage	4(44)	0(0)	2(14)
Presentation			
Cardiac Arrest	4(44)	4(40)	4(29)
Hypotension (SBP < 90 mmHg)	9(100)	10(100)	13(93)
Shock	7(78)	10(100)	11(79)
In-hospital mortality	6(66)	6(60)	5(36)
Complications			
Haemorrhage	5(56)	1(10)	1(7)
Stroke	0(0)	0(0)	0(0)
Allergy	4(44)	2(20)	5(36)

CONCLUSION. Massive PE has a high mortality. Patients who have contraindications to thrombolysis and/or embolectomy may benefit from simple anticoagulation.

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0034

NURSE-LED FOLLOW-UP CLINIC IN A DANISH COMMUNITY HOSPITAL

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INTRODUCTION. Following discharge from intensive care patients may present many physical and psychological problems (1). Since 1985 follow-up clinics have been introduced mainly in Great Britain to help these patients. This study describes an experience with the follow-up clinic introduced in a community hospital in Denmark.

METHODS. The multidisciplinary follow-up clinic is led by a team of 3 nurses. It is funded from the ICU budget. An intensivist is present during patient's first visit to the clinic. The nurse liaises with the physiotherapist, occupational therapist or makes referrals to specialists. The consultation lasts approximately one hour. Patients treated on the ICU for 4 days or longer with mechanical ventilation (MV) were invited to attend the follow-up clinic 2 months post ICU discharge. Subsequent appointments are offered to all patients. A locally derived questionnaire was used to assess patient's functional recovery from critical illness. The short form survey-36 (SF-36) and the hospital anxiety and depression scale (HADS) were also employed in the last part of the study.

RESULTS. During the last two years, 202 patients were treated on the ICU for 4 days or longer with MV. There were 76 eligible patients who were contacted by telephone or in the ward. 31 patients attended the follow-up clinic. 14 patients had an ICU diary. Different physical problems were faced by 16 patients. Psychological problems were observed in 14 patients. 24 patients presented some symptoms of post-traumatic stress disorder.

CONCLUSION. The follow-up clinic enables a multidisciplinary approach of the various physical and psychological problems experienced by the ICU survivors. However, funding is still a major hindrance to the development and the conduct of a well structured follow-up clinic.

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0035

A QUALITY IMPROVEMENT INITIATIVE TO INCREASE COMPLIANCE WITH SEMI-RECUMBENT POSITIONING FOR THE PREVENTION OF VENTILATOR-ASSOCIATED PNEUMONIA

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INTRODUCTION. Ventilator-associated pneumonia (VAP) is one of the commonest nosocomial infections in the ICU with an attributable mortality of 30–50%. Previous literature has shown that semi-recumbent positioning is a cost-effective intervention in reducing the incidence of VAP. However, compliance with semi-recumbent positioning remains an issue in our 8-bed medical intensive care unit. A multi-disciplinary team was formed to improve the compliance rate with semi-recumbent positioning.

METHODS. Team members consisted of two intensivists, a specialist nurse clinician, two critical care nurses and a medical student. Through several meetings, process evaluation was performed, barriers to semi-recumbent positioning were identified, interventions and data collection were planned utilizing cause-and-effect diagrams, Pareto charting and plan-do-study-act cycles.

RESULTS. The top three barriers to semi-recumbent positioning were a knowledge deficit among ICU staff, forgetfulness and difficulty with caring for femoral catheters in patients who were semi-recumbent. Three interventions were designed. These included staff education regarding importance of semi-recumbent positioning and care of femoral catheters, and bedside visual reminders. Over a three month period, compliance with semi-recumbent positioning improved from 56% to 100%.

CONCLUSION. Improvements in quality of care can be achieved utilizing a multidisciplinary team approach and standard quality improvement methodology.

0036

MORTALITY RISK FACTORS AT THE ICU FROM SOUTH AMERICA

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INTRODUCTION. Inadequate antimicrobial therapy, mechanical ventilation, pulmonary catheter, infections, age etc have been demonstrated has a risk factor of mortality at developed countries. Not any report from Colombia, South America has been shown looking for specific variables involved to mortality. Aim: To evaluate the association between intensive care variables with any possible influence to mortality.

METHODS. We did a prospective observational research study and six hundred and seventy one patients critical ill patients admitted to an ITU were evaluated, seven months data were collected. The effects of several variables selected on mortality were evaluated (nosocomial pneumonia, age, APACHE II score, mechanical ventilation, tracheostomy, hospitalised days before ICU admission, ARDS and pulmonary catheter). Statistics: Statistical analysis of data (mean and standard deviation, $\pm$ 2) were performed and chi2 were used to compare mortality and nominal variables. The statistical analysis was carried out with the SPSS 10 package, and $p < 0.05$ was significant.

RESULTS. Death was the outcome variable that was studied. Age of 63.3 $\pm$ 18.4 yrs, of 671 patients, 344 (51.3%) were male and 326 (48.7%) were female. The common diagnosis at admission was septic shock 13.3%, Aortic aneurism 8.5%; Community Pneumonia 4.6%, post-operative brain trauma resection 4.2% and hypovolemic shock 3.7%. From the total of patients mortality was 30.9%. Statistics analysis showed the most important variables related to mortality in one of developing countries. (Table 1).

TABLE 1 MORTALITY ACCORDING TO SELECTED VARIABLES AT THE ICU

ICU variable	Death Yes	Death Not	(Chi2)p
Age	69 $\pm$ 13	60 $\pm$ 19	0.0005
Days of Stay	12 $\pm$ 17	6.8 $\pm$ 9.5	0.0005
APACHE II	17.8 $\pm$ 6.9	12.2 $\pm$ 5.8	0.0005
Hospitalized before ICU admission	7.45 $\pm$ 7.6	11.4 $\pm$ 26	0.029
Nosocomial Pneumonia (S/N)	45/157	45/407	0.0005
Tracheostomy (S/N)	38/163	36/416	0.0005
ARDS (S/N)	15/187	9/443	0.0006
Pulmonary catheter (S/N)	42/206	27/546	0.0005

CONCLUSION. These data suggest that in our intensive care units sometimes we have similar variables that affect mortality if we compare to developed countries, also, the identification of variables that affect our mortality in some countries allow to generate hypothesis and to create managements and vigilance of results after the intervention of any risk factor that affect mortality.

0037

NEW HORIZONS: NT-PROBNP FOR RISK STRATIFICATION OF PATIENTS IN THE INTENSIVE CARE UNIT

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INTRODUCTION. The aim of the study was to evaluate the relationship between N-terminal brain natriuretic propeptide (NT-proBNP) plasma concentrations and prognosis of critically ill patients.

NT-proBNP are hormones released by the ventricular myocardium in response to pressure and volume overload.

The NT-proBNP level has been used to evaluate cardiac function in patients with heart failure, but recently studies have shown that critical illness in a setting of sepsis, systemic inflammatory response syndrome, trauma or surgery can elevate NT-proBNP by different mechanisms (hypoxemia, inflammatory cytokines).

METHODS. This was a prospective observational study. The study period was 4 months, from September to December 2007. All adult patients admitted to the ICU were eligible if the patient did not have an acute cardiac condition. Surgery patients were excluded.

Blood serum NT-proBNP concentrations were determined in each patient at given time intervals. The first measurement was performed within 12 h after the patient's inclusion into the study, the second and third at 12 and 24 hours.

RESULTS. Our study included 35 patients, 20 men (57%) and 15 women (43%). Patients were a mean of 62 (40 to 82) years old. The ICU mortality rate was 20% (7 deaths), the Acute Physiologic Score Age Chronic Health Evaluation (APACHE) II was 15,7 (from 8 to 34) and Simplified Acute Physiologic Scale (SAPS) II was 31,5 (16 - 51).

In the study population NT-proBNP serum concentrations were elevated (mean 2493 pg/ml) with a broad range: from 61 to 7913 pg/ml.

Over 78% of patients had an NT-proBNP level > 150 pg/ml.

NT-proBNP serum concentrations of ICU survivors was 2232 (mean) and for nonsurvivors was 3540 (mean), but the difference were not statistically significant.

CONCLUSION. NT-proBNP serun concentrations are elevated in critically ill patients, even without acute heart disease. NT-proBNP levels were correlate with the severity of organ dysfunction, but we did not find NTproBNP to predict survival, this will need to be confirmed in larger population.

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0038

REGIONAL ICU COLLABORATION: THE BEST OF BOTH WORLDS

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INTRODUCTION. Every critically ill patient is entitled to receive optimal intensive care (ICU) treatment. There is a growing body of evidence that improved ICU outcomes are associated with increased volume of the ICU. This results in a tendency to centralise ICU facilities. However, the fact that critically ill patients also benefit from a prompt institution of treatment is reason to maintain ICU's in smaller hospitals as is the fact that transportation of these patients always helds a risk.

We developed a system of regional collaboration of ICU's designed to make patients benefit from the advantages of treatment at level II or III ICU's if necessary avoiding the down side of erosion of local expertise and unnecessary transportation.

METHODS. In 2005 the medical staffs of the ICU's of nine different hospitals in an area 50 kilometres around Zwolle in the North-East Netherlands started to meet. One hospitals ICU meets the ESICM criteria for level III ICU's, two meet the level II criteria, the remaining hospitals have a level I ICU. The hospitals already transferred patients to the level II and III ICU's but only because of logistic reasons (mainly lack of ICU beds) or because of the non-availability of certain specialists in the referring hospital.

The first year intensivists and the non-intensivists taking care of the patients in some of the smaller ICU's regularly got together to discuss patient cases and treatment protocols. Doing so they gained insight in the possibilities of treatment at the different ICU's and a mutual thrust developed. End 2006 it was possible to start a formal collaboration with the goal to improve the quality of intensive care in all participating hospitals and to provide optimal care for every ICU patient in the region; in the ICU of the local hospital if possible or in the regional level II or III ICU's if necessary.

RESULTS. Regional protocols for several ICU treatments are developed and their use is enforced. Consultation of intensivists from level II and III ICU's is made possible not only by life consultation but also via the internet and via video conferencing. Every level I ICU has a nearby ICU of a higher level as preferred partner, consultation with other centres being possible on an as needed basis. Criteria for consultation and for the transfer to a higher level ICU are in place. To provide safe transportation from one ICU to another without interrupting monitoring and treatment the region will soon have a mobile ICU unit available.

CONCLUSION. Regional ICU collaboration is not yet widespread in the Netherlands and the idea of reinforcing lower level ICU's is unique. We expect to combine the advantages of high quality basic local ICU treatment with the possiblity of quick and safe referal if needed. The aim of this paper is to share our ideas and experience in this field with others.

0039

CHARACTERIZATION OF CHRONIC CRITICALLY ILL PATIENTS

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INTRODUCTION. The population of chronic critically ill patients is still little studied. Identification of specific characteristics of this population and factors capable of predicting the evolution to a chronic condition can be important for planning intensive care. The aims are to describe the clinical and epidemiological characteristics and to identify factors predisposing to the development of a chronic status and mortality of this subgroup of patients.

METHODS. Prospective observational study of all patients admitted from February to May 2007. Since admission, we collected epidemiological data, APACHE II, presence of organ dysfunction, shock, ARDS, sepsis, episodes of infection, duration of mechanical ventilation, ICU and hospital length stay and mortality. Chronic condition was defined as those who had tracheostomy to maintain mechanical ventilation Group Tracheo) or mechanical ventilation for > 21 days (Group MV).

RESULTS. 256 patients were studied. 20 (7.8%) patients were identified as Group Tracheo. Compared to the rest of the population, these patients had a higher APACHE II (24 ± 8 vs. 20 ± 8; $p = 0.034$), SOFA neurological score (1.6 vs. 0.7 ± 1.3; $p = 0.04$) and SOFA pulmonary score (2.8 ± 0.7 vs. 2.0 ± 1.2, $p < 0.01$) and a greater proportion of ARDS (10.0% vs. 2.5%, $p = 0.05$). Group MV showed a higher incidence of shock (100% vs. 80%), renal dysfunction (62.5% vs. 45.0%), ARDS (31.3% vs. 20%) and higher mortality in the ICU and hospital (50.0% vs. 20.0% in 62% vs. 50.0%, respectively) compared to those defined by need for tracheostomy. There was no difference in mortality between chronic and non-chronic patients.

CONCLUSION. Chronic critically ill patients are sicker already at admission. Neurological and pulmonary dysfunctions are more related to the development of a chronic condition. Although most patients fit both definitions used, the characterization of a chronic condition in the ICU is important in future large epidemiological studies as the outcome may diverge.

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0040

ELDERLY PATIENTS IN THE INTENSIVE CARE UNIT

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INTRODUCTION. Nowadays elderly represent a significant proportion of patients who required admission to the Intensive Care Unit (ICU). The resources required for the management of elderly patients admitted in the ICU, represent a constant concern of hospital staff.

METHODS. The aim of this study was to examine retrospectively the patients over 65-years old who admitted in a general ICU focused to the epidemiological parameters, like age, gender, the principal diagnosis, co morbid conditions, ICU length of stay and finally the outcome.

RESULTS. During 1-year period (from 1.1.06 to 31.12.06) 94 patients were admitted in a 3-bed general ICU. Elderly (over 65 years old) were 65 patients, (69.14%), average age 76 years, SD 6.44 years, with a range of 65–94. years, men were 43, 66.15% and women 22, 33.84%. The main reason of admission in ICU was 1. post operative (after elective operation) 31 patients 47.69%. 2.acute respiratory failure 13, 20% 3. cardiovascular 11, 16.92% 4. sepsis 7, 10.76%, 5. trauma 5, 7.69%, 6.other 3, 4.61%. the mean length of stay in the ICU was 17.8 days but it ranged from 1 to 54 days. 24 patients died. From 65 elderly patients who admitted to the ICU 52 had co morbid medical illnesses. Post-operative patients independently from the age had a favorable prognosis, only 3 deaths. In the other etiological groups the prognosis was poor, 21 deaths for 34 patients.

CONCLUSION. As the number of people over the age of 65 years begins to increases, the proportion of patients who required ICU admission may also be expected to increase. Post-operative patients (mild to moderate planned operation) who required ICU admission generally have a good prognosis independently from age. The prognosis of the rest of elderly patients who required admission to ICU was poor.

0041

PLEURAL EFFUSIONS IN A MEDICAL INTENSIVE CARE UNIT

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INTRODUCTION. Pleural effusion represents a common clinical modality, which rarely represents a manifestation of primary pleural disease. The aim of this retrospective study was to examine the cases of Intensive Care Unit (ICU) patients who developed pleural effusions in related to the etiology, the epidemiologic characteristics, the detection and finally the management.

METHODS. 126 consecutive patients admitted to the ICU during 2006–2007 were enrolled in the study retrospectively. 13 patients developed pleural effusions which required thoracocentesis. The following data were collected: 1. epidemiologic characteristics like age, gender, 2. reasons for ICU admission and comorbidities, 3. characteristics of the effusion like side, unilateral or bilateral, laboratory findings, (protein, albumin, glucose, LDH levels, leukocyte count and neutrophils proportion, and finally culture findings).

RESULTS. From 13 patients who developed pleural effusions only 3 were treated for a pulmonary disorder. The detection of the fluid based on physical and radiographic evaluation. In some cases we used ultrasound –guided aspiration especially when the quantity of fluid was small. In 11 patients the extracted fluid was sterile. In 11 cases the fluid was transudative. In 6 patients required repeated attempts for fluid removal. In 3 cases the fluid was unilateral. In all cases the thoracocentesis was considered useful. The thoracocentesis was performed via pigtail catheter. Complications were not occurred. In our patients hypoalbuminemia and cardiac failure were the most common causes of pleural effusions.

CONCLUSION. The incidence of clinically and radiographically evident pleural effusions is about 10% in ICU patients. Small amounts of fluid are missed and moderate effusion also may be overshadowed by a coincident parechymal lung disorder. In the majority of cases the pleural effusion is transudative. Thracocentesis in moderate and excessive fluid quantity is a safe process even if in mechanically ventilated patients. The usefulness of evacuation process is pulmonary decongestion, and bacteriological confirmation in febrile states.

0042

MONITORING OF INTRA ABDOMINAL PRESSURE (IAP) AS AN EARLY INDICATOR OF ABDOMINAL COMPARTMENT SYNDROME (ACS) AND MULTIPLE ORGAN DISEASE SYNDROME (MODS)

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INTRODUCTION. The term abdominal compartment syndrome (ACS) describes the clinical manifestations of the pathologic elevation of the intra-abdominal pressure (IAP). When the IAP exceeds 12 mm Hg it is referred to as intra-abdominal hypertension (IAH) while ACS generally sets in at an IAP in excess of 20 mm Hg. This syndrome is most commonly observed in the setting of severe abdominal trauma and in the aftermath of major abdominal operations. ACS affects mainly the respiratory, cardiovascular, renal, gastrointestinal and the central nervous systems. Fundamental to the development of ACS are the obstruction of venous return to the heart via the inferior vena cava and the splinting of the diaphragm due to elevated IAP. IAP monitorization and early decompressive treatment is the only therapeutical option to stop the evolution of the ACS. The aim of this prospective study were to identify the incidence of abdominal hypertension (IAP > 15 mmHg) and ACS in critical patients, to evaluate the ACS treatment with decompressive laparotomy and to confirm the effectiveness of the IAP as predictive indicator of morbidity and mortality for multiple organ disease syndrome (MODS).

METHODS. From January 2005 to October 2007 100 high risk patients who responded to inclusion criteria, were enrolled in the study. The inclusion criteria were: abdominal surgery that required ICU recovery, abdominal trauma or serious trauma without abdominal interesting, acute pancreatitis, hypovolemic or septic shock treated with high liquid volume. All this patients did not present clinical condition that could bias the IAP monitoring, such as neurogical bladder, pelvis fractures, obesity.

Patients underwent monitoring of: IAP in the bladder (4 misurations every 6 hours), liquid infused volume, diuresis, SOFA score, cardiac frequency, mean blood arterial pressure, inotropes, Glasgow Coma Scale, ventilation method, PaO2/FiO2, pH, PaCO2, Base Exceed.

RESULTS. IAP mean value was 12 mmHg in stable patients, and 20 mmHg in patients with MODS. IAH incidence was 20%. In 10 cases ACS was observed, with rapid IAP increase in the first 12–24 hours and clinical instability that required surgical treatment in 5 cases. MODS was developed in 7 patients with ACS, with mortality statistically superior in patients operated vs patients not operated ($p < 0.000$).

CONCLUSION. IAP monitoring is an early predictor of ACS and, in combination with early surgical treatment, it's able to prevent the developing of sepsis and MODS.

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Poster Sessions
Perioperative monitoring and outcome: 0043–0053

0043

IMPACT OF THE INTENSIVIST-LED TEAM ON POSTOPERATIVE OUTCOMES IN A SPECIALIZED CARDIAC SURGICAL INTENSIVE CARE UNIT

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INTRODUCTION. It is apparent that the increasing complexity of cardiac surgical cases requires a new level of critical care performance. The aim of the study was evaluation of the impact of a newly appointed intensivist on cardiac surgical intensive care unit patient outcomes and quality of care variables.

METHODS. We performed observational cohort study with historical controls in eight-bed cardiac surgical intensive care unit (CSICU) in tertiary university hospital. Mortality, ventilation time, length of stay in the CSICU and hospital (LOS) were compared between two 1-year periods, before and after the appointment of intensivist. Data regarding these patients were collected using the department database.

RESULTS. We analyzed 864 patients before (first period) and 856 patients after (second period) the intensivist appointment. The unadjusted in-hospital mortality decreased from 6.59% (57 patients) in the first period to 3.61% (31 patients) in the second period (95% confidence interval, 1.3 to 3). The mortality predicted according to EuroSCORE was $8.5 \pm 11.4\%$ in the first period and $8.3 \pm 11.6\%$ in the second. Mean ventilation time increase from 31 hours to 43.1 hours (95% confidence interval, 1.7 to 2.7). Median ventilation time was unchanged – 10 hours. Mean ICU LOS increase from 2.8 to 3.8 days (95% confidence interval, 0.2 to 0.9), but median ICU stay was unchanged – 24 hours. ICU readmission rate decrease from 4.8% to 31%. Mean hospital stay was 8.2 and 8.4 days respectively (median 6 days).

CONCLUSION. The appointment of intensivist-led team model was associated with a positive impact on patient outcomes, including lower intensive care unit mortality.

0044

RELIABILITY OF CONTINUOUS PULSE CONTOUR CARDIAC OUTPUT MEASUREMENT FLOTRAC™ COMPARED TO THE TRANSESOPHAGEAL ECHOCARDIOGRAPHY IN CARDIAC SURGERY PATIENTS

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INTRODUCTION. During cardiac surgery, cardiac output is commonly evaluated with different less or more invasive technics. Continuous pulse pressure cardiac output measurement FloTrac™ is a less invasive device used in our patients monitoring. Transesophageal echocardiography (TEE) is also used to evaluate valvular replacement and myocardial dysfunction. We decide to compare the cross-correlation between cardiac output (CO) values, among the FloTrac™ and the TEE.

METHODS. We simultaneously compared TEE cardiac output and estimates of arterial pulse contour-derived CO using the FloTrac™, measured at five time in 22 cardiac surgery patients, under cardiopulmonary by-pass: T1: After anesthesia induction, T2: before sternotomy, T3: after sternotomy and before cardiopulmonary by-pass (CPBP), T4: after cardiopulmonary bypass, T5: after sternotomy closure. Mean values for CO across all devices were compared by Bland–Altman analysis.

RESULTS. We obtained 110 pairs of measurements. Mean CO values were different across devices (5,2 l.min-1 (± 1,3) vs 4,4 l.min-1 (± 0,8) for TEE and FloTrac™ respectively. All results are noted in the table.

TABLE 1

	CO(TEE)	CO(Flotrac)	Biaises	Precisions	Agreement
T1	4,4[1,1]	4,0[0,5]	0,45	1,35	−1,35/2,2
T2	4,8[1,3]	4,3[0,7]	0,54	1,70	−1,8/2,9
T3	5,0[1,1]	4,5[0,6]	0,46	1,43	−1,5/2,4
T4	5,9[0,9]	4,9[0,9]	1,00	2,43	−1,9/3,9
T5	6,0[1,3]	4,5[0,8]	1,50	2,70	−1/4
Global (T1-5)	5,2[1,3]	4,4[0,8]	0,78	1,23	−1,6/3,2
Before CPBP (T1-T3)	4,7[1,2]	4,2[0,6]	0,49	1,02	−1,5/2,5
After CPBP (T4-T5)	6,0[1,3]	4,7[0,9]	1,25	1,29	−1,5/3,9

CONCLUSION. In our study, the FlotracTM device underestimate the CO comparatively to the TEE despite of little biaises. These two devices cannot be interchangeable to monitor CO while cardiac surgery.

0045

ADMISSIONS TO CRITICAL CARE FOLLOWING OESOPHAGEAL SURGERY: PROGNOSTIC FACTORS AND PERFORMANCE OF RISK PREDICTION MODELS

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INTRODUCTION. The ICNARC Case Mix Programme Database (CMPD) is comprised of validated data from adult, general critical care units across England, Wales and Northern Ireland. A secondary analysis was carried out on data relating to admissions following oesophageal surgery.

METHODS. The CMPD was searched between 1st December 1995 and 30th September 2007 for elective surgical patients with oesophageal malignancy as a primary or secondary reason for admission. Case mix, outcome and unit activity for these admissions were investigated, and multivariable analysis was carried out to identify prognostic factors. The performance of three generic risk prediction models was compared using measures of discrimination, calibration and overall goodness of fit.

RESULTS. Of 563,290 admissions to 181 units, 7227 were identified as admissions following oesophageal surgery, representing 1.3% of the CMPD. Mean age was 64.3 years, and 75.1% were male. Median unit length of stay was 2.8 days for unit survivors and 10.9 days for unit non-survivors. Unit mortality was 4.4% and ultimate acute hospital mortality 11.0%. Readmissions within the same hospital stay scored significantly worse on all severity scores and had a unit mortality of 24.7% and a hospital mortality of 33.9%. Age, mechanical ventilation, lowest PF ratio, arterial pH and serum albumin and highest serum urea and serum creatinine, from the first 24 hours following admission to critical care, were all independent predictors of hospital mortality. The three prognostic models examined performed only moderately with areas under the ROC curve between 0.60 and 0.64 and significant departures from perfect calibration for all three. However, the ICNARC model[1] performed better than APACHE II[2] and SAPS II[3] on all performance measures.

CONCLUSION. Oesophageal surgery admissions to critical care have a significant mortality rate, with readmissions at greater risk. Patient age was found to be an independent predictor of outcome. Unsurprisingly, the performance of generic risk prediction models applied in the first 24 hours in the CMPD unit after surgery was poor, and additionally impaired by their inability to take into account subsequent complications that have a major impact on mortality.

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0046

A SYSTEMATIC REVIEW OF THE IMPACT OF PHYSIOTHERAPY, INCENTIVE SPIROMETRY AND CPAP ON POSTOPERATIVE PULMONARY COMPLICATIONS AND HOSPITAL LENGTH OF STAY

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INTRODUCTION. Postoperative respiratory dysfunction is reported to occur in 5 to 10% of patients undergoing major thoracic and abdominal surgical procedures. The most important morbid postoperative pulmonary complication is atelectasis formation, which increases the risk for pneumonia and hypoxic respiratory failure, thus increasing morbidity and mortality and prolonging intensive care unit and hospital stay. We undertook a systematic review to investigate the effects of physiotherapy, incentive spirometry and non-invasive CPAP on atelectasis formation, risk of pneumonia and hospital length of stay in patients after major surgery.

METHODS. Databases searched were the Cochrane Central Register of Controlled Trials (CENTRAL, The Cochrane Library Issue 3, 2006), MEDLINE (from inception to December 2006), and EMBASE (from inception to December 2006). We classified the following comparisons in patients undergoing surgery: physiotherapy versus non-physiotherapy, physiotherapy versus physiotherapy plus incentive spirometry, and physiotherapy versus physiotherapy plus CPAP. Physiotherapy was considered to be the treatment. We summarized available data for all trials reporting results by computing pooled odds ratios (OR) and their respective 95% confidence intervals (CI) by means of a fixed-effects or a random-effects meta-analysis model. Effect measures for length of hospital stay are reported as weighted mean difference (WMD). We examined heterogeneity using the I2 test.

RESULTS. Physiotherapy was associated with a decrease in the postoperative pneumonia risk (OR 0•41, 95% CI 0•25–0•67, P = 0•0003) but not with a consistent reduction in atelectasis formation (OR 1•29, 95% CI 0•84–2•00, P = 0•25) and length of hospital stay (WMD -0•11, 95% CI -0•61-0•38, P = 0•65) when compared with no physiotherapy. In non-cardiac surgery patients physiotherapy reduced postoperative pneumonia risk (OR 0•31, 95% CI 0•18-0•55, P < 0•0001). No substantial difference in atelectasis formation, pneumonia, and length of hospital stay with incentive spirometry as an adjunct to physiotherapy was found (OR 1•24, 95% CI 0•88-1•76, P = 0•22; OR 1•24, 95% CI 0•65-2•35, P = 0•51; WMD 0•56, 95% CI -0•32 - 1•44, P = 0•21, respectively). CPAP was associated with a significant reduction in atelectasis formation in non-cardiac surgery patients (OR 3•60, 95% CI 1•10-11•78, P = 0•03).

CONCLUSION. In conclusion, our study shows that in postoperative patients: a) physiotherapy seems to reduce postoperative pneumonia risk while atelectasis formation and length hospital of stay remain unaffected; b) incentive spirometry as an adjunct to physiotherapy is lacking benefit; c) non-invasive CPAP reduces atelectasis formation in non cardiac patients.

0047

CLINICAL PROFILE AND OUTCOMES FROM OBSTETRIC ADMISSIONS TO AN INDIAN INTENSIVE CARE UNIT

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INTRODUCTION. Obstetric problems frequently require intensive care. We retrospectively analysed all obstetric admissions to our unit over a two year period from February 2006 to January 2008 to identify indication for admission, clinical profile and outcomes.

METHODS. Case records of all obstetric admissions during the study period were reviewed. Data collected included (1) primary obstetric problem that necessitated ICU admission (2) APACHE II score (3) organ failures (4) ventilation days (5) length of stay in ICU and mortality. Data are presented as mean ± standard deviation. Correlation between APACHE II scores and ICU stay was analysed by linear regression. The Mann-Whitney U test was used to compare length of stay in patients who had shock, acute renal failure, ALI/ARDS and hepatic dysfunction with those who did not.

RESULTS. There were 47 (1.7%) obstetric admissions out of a total of 2,722 admissions during the study period. The diagnoses in these patients were as shown in Table 1. The mean APACHE II score of all patients was 17.5 ± 10.4. Nineteen patients (40.4%) required mechanical ventilation. The mean duration of mechanical ventilation was 4.2 ± 3.9 days. The mean ICU length of stay was 4.1 ± 3.8 days. Fifteen patients (31.9%) presented with shock (systolic blood pressure less than 90 mm of Hg); 14 (29.8%) patients developed acute kidney injury (by the RIFLE criteria); 7 (14.9%) patients had seizures and 22(46.8%) patients had thrombocytopaenia (platelet count < 100,000). Twelve patients (25.5%) developed ALI/ARDS. Eight patients had uncontrolled ante-partum or post partum haemorrhage; 6 of these patients underwent hysterectomy; a bilateral internal iliac artery ligation was also done in all except one of these patients. ICU length of stay correlated with increasing APACHE II score (r = 0.47; p = 0.0008). The ICU length of stay was also significantly higher in the presence of shock, acute renal failure and ALI/ARDS, while hepatic dysfunction did not result in significantly prolong ICU stay. There were no fatalities in our study; one patient was transferred to another hospital for continued care.

TABLE 1 INDICATIONS FOR ADMISSION

Diagnosis	No: of patients (%)
Pregnancy induced hypertension (PIH)	15 (31.9)
Post partum haemorrhage (PPH)	6 (12.8)
Acute fatty liver of pregnancy	4 (8.5)
HELLP syndrome	3 (6.4)
Ruptured ectopic gestation	2 (4.2)
Sepsis	2 (4.2)
Ante partum haemorrhage (APH)	2 (4.2)
Amniotic fluid embolism	1 (2.1)
Others	12 (25.5)

CONCLUSION. PIH, followed by peri partum haemorrhage were the two most common obstetric indications for admission to our ICU. High APACHE II scores, presence of shock on admission, acute renal failure and ALI/ARDS were associated with a longer ICU stay.

0048

PROSPECTIVE, RANDOMIZED, CROSSOVER TRIAL OF THREE OXYGEN THERAPY DELIVERY DEVICES IN ADULT PATIENTS

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INTRODUCTION. A failure to administer oxygen correctly places the patient at risk of hypoxemia/hypoxia, suffering a severe adverse event such as cardiac arrest, and potentially death. Disadvantages with face mask (FM) and nasal prongs (NP) oxygen delivery devices tend to result in patients removing the device, interrupting oxygen therapy and thus enhancing the risk of hypoxia. Nasopharyngeal oxygen (NPO) therapy may overcome some of the difficulties associated with NP and FM oxygen delivery devices. In order to determine whether NPO is a feasible therapeutic alternative to NP and FM, a well designed clinical study is required.

METHODS. Using a prospective, randomized, crossover trial this study evaluated the efficacy of these three oxygen delivery devices: NPO, NP and FM. Patients received non-humidified oxygen with oxygen flow rates increased to achieve a SpO2 of ≥ 95% by each device. After 10 minutes and a stable SpO2 waveform, the patient's SpO2, respiration rate, and the oxygen flow rate were recorded. After the trial, each patient rated their level of comfort for each device using a horizontal visual analogue scale (100 mm = most comfortable).

RESULTS. From Feb 07 to Sept 07, 37 adult patients (68 ± 10 years) were studied. Seventeen were cardio-thoracic patients and 20 were medical-surgical patients. All devices were effective at maintaining SpO2 ≥ 97% and patients' respiration rates were unaffected by changes in device. NPO required lower oxygen flow rates compared to NP and FM to achieve an equivalent SpO2. Patients' rated the FM rated the least comfortable device.

	(1) NP	(2) NPO	(3) FM	P	Multiple Comp.
Oxygenation (SpO2)%	97.0 (1.9)	97.7 (1.7)	98.8 (1.3)	<0.001	(1) ≠ (2) ≠ (3)
Oxygen flow l/min	2.6 (1.0)	2.2 (0.9)	6.1 (0.4)	<0.001	(1) ≠ (2) ≠ (3)
Respiration rate/min	19.9 (3.2)	19.9 (3.0)	19.8 (3.1)	0.491	
Comfort (HVASmm)	65.5 (14.3)	62.8 (19.4)	49.4 (21.4)	<0.001	[(1) = (2)] ≠ (3)

CONCLUSION. All three devices were effective in maintaining SpO2 ≥ 97% however nasal devices were rated as being more comfortable by patients. Although NP is used in current practice NPO may offer an alternative nasal oxygen delivery device worth considering as it was more cost effective in terms of oxygen flow rate. Further research is needed to explore the real world factors the impact on oxygen therapy from the perspective of patients and nurses.

0049

THE PULSE PRESSURE/HEART RATE RATIO AS A NEW MARKER OF STROKE VOLUME DURING SEVERE HEMORRHAGIC SHOCK IN ANESTHETIZED SWINE

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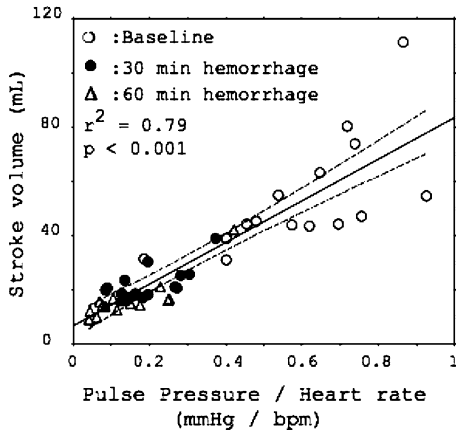
INTRODUCTION. The aim of this study was to investigate the patterns of pulse pressure (PP), respiratory variation in PP (dPP) and stroke volume (SV) in experimental hemorrhagic shock. Because heart rate (HR) increases at the initial stages of hemorrhage, we also tested the hypothesis that the PP/HR ratio may be more strongly related to SV than was PP.

METHODS. Pressure-controlled hemorrhagic shock was induced in 15 swine to achieve 30 mmHg mean arterial pressure under controlled propofol-remifentanil anesthesia. Pulmonary artery thermodilution cardiac output, SV, and central arterial pressures were recorded at baseline and following 30 (T30) and 60 (T60) minutes of hemorrhage. Data (mean ± sd) were analyzed with ANOVA and linear regression.

RESULTS. At T60, blood withdrawal was 1053 ± 309 mL (54 ± 11% blood volume) and induced a 59% decrease in SV and a 25% increase in HR, resulting in a 49% decrease in cardiac output. Between T0 and T60, PP decreased from 43 ± 8 to 15 ± 7 mmHg, and dPP increased from 9 ± 3 to 66 ± 25% (each $P < 0.01$). When data at T0, T30 and T60 were pooled, SV was more closely related to PP/HR ($r^2 = 0.79$) and to PP ($r^2 = 0.67$) than to dPP ($r^2 = 0.49$) (each $P < 0.01$).



CONCLUSION. The PP/HR ratio was the hemodynamic variable most strongly related to SV during severe hemorrhage in anesthetized swine.

0050

EFFECTS OF MUSICAL STIMULATION ON CRITICALLY ILL PATIENTS PAIN: BEHAVIOURAL INDEXES

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INTRODUCTION. Recently pain was considered the 5th vital sign and it seems to be very often mentioned by a large number of patients over postoperative period. As also seemed to be a powerful quality index of caring. The high tecnology used to monitorize, diagnose ant to treat these critically ill patiens in the intensive care unit (ICU) also causes or aggravates their pain. In the Literture there plenty of instruments to quantify or qualify the conscients patients pain but there are only a few to apply to the sedated and ventilated patients.

METHODS. Objectives:To study the effects of pain in behavioral variables and to investigate the musical stimulation effects on postoperative patients pain.
Material and Methods. Patients were randomly divided into 2 groups (GE- experimental and GC- Control. GE patients were daily submitted to sessions of (instrumental and nature sounds) musical stimulus, over 30–45 minutes each, for 2 to 5 days. The pain assessement instruments were Behavioral Pain Scale and Verbal Scale.

RESULTS. 58 patients, GE (n = 22) average 50,08 ± 19,03 years, GC (n = 36) on average 61,58 ± 17,54 years. Statiscal analises did not show significant diferences in BPS or VS. However t-test demonstrat significat difrences on patients satisfaction in the GE patients, when we compared the periods with and without music. (with music = 3,55 ± 0,93; without music = 2,27 ± 0,91.*T-test* = 2,430; p = 0,035.

CONCLUSION. The present study can not prove that music stimulation did not seem to have a significant impact on the behavioral pain index.

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GRANT ACKNOWLEDGEMENT. Music Pain intensive care.

0051

EFFECTIVENESS OF RFVIIA IN CARDIAC SURGERY

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INTRODUCTION. Although Recombinant factor VIIa (rFVIIa) was first licensed for the treatment of haemorrhage in patients with hemophilia A or B, its license has changed in the last years. Subsequently, it has been used to control life-threatening bleeding after trauma or major abdominal surgery. There is an increasing use off-label in patients undergoing cardiac surgery that have refractory bleeding. Despite the results, there is no randomized-controlled trial that shows benefits of using rFVIIa. The aim of our study is to analyze our experience with rFVIIa in the management of life-threatening bleeding after cardiac surgery.

METHODS. Retrospective study at the Hospital Universitario 12 de Octubre, Madrid, Spain, that includes 17 pacients from august 2005 until january 2008 who received rFVIIa after cardiac surgery. We create a database including diagnosis-surgical procedure, cardiopulmonary bypass time-hypothermia, re-exploration, bleeding before and 1 hour after rFVII, adverse events with rFVIIa, days of mechanical ventilation and ICU stay, mortality. Statistical analysis: pre treatment and post treatment bleeding were compared with repeated measures variance analysis after logarithmic transformation of the raw data assuming the non-parametric distribution. The data were analyzed with the SPSS for Windows release 13.0.0 software.

RESULTS. 17 patients (13 M:4F) received rFVIIa therapy: 5 valve replacement, 7 Aortic surgery, 1 CABG, 2 Cardiac Transplantation, 1 Cardiac tamponade, 1 Biventricular Assist Device. Patients ranged from 30–79 years (mean 57), cardiopulmonary bypass 88–292 min (mean 145), Aortic clamp time 74–291 min (mean 125), Temperature from 16 to 33°C (mean 26). Postoperative bleeding ranged from 450 to 1950 ml (mean 1002). After rFVIIa treatment bleeding ranged from 20 to 2340 ml (mean 503) with statistical significance $p < 0,03$. rFVIIa dose: 60 mcg/kg. Surgical re-exploration was necessary in 3 patients after rFVIIa therapy and only found a surgical source of bleeding in 1 patient. Hospital mortality was 35,3% (6 patients) and mortality was related to massive bleeding in 2 patients, that died in the first 24 hours. In 15 patients the bleeding was controlled, and they had 23 h (mean) of mechanical ventilation and 72 h (mean) of ICU stay. We did not find any thromboembolic complications during the stay in the hospital.

CONCLUSION. In our study, doses of 60 mcg/kg resulted to be effective in refractory hemorrhage associated with cardiac surgery. There were no adverse reactions to rFVIIa in our experience. Even though randomized, multicenter, controlled trials are necessary to confirm the efficacy of rFVIIa, our study shows results similar to other studies.

0052

OUTCOME OF INHALATION INJURY IN LIMITED RESOURCE SETTING

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INTRODUCTION. Inhalation injury (II) increases morbidity and mortality in burn patients, and influences their early burn management (1). Early intubation and positive pressure ventilation have been shown to improve outcome. We present a series of patients treated at Médecins Sans Frontières (MSF) Burn center in Iraq. MSF is an international independent humanitarian aid organisation that provides emergency medical assistance to populations in danger in more than 70 countries. Burn center in Iraq is the first of its kind within MSF, with good surgical treatment of burns but with limited financial and logistic resources for treatment of II. Diagnosis of II was clinical and marked on patient's chart upon admission. Management of II was done by a protocol and consisted of nursing with head elevation, oxygen, inhaled bronchodilators and corticosteroids, careful fluid management and escharotomy.

METHODS. Retrospective review of charts of all 222 burn patients, admitted to MSF Burn Center in Suleymania, Iraq, in period from 1.11.2007 to 21.2.2008.

RESULTS. Our cohort consisted of 107 male and 115 female patients, with the average total burn surface area (TBSA) of 24,3%. Their mean age was 17,1 years, 34 patients were infants younger than 1 year. 18,9% of our patients died, on average within 5,7 days from admission. II was clinically determined in 39 patients (17,6%), additional 67 patients had facial burns but no clinical signs of II. 66,6% of patients with II died, most within first 3 days. Their average TBSA was 64,5% and they represented 62% of all patients that died. Patients with facial burn but no signs of II had lower average TBSA (18,6%), seven of them died but their TBSA was higher (35,3%). In all except 8 patients with clinical signs of II the leading cause of death was respiratory failure, most commonly non-cardiogenic pulmonary oedema.

CONCLUSION. As expected, mortality of burn patients with concomitant II in MSF Burn Center was higher than reported in the studies from developed world. Although intubation and mechanical ventilation is not available, we speculate there is still some room for improvement in management of II. Our review showed that not all patients with facial burns or extensive burns were recognized as a risk for inhalation injury and treated accordingly. Fluid management could be improved, as well as introduction of non-invasive PEEP application. With appropriate training of the national staff, meticulous early management and PEEP we hope to detect some improvement in mortality of these patients in the future months.

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0053

READMISSION TO THE SURGICAL INTENSIVE CARE UNIT: INCIDENCE, OUTCOME, AND RISK FACTORS

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INTRODUCTION. Readmission to the surgical intensive care unit (ICU) may be associated with high morbidity and mortality rates. We investigated the incidence, outcome and possible risk factors for readmission to our ICU.

METHODS. Prospectively collected data from all patients admitted to a postoperative ICU between September 2004 and July 2006 were analyzed.

RESULTS. Of 3169 patients admitted to our ICU, 2852 patients were discharged to the hospital floor and constituted the study group (1828 male (64.1%), mean age 62 years). The readmission rate was 13.4% ($n = 381$); 314 (82.4%) single readmissions, 39 (10.2%) two readmissions, and 28 (7.3%) more than two readmissions. The first readmission to the ICU occurred within a median of 7 [5–14] days. Patients who were readmitted to the ICU had higher SAPS II (37 ± 16 vs. 33 ± 16, $p < 0.001$) and SOFA scores (6 ± 3 vs. 5 ± 3, $p = 0.001$) on intitial admission to the ICU compared with those who were not. In-hospital mortality was significantly higher in patients readmitted to the ICU (17.1 vs. 2.9%, $p < 0.001$) than in other patients. Factors associated univariately with a higher risk of ICU readmission included older age, higher SAPS II and SOFA scores on admission, the occurrence of sepsis syndromes during the ICU stay, and higher creatinine and C-reactive protein levels on the day of discharge to the hospital floor. In a multivariate analysis with readmission to the ICU as the dependent variable, older age was the only factor independently associated with a higher risk of readmission to the ICU (odds ratio: 1.01 per year, 95% CI: 1.01–1.02, $p = 0.004$).

CONCLUSION. In this group of surgical ICU patients, readmission to the ICU was associated with a more than 5-fold increase in hospital mortality. Older age was the only independent factor associated with a higher risk of readmission to the ICU.

0055

ACCURACY OF SAPS 3 IN A BRAZILIAN INTENSIVE CARE UNIT

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INTRODUCTION. SAPS 3 was recently developed to assess severity of illness and predict vital status at hospital discharge based in a sample of patients admitted to intensive care units (ICUs) worldwide. Statistical techniques were used to perform discrimination, calibration and validation. Equations of probability of death were adjusted based on the major geographic regions as North America, South America, and North Europe and so on.

METHODS. Data of 141 patients admitted to an adult ICU from a private hospital in Sao Paulo – Brazil, in the period of January to March of 2008, were collected considering inclusion and exclusion criteria from the original study. Probability of mortality was calculated using the customized equations given in the major study. Observed to Expected (O/E) mortality ratio was performed.

RESULTS. Hospital observed mortality was 11%. Probability of hospital mortality was 20%, 15.4% and 13% respectively for the equations customized to South America, Northern Europe and North America. O/E mortality ratio was 0.91 (0.87–1.11).

CONCLUSION. We observed that our sample fits better with the Northern European and the North American equations of probability of death instead the South American one. This might be related to the case mix, medical practices and structural organization at our institution. Therefore, yet the equations of probability of death given by SAPS 3 can contemplate the majority of ICUs worldwide, each institution perhaps should use the one that can better predicts mortality.

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Poster Sessions
Severity scoring: 0054–0067

0054

VALIDATION OF THE SAPS 3 ADMISSION PROGNOSTIC MODEL IN A FRENCH GENERAL ICU POPULATION

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INTRODUCTION. Outcome research in intensive care units (ICU) is of major interest. Reliable and regularly updated tools are required for meaningful evaluations, external comparisons, and benchmarking. In that view, the Simplified Acute Physiology Score (SAPS) 3 was recently developed and proposed as an alternative to older prognostic models. Our aim was to assess its external validity in an independent general ICU population, and compare its prognostic performance to that of the SAPS II, and the Mortality Probability Model at intensive care unit (ICU) admission version 2 (MPM 0-II) and version 3 (MPM 0-III).

METHODS. We performed a validation study in a multi-center database. Severity scores and related probabilities of death were calculated according to published coefficients and equations. Regarding the SAPS 3, probability of death was derived both from the global equation (SAPS 3-glob) and the customized equation for Central and Western Europe (SAPS 3-CWE). Calibration was assessed by the Hosmer-Lemeshow (HL) statistic ($p > 0.05$ indicates good fit) and discrimination was assessed by the area under the ROC curve (AUROC).

RESULTS. Analyses were processed on data from 3635 patients. Only the SAPS II had a satisfying calibration (HL: 15.4, $p = 0.06$). The SAPS 3-CWE calibrated slightly better than the SAPS 3-glob but was still unsatisfying (HL SAPS 3-CWE: 37.8, $p < 0.001$; HL SAPS 3-glob: 124.3, $p < 0.001$). Regarding discrimination, the SAPS 3 (same AUROC for the SAPS3-glob and the SAPS 3-CWE) was as accurate as the SAPS II (AUROC: 0.792 vs 0.806, $p = 0.08$), and more accurate than the MPM 0-II and the MPM 0-III (AUROC: 0.792 vs 0.739 and 0.753, $p < 0.001$).

CONCLUSION. Our results suggest that the SAPS 3 is preferable to the MPM 0-II and the MPM 0-III for early prediction of ICU mortality but does not calibrate as well as the SAPS II.

0056

THE VALUE OF RADIOLOGICAL AND CLINICAL SCORING SYSTEMS IN PATIENTS WITH ESTABLISHED SEVERE ACUTE PANCREATITIS

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INTRODUCTION. Different tools have been developed to predict outcome in patients with acute pancreatitis. The newly developed EPIC score (1), a radiological score based on the presence of extrapancreatic signs of inflammation on non-contrast enhanced CT scan, may allow for early risk stratification in patients with pancreatitis. In this study, we want to evaluate radiological scoring systems, including the EPIC score, in a subgroup of patients with severe acute pancreatitis, and compare it with other prediction tools.

METHODS. A retrospective cohort study of 84 patients with severe acute pancreatitis included in an international multicenter study on the use of antibiotic prophylaxis in severe acute pancreatitis.

The Balthazar score, CT severity index and the newly developed EPIC score were calculated for each patient. The performance of the radiological scores to predict outcome (defined as mortality and the need for surgery) was evaluated by constructing ROC curves and calculating the area under the curve (AUROC) for the outcome parameters. These were compared to the APACHE II score, and 2 specific pancreatitis scoring systems, the Ranson score and Modified Glasgow score. Data are reported as mean (standard deviation), a p-value of 0.05 or less was considered statistically significant.

RESULTS. Mean age of the patients was 53 years (17,8), 58 of them (69%) were male. APACHE II score, Ranson score and modified Glasgow score was 11.4 (6.87), 4.1 (2.04) and 3.8 (1.95) respectively.

Ten patients (12%) needed surgery for complications of severe acute pancreatitis, and 10 patients eventually died because of progression of pancreatitis or (peri)-pancreatic infection.

The AUROC curve for mortality was 0.61 (EPIC score), 0.63 (CT severity index), and 0.55 (Balthazar score) for the radiological scores, compared to 0.67 (APACHE II), 0.66 (Ranson) and 0.65 (Modified Glasgow) for the generic and pancreatitis scoring systems. The AUROC curve for predicting the need for surgery was 0.73 (EPIC score), 0.68 (CT severity index), and 0.55 (Balthazar score), whereas it was 0.75 (APACHE II), 0.74 (Ranson) and 0.75 (Modified Glasgow). None of these differences were statistically significant.

CONCLUSION. The new EPIC score, a radiological scoring tool which can be obtained without the need for intravenous contrast, performed comparable to the CT severity index and clinical scoring systems in predicting the outcome of acute pancreatitis in pancreatitis patients with established severe disease. However, overall scoring systems performed only poor in predicting mortality of these patients.

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0057

PTSD AFTER ICU DISCHARGE BY GOLD STANDARD ASSESSMENT

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INTRODUCTION. Accuracy of PTSD prevalence after ICU discharge is believed unreliable (1,2). The presence of anxiety, depression and the survivors' physical condition may confuse the overall picture, when self-report methods are used for the detection of PTSD symptoms.

METHODS. Prospective Longitudinal Study of Psychological Follow-up over six-months. PTSD assessment was conducted at 2 weeks, 1, 3 and 6 months by structured clinical interview (CAPS)(f1/i2/ts > 65) and self report questionnaire (DTS)(ts > 40) in consecutive survivors. Assessments for anxiety, depression, cognitive function and quality of life were carried out simultaneously.

RESULTS. Statistically significant differences were found between assessment for PTSD by clinical interview, compared to that identified through questionnaires at 2 weeks,1 month and 3 months. There was a gradual, but significant resolution of PTSD symptoms over time (Wilks' Lambda = .59, F (3, 59) = 13.86, p = .000, multivariate partial eta squared = .413).

FOLLOW-UP	CAPS PTSD N (%)	DTS PTSD N (%)	PROPORTION DIFFERENCE	CONFIDENCE INTERVAL
2 WEEKS	3 (3%)	12 (13%)	0.10	0.04 to 0.18*
1 MONTH	1(1%)	6 (8%)	0.06	0.00 to 0.15*
3 MONTHS	2 (3%)	7 (10%)	0.07	0.00 to 0.15*
6 MONTHS	1 (2%)	2 (3%)	0.02	−0.05 to 0.09

CONCLUSION. Prevalence of PTSD after ICU discharge may be much lower than previously suggested and may resolve spontaneously over time in most survivors, without provision of psychological intervention.

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0058

THE IMPACT OF RESUSCITATION PREFERENCE ON THE PERFORMANCE OF AN ADULT INTENSIVE CARE UNIT MORTALITY PREDICTION MODEL

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INTRODUCTION. APACHE, SAPS, and MPM are used to estimate the probability of hospital death in adults admitted to the ICU. Only the MPM includes DNR status. We undertook this study to determine the impact of patients' DNR status on the performance of APACHE III in mortality prediction.

METHODS. This retrospective study involves analyses of the APACHE III database of our institution. The APACHE III related severity scores and probability of hospital death as well as the patients' DNR status within 24 hours of ICU admission were abstracted. A new model was created by entering the DNR status and the probability of death. Performance of mortality prediction was assessed using the area under the receiver operating characteristic curve (AUC) with its 95% confidence interval (CI) and Hosmer-Lemeshow (H-L) statistic.

RESULTS. During the study period from 1994 through 2006, 65171 admissions were entered in the APACHE III database. Excluding patients with incomplete data and those who did not authorize their medical records to be reviewed for research, 62,501 admissions were included in the study. DNR status was established in 3,810 (6.1%) within 24 hours of ICU admission. The DNR patients had higher severity of illness (Table 1). There were no significant differences in the AUCs between the APACHE III and the new model in predicting hospital mortality (Table 2). Both models had poor calibration.

TABLE 1 DIFFERENCES BETWEEN DNR AND NON-DNR PATIENTS

Severity measure, mean (SD)	DNR	Non-DNR	P-value
APS	53.0 (30.0)	34.2 (22.2)	< 0.001
APACHE III score	71.5 (32.0)	46.0 (25.5)	< 0.001
Death probability	0.31 (0.27)	0.12 (0.18)	< 0.001

TABLE 2 MODEL PERFORMANCE

Model	H-L Statistics	H-L P value	AUC (95% CI)
APACHE III	802	< 0.001	0.850 (0.845–0.855)
New with DNR	705	< 0.001	0.857 (0.852–0.862)

CONCLUSION. Sicker patients are more likely to have DNR status within 24 hours of ICU admission. The inclusion of DNR status does not improve the performance of the APACHE III model in mortality prediction.

0059

AGE, ICU LENGTH STAY AND TYPE OF ICU ADMISSION AS PROGNOSTIC FACTORS OF ICU MORTALITY RATE. A 20 YEARS RETROSPECTIVE STUDY

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INTRODUCTION. The aim of this retrospective study was to evaluate the possible effect of age, gender, ICU length stay and type of ICU admission on ICU outcome and to determine their differences over a 20-yrs period.

METHODS. Patients: 2720 pts (56,5% male, mean age 62,8 ± 16,8 yrs) over 20-yrs period (1988–2007). Setting: A 5-bedded medical/surgical adult ICU. Measurements: Demographics were collected, including age, gender, type of ICU admission (medical, surgical-emergency, surgical-elective), ICU length stay, outcome (total mortality 20,4%). The pts were divided into two Groups, according to the year of ICU admission: Group A (1988–1997) and Group B (1998–2007). Statistical analysis was performed with SPSS 15.0 software.

RESULTS. In both groups, higher age, longer ICU length stay and medical type of ICU admission were associated (p < 0,001) with a negative outcome (i.e. mortality). Age, ICU length stay and outcome significantly differed (p < 0,001) with respect to the type of ICU admission. In particular, in both Groups surgical-elective pts were older (Group A: 65,2 ± 13,9; Group B: 69 ± 11,4), with shorter ICU length stay (Group A: median = 4 days; Group B: median = 3 days) and smaller mortality rate (Group A: 9,5%; Group B: 5%), while surgical-emergency pts were younger (Group A: 54 ± 19,7; Group B: 60,9 ± 19,2) and medical pts had the highest mortality rate (Group A: 37,9%; Group B: 37,2%). Pts in Group B were older and remained less days in ICU compared to pts in Group A (p < 0,001; Table 1). Interestingly, the mortality rate of surgical-elective and surgical-emergency pts in Group B was significantly reduced compared to Group A (p = 0,004 and p = 0,038 respectively).

TABLE 1

	Group A (1988–1997)	Group B (1998–2007)	p
Gender (male)	55,2%	57,5%	ns
Age (years)	60,8 ± 17,3	64,5 ± 16,2	<0,001
ICU length of stay (days)	5 (1–108)	4 (1–101)	<0,001
Medical patients	31,2%	36,2%	<0,001
Surgical elective patients	42,2%	43,4%	<0,001
Surgical emergency patients	26,6%	20,4%	ns
Mortality rate of medical patients	37,9%	37,2%	ns
Mortality rate of surgical elective patients	9,5%	5%	0,004
Mortality rate of surgical emergency patients	23,5%	16,8%	0,038

CONCLUSION. In both groups, ICU outcome was influenced by age, ICU length stay and type of ICU admission. During a 20-yrs period, the age of the admitted pts and the proportion of medical and surgical-elective pts were significantly increased, while the ICU length stay and the mortality rate of surgical-elective and surgical-emergency pts were significantly reduced. On the contrary, the mortality rate of medical pts remained stable.

0060

UTILITY OF ILLNESS SEVERITY SCORING FOR PREDICTION OF PROLONGED CRITICAL CARE AND POST ICU HOSPITAL MORTALITY

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INTRODUCTION. To determine whether multiple organ dysfunction syndrome scores can predict a prolonged length of stay for critically ill patients in the intensive care unit and the post ICU hospital mortality.

METHODS. Prospective, cohort study performed in the Intensive care unit (ICU) of a regional hospital. 3,295 consecutive admissions for critical illness were studied on a 5 years period with postoperative complications or postoperative monitoring in 1,258 patients. Calculation of Acute Physiology and Chronic Health Evaluation (APACHE) II score was performed 24 hours after admission to the ICU and serial determination of organ dysfunction for the duration of hospitalization according to the multiple organ dysfunction score. Patients were stratified by survival and time intervals for the duration of critical care, and followed until discharge or death. Main outcome measures was post ICU hospital mortality and length of stay in the ICU.

RESULTS. The mean APACHE II scores were 14.0 ± 0.8 points, respectively (mean ± -SEM). The incidence of organ dysfunction was 46%, and the hospital mortality was 9.8%. The mean ICU length of stay was 5.1 ± 0.2 days, but decreased progressively from 5.8 ± 0.5 days in 2001 to 4.3 ± 0.6 days in 2006 (p < 0.01) with no change in either illness severity or the number of admissions. By univariate analysis, increased length of stay in the ICU was associated with increasing APACHE II scores, an increased incidence of emergency admissions, and the incidence and development of severe organ dysfunction (all p < 0.01). Post ICU intra hospital mortality in patients whose ICU stay was more than 1.5 the mean length of ICU stay (ICU LOS) was also significantly higher than for patients whose ICU stay was shorter than 1,5 ICU LOS (30,5 ± 8% versus 8,5 ± 4%, p > 0.01). By multivariate analysis of variance (MANOVA), independent predictors of a prolonged stay in the ICU were emergency admission (p = 0.0007), and the magnitude of organ dysfunction (p < 0.00001), but not APACHE II. Only an emergency admission (p = 0.0005) and the magnitude of organ dysfunction (p < 0.00001) predicted a prolonged stay independently in survivors.

CONCLUSION. This study confirms that the development of multiple organ dysfunction syndrome is an interesting predictor of a prolonged ICU course in critical illness, even in survivors. Increased risk of a prolonged stay in the ICU increased risk of post ICU intra hospital mortality. The combined use of APACHE II, the multiple organ dysfunction score and the length of ICU stay may provide improved prediction of post ICU intra hospital mortality, but further studies are necessary before prediction of hospital outcome in this population is reliable.

0061

APACHE II, SOFA AND PERFORMANCE STATUS ARE PROGNOSTIC PREDICTORS TO ICU AND HOSPITAL MORTALITY TO CRITICAL ILL ONCOLOGIC PATIENTS?

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INTRODUCTION. The objective of this study is to available two intensive care scores systems: the Acute Physiology and Chronic Health Evaluation II (APACHE II) and the Sequential Organ Failure Assessment Score (SOFA) and the oncologic clinical score: PS (Peformance Status) as prognostic predictors to ICU and hospital mortality on cancer patients.

METHODS. This study is a prospective cohort that was carried out in an Intensive Care Unit of an urban tertiary 300 bed hospital in Brazil. Data were collected prospectively from 200 consecutive patients who were admitted to the combined medical and surgical ICU. The outcomes studied were overall ICU and hospital mortalities. In the initial phase of the statistical analyses, relative risks of death to each independent variable and its respective 95% confidence interval were calculated. In a second phase, the Kaplan- Meier procediment was used. The final phase of the statistical analyses consisted of the Cox multiple regression.

RESULTS. Overall, 15, 5% of patients had PS = 0–1, 60, 5% of patients had PS = 2–3 and 24% of patients had PS = 4. There was significant difference between mortality of patients with PS = 4 and the patients with PS = 0–1 and PS = 2–3 ($p < 0{,}050$ to ICU mortality and $p < 0{,}048$ to hospital mortality). Overall, 44, 3% of patients had high classification on SOFA (SOFA > 3: our study median). However, the value of this score system was not important to predict ICU and hospital mortality. Additionally, 64% of patients had high classification on APACHE II (APACHE II > 9: our study median), but the value of APACHE II also was not statistically significant as a prognostic factor to critical ill oncologic patients.

CONCLUSION. Prognostic models specifically designed for clinical patients with cancer show better discrimination to identify subgroups of patients with very high mortality risk than the general models. Our study suggests that patients with high classification on PS score had higher ICU and hospital mortality. The intensive care scores (APACHE II e SOFA), however, are not accurate enough to be used in the routine management of these patients.

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0062

SOFA SUB-SCORES AND FOOD INTOLERANCE IN PREDICTION OF ICU MORTALITY

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INTRODUCTION. We aimed to evaluate SOFA (Sequential Organ Failure Assessment) sub-scores separately and together with food intolerance in prediction of ICU mortality.

METHODS. We studied 1312 consecutive patients admitted to medical-surgical ICU of university hospital in years 2004–2007. SOFA sub-scores were calculated daily. The real amount of enteral feeding was assessed daily and calculated as enteral feeding minus nasogastric aspirate. Enteral feeding solutions with 1 kcal/ml were used as standard. Food intolerance was assessed in following scale: 0 as real enteral feeding 1500 ml or more, 1 as 800–1499 ml, 2 as 300–799 ml, 3 as 0–299 ml and 4 as negative balance.

The performance of SOFA sub-scores and food intolerance was tested in different time-points: admission day, mean of the first two days, mean of the first three days, mean of the first week and mean of total ICU stay.

RESULTS. In separate assessment all SOFA sub-scores were independently important predictors only if assessed as means for total ICU stay. Cardiovascular SOFA was the most powerful predictor in all time-points. Central nervous system, respiratory and renal SOFA had also significant impact in all studied time-windows.

When assessed in combination with food intolerance scale (at the same time-points), respiratory SOFA was not independent predictor in any time-point. Hepatic SOFA was important only if means of total ICU stay were used and hematologic SOFA if means of the first week or total stay were analyzed. Food intolerance was independent in all time-points together with cardiovascular, central nervous system and renal SOFA.

The regression model with SOFA sub-scores and food intolerance at admission day resulted in Nagelkerke R square 0.432 and the same model for total ICU stay in 0.571.

TABLE 1 REGRESSION MODEL FOR PREDICTION OF ICU MORTALITY WITH MEANS OF THE FIRST THREE DAYS

	Odds ratio	95% CI for OR
cardiovascular SOFA	2.52	2.15–3.24
central nervous system SOFA	1.44	1.30–1.59
renal SOFA	1.23	1.06–1.43
respiratory SOFA	1.14	0.95–1.36
hematologic SOFA	1.12	0.94–1.33
hepatic SOFA	1.06	0.87–1.28
food intolerance scale	1.50	1.25–1.79

CONCLUSION. SOFA sub-scores have different power in prediction of ICU mortality. Food intolerance is an independent predictor of ICU mortality when used in combination with SOFA sub-scores at any time-window of ICU stay.

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0063

PERFORMANCE OF THE PROGNOSTIC SCORES SAPS II, APACHE II AND APACHE IV IN A MEDICAL SURGERY ICU

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INTRODUCTION. Several prognostic models has been proposed for evaluation of the gravity of the critical patients.More recently old models has been customized and new scores has been developed with intention to improve the performance of the methods. The objective of the present study was to compare the performance of SAPS II, APACHE II and APACHE IV in a medical surgical ICU.

METHODS. Observacional study that included all the patients admitted in the period of January to June of 2007. Was analyzed demographic data, days of ICU and mortality, and calculated the scores APACHE II, SAPS II and APACHE IV, using the standards formulas. The discrimination was gotten by ROC curves and the calibration for the Hosmer Lemeshow test, with the H test.

RESULTS. Two hundred sixty-eight patients was admitted in the period, with mean age of 59 y and (20 SD) Was 134 male and 134 female. The mean time of ICU days was 7 days (9 SD). The predict days of ICU permanence by the APACHE IV was 4 days and (6 SD). Mortality was 20 percent, the mean APACHE II was 14, the mean SAPS II was 29 and mean APACHE IV was 53.

TABLE 1

Scores	ROC	HL
SAPS II	0.83	0.07
APACHE II	0.81	0.46
APACHE IV	0.88	0.0001

CONCLUSION. All the evaluated scores had not demonstrated a good discrimination, being APACHE IV the method with worse calibration, beyond not has predicted with good correlation the average days of ICU permanence. APACHE II although not to have reached the necessary punctuation to be considered a good predictor of mortality, it has what better validation got in our sample.

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0064

COMPARISON OF RISK PREDICTION MODELS FOR PREDICTING ACUTE HOSPITAL MORTALITY FOR CRITICALLY ILL PATIENTS WITH HAEMATOLOGICAL MALIGNANCIES

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INTRODUCTION. Severity-of-illness scores have been found to underestimate the mortality of critically ill patients with haematological malignancies. We investigated the discrimination and calibration of the APACHE II and ICNARC models in predicting acute hospital outcome for these patients.

METHODS. A secondary analysis of the ICNARC Case Mix Programme Database (CMPD) was conducted. Admissions to 178 adult, general intensive care units in England, Wales and Northern Ireland between 1995 and 2007 were included. All admissions that had a haematological malignancy recorded as the primary or secondary reason for admission or as a co-morbid condition were included in the analysis. The APACHE II score and ICNARC physiology score were evaluated for discrimination (the ability of the model to distinguish survivors from non-survivors). The APACHE II mortality probability (using coefficients previously calibrated on the CMPD) and ICNARC model mortality probability were evaluated for discrimination and calibration (the accuracy of the predicted probability).

RESULTS. Of 514,918 admissions in the CMPD, there were 7,689 eligible admissions (1.5%); 2,980 had a haematological malignancy as a reason for admission and 4,709 as a co-morbid condition. The ICNARC model was found to have a better discrimination for all admissions with an area under the receiver operating characteristic (ROC) curve of 0.79 compared with 0.72 for the APACHE II model. The same was true within each of the two subgroups. Both models showed better discrimination, as assessed by the area under the ROC curve, for patients with a haematological malignancy as a co-morbid condition, as compared with patients with a haematological malignancy as a reason for admission. The standardised mortality ratios (SMRs) were high across all groups with both models (SMR 1.17 for APACHE II and SMR 1.26 for the ICNARC model), indicating that both models underestimate mortality. The Hosmer-Lemeshow C* statistic indicated a slightly better calibration for the APACHE II model, but there was still strong evidence of poor calibration for both models. This was reinforced by the results of Cox's calibration regression, which also demonstrated poor calibration for both models.

CONCLUSION. Both the APACHE II model and the ICNARC model have poor calibration when predicting acute hospital outcome for admissions to adult, general intensive care units in England, Wales and Northern Ireland with haematological malignancy. The discrimination of both models was moderate, with the ICNARC model showing better discrimination than APACHE II.

0065

AMINOTERMINAL PRO-BRAIN NATRIURETIC PEPTIDE (NT-PROBNP) AND BURNED PATIENTS

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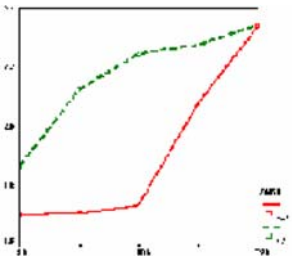
INTRODUCTION. The NT- proBNP is a good predictive value in medical intensive care patients according to studies newly published. Nevertheless, its role in burned patients is yet unknown. The aim of this study was to evaluate the pattern and the predictive value of NT-proBNP levels in the reanimation period of adult critically ill burned patients.

METHODS. Prospective, consecutive, observational study of a cohort of burned patients with total body surface area burned > 20%. Blood tests for NT-proBNP, lactic acid, troponin I and C reactive protein (CRP)were drawn every 8 hours during the first 3 days after admission. ABSI, APACHE-II, demographic data, days under mechanical ventilation(MV), ICU length of stay (ILS) and mortality were recorded. Statistical analysis with SPSS R-9 for Windows and two ways ANOVA with repeated measurements were used. p values < .05 were considered significant. The study was approved by the hospital ethical committee.

RESULTS. Of the 15 patients, 9 were men and 6 women, with a mean age of 46.1 ± 20.6(20–74). The mean ABSI and APACHE II were 8.4 ± 3.1(5–16) and 12.4 ± 4.1(6–20), respectively. Mortality rate was 20%. No relation was found between the increase of NT-proBNP and APACHE II, days under MV, ILS or mortality. No significant differences in variation of Troponin I, lactic acid, CRP and NT-proBNP were shown. Two subgroups were done: A(8 patients with ABSI = <7) and B(7 with ABSI > 7). Values of N-proBNP (pg/ml) at 8 h of admission were A: 62 ± 85, B:123 ± 44, at 40 h were A:69 ± 59, B:379 ± 640 and at 72 h were A:319 ± 263, B:554 ± 777. For this, the increase of NTproBNP was higher and earlier in group A with p < 0.1.



CONCLUSION. Serum NT-proBNP values are increased in burned patients. NT-proBNP shows a different elevation curve depending on severity, with earlier and higher values in patients with ABSI > 7. Subsequent determinations and a bigger sample size are necessary to confirm the use of the NT-proBNP as a biochemical surrogate marker in severe burn injury patients.

0066

ASSESSMENT OF SEQUENTIAL ORGAN FAILURE ASSESSMENT (SOFA) SCORE FOR TRIAGING ADMISSIONS TO INTENSIVE CARE DURING INFLUENZA PANDEMIC

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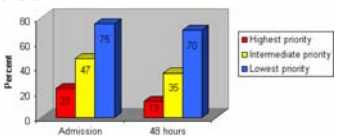
INTRODUCTION. Christian et al have proposed the use of the Sequential Organ Failure Assessment score as a triage tool for use during Avian Flu pandemic, when ICU capacity will be overwhelmed. We assessed the triage system to predict mortality outcome for emergency admissions to a UK ICU network.

METHODS. SOFA scores were collected over a 3-week period in 4 intensive care units. The triage system was applied retrospectively to group each patient as follows:
Critical care offered to those who score < 11.
Highest priority given to those scoring < 7.
Intermediate priority to those scoring 8–11.
48 hour score:
Pts scoring < 11 and improving given highest priority
Pts scoring < 8 and no/little change given intermediate priority
Pts scoring 8–11 with no change or worsening lowest priority
(i.e. withdrawal and palliation).

RESULTS. 121 patients were admitted during the collection period. Four scored > 11, 28 scored 8–11, 89 scored < 7. The mortality for each triage category on admission and at 48 hours is shown in the chart.



CONCLUSION. The triage protocol is succinct, easy to use and apply and allows continued consistent tracking of patient progress after admission to ICU with clear demarcations of priority. In the context of overwhelming demand for critical care services, decisions regarding whether to decline admission or actively withdraw treatment may be greatly assisted by the use of this protocol. However the mortality of 70–75% in the low priority groups highlights the inadequacy of relying purely on the protocol to inform such decisions.

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0067

LABORATORIAL PARAMETERS ANALYSES DURING ICU AND HOSPITAL LENGTH OF STAY ON CRITICAL ILL ONCOLOGIC PATIENTS

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INTRODUCTION. The objective of this study is to evaluate if leucopenia (leukocytes < 4000/mm^3); leucocytoses (leukocytes > 12.000/mm^3), anemia (hemoglobin value < 12,0 g/dl) and coagulopathy are related to ICU and hospital mortality to critical ill oncologic patients.

METHODS. This study is a prospective cohort that was carried out in an Intensive Care Unit of an urban tertiary 300 bed hospital in Brazil. Data were collected prospectively from 200 consecutive patients who were admitted to the combined medical and surgical ICU. The outcomes studied were overall ICU and hospital mortalities. In the initial phase of the statistical analyses, relative risks of death to each independent variable and its respective 95% confidence interval were calculated. In a second phase, the Kaplan- Meier procediment was used. The final phase of the statistical analyses consisted of the Cox multiple regression.

RESULTS. Overall 15, 9% of patiens had leucopenia; 65, 7% had leucocytoses; 85, 1% had anemia and 38, 7% had coagulopathy. There was significant difference between ICU mortality of patients who had leucopenia ($p < 0,037$), leucocytoses ($p < 0,007$) and anemia ($p < 0,035$). The patients who had hemoglobin value < 7,0 g/dl had higher ICU mortality rate than who had hemoglobin value = 7, 1- 10, 0 g/dl ($p < 0,043$) and these population had worst outcome than who had hemoglobin value = 10, 1- 12, 0 g/dl ($p < 0,048$).Leucopenia ($p < 0,024$), leucocytoses ($p < 0,016$) and coagulopathy (RNI > 1, 5: $p < 0,015$; Plaquelet < 50.000/mm3: $p < 0,003$) are related to higher hospital mortality rate.

CONCLUSION. Our study suggests that patients with leukopenia and leucocytoses had higher ICU and hospital mortality. Additionally, anemia only was related to ICU mortality and coagulopathy only was related to hospital mortality.

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0068

FATAL HYPOGLYCAEMIA FROM ARTERIAL BLOOD SAMPLING

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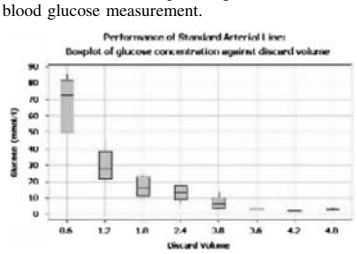
INTRODUCTION. Errors in blood glucose analysis from arterial line blood samples may lead to inappropriate insulin administration and death from hypoglycaemia (1). Measurement errors frequently occur during sampling or handling. The accidental use of 5% glucose as the arterial line flush solution in our unit, proved fatal, through the inappropriate use of insulin to treat elevated arterial blood glucose. The objective of this bench study is to consider the discard volume necessary to prevent sample contamination from the flush solution and to evaluate a robust system to prevent repetition of this iatrogenic fatality.

METHODS. A bench model was developed to measure the performance of the standard Becton Dickinson (BD) compared with the Safedraw (BD) pressure transducer, when 5% glucose is used as the flush solution. Incremental multiples of the dead space of the standard transducer were discarded before a 1 ml sample was taken for glucose analysis. The measured glucose concentration was compared with the novel sampling system of the BD transducer system. The sampling system consists of a distal aspiration port where a 2 ml closed loop syringe aspirates test solution into the transducer system. A resealable proximal port with a septum acts as the sampling port. 1 ml volume was taken from the sampling port for glucose analysis. After sampling the aspirate volume from the closed loop syringe can be returned back to the system and need not be discarded. Radiometer Copenhagen blood gas analyser measured the sample glucose.

RESULTS. The standard BD transducer set produced elevated blood glucose samples with discard volumes up to 8 times the dead space (figure). The Safedraw transducer system produced negligible blood glucose measurement.



CONCLUSION. European guidelines recommend discard volumes of 3 times the dead space when drawing blood samples from arterial lines. This study demonstrated that even with discard volumes of 8 times the dead space, glucose contamination is still present. There was clinically negligible contamination using the safedraw transducer system. This study has determined the mechanism of blood sample contamination and a robust solution to prevent further cases of fatal hypoglycaemia.

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0069

NEAR INFRARED SPECTROSCOPY TO ASSESS SYSTEMIC PERFUSION AND IMPROVE TRIAGE IN THE EMERGENCY DEPARTMENT AND CRITICALLY ILL

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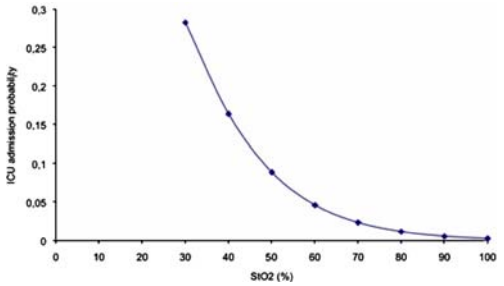
INTRODUCTION. Near-infrared spectroscopy (NIRS) is a non-invasive technique that allows to assess the tissue oxygenation by measuring the tissue HbO2 (%STO2) saturation. Pre-clinical and clinical studies using this technique have shown its usefulness in models of haemorrhagic or septic shocks ressuscitation (1–3). We hypothesize that NIRS can be used as an early, noninvasive indicator of triage in the emergency department (ED).

METHODS. Prospective study in an Emergency Department (45 000 visits per year); inclusion criteria: all patients visiting the ED during the time the study is being carried out. Each patient, after information has been provided and consent given for inclusion in the study during their appointment, is evaluated right from the initial nurse consultation and orientation (within 10 minutes of admission) over and above all other parameters (StO2, blood pressure (BP), HR, SpO2, Temp). The NIRS probe was applied to the right thenar eminence for 1 minute and data was collected and stored for analysis.

RESULTS. 856 patients have had their STO2 measured. Out of these patients, 72 and 12 were admitted to hospital and ICU respectively, and 772 were not. STO2 was found independently associated with admission to ICU (OR = 3.15 per 10 points decrease, 95% confidence interval: 1.28–7.74, OR adjusted for age, SpO2, temperature and BP using polytomous logistic regression). However, the association was curvilinear rather than linear (Fig. 1).



CONCLUSION. StO2 can be easily achieved in ED by the initial nurse as soon as the patient is admitted. In multivariate analysis, the most serious patients who will eventually be admitted in ICU or in ressuscitation unit have shown lower STO2 values than out-going patients. This new parameter could then allow an improved sorting of the patients and so at a very early stage (Golden hours of the sepsis for example), of all types of patients in ED.

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0070

THE PROGNOSTIC VALUE OF EXTRAVASCULAR LUNG WATER INDEX IN CRITICALLY ILL SEPTIC SHOCK PATIENTS

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INTRODUCTION. To investigate the prognostic value of extravascular lung water index (EVLWI) determined by the single transpulmonary thermodilution tecnnique and its relationship with physiologic indexes of lung injury in critically ill patients with septic shock in intensive care unit.

METHODS. EVLWI was determined by using a PiCCO Monitor, and the daily fluid balance, oxygenation ratio (PaO2/FiO2), pulmonary vascular index (PVI), lung compliance and lung injury score (LIS) were recorded. The final outcome was assessed at day 28. Data (mean ± sd) were compared using Student's t-test for continuous variables and by the Chi^2 test for discrete variables. The correlations were estimated using Pearson's coefficient. A $p < 0.05$ was regarded as statistically significant.

RESULTS. thirty patients with septic shock were admitted prospectively. At day 1 and 3 the EVLWI was correlated to PaO2/FiO2 ($r = -0.4$ and $r = -0.47$, respectively; $p < 0.05$) and to LIS ($r = 0.47$ and $r = 0.43$, respectively; $p < 0.05$). In opposite, no correlation was found between EVLWI and lung compliance and fluid balance. At inclusion EVLWI was increased (> 10 ml/kg) in 63% of all patients and the average EVLWI at baseline was 12 ± 5 ml/kg. At day 1 EVLWI and PVI displayed no significant differences between the two groups, $p = 0.14$. The EVLWI and PVI of day 3 in non survivors was significantly higher than the survivors (13.7 ± 4.5 vs. 8.6 ± 2.6 ml/kg; $p = 0.001$) and (2.69 ± 0.98 vs. 1.93 ± 0.65; $p = 0.01$) respectively. ROC statistics using the highest EVLWI value at day 3 in each individual revealed an area under the curve of 0.868 ± 0.128; $p = 0.001$ with a cutoff point of 11.5 ml/kg. If the patients were divided into two groups by the EVLWI of day 3, group one < 11.5 ml/kg and group two > 11.5 ml/kg, the hospital mortality of the second group was significantly higher than the first group (77% vs. 19%; $p = 0.02$) with sensitivity of 77% and specificity of 80%. During the course of illness, EWLI, PVI and fluid balance decreased from day 1 to 3 only in the survivors group ($p < 0.05$). Fourteen (47%) patients died before day 28.

CONCLUSION. In human septic shock, EVLWI demonstrated moderate correlation with markers of the severity of pulmonary injury. Dynamic observation of EVLWI can be one of the factors for predicting the prognosis of patients with septic shock. Early reduction of EVLWI after treatment was associated with a better prognosis.

0071

ASSESSMENT OF QUALITY OF POSTOPERATIVE NEURO-INTENSIVE CARE INSTRUCTIONS RELYING ON CLINICAL DECISION SUPPORT

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INTRODUCTION. Introduction of clinical decision support in electronic medical records (EMRs) could prevent diagnostic and medication errors resulting in a better quality of patient care. Therefore, we wanted to assess the quality of ICU instructions for elective postoperative neurosurgical patients relying on clinical decision support.

METHODS. Since jan 2006, we implemented a clinical decision support system in our EMR for all elective postoperative neurosurgical pts. Referring to the specific type of neurosurgical intervention (OR code) and to the patient's history (medical history, medication…), all postoperative instructions were prefetched and made electronically available for the physician. At end of surgery, both anesthesiologist and neurosurgeon confirmed and/or (if necessary) adapted the postoperative instructions, concerning all aspects of ICU management: technical investigations, monitoring, medication etc…. The ICU instructions were assessed by different categories (essential, possibly essential, non essential) of missing or incorrect instructions. For this paper, an ICU physician, blinded to the origin of the instructions, compared all postoperative instructions for 50 at random pts (after the introduction of the clinical decision support system) with 50 at random control pts. For these control pts, all postoperative instructions were handwritten by the physician without any ICT decision support.

RESULTS. In 43 of 50 handwritten instructions, at least one essential medical information and/or instruction was considered as missing, while in only 7 of 50 instructions (build on decision support) one element of essential information was missing (4 concerning specific instructions for intracranial pressure monitoring, 3 concerning the unusual prescription of anti-epileptic drugs). Missing handwritten information concerned in 29 cases the prescription of medication (antibiotics, anti-epileptic drugs, corticosteroids…or missing dosages of medication), while in 14 cases specific instructions concerning management of blood pressure and intracranial pressure were missing. In 7 of 50 handwritten instructions, errors were observed in dosages of medication.

CONCLUSION. The introduction of clinical decision support for the postoperative IC instructions for neurosurgical patients resulted in a significant decrease of missing essential instructions.

0072

CENTRAL VENOUS CATHETERIZATION IN INTENSIVE CARE MECHANICALLY VENTILATED PATIENTS: ARE ROUTINE CHEST RADIOGRAPHS STILL NECESSARY AFTER B-MODE AND REAL TIME CONTRAST ENHANCED ULTRASONOGRAPHY (CEUS) CHECK?

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INTRODUCTION. After the insertion of a central venous catheter, chest radiograph is usually obtained to ensure correct positioning of the catheter tip.

We wanted to determine the usefulness of conventional B-mode (US) plus real-time contrast-enhanced (CEUS) ultrasonography to evaluate central catheter misplacements and tip positioning (i.e., right atrium, superior vena cava-atrium junction, or superior vena cava) in mechanically ventilated adults, thus obviating the need for a post-procedural radiograph.

METHODS. A prospective study of 38 consecutive central venous access procedures using landmark technique was conducted in an adult intensive care unit. The preferred catheterization site was the right subclavian one. At the end of the procedure a B-mode US was first performed to assess catheter position and then CEUS was used to to exactly detect the catheter tip position, avoiding unknown RA placing. CEUS studies were performed using a commercially available US system and 3.5 MHz transducers on epigastric window. The contrast agent was prepared by mixing 10 times 1 mL of air and 9 mL of saline into two syringes connected by a three-way stopcock to an indwelling catheter placed in the central line. The bubble containing saline was then injected as bolus. A post-procedural chest radiograph was obtained in all patients and was considered as reference technique.

RESULTS. In 27/38 patients post-procedural US and CEUS showed catheter and tip position inside in the vena cava. Among 9 patients expected to have a complication, US detected 1 catheter malpositioning and CEUS 8 tip misplacements into the right atrium. US plus CEUS showed a 90% sensitivity and 93% specificity, with a 90% positive predictive value and 96% negative predictive value in the detection of catheter malpositioning and right atrium tip misplacement. In 35/38 cases there was concordance between US plus CEUS and chest radiography.

CONCLUSION. The close concordance between US plus CEUS and chest radiography in detection of tip malpositioning and catheter misplacement justifies the use of sonography as a reference technique to ensure the correct positioning of catheter tip after central venous cannulation in order to optimize hospital resources utilization and minimize time-consumption and radiation. Chest radiography may be still necessary when sonographic examination is limited by metheorism, deep traumatic or surgical wound, low echogenicity transmission or technical limitations at insertion site, such as presence of neck sterile drainage in oral or maxillar surgery.

0073

COMPUTERIZED LUNG SOUND ANALYSIS IN THE DIAGNOSIS OF OBSTRUCTIVE AIRWAY DISEASE AS THE ETIOLOGY OF DYSPNEA

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INTRODUCTION. Dyspnea is a leading cause visits to the emergency department (ED). The aim of this pilot study was to determine whether patients with acute dyspnea due to obstructive airway disease (OAD) had distinguishing features when studied with a computerized lung sound imaging technique.

METHODS. Respiratory sounds were recorded and displayed using an acoustic-based imaging technique. Patients with OAD ($n = 32$) were studied and contrasted with other patients presenting with dyspnea ($n = 39$) and also with healthy controls ($n = 16$). The data were subjected to visual and mathematical analysis.

RESULTS. In the patients without OAD and the controls, the ratios of peak inspiratory to peak expiratory vibration energy values (peak I/E vibration ratio) were remarkably similar, 6.3 ± 5.1 and 5.6 ± 4 respectively. For the OAD patients, the peak I/E vibration ratio was significantly lower at 1.3 ± 0.04 ($p < 0.01$). In the patients without OAD and the controls, the ratios of inspiratory time to expiratory time (I/E time ratio) were again similar, 1.0 ± 0.1 and 0.99 ± 0.11 respectively. For the OAD patients, the I/E time ratio was significantly lower at 0.72 ± 0.19 ($p < 0.01$).

CONCLUSION. This modality was useful in identifying patients whose SOB was due to OAD and separating those patients from other symptomatic patients and from controls. Although these results are not surprising from the knowledge of the pathphysiology of OAD, the ability to have recorded objective and non-invasive measurements of these differences may prove to be clinically useful in distinguishing the operant physiology in a patient presenting with acute dyspnea.

0074

DEPENDENCE OF VOLUMETRIC INDICES OF PRELOAD ON ARTERIAL THERMISTOR SITE

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INTRODUCTION. Volumetric indices are superior to pressure derived variables as an indicator of end-diastolic left ventricular fibre length and thus preload. (1) The PiCCO system (Pulse Contour Cardiac Output system, Pulsion Medical Systems, Munich, Germany) calculates intrathoracic blood volume index (ITBVI) as an indicator of volumetric preload. The normal ranges for its measured variables, were originally validated using a femoral arterial thermistor and central venous catheter inserted in the SVC for cold saline bolus injections. The axillary artery can be used as an alternative detection site. The ideal site of central venous bolus injection is also not specified. Given that ITBVI is calculated using the mean transit time (MTt) (time until half of an injected saline bolus has passed the thermistor) of the indicator we postulated that a clinically important difference in values would be observed depending on the site of arterial cannulation.

METHODS. Observational study of variation in ITBVI in patients who had different combinations of femoral and axillary arterial PiCCO thermistor placement and SVC cold indicator injection. Several other variables, including cardiac index (CI), extravascular lung water index (EVLWI) and intra abdominal pressure (IAP) were also measured and compared between different thermistor sites. The mean values of axillary and femoral artery ITBVI, CI, EVLWI and IAP were compared with a paired T test.

RESULTS. Overall 118 axillary and femoral ITBVI measurements were analyzed with a mean value of 706 (SD 147) and 959 (146) respectively ($p < 0.0001$). In 4 patients axillary and femoral artery measurements were performed sequentially following a line change. ITBVI was significantly lower with axillary indicator detection 644 versus 917 ($p = 0.002$). CI, EVLWI and IAP did not differ between groups.

CONCLUSION. Our results indicate that measured values for ITBVI using the PiCCO system are influenced by the site of arterial cannulation. This has clinically relevant implications as algorithm based ITBVI values are frequently used to guide fluid resuscitation. Values obtained using axillary arterial thermistors consistently underestimate ITBVI when compared with femoral thermistors. This poses the risk of inappropriate volume loading. We postulate that a detection site closer to the aortic valve (axillary artery) reduces the MTt of the indicator as CI was not different between groups.

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0075

EFFECT OF INTRAVENOUS PARACETAMOL ADMINISTRATION ON THE ACCURACY OF POINT-OF-CARE GLUCOMETERS

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INTRODUCTION. Paracetamol overdose is reported to be associated with overestimation of glycemic measurement by point-of-care (POC) glucometers. We wanted to evaluate in an adult intensive care unit the influence of a first dose of intravenous paracetamol on the accuracy of six POC glucometers.

METHODS. In this prospective study, arterial blood glucose was measured simultaneously on the Accu-chek Inform Roche, the Accu-chek Aviva Roche, the Hemocue, the Statstrip NovaBiomedical, the Precision PCx Abbott and on the RapidLab1265 Siemens. Each value was compared with the reference laboratory value using the hexokinase. The timing of measurements was: before administration, 3 minutes after the end of the paracetamol infusion (1000 mg with a pump in 30 minutes), and then after each hour for 5 hours. Biases are expressed as the POC minus the laboratory result.

RESULTS. The evolution of the mean biases observed for each glucometer is shown in Table 1. These biases are not statistically modified by the administration of paracetamol.

TABLE 1 BIASES FOR EACH GLUCOMETER (MG/DL) AT EACH TIME REFERED TO THE PARACETAMOL INFUSION

	Before	+ 3 min	+1H	+2H	+3H	+4H	+5H
Aviva-Lab	1.6	1.5	0.9	.4	.9	0	.8
Inform-Lab	9.5	10.9	13.5	8.8	9.2	9.1	10.1
Hemocue-Lab	4.1	5.2	6.4	3.2	4.6	2.7	5.5
Nova-Lab	−2.2	−2.2	−3.1	−3.7	−2.5	−4.4	−3.2
Pcx - Lab	1.6	−0.7	−1.3	−0.9	0.8	−0.3	−1.5
RapidLab-Lab	−1.4	−2.3	−2.1	−2.3	−1.1	−2.4	−1.7

CONCLUSION. Therapeutic paracetamol infusion do not modify systematic bias of the studied glucometers.

0076

EVALUATION OF ACTIGRAPHY AS A NEUROLOGICAL STATUS ASSESSMENT FOR THE "OBSERVATION-GUIDED SEDATION" IN ICU

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INTRODUCTION. Deep sedation and agitated behavior are common in ICU. The causes of brain disfunction are often multifactorial and the search for the most appropriate method to measure sedation and agitation is recently gaining attention because it is surely relevant for the clinical outcome. The aim of this study is then the evaluation of continuous wrist actigraphy (measurement of limb movements) feasibility in critically ill patients, and its accuracy in describing the actual neurological status compared with observation operated by nurses.

METHODS. In this prospective, observational study all motor activity of adult, high-risk critically ill patients was collected all along their ICU stay by an actigraph (Bio-trainer Pro, IM Systems, Baltimore, CA) continuously placed at the dominant wrist. Each nurse, once for shift, estimated the number of sleeping hours and the agitated ones; three times a day pain and anxiety level (Verbal Numeric Rating score, VNR), and the agitation/sedation level (Richmond Agitation-Sedation Scale, RASS) were also collected.

RESULTS. Thirteen patients, with a total of 157 days of observation collected were studied. Patients had mean age 63.23 ± 18.83 years, mean SAPSIII 67.58 ± 16.70 and mean ICU lenght of stay 15.84 ± 26.06 days. The number of surveied movements was gathered for each hour, obtaining a gross estimation of patient motor status. This actigraphy-guided measure was found to be significantly different between days and nights (42.39 ± 37.17 vs 17.42 ± 34.11, $p < 0.001$), and it shows a weak but significant correlation with sleeping hours estimated by nurses ($p < 0.001$, $r^2 = 0.17$), with RASS value ($p < 0.001$, $r^2 = 0.07$), with pain ($p < 0.001$, $r^2 = 0.06$) and anxiety ($p < 0.001$, $r^2 = 0.29$) VNR. No differences were found while collecting movements each 15 or 120 seconds. No difficulties were revealed in the use of the actigraph. Compliance with patient and nurses was acceptable.

CONCLUSION. Actigraphy provides a continuous measurement of patients' limb movement that is correlated with patients' observed activity and sleep, and with subjective scores on agitation and sedation scales. In this relatively small sample of patient/days observed, the measurement of actigraphically-guided movements was shown to be adequate to identifying the neurological status. The numeric determinations of body movements were found to be related to actual status of conscience, and these data were found easy to record and accurate in evaluating the need of changes in sedative therapy. Continuous actigraphy measurement may become particularly important as a clinical tool both to guide utilization of sedative drugs, and to enhance early recognition and management of the excessive activity that characterizes agitation and hyperactive delirium.

0077

RELIABLE DETECTION OF PERIPHERAL DECOUPLING LEADS TO IMPROVED CARDIAC OUTPUT ACCURACY IN UNSTABLE PATIENTS

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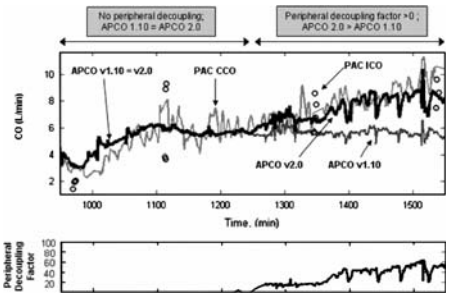
INTRODUCTION. In some patients with severe sepsis, FloTrac™ has underestimated cardiac output, a problem attributed to a decoupling between peripheral and aortic tone. We tested a new FloTrac™ algorithm (Edwards Lifesciences, CA, USA) to detect these conditions and whether the use of a peripheral decoupling factor (PDF), derived from hyperdynamic states, leads to improved accuracy.

METHODS. Ten patients with severe sepsis were monitored using ICO and CCO (intermittent and continuous cardiac output) data from the pulmonary artery catheter (PAC) and the arterial pressure cardiac output (APCO) from the FloTrac system. Data from the PDF was recorded after bolus collection, with a value of > 0 representing the threshold for peripheral decoupling identification.

RESULTS. Four patients displayed peripheral decoupling. The PDF showed sensitivity of 0.85 and specificity of 0.90. When the PDF was incorporated into the new APCO algorithm (v.2.0), the FloTrac algorithm showed a bias of 0.13 L/min with precision of 1.22 L/min (1SD of bias) compared to ICO, and bias of −0.19 L/min and precision of 1.20 L/min compared to the CCO PAC measurements for a 57% improvement in accuracy for the 4 peripherally decoupled patients.



CONCLUSION. The new FloTrac System identified time periods during which conditions caused an underestimation of previous APCO software. The new algorithm showed clinically acceptable accuracy in this group of unstable patients when compared to the PAC. Further studies will be needed to evaluate the clinical significance of the PDF, validate the improved software in wider populations, and evaluate accuracy of other minimally invasive cardiac devices during these hemodynamic conditions.

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0078

EVALUATION OF MICRODIALYSIS-BASED GLUCOSE MONITORING IN BLOOD AND SUBCUTANEOUS ADIPOSE TISSUE FOR ICU APPLICATION

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INTRODUCTION. Tight glycaemic control (TGC) is beneficial for critically ill patients at a cardiac and medical ICU. In order to achieve TGC a continuous glucose signal could be helpful to decrease workload. Subcutaneous adipose tissue (SAT) has been suggested as an alternative site for continuous glucose monitoring and has extensively been tested in type–1-diabetic patients. In the critically ill patient, vascular access is granted, and thus, continuous blood glucose monitoring is feasible. The aim of the present study was to test a microdialysis-based technique for peripheral venous glucose monitoring and compare the technique with SAT glucose monitoring in type-1-diabetic patients.

METHODS. 21 type-1-diabetic patients (age: 31.9 ± 3.1 years; BMI: 25.1 ± 8.1 kg/m^2) were investigated over a period of 26 hours. SAT microdialysis (MDs) was performed using a standard CMA60 catheter (CMA microdialysis, Sweden), for vascular microdialysis (MDv), a conventional double lumen catheter (mtb Zier, Germany) with a planar flow-through microdialysis unit was used. Microdialysis samples were collected in 15 to 30 minutes intervals and analyzed for glucose with a standard laboratory analyzer. Microdialysis samples were prospectively calibrated to reference glucose by applying a one-point calibration. MDs and MDv glucose levels were compared against arterialized-venous reference blood measurements.

RESULTS. Both microdialysis techniques could be applied without restrictions and all 21 patients completed the trial period of 26 hours. Mean glucose difference [2SD] between reference blood glucose and glucose readings obtained from microdialysis were as follows: MDs 5.0[40.3]%, and MDv 8.9[32.8]%, respectively. Mean absolute relative difference (MARD) [± SD] was 15.7 ± 7.8% (MDs), and 15.9 ± 10.8% (MDv), respectively. Clarke Error Grid analysis indicated 71.5% in A, 25.6% in B, 2.3% in C and 0.6% in D for MDs and 68.1% in A and 31.9% in B for MDv, respectively.

CONCLUSION. Glucose monitoring from SAT and blood using a microdialysis-based approach indicated similar performance when investigated in type-1-diabetic patients for a period of 26 hours. Since tissue perfusion can be altered in the critically ill, a continuous vascular approach might be preferred.

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0079

LASER SPECKLE IMAGING VALIDATED BY QUANTITATIVE COMPARISON TO SIDESTREAM DARK FIELD IMAGING OF THE NAILFOLD MICROCIRCULATION

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INTRODUCTION. Several techniques can be used to assess the microcirculation in clinical scenarios by providing sensitive tissue perfusion parameters (e.g., laser Doppler flowmetry, Orthogonal Polarization Spectral imaging, and Sidestream Dark Field (SDF) imaging). However, these techniques all measure in small areas/volumes, while microcirculatory alterations often occur more globally. Therefore, we propose laser speckle imaging (LSI), a laser-based full-field perfusion monitoring modality, for macroscopic imaging of microcirculatory alterations. LSI is a video imaging modality of laser-illuminated tissue surface in which analysis of perfusion-induced changes in speckle patterns allows imaging of microcirculatory flow patterns [1]. To validate the use of LSI for this purpose, the sensitivity of the technique was investigated by comparison to SDF imaging, a microscopic imaging modality capable of direct video visualization of flowing cells in the microcirculation allowing quantitative measurement of the red blood cell velocities in individual capillaries [2,3].

METHODS. SDF and LSI recordings were made of the nailfold microcirculation of 11 healthy volunteers. Nailfold capillary flow was 'controlled' by a cuff, placed around the subjects arm, which was inflated to 30, 60, 90, 120, 150, and 180 mmHg. SDF and LSI measurements were normalized to baseline (i.e., cuff pressure = 0 mmHg) values and plotted as function of applied pressure.

RESULTS. Red blood cell velocities measured in the nailfold capillaries ($N = 57$) ranged from 0.024 to 0.206 mm/s) at the baseline. Normalized SDF and LSI measurements both showed an exponential decay in capillary perfusion as function of applied cuff pressure, where $R^2 = 0.96$ for SDF and $R^2 = 0.99$ for LSI, respectively. Comparison of the normalized SDF and LSI measurements showed a 1:1 correlation, with $R^2 = 0.98$. Additionally, all LSI baseline measurements revealed a $\sim$ 1 Hz oscillation, probably corresponding to the heart rates of the subjects.

CONCLUSION. LSI is a macroscopic technique, capable of imaging flow alterations at the microscopic level in a relative, but linear, fashion with high temporal resolution (i.e., video frame rate). Studying individual capillary perfusion alterations and small-scale microcirculatory shunting, however, can not be performed using LSI. SDF imaging, on the other hand, was shown to serve as a useful tool to validate the LSI measurements of microcirculatory perfusion.

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0080

MODEL-BASED ASSESSMENT OF RIGHT VENTRICULAR ARTERIAL COUPLING DURING SEPTICK SHOCK – RESULTS WITH A PORCINE MODEL

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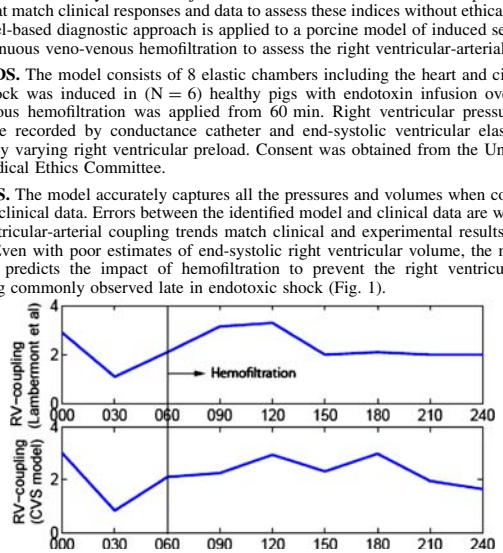
INTRODUCTION. Experimentally, the determination of indexes of ventricular contractility requires the recording of several pressure-volume loops during an induced preload reduction (caval vein occlusion). Due to invasiveness and risk it is rarely done. Computational models of the cardiovascular system in conjunction with clinical data can create patient-specific models that match clinical responses and data to assess these indices without ethical concerns. This model-based diagnostic approach is applied to a porcine model of induced septic shock with continuous veno-venous hemofiltration to assess the right ventricular-arterial coupling.

METHODS. The model consists of 8 elastic chambers including the heart and circulations. Septic shock was induced in ($N = 6$) healthy pigs with endotoxin infusion over 30 min. Veno-venous hemofiltration was applied from 60 min. Right ventricular pressure-volume loops were recorded by conductance catheter and end-systolic ventricular elastance was assessed by varying right ventricular preload. Consent was obtained from the University of Liege Medical Ethics Committee.

RESULTS. The model accurately captures all the pressures and volumes when compared to measured clinical data. Errors between the identified model and clinical data are within 10%. Right ventricular-arterial coupling trends match clinical and experimental results very well (Fig. 1). Even with poor estimates of end-systolic right ventricular volume, the model captures and predicts the impact of hemofiltration to prevent the right ventricular-arterial uncoupling commonly observed late in endotoxic shock (Fig. 1).



CONCLUSION. The model accurately captures the essential cardiovascular dynamics in endotoxic shock and veno-venous hemofiltration over a selection of subjects, matching clinical and experimental expectations. The results obtained are robust and enable patient-specific monitoring of otherwise unmeasurable, but clinically significant, physiological parameters for improving diagnosis and treatment.

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0081

PHARMACODYNAMIC MARKERS FOR DROTRECOGIN ALFA (ACTIVATED) FROM PROTEOMIC ANALYSIS

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INTRODUCTION. Drotrecogin alfa (activated) (DrotAA) has been shown to improve survival in patients with severe sepsis by a reduction in relative risk of 19.4%. The greatest reduction in mortality and cost effectiveness was observed in patients with APACHE II scores of ≥ 25. There exists a significant need for biomarkers to assist in assessing individual patient response to DrotAA, and to further the knowledge of the mechanism of action.

METHODS. Protein array analysis was performed on a group of 243 PROWESS patients (116 DrotAA- and 127 placebo-treated) that had baseline APACHE II scores > 25 and serum samples obtained at baseline and 24 hrs from start of study drug. The 143 proteins analyzed included cytokines, chemokines, soluble cytokine receptors, receptor antagonists, adhesion molecules, and hormones. Samples were analyzed 3 times on 5 protein arrays, each containing 25 to 30 fluorescent, sandwich immunoassays. Statistically significant differences between DrotAA- and placebo-treated groups were determined using plots of significance analysis of microarrays (SAM) and by analysis of variance (ANOVA).

RESULTS. Of the 243 patients, 130 were survivors (58 placebo- and 72 DrotAA-treated) and 113 non-survivors (69 placebo- and 44 DrotAA-treated). Demographic and clinical parameters were well balanced in the two treatment groups. Pharmacodynamic biomarkers (markers of DrotAA effect) were identified by comparison of the 143 proteins in DrotAA- and placebo-treated groups at the 24 hr time point. A SAM plot revealed that RANTES, P-selectin, platelet factor 4 (PF-4) and hemofiltrate CC chemokine 4 levels were significantly lower in the DrotAA group following infusion. With regard to changes from baseline, the chemokines TARC, GRO-beta and GRO-gamma also exhibited a significant decrease with DrotAA treatment. Analyses of variance of each of 3 replicate runs demonstrated similar findings: levels of RANTES, P-selectin, PF-4 and E-selectin (endothelial leukocyte adhesion molecule 1) were significantly lower ($p < 0.05$) in DrotAA- than placebo-treated patients.

CONCLUSION. Microarray proteomics can provide insight into potential mechanisms of action for sepsis therapies such as DrotAA. In this analysis of patients with high disease severity, after 24 hrs of infusion, DrotAA was associated with a significant down regulation of factors associated with leukocyte chemotaxis and adhesion.

GRANT ACKNOWLEDGEMENT. Studed funded by Eli Lilly and Company.

0082

IMBALANCE BETWEEN MACROPHAGE MIGRATION INHIBITORY FACTOR AND CORTISOL LEVELS INDUCES MULTIPLE ORGAN DYSFUNCTION SYNDROME IN PATIENTS WITH SEVERE BLUNT TRAUMA

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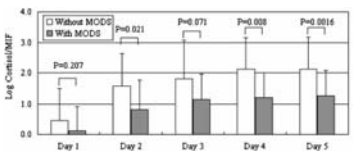
INTRODUCTION. Macrophage migration inhibitory factor (MIF) acts as a counter regulator of the immunosuppressive effects of glucocorticoids and plays a pivotal role during severe stress condition. However, the role of MIF in trauma has not been clear. To investigate the influences of the balance MIF and cortisol in patients with severe blunt trauma, we prospectively examined the serial changes of MIF and cortisol.

METHODS. This study included 45 patients with severe blunt trauma who were admitted to our intensive care unit. Twenty-four patients complicated with multiple organ dysfunction syndrome (MODS) in the first 5 days. Twenty-one patients complicated without MODS in the first 5 days. Daily plasma levels of MIF and cortisol were measured from days 1 to 5 after the injury.

RESULTS. The serum levels of cortisol were identical between the patients with and without MODS. However, the MIF levels in the patients with MODS were statistically higher than those of the patients without MODS, and the high levels of MIF in the patients with MODS were persistent during the observation. The cortisol/MIF ratios in the patients with MODS were statistically higher than those of the patients without MODS. The duration of systemic inflammatory response syndrome in the patients with MODS was statistically longer than those of the patients without MODS.



CONCLUSION. The excessive and persistent release of MIF overrides the immunosuppressive effects of cortisol and may induce systemic inflammation and MODS in the patients with severe trauma.

0083

METABONOMIC PROFILING FOR DETECTION OF PERITONITIS AND SEPSIS

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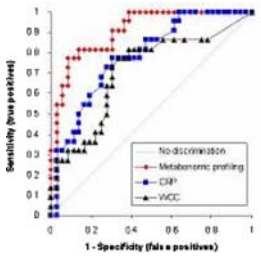
INTRODUCTION. Novel biomarkers with improved sensitivity and specificity for detecting peritonitis and sepsis would enable earlier diagnosis and treatment. In this pilot study, the potential application of metabonomics to peritonitis and sepsis is investigated in order to determine if patient groups can be distinguished on the basis of pathological variation in their metabolic profiles.

METHODS. Patients presenting with acute abdominal pain were divided into a control patient group ($n = 18$) and patient groups with peritonitis ($n = 11$) and severe peritonitis with sepsis ($n = 5$). 1H NMR spectroscopy of plasma and urine samples was used to generate metabonomic spectra for each group, and these were analysed using multivariate pattern recognition techniques.

RESULTS. No models could be generated that were able to differentiate septic from non-septic patients, however a distinction could be made between peritonitic and non-peritonitic patients. Models based on metabolic variation in plasma samples were able to distinguish peritonitic from non-peritonitic patients with a high specificity and sensitivity. The area under the ROC curve for the white blood cell count, C-reactive protein and metabonomic profiling was 0.708, 0.783 and 0.909 respectively. This method correlated significantly with the APACHE II score ($p < 0.05$) and was a better predictor of length of hospital stay ($p < 0.05$).



CONCLUSION. Metabonomic profiling compared favourably to current inflammatory markers for the detection of peritonitis, and was a better predictor of length of stay than the APACHE II score. Metabonomic profiling may therefore enable early diagnosis and provision of treatment, and may be useful in avoiding unnecessary invasive procedures. In this pilot study, metabonomic profiling was not well suited to the detection of sepsis, but the number of septic patients in the study group was small ($n = 5$) so further investigation may be warranted in a larger group.

GRANT ACKNOWLEDGEMENT. NHS London.

0084

NON HYPOTENSIVE ENDOTOXEMIA INHIBITS DERMAL NITRIC-OXIDE-DEPENDENT VASODILATION IN OBESE SUBJECTS

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INTRODUCTION. Intensive care units (ICU) have to treat an ever increasing number of obese patients. Sepsis is a leading cause of ICU death. Accompanied by low-grade inflammation, obesity may exacerbate the systemic inflammatory response syndrome (SIRS). In animals, a component of SIRS is endothelial dysfunction, i.e a reduced ability of the vascular endothelium to mediate vasodilation via the nitric oxide (NO) pathway. In humans, SIRS can be induced experimentally by the i.v. infusion of endotoxin (LPS) at very low dose. Our purpose was to test whether low dose LPS infusion attenuates an NO-dependent vasodilatory response in the skin of obese subjects.

METHODS. 8 obese (body mass index > 30 kg/m2) normotensive, nondiabetic volunteers, none of whom took any vasoactive or anti-inflammatory medication, were studied on two different visits 7- 10 days apart. In randomized order, they received a bolus i.v. injection of either E.Coli LPS (2 ng/kg) dissolved in saline on one visit, or saline alone on the other (Control). Because local heating is known to cause a NO-dependent vasodilation in the dermal microcirculation, the response of skin blood flow (SkBF, laser Doppler flowmetry) to an increase in local temperature from 34°C to either 39°C or 41°C, was recorded immediately before (T0) and 4 hours after (T4) LPS or saline administration.

RESULTS. Data are presented in Table 1, where SkBF, expressed in perfusion units, is reported immediately before (baseline) and after 30 minutes of heating to the indicated temperature (plateau) (mean ± sd, * $p < 0.05$, ** $p < 0.01$ vs Baseline § $p < 0.05$, §§$p < 0.01$ LPS vs Control at T4). At T4, LPS caused tachycardia, light fever, but no arterial hypotension (Table 1). Skin temperature increased slightly from T0 to T4, to the same extent on both visits. LPS significantly blunted the response of SkBF to local heating.

TABLE 1

	Control		LPS	
	T0	T4	T0	T4
Mean BP (mm Hg)	84 ± 8	86 ± 5	84 ± 5	84 ± 12
Heart rate (bpm)	65 ± 7	69 ± 8	65 ± 8	93 ± 8**§§
Rectal temperature (°C)	36.7 ± 0.3	37.1 ± 0.3	36.8 ± 0.3	38.2 ± 0.68**§§
Skin temperature (°C)	31.4 ± 1.3	33.1 ± 0.9**	31.8 ± 0.9	33.4 ± 1.28**
SkBF, 34 to 39°C				
baseline	58 ± 16	59 ± 12	55 ± 16	63 ± 25
plateau	366 ± 141	397 ± 171	392 ± 91	250 ± 568**§§
SkBF, 34 to 41°C				
baseline	55 ± 15	57 ± 21	53 ± 13	54 ± 10
plateau	639 ± 164	634 ± 146	675 ± 124	600 ± 106*

CONCLUSION. In obese volunteers, nonhypotensive endotoxemia inhibits NO-dependent vasodilation in the skin.

0085

THE EFFECT OF SEPSIS ON ERYTHROCYTE AND PLASMA LIPID COMPOSITION IN CRITICALLY ILL PATIENTS

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INTRODUCTION. The lipids are important energetic substrates, basic structural components of biological membranes and also important signaling molecules. The changes in lipid composition and metabolism probably affect reactivity of organism to diverse stimuli. Sepsis is the significant cause of morbidity and mortality in critically ill patiens. The important factor which plays a key role in pathogenesis of sepsis is oxidative stress. This process causes a cellular injury by oxidation of proteins, nucleic acids and lipids. Lipoperoxidation most likely affects polyunsaturated fatty acids (PUFAs). The aim of our study was to analyze the fatty acid composition in main lipid classes of plasma and erythrocytes during sepsis in comparisons with non-septic critically ill patients as well as with healthy controls.

METHODS. The prospective case-control study in adult intensive care unit. Routine venous blood samples were obtained from septic patients ($n = 17$) with APACHE II score > 10, from non-septic APACHE II score matched critically ill patients ($n = 11$) and healthy controls ($n = 17$). All three groups were sex and age matched. Plasma and erythrocyte lipids were extracted. Individual lipid classes were separated by one-dimensional thin layer chromatography. The fatty acids were analysed as methylesters by gas chromatography. $P < 0.05$ was considered statistically significant.

RESULTS. The monounsaturated fatty acids (MUFA) were increased in septic patients as compared with non-septic critically ill or healthy controls. On the other hand the n-6 PUFA were significantly lowered in septic patients in comparison with both control groups. The most pronounced changes in fatty acid composition among lipids were observed in cholesterolesters, where the increase in MUFA was due to the accretion of palmitic, oleic (OA) and palmitoleic acids. The decrease in n-6 PUFA was caused by the fall in linoleic acid. The increase in OA was observed in all septic patients and it was even higher in non-survivors as compared with survivors. Moreover the proportion of arachidonic acid and docosahexaenoic acid was significantly lower in subgroup of non-survivors. On the other hand, the n-3 PUFA proportion was higher in non-survivors. The n-6 to n-3 PUFA ratio was decreased in sepsis survivors compared with healthy controls.

CONCLUSION. Our study demonstrates that in sepsis the proportion of PUFA in plasma and erythrocyte lipids is decreased in correlation with the severity of the septic state.

GRANT ACKNOWLEDGEMENT. The study was supported by the research grants: IGANR/8943-4 and MSM0021620858.

0086

TRANSIENT INTESTINAL BARRIER DYSFUNCTION AND FLUID REDISTRIBUTION IN THE ISOLATED PERFUSED RAT SMALL BOWEL INDUCED BY PLATELET ACTIVATING FACTOR PAF

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INTRODUCTION. Intestinal epithelial barrier dysfunction with subsequent oedema formation is a common clinical problem in critically ill patients contributing to the development of sepsis and multiorgan failure. Its pathogenesis is still not known in detail as appropriate models for studying the underlying mechanisms are rare. We have recently developed a new isolated perfused rat small bowel model with access to the vascular, luminal, interstitial and lymphatic compartments (1) which we have used in the present study to analyse the effects of the proinflammatory mediator PAF on the intestinal barrier function.

METHODS. Isolated intestines were randomly assigned to the vehicle or PAF groups ($n = 6$, each). Vascular and luminal perfusion was performed with a modified oxygenated Krebs-Henseleit and an ileum-compatible buffer respectively. After equilibration a bolus of 0.5 nmol PAF or vehicle was applied via the mesenteric artery and the changes in fluid homeostasis and compartment pressures were analysed.

RESULTS. PAF caused a transient vasoconstriction and a remarkable fluid shift. Within 10 min 19.1 ± 2.6% of the capillary volume flow (mean ± sd) was lost from the vasculature and redistributed to the lumen and lymph (73 ± 0.5% and 27 ± 0.5% respectively). Gut weight rose with a maximum gain of 3.8 ± 0.9 g • min^{-1} achieved at 54 ± 10 s after PAF administration and returned to baseline within 10 min. In parallel with the observed fluid shifts, fluorescein isothiocyanate labelled albumin from the vascular perfusion medium temporarily appeared in the luminal effluent. All these pathophysiological changes were reversible as indicated by the unchanged histological mucosal stability score and lack of oedema formation 80 min after stimulation.

CONCLUSION. PAF administration led to a rapid vasoconstriction accompanied by significant fluid loss from circulation which *in vivo* might result in hypoperfusion and shock. This fluid loss was caused by increased hydrostatic pressure and elevated vascular permeability, as indicated by the albumin transfer. The fluid lost into the interstitial space was effectively removed into the gut lumen and, to a lesser extent, lymphatics. The detected leakiness of the epithelial barrier cannot be explained by mucosal injury because fluid homeostasis and gut morphology completely recovered. Our findings indicate a novel safety mechanism permitting transfer of excess interstitial fluid to the gut lumen.

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GRANT ACKNOWLEDGEMENT. This study was supported by a restricted research grant funded by The Medical Faculty of the Christian Albrechts University in Kiel, Germany.

0087

ENDOTOXIN TOLERANCE DOES NOT LIMIT ISCHEMIA-REPERFUSION INJURY IN HUMANS IN VIVO

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INTRODUCTION. Although endotoxin (lipopolysaccharide, LPS) has been used to induce resistance against a subsequent identical insult, it has also been demonstrated in animal studies and human in vitro experiments that endotoxin tolerance provokes cross-tolerance against other forms of injury, such as ischemia-reperfusion injury. This may represent a clinical application in procedures in which episodes of organ ischemia are likely to occur, for example elective transplantation procedures. The aim of this study was to test whether endotoxin tolerance protects against ischemia-reperfusion injury in humans in vivo.

METHODS. 14 volunteers received intravenous bolus injections of increasing dosage Escherichia coli LPS (0,2-0,5-1,0-2,0-2,0 ng/kg/day) on 5 consecutive days (endotoxin group). Before and after 5 days of LPS administrations, all subjects in the endotoxin group performed ischemic exercise followed by Annexin A5 scintigraphy. The forearm was occluded for 10 minutes in order to induce ischemia, whilst after intermittent hand gripping (performed at 50% of maximal force) reperfusion was initiated. 10 volunteers also performed ischemic hand gripping twice with an interval of 5 days (control group). After reperfusion, 0.1 mg of 99 m TC Annexin A5 (400 MBq) was intravenously injected. Both hands were imaged with a gamma camera 4 hours after reperfusion. Radioactivity was measured in the thenar muscle of both hands. Annexin A5 targeting was calculated as percentage difference in radioactivity between both hands.

RESULTS. Endotoxin tolerance developed during 5 consecutive days of LPS administrations as demonstrated by the attenuated release of pro-inflammatory cytokines and absence of symptoms on the fifth day. Annexin A5 targeting decreased from 14,5 ± 7,5% to 10,1 ± 6,2% in the endotoxin group ($p = 0.21$)4 hours after reperfusion. The control group showed no difference 4 hours after reperfusion.

CONCLUSION. First, endotoxin tolerance develops in humans in vivo, mediated by attenuated release of both pro- and anti-inflammatory cytokines. Second, LPS-tolerance does not limit ischemia-reperfusion injury through cross tolerance in thenar muscle in humans in vivo.

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0088

SEPTIC-RELATED HYPOTENSION WITH OR WITHOUT HYPERLACTATEMIA: SEPTIC SHOCK OR PERSISTENT CIRCULATORY DYSFUNCTION?

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INTRODUCTION. Septic-related hypotension refractory to fluid resuscitation and resulting in tissue hypoperfusion (as demonstrated more commonly by lactic acidosis) characterizes septic shock according to consensus definition (1). However, septic shock is operatively defined by hypotension requiring vasopressors to restore MAP, irrespective of lactate levels. Inclusion of heterogeneous populations due to the lack of more precise definitions has been implicated in the failure of several septic shock trials. Although the physiological meaning of hyperlactatemia in shock states has been recently challenged (2), lactate's prognostic value remains undisputed. In this context, the clinical significance of persistent circulatory dysfunction without hyperlactatemia during sepsis is unknown. The aim of this study was to determine differences in demographics, clinical course and outcome between patients diagnosed as septic shock but presenting normal v/s elevated peak lactate levels.

METHODS. Retrospective analysis of a prospective database including 256 septic shock patients treated in our ICU from June 1998 to September 2007 with a norepinephrine (NE) based management algorithm (2,3). Demographics, APACHE and SOFA scores, peak lactate levels, NE requirements, clinical course and outcome were analyzed. Patients were grouped according to peak lactate levels (< 2.5 mmol/l or > 2.5 mmol/l) and compared with the t test or chi square. Data are presented as mean + SD.

RESULTS. Hyperlactatemia was present in only 64% of the patients. Septic shock patients without hyperlactatemia had lower APACHE and SOFA scores and had less mechanical ventilation and lower NE dose requirements. Mortality was 17% in the absence of hyperlactatemia compared to 43% when present ($p < 0.001$). Main findings are presented on Table 1.

TABLE 1 CLINICAL FEATURES ACCORDING TO LACTATE LEVELS

	Total	Lactate < 2.5	Lactate = or > 2.5	p
n	256	94	162	
APACHE II	20 ± 7	18 ± 6	21 ± 7	p < 0.01
SOFA	10 ± 4	8 ± 3	11 ± 4	p < 0.01
Age (years)	61 ± 17	63 ± 17	60 ± 18	NS
ICU stay (days)	10 ± 10	10 ± 9	10 ± 10	NS
Mech ventilation n(%)	194 (75.2)	65 (69)	138 (84.7)	p < 0.01
NE peak (mcg/K/min)	0.5 ± 1.7	0.18 ± 0.14	0.45 ± 0.44	p < 0.01
NE use (Hrs)	72 ± 79	62 ± 12	67 ± 77	NS
Mortality n(%)	20 (27.2)	16 (17)	70 (43.2)	p < 0.01

CONCLUSION. At least one third of hypotensive septic patients unresponsive to fluids and requiring vasopressors, course with sustained normal lactate levels and may represent another pathophysiological variant of septic disease. Septic-related persistent circulatory dysfunction without demonstrable tissue hypoperfusion, confers a much lower risk of progressive organ dysfunctions and mortality than established septic shock with high lactate levels. This finding challenges current septic shock definitions and could have implications for specific management and for patients selection in future clinical trials.

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0089

DIFFERENT INFLAMMATORY RESPONSE AFTER WHOLE BLOOD STIMULATION OF ICU PATIENTS BY CELL WALL COMPONENTS OF GRAM POSITIVE BACTERIA AND FUNGI

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INTRODUCTION. Although, gram positive bacteria and fungi are responsible for a major and ever-increasing percentage of sepsis in critically ill patients, pathophysiology is not completely elucidated.
Purpose: To determine the acute inflammatory response after ex-vivo challenge of whole blood of ICU pts with lipoteichoic acid (LTA) and mannan and to compare the pro-inflammatory profiles caused by those different classes of pathogens.

METHODS. We collected blood from critically patients with various medical causes of admission. After proper procession, blood cultures were stimulated in parallel with 1 μg of LTA and 100 μg of mannan for 6 hours. Aliquots remained at −70°C until tested with ELISAs for TNFa and IL-6 concentration.

RESULTS. We had blood samples from 11 pts (8 males; age 63.83 ± 10.73; APACHE II score 21.12 ± 3.45). Baseline TNFa and IL-6 concentrations' were 85.75 ± 56.05 pg/ml and 363.2 ± 363.1 pg/ml, respectively. There was a significant increase of both cytokines after LTA provocation vs a not significant elevation of TNFa and a modest increase of IL-6 after mannan stimulation (Table 1).

TABLE 1 CYTOKINES CONCENTRATION AFTER STIMULATION WITH LTA AND MANNAN. ★STUDENT'S T-TEST

	LTA	mannan	p★
TNFa dif from baselin	4764 ± 2605 ($p < 0.0001$)	100.3 ± 78.42 ns	<0.0001
IL-6 dif from baselin	1765 ± 404 ($p < 0.0001$)	449.7 ± 521.9 ($p = 0.037$)	<0.0001

CONCLUSION. LTA is a much more potent immunostimulator than mannan in critically ill patients.
The more intense provocation by LTA probably reflects a distinct pathogenetic pathway of gram positive pathogens and the fact that fungi are host inhabitants.

0090

EARLY AND MAJOR DECREASE IN PLASMA SELENIUM CONCENTRATION IN AN OVINE MODEL OF PERITONITIS

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INTRODUCTION. Oxidative stress and endothelium damage are considered as key element in microcirculatory dysfunction in septic shock, leading to multiple organ failure. Selenium is required for key anti-oxidant seleno-enzymes in mammals. On ICU admission, there is a decrease of more than 40% of plasma selenium concentrations, in patients with septic shock. In healthy individuals, 52% of the total plasma selenium is made of selenoprotein P (Sel-P). The plasma Sel-P (4 hours half-life) is released from the liver. Sel-P may bind to the activated endothelium for anti-oxidant purposes, in cases of septic shock. Decrease availability in Sel-P may lead to endothelium damage and organ dysfunction.

We hypothesized that, in septic shock, binding of Sel-P to the activated endothelium may leads to a decrease in plasma Se concentration.

METHODS. Total plasma Se concentrations were measured by GF-AA spectrometry with Zeeman (BC) correction in an anesthetized, mechanical ventilated and fluid resuscitated ovine model of peritonitis, induced at H0, by injecting autologous feces into the abdomen.

RESULTS. Results are shown in Table 1 and 2.

TABLE 1 PLASMA SELENIUM CONCENTRATION

	H0	H4	H9	H10*	H14*
\mu mol/l	0.6 ± 0,3	0.4 ± 0.3£	0.2 ± 0.2£	0.2 ± 0.1£**	0.2 ± 0.1£
% dim		- 46% ± 15%	- 50% ± 30%	-	-

*(Mean ± sd) (n = 20, *n = 6, **H12) H: Hour*

TABLE 2 HEMODYNAMICS (HR HEART RATE, MAP MEAN ARTERIAL PRESSURE)

	H0	H4	H9	H10*	H14*
HR (b/min)	103 ± 21	144 ± 27£	148 ± 22£	158 ± 23£	151 ± 25£
MAP(mmHg)	94 ± 7	94 ± 10	84 ± 8£	79 ± 8£	57 ± 18£

£ $P < 0.001$ vs H0, Friedmann repeated measurement ANOVA.

CONCLUSION. A major decrease in plasma selenium concentration appeared early in peritonitis, before the development of signs of septic shock and organ dysfunction.

GRANT ACKNOWLEDGEMENT. French research ministry.

0091

EVALUATION OF THE DIAGNOSTIC AND PROGNOSTIC VALUE OF SERUM PROCALCITONIN, C-REACTIVE PROTEIN, INTERLEUKIN-6, AND LIPOPOLYSACCHARIDE-BINDING PROTEIN LEVELS IN PATIENTS WITH SIRS AND SUSPECTED INFECTION

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INTRODUCTION. The objetive of this study is to evaluate whether the measurement of the plasma concentrations of procalcitonin (PCT), C-reactive protein (CRP), interleukin-6 (IL-6), and lipopolysaccharide binding protein (LBP) in patients with clinical suspicion of sepsis or systemic inflammatory response syndrome (SIRS) discriminate between patients suffering from sepsis or SIRS, and to evaluate whether a strategy based on combining the results of several markers improves the diagnostic accuracy for sepsis and septic shock and has prognostic value.

METHODS. Single-centre prospective observational study of all consecutive medical and surgical adult patients (≥ 14 years), admitted to the hospital with clinically suspected infection and a blood sample drawn for a "sepsis profile" analysis. "Sepsis profile" is an optional tool to screen patients for severe sepsis in the emergency department, on the wards, or in the ICU. It is obtained in patients with clinically suspected infection who fulfill at least two SIRS criteria. At our institution the profile includes: blood cultures, lactic acid, cell blood count with differential, urea, sodium, potassium, creatinine, bilirubin, CRP, PCT semiquantitative test (PCT-Q) and blood gases.

RESULTS. We analyzed 212 consecutive patients with SIRS and presumed diagnosis of sepsis (40%), severe sepsis (45%) or septic shock (15%; an additional 10% were in septic shock during the first 48 hours). Mean age was 63 ± 19 years, medical patients comprised 56%, mean APACHE II was 15 ± 9, and SOFA 4 ± 4. A bacterial infection was confirmed in 74%. Global hospital mortality was 24%. The serum levels of all biomarkers were significantly higher in patients with systemic or localized bacterial infection than in patients with nonbacterial infection or noninfectious diseases. Serum levels increased significantly with the severity of the SIRS. Areas under the receiver operating characteristic (ROC) curves were: 0.74 for PCT, 0.68 for CRP, 0.65 for IL-6, 0.64 for LBP, and 0.63 for PCTQ ($p > 0,05$). In the multivariate analysis PCT > 0,26 ng/ml was the only independent predictor of sepsis (S = 85%, E = 53%, PPV = 84%, NPV = 55%). After adjusting for antibiotic use, immunosupression, age, sex, severity and diagnosis delay, PCT remained as an independent diagnostic marker of sepsis. Logistic-regression analysis identified serum PCT and SOFA as independent risk factors for septic shock at time of "sepsis profile" analysis.

CONCLUSION. PCT > 0,26 ng/ml was the most reliable diagnostic and prognostic marker in a heterogeneous sample of patients with SIRS and suspected sepsis. Serum PCT levels and SOFA score at time of obtaining the "sepsis profile" may be useful prognostic markers of the risk of developing septic shock.

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0092

MAGNETIC RESONANCE TECHNIQUES APPLIED TO THE STUDY OF SEPSIS: MOUSE BRAIN ASSESSMENT

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INTRODUCTION. Brain is frequently affected in sepsis and recently long-term cognitive dysfunctions were identified in this population contributing to a severe reduction of quality of life. Additionally, acute impairment of brain function can influence hemodynamic, immune and endocrine functions in septic patients. However, the mechanism related to the development of sespsis associated encelopathy and a better characterization of this syndrome is lacking. Here we demonstrate that MRI enables the detection of brain modifications induced in the clinically relevant murine cecal ligation and puncture (CLP) model of sepsis.

METHODS. All magnetic resonance (MR) images were acquired on a 7T, 30 cm horizontal bore magnet (Bruker Biospin, Germany), using a G060 gradient set (Bruker BioSpin France) and a whole body resonator (Bruker Biospin, Germany). Morphologic images were acquired using a rapid acquisition, relaxation enhanced (RARE) pulse sequence with T2 weighting (repetition time: 4 s; echo time: 56 ms) and a RARE factor of 8. The animals (n = 16) were studied before, 6 h and 24 h after the CLP model.

RESULTS. Compared to the baseline, animals after the CLP presented significant increase in the T2 signal intensity in the base of the skull, especially related to the base vessels (circle of Willis), suggesting perivascular edema. The animals that died during the first 24 h after CLP presented a significant increase in the T2 perivascular signal when compared to survival animals ($p = 0.02$).

CONCLUSION. Based on our initial results, magnetic resonance techniques seem promising as a tool to study the sepsis-inducedbrain dysfunctions.

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0093

EFFECTS OF N-3 FATTY ACIDS ON INTESTINAL BARRIER FUNCTION IN AN ISOLATED PERFUSED RAT SMALL BOWEL

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INTRODUCTION. Loss of intestinal epithelial and endothelial barrier function may contribute to the development of sepsis and multiorgan failure. The benefits of immunonutrition containing n-3 fatty acids are still unclear partly because the underlying immunomodulatory mechanisms could, for technical reasons, not be investigated in the intestine so far. The aim of our study was to analyse the modulatory effects of an eicosapentaenoic acid (EPA) enriched diet on inflammatory intestinal barrier dysfunction and fluid redistribution between compartments induced by platelet activating factor PAF using a recently developed isolated perfused rat small bowel model (1).

METHODS. For 20-22 days, rats were fed one of two diets containing either 5% soybean/saflor oil (n-6/n-3 = 15.5, control) or 5% EPA-rich/saflor oil (n-6/n-3 = 2.0, EPA-rich) in an identical standard rodent chow. Subsequently, small intestines were isolated and randomly assigned to the solvent or PAF groups. Vascular and luminal perfusion was performed with a modified oxygenated Krebs-Henseleit and an ileum-compatible buffer respectively. After equilibration, a bolus of 0.5 nmol PAF or solvent was applied via the mesenteric artery and the changes in fluid homeostasis and compartment pressures were analysed.

RESULTS. In both groups, PAF resulted in a sharp rise in arterial and intraluminal pressures (max ΔP arterial = 29.1 ± 4.4 vs. 32.0 ± 2.7 mmHg; max ΔP luminal = 9.3 ± 1.6 vs. 9.8 ± 1.4 mmHg (mean ± sd, control vs. EPA-rich, n = 5/6) which returned to baseline in 10–15 min. Within 10 min after stimulation, 16.3 ± 2.1 ml vs. 21.8 ± 5.5 ml (control vs. EPA-rich, n = 4/5) of the capillary volume flow were lost from the vasculature and redistributed to the lumen (11.2 ± 0.9 vs.14.4 ± 3.6 ml), the lymph (3.4 ± 0.8 vs. 4.5 ± 1.7 ml) and the interstitium (1.1 ± 0.8 vs. 2.0 ± 0.7 g). These parameters did not differ significantly.

CONCLUSION. Feeding rats an EPA-rich diet for 3 weeks did not alleviate the PAF induced transient vasoconstriction and disturbances in fluid homeostasis of isolated perfused small intestines. As the diets contained intentionally only moderate amounts of EPA-rich oil this might be due to low replacement of arachidonic acid by EPA in the plasma membrane lipids of the isolated intestine. Alternatively, even though the PAF dose was too low for any permanent damages to occur, it might have been too high to elucidate a beneficial effect of dietary n-3 fatty acids.

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0094

ACUTE TIGECYCLIN ADMINISTRATION IMPROVES FUNCTIONAL CAPILLARY DENSITY AND ATTENUATES LEUKOCYTE ADHERENCE IN THE INTESTINAL MICROCIRCULATION DURING EXPERIMENTAL SEPSIS

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INTRODUCTION. Antibiotic therapy represents a mainstay of clinical sepsis therapy. It can be principally assumed that parallel to the antibacterial effect, an improvement of the impaired microcirculation occurs. However, the administration of antibiotics is intended to bacteriolysis and the released toxins may also lead to an acute impairment of the microcirculation. Therefore, the goal of our study was to investigate the acute effects of tigecyclin (TIG - a recently approved agent from a new class of antibiotics, the glycylcyclines that exhibits bacteriostatic activity against a broad spectrum of gram-positive and gram-negative bacteria) on microcirculatory parameters in experimental sepsis using the colon ascendens stent peritonitis model (CASP (1)).

METHODS. A total of 40 male Lewis rats were randomly assigned to four groups (n = 10): sham surgery (SHAM), experimental sepsis (CASP), CASP + TIG and SHAM + TIG. Following 15 hours of observation the animals of the CASP + TIG and the SHAM + TIG groups received 5 mg/kg tigecyclin intravenously. One hour later (16 hours) all animals underwent intravital microscopy of the intestinal wall.

RESULTS. TIG administration in septic CASP rats increased mucosal (+42%) and muscular (longitundinal: +25%; circular: +18%) functional capillary density and attenuated the rolling behaviour (−12%) and the number of firmly adhering leukocytes (−50%) in the V1 venules of the intestinal submucosa compared to untreated CASP animals ($p < 0.05$). The results suggest, that TIG protects microvascular perfusion as measured by functional capillary density and reduces leukocyte activation.

CONCLUSION. In addition to the results of microbial sensitivity testing, a specific knowledge of the potential effects exerted upon the microcirculation is important in order to detect possible side effects of antibiotics. Acute tigecyclin administration did not worsen the intestinal microcirculation in experimental sepsis. In contrast, an improvement of the intestinal microcirculation could be observed. Therefore, tigecyclin treatment may be a preferred choice in the antibiotic therapy of severe sepsis.

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Poster Sessions
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0095

INFLUENCE OF QUINOLONES ON CD11B-EXPRESSION OF HUMAN POLYMORPHONUCLEAR NEUTROPHILS (PMN) AND SUBSEQUENT PHAGOCYTOSIS AND KILLING OF METHICILLIN RESISTANT STAPHYLOCOCCUS AUREUS (MRSA)

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INTRODUCTION. Quinolones are important antibiotics in ICUs because of their broad antibacterial spectrum covering many important pathogens frequently encountered in different infectious diseases. The function of PMN is of high relevance for the prognosis of antibiotic-treated patients. Especially in severely ill patients, phagocytosis and killing of pathogenic microorganisms highly affect the outcome. As quinolones have been reported to influence the function of PMN, this study gained for more detailed information about the influence of fluoroquinolones on phagocytosis and killing of MRSA.

METHODS. The effects of selected quinolones (pipemid acid, norfloxacin, ciprofloxacin, moxifloxacin, garenoxacin) on phagocytosis of MRSA by human PMN were studied. MRSA was chosen for its clinical impact and its high resistance to quinolones. A relevant direct influence of the test-substances on the vitality of this microorganism was thereby excluded. Whole-blood samples were taken from healthy volunteers and incubated with the fluoroquinolones in concentrations ranging from 0.5 to 1.500 µg/mL and compared to a drug-free control. CD11b-expression of PMN was evaluated using fluorescence-labeled mAB. To measure phagocytosis fluorescence-labeled bacteria were added to the blood. Bacteria:PMN ratio was adjusted to 5:1 to 15:1. Phagocytosis was stopped after 5, 15, 30, and 60 min and samples were subsequently analysed by flow-cytometry.
As garenoxacin showed the most prominent effect on phagocytosis of MRSA and CD11b-expression, garenoxacin was chosen for additional determination of killing of MRSA after three hours of incubation in whole blood by plate counting.

RESULTS. Clinical relevant concentrations of quinolones (0.5, 5.0, and 100 µg/mL) have no significant influence on phagocytosis of MRSA by human PMN. Incubation with garenoxacin at high concentration (1.500 µg/ml) results in a decreased and delayed phagocytosis.
Higher concentrations (1.500 µg/ml) of all quinolones except norfloxacin influence CD11b-expression on PMN after phagocytosis of MRSA while only garenoxacin shows an accelerated CD11b-expression at clinical relevant concentrations.
Garenoxacin showed no effect on the killing of MRSA up to concentrations of 100 µg/ml while garenoxacin at a concentration of 1.500 µg/ml reduced the killing of MRSA.

CONCLUSION. Quinolones in clinical relevant concentrations have no effect on the phagocytosis of MRSA. Although garenoxacin alters the CD11b-expression of PMN after phagocytosis of MRSA, this phenomenon does not result in a decreased killing of MRSA by PMN. According to our results, antiinfective therapy with the selected Quinolones has no significant influence on the main human defence mechanism against this important pathogen.

0096

QUALITY MARKERS OF THE USE OF ANTIMICROBIALS IN CRITICALLY ILL PATIENTS

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INTRODUCTION. To identify the reference values of different quality markers of the use of antimicrobials (AM) in critically ill patients.

METHODS. Prospectivo, multicenter and observational study in which patients admitted to the ICU during two study periods of the ENVIN project in the years 2005 and 2006 were included. The following rates were defined as markers of quality: 1) AM use ratio, 2) rate of directed treatments, 3) rate of empirical inadequate antibiotics, 4) global rate of AM changes used for treatment, 5) rate of AM change due to inadequate treatment, 6) rate of AM change due to adjustment or de-escalating strategy, 7) rate of use of SDD, and 8) duration of prophylaxis with cefazolin, amoxicillin-clavulanate combination, and cefuroxime. Results are expressed as percentages for each category. Data for the two years studied are compared.

RESULTS. A total of 20,430 patients were included, 11,799 of which (57.8%) received 25,880 AM. Quality markers of AM use are shown in the following Table 1.

TABLE 1

	2005	2006	2007
No. days of AM use/no. of ICU stay x 100	114	101.5	112.4
No. directed AM/no. AM used for treatment x 100	24.33	24.07	23.13
No. inadequate empiric AM/no. empiric AM x 100	NR	14.15	12.04
No. AM changes/no. AM used for treatment x 100	23.4	24.66	24.23
No. AM changes for inadequacy/No. total empirical AM x 100	6.6	5.9	5.62
No. AM changes for adjustment/de-escalating/No. total empirical AM x 100	5.7	6.6	7.22
No. patients with SDD/No. ventilated patients x 100	3.2	5.4	6.6
No. days of SDD/No. days of mechanical ventilation x 100	4.4	6.8	7.13
Days of use of AM prophylaxis (mean)			
- Cefazolin	2.32	2.39	2.53
- Amoxicilin-clavulante	4.3	4.4	4.0
- Cefuroxime	2.5	2.8	2.4

CONCLUSION. High rate of use of AM in the ICU. One fourth of AM were used for directed treatments and another fourth were changed. AM changes due to inadequate treatment had decreased but AM changes for adjustment increased. The use of SDD increased. The duration of AM given prophylactically was longer than required. Same trends for 2007.

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0097

DAPTOMYCIN USE IN NECROTIZING SOFT TISSUE INFECTIONS (NSTIS)

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INTRODUCTION. Daptomycin (DAP) is an antibacterial agent of a new class of antibiotics (cyclic lipopeptides), which has proven clinical utility in the treatment of complicated skin and skin structure infections and bacteremia caused by certain aerobic Gram-positive organisms (GPC). While we have utilized this drug successfully for these types of infections, we hypothesized that DAP may also be useful in the treatment of NSTI's, given the increased prevalence of MRSA in these infections.

METHODS. This study was a subset analysis of a retrospective review of all patients that had received DAP during the period of January 01, 2005 - June 20, 2007 at a regional referral burn center. Data collected determined whether treatment was given for wounds infected with specific organisms, empirically, or for bacteremia and whether each case was considered a treatment success or failure. Success for empiric coverage was considered to be adequate if the condition improved, patient was discharged, or coverage with this agent was no longer warranted due to growth of different organisms needing some other type of anti-infective such as Gram-negative organisms or fungal species. Microbiological cure was defined as a positive culture at treatment onset, followed by a negative culture upon discharge or discontinuation of therapy.

RESULTS. A total of 22 patients were diagnosed with a necrotizing soft-tissue infection (NSTI's). Demographics included 7 females and 15 males with a mean age of 51 years old. Several GPC organisms were cultured including MRSA (9), MSSA (5), Streptococci (6) and Enterococci (2). Eight of these cases also presented with a GPC bacteremia. The complexity of this population was demonstrated by their multiple co-morbidities including diabetes mellitus (9), hypertension (5), renal dysfunction/failure (4). Microbiological cure and presumed eradication by clinical response to treatment with DAP was 100% following a mean 21 days of intravenous antibiotics. Final disposition of patients revealed that one patient (4.5%) expired due to other co-morbid conditions unrelated to the NSTI, while the remaining 21 (95.5%) were discharged home or to appropriate venues.

CONCLUSION. In our center, patients with necrotizing soft-tissue infections (NSTI's) predominantly caused by Gram-positive organisms presented complex management issues, were critically ill, had a significant number of associated bacteremias and had an increase risk of mortality. Daptomycin (DAP) use contributed to a robust success rate in these complex patients.

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0098

DAPTOMYCIN USE FOR A VARIETY OF WOUND TYPES IN A BURN AND WOUND CARE FACILITY – UPDATE ON CURRENT USE

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INTRODUCTION. Daptomycin is an antibacterial agent of a new class of antibiotics (cyclic lipopeptides), which has proven clinical utility in the treatment of complicated skin and skin structure infections caused by aerobic Gram positive bacteria. While we have utilized this drug successfully for these type of infections, we have also found its use to be successful in a number of other clinical scenarios as well (i.e. acute burns, chronic wounds, and 'other' wounds such as TENS, Necrotizing Fasciitis to name a few). Across all wound types, we have seen successful treatment of wound coverage for specific organisms, adequate empirical coverage, as well as successful treatment of bacteremia.

METHODS. This study was a retrospective chart review of all patients that had received Daptomycin (DAP) during the period of January 1, 2005 – June 20, 2007 at a regional referral burn center. Collected data was analyzed to determine whether treatment was given for empiric coverage, specific organisms, or for bacteremia. Each case was further evaluated as a treatment success or failure based on therapeutic monitoring and treatment outcomes. Success for empiric coverage was deemed adequate if the condition improved, patient was discharged, or coverage with this agent was no longer warranted due to growth of organisms not covered in the spectrum of activity by DAP. Wound coverage was deemed a success if follow-up cultures returned as negative for the offending organism on original culture. Bacteremia was deemed a success if follow-up cultures returned as negative for the causative organism on follow-up culture.

RESULTS. A total of 415 patients met the criteria for evaluation in this study. Diagnosis on admission included 157 patients treated for a skin and skin soft tissue infection, 135 burn patients, 84 chronic wound, 22 necrotizing fasciitis, 9 Hidradenitis Suppurativa, 8 TENS, 1 Gas Gangrene, and 1 Pemphis vulgaris. There were 205 patients treated for organism-specific coverage, 153 for empiric therapy, and 57 for bacteremia coverage. Microbial response to treatment with Daptomycin was such that 361 patients had a presumed eradication and 52 definite eradications. Two patients had presumed persistence of originally cultured organisms. The clinical response was such that 405 patients were considered cured, 8 indeterminant, and 2 failures. No serious adverse events attributed to DAP were reported. One possibly-related adverse event of an elevated CPK level was reported in an elderly female. The event was self-limiting and the CPK level decreased after discontinuation of DAP.

CONCLUSION. Daptomycin use demonstrated a robust 97% success rate (cure plus improved) in complex and critically ill patients in a large burn and wound center for the coverage of specific wound organisms, bacteremia, and empiric treatment across all wound types.

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0099

ANTIBIOTIC TREATMENT FOR INTRA-ABDOMINAL INFECTIONS IN THE ICU: IS XXL NECESSARY FOR ALL PATIENTS?

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INTRODUCTION. Severe sepsis and septic shock caused by intra-abdominal infections (IAI), community acquired and nosocomial, are common in the ICU. Etiology and microbiology of community acquired IAI is considered to be different from hospital acquired IAI, but some guidelines recommend the empiric use of broad-spectrum antibiotics in critically ill patients [1], irrespective of this aspect, whereas others advise to choose antibiotics based on previous antibiotic use and the duration of hospital stay before the diagnosis of infection [2]. In this study, we want to describe the empiric treatment of IAI in a tertiary ICU, evaluate its adequacy and its relation with outcome.

METHODS. We performed a retrospective analysis of 67 consecutive ICU patients treated between December 2006 and December 2007, in whom 70 episodes of IAI occurred. Demographic characteristics, details of the intra-abdominal focus, antibiotic treatment and outcome parameters (length of stay and mortality) were retrieved from the patients file. Antibiotic treatment was considered adequate if all pathogens recovered from intraoperative cultures were covered by the antibiotic agent, and pathogens were not resistant to the antibiotic agent.

RESULTS. IAI was mainly due to gastro-intestinal perforation ($n = 57$); 39 patient were operated on before the current episode of IAI. In 29 episodes, infections were community acquired, whereas in 41, they occurred in a nosocomial setting. E. coli was isolated most frequently.

Thirty-three episodes of IAI were treated empirically with narrow spectrum empiric antibiotic treatment (Group A: amoxicillin/clavulanic acid ($n = 30$) or a combination of cefuroxim and metronidazole ($n = 3$), whereas 37 patients received broad spectrum antibiotic treatment (Group B: piperacillin/tazobactam ($n = 26$), meropenem ($n = 10$) or other ($n = 1$). Pseudomonas sp. was isolated in 8 episodes, multidrug resistant organisms were present in 6 episodes only. Empiric antibiotic treatment was adequate in 60 episodes (86%), with no differences between group A vs. group B (85% vs. 86%, $p = 0.99$).

Lengths of stay in the ICU and in the hospital were significantly longer in group B patients. Overall mortality was 28%, and was not significantly different between the two groups (Group A 36% vs. B 21%, $p = 0.15$). Mortality in patients initially treated with adequate and inadequate empiric antibiotic treatment was also not significantly different (26% vs. 42%, $p = 0.45$).

CONCLUSION. Amoxicilllin/clavulanic acid, piperacillin/tazobactam and meropenem were most often used for the empiric treatment of IAI. Adequacy of this empiric antibiotic treatment was high, also when narrow spectrum agents were used.

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0100

IMPACT OF EMPIRIC ROTATED ANTIMICROBIAL SELECTION ON MORTALITY OF CRITICALLY ILL PATIENTS ADMITTED WITH INTRA-ABDOMINAL SEPSIS (IAS)

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INTRODUCTION. Inadequate antimicrobial therapy may adversely affect the outcome of critically ill patients (pts) with IAS in the ICU (1). Infections mainly affected by the selection of antimicrobial are lung, abdomen and bloodstream infection. Aim: To evaluate the relationship between inadequate antimicrobial treatment of IAS and mortality for patients requiring ICU admission (2).

METHODS. We did a prospective observational research study and Thirty six critical ill patients admitted to the ITU, data collected during six months participated in the study. The effects of several selected empiric antibiotics on mortality were evaluated. Antibiotics included on the analysis were Imipenem, Ceftriaxone and Cefepime. The selection of antibiotic was depending on the rotated schedule (± 6 months) previously defined by the group of intensivist and according to bacterial susceptibility obtained from microbiologist. Samples were taken after ICU admission in order to do the management according to international guidelines of infections. Statistical analysis of data (mean and standard deviation, ± 2) were performed and chi2 were used to compare mortality and nominal variables. The statistical analysis was carried out with the SPSS 10 package, and $p < 0.05$ was significant.

RESULTS. Death was the outcome variable that was studied. From 36 patients, 12 (36.1%) were male and 22 (63.8%) were female. Their average age was 62.1 ± 14.8 y. APACHE II score 16.3 + 5.3. 88.8% (32/36) was secondary peritonitis and 11.1% (4/36) Tertiary peritonitis. The overall mortality rate was 41.6%, and mortality for just secondary peritonitis was 33.3%. Patients were empirically treated with Imipenem 19.4%, Cefepime 30.5%, Ceftriaxone 30.5%. Statistics analysis showed that ICU hospital mortality was not influenced by antimicrobial selection after ICU admission (Table 1).

TABLE 1 MORTALITY ACCORDING TO SELECTED ANTIBIOTIC

Antibiotic	Death Yes	Death Not	(Chi2)p
Cefepime	33.3%	26.1%	0.65
Ceftriaxon	33.3%	26.1%	0.65
Imipenen	16.7%	21.7%	0.72

CONCLUSION. These data suggest that initial empiric antimicrobial therapy in critically ill patients with IAS according to the rotated schedule will not likely offer additional survival benefit. Indirectly, our data support the importance to know own bacterial susceptibility in order to choice an adequate antibiotic. Besides of this, South America hospitals should expand the analysis of ICU infection date added to microbiologic information to detect infection-risk factor related to mortality on IAS.

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0101

A LOADING DOSE OF TEICOPLANIN IN CRITICALLY ILL PATIENTS: EFFECTIVENESS OF DOSING DETERMINED BY DATA ANALYSIS SOFTWARE

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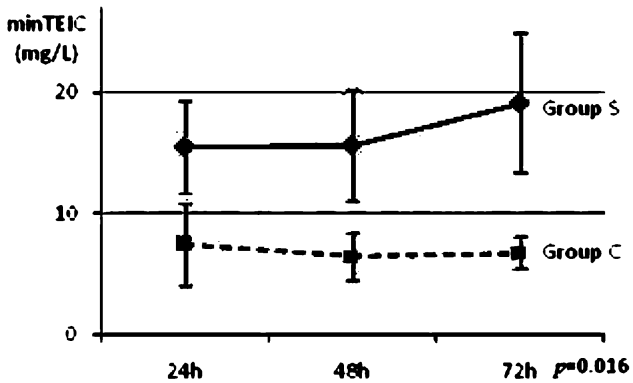
INTRODUCTION. Methicillin-resistant Staphylococcus aureus (MRSA) infection is a big issue in intensive care unit (ICU). Teicoplanin (TEIC) is a new glycopeptide agent for MRSA infection. Distribution volume of TEIC is large and it takes long to achieve adequate plasma concentration of TEIC without an initial loading dose. In the present study, we determined an initial loading dose by using data analysis software, and monitored a trough plasma level of TEIC (minTEIC). We compared minTEIC between the patients of study group and those of administered standard loading TEIC.

METHODS. We enrolled patients suspected or documented Gram-positive infections in our ICU between October 2007 and March 2008. Ten patients were randomly allocated into two groups: in group C, 400 mg of TEIC was administered regardless of body weight (BW) or creatinine clearance (Ccr); and in group S, an initial loading dose was determined by data analysis software based on BW and Ccr. All patients were administered TEIC intravenously every 12 h three times and then every 24 h. The value of minTEIC was measured at 24, 48 and 72 h after the first dose of TEIC.

RESULTS. Five patients were allocated to each group. BW was 58 +/−10 kg (S) and 67 +/−17 kg (C), and Ccr was 75 +/−34 mL/min (S) and 123 +/−14 mL/min (C), respectively. The dose of TEIC was 10.1 +/−1.4 mg/kg (S) and 6.2 +/−1.5 mg/kg (C). A figure shows minTEIC of each group at 24, 48 and 72 h. In the group S, minTEIC increased above 10 mg/L at 24 h and maintained the values up to 72 h.



CONCLUSION. An initial loading dose significantly influenced minTEIC at 24, 48 and 72 h. The loading dose should be determined according to BW and Ccr for each patient.

0102

TEMOCILLIN: A VALID OPTION FOR DIRECTED THERAPY IN ICU PATIENTS?

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INTRODUCTION. Temocillin is a 6α-methoxy-penicillin active against Enterobacteriaceae and resisting to most β-lactamases, including extended-spectrum β-lactamases (ESBLs). It has been suggested as a therapeutic option for the directed treatment of gram-negative infections in critically ill patients, but clinical data are scarce. The goal of this study is to analyze the indications for and the efficacy of temocillin as a directed treatment for surgical ICU (SICU) patients with infections caused by temocillin susceptible micro-organisms.

METHODS. We performed a retrospective analysis of all consecutive temocillin prescriptions in the SICU from January 2005 until October 2006. Age, sex, APACHE II score on admission, length of stay (LOS), SOFA on day of the start of temocillin, antibiotics used before the start of temocillin, and type of infection location plus causative organism agent were retrieved from the patients file. Treatment efficacy was evaluated 2 weeks after the start of temocillin: clinical success was defined as the resolution of signs and symptoms of the infection without the need for alternative antibiotic therapy for the same infection; when alternative antibiotic treatment was prescribed for a new infection during temocillin administration, the outcome was considered indeterminate.

RESULTS. Sixty seven patients (47 male, mean age 65) with Gram-negative infections were treated with temocillin. In 62 (92%) patients, temocillin was initiated as a de-escalation antibiotic after initial broad-spectrum antibiotics (mainly meropenem, piperacillin/tazobactam and amoxicillin/clavulanic acid); in the remaining patients (n = 5) it was started as the initial antibiotic in documented infection with a temocillin-susceptible micro-organism. The focus of the infection was mainly the respiratory tract (43 of which 18 were considered as ventilator associated pneumonia), the urinary tract (12), and the abdomen (5). The causal micro-organisms were E. coli (n = 28), Klebsiella sp. (n = 16), Proteus sp. (n = 9), Enterobacter sp. (n = 9), Morganella sp. (n = 7), Citrobacter sp. (n = 6) and Serratia sp. (n = 4); 12 of these micro-organisms (18%) were ESBL-producing.
At the test of cure, clinical success was present in 23 patients (34%), clinical failure in 33 patients (49%) and in the remainder (n = 11, 17%) the outcome was indeterminate. Overall mortality was 15%.

CONCLUSION. In this cohort of SICU patients, temocillin was mainly used as a de-escalation antibiotic. Despite isolation of temocillin-susceptible pathogens, clinical failure with need for alternative antibiotic therapy was observed frequently, necessitating both caution in the use of this narrow spectrum as well as the need for comparative studies on this issue.

0103

EMPIRIC ANTIBIOTIC DOES NOT AFFECT MORTALITY IN PATIENTS WITH CLINICAL PNEUMONIA AT ADMISSION TO THE ICU

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INTRODUCTION. Inadequate antimicrobial therapy may adversely affect the outcome of critically ill patients (pts) with pneumonia (both community-acquired and nosocomial infections) in the ICU (1). One of the most important infections affected by the selection of antimicrobial is severe community-acquired pneumonia (CAP). Aim: To evaluate the relationship between empiric antimicrobial selection treatment and mortality for patients requiring ICU admission with CAP (2).

METHODS. We did a prospective observational research study and ninety critical ill patients admitted to an ITU, six months data were collected and participated in the study. The effects of several selected empiric antibiotics on mortality were evaluated. Antibiotics included on the analysis were Imipenem, Meropenem, Ciprofloxacin, Amp-Sulb, and Cefepime. The selection of antibiotic was done when pneumonia was suspected on clinical grounds (chest X-ray infiltrate, together with at less two of the following: fever/hypothermia; leukocytosis/leukopenia and purulent tracheal secretion) and based on own bacterial susceptibility. Different kinds of sample were taken after ICU admission in order to do the management according to international guidelines of infections. Statistics: Statistical analysis of data (mean and standard deviation, ± 2) were performed and chi2 were used to compare mortality and nominal variables. The statistical analysis was carried out with the SPSS 10 package, and $p < 0.05$ was significant.

RESULTS. Death was the outcome variable that was studied. Patients were empirically treated with Amp-Sulb 26.7%, Meropenem 7.8%, Imipenem 7.8%, Cefepime 7.8%, and Ciprofloxacin 4.4%. Mortality rate was 25.6%. None microorganism was isolated on 62.2%, H. influenzae 6.7%, S. aureus 6.7%, S. pneumoniae 6.7%, Klebsiella P 4.4% and P. aeruginosa 2.2%. Of 90 patients, only 38.9% had clinical respond to empiric antibiotic and among those patients with an evident cause of response had fewer mortality ($p = 0.003$). Statistics analysis showed that ICU hospital mortality was not influenced by antimicrobial selection after ICU admission (Table 1).

TABLE 1 MORTALITY ACCORDING TO SELECTED ANTIBIOTIC

Antibiotics	Death Yes	Death Not	(Chi2)p
Imipenem	0%	100%	0.10
Meropenem	28.6%	71.4%	0.84
Ciprofloxacin	25%	75%	0.97
Amp-Sulb	20.8%	79.2%	0.53
Cefepime	42.9%	57.1%	0.27

CONCLUSION. These data suggest that initial empiric antimicrobial therapy in critically ill patients according to the clinically suspected infections does not depend on the selected antibiotic and will not likely offer additional survival benefit. However, non empiric response to treatment was associated with mortality. Indirectly, our data support the importance to know own bacterial susceptibility in order to choice an adequate antibiotic. Besides of this, South America hospitals should expand the analysis of ICU infection date added to microbiologic information to detect infection-risk factor related to mortality for pneumonia.

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0104

EMPIRIC TREATMENT AND DE-ESCALATION APPROACH IN BACTERAEMIAS IN THE ICU

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INTRODUCTION. To develop local guidelines for the empiric management and to investigate the applicability of de-escalation strategy of bacteraemias in a general adult 7 bed ICU at Athens, Greece.

METHODS. We prospectively collected data regarding demographics and microbiology/sensitivity results of bacteraemias.

RESULTS. Of a total of 121 pts admitted to our ICU during one year period, 38 pts (31.4%, 26 males, 68,4%; mean age 55,6 ± 4,2, mean ICU stay 50,7 ± 6,4) developed bacteraemia and positive blood cultures (26/75 men, 12/46 women).

We totally had 93 isolates of which gram (+) were 48/93 (51,6%): MSSA 1, MRSA 3, MRSE 20, MSSE 9, Enterococcus spp 15. The most appropriate empiric antibiotic therapy was linezolid or vancomycin covering 44/48 pathogens. Subsequent de-escalation was applicable in 17/48 cases (35.4%).

Gram (-) isolates were 40/93 (43,1%) including Acinetobacter baumannii 19, Klebsiella pneumoniae 14, Pseudomonas aeruginosa 3, Proteus mirabilis 1, Escherichia coli 1, Morganella morganii 1, Providencia stuartii 1. According to sensitivity results the most appropriate empiric antibiotic therapy was colistin plus meropenem covering all pathogens. However, subsequent de-escalation was applicable in only 8/40 cases (20.0%).

Fungi spp were isolated in 5/93 (5,4%) of which Candida parapsilosis 2, candida albicans 3 isolates respectively. Empiric treatment included voriconazole or caspofungin. De-escalation was not applicable in these cases.

In total de-escalation was applicable in 25/93 cases (26.9%).

CONCLUSION. Empiric antibiotic treatment of gram (+) bacteraemias should include linezolid or vancomycin and empiric treatment of gram (-) bacteraemias should include colistin plus meropenem. The de-escalation strategy was applicable more often in gram (+) bacteraemias as compared to other bacteraemias.

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0105

ALL OR NOTHING AT ALL IN SEPSIS TREATMENT

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INTRODUCTION. Sepsis, severe sepsis and septic shock are the most common cause of in-hospital mortality in Brazil. Studies shown that patients in Intensive Care Units (ICU), 64,1% were diagnosed as sepsis, 35,6% as severe sepsis and 30% as septic shock per 1000. The initial treatment is based on steps of interventions and monitoring actions. These steps are collect of cultures before antibiotics use, serum lactate dose, antibiotic use before 6 hours, infusion of > 1500 ml of crystalloids, central venous pressure between 8 and 12cmH_2O, venous oxygen saturation over 70%, correction of hemoglobin levels if < 7 g/dl.

METHODS. We assessed of the adherence to the interventions of the sepsis protocol in the first 24 hours in a hospital in south Brazil from April 2006 through January 2008. The study included patients from ICU and emergency department (ED). Objectives were to describe the characteristics of our population and frequency of the interventions used. We assessed the mortality in 28 days and correlated to the interventions to see if one was more important than the others in reducing mortality. We evaluated if other interventions as mechanic ventilation, strict glicemic control and corticosteroid use were associated with mortality.

RESULTS. A total of 124 patients were included. The diagnosis were 11,29% sepsis, 32,26% severe sepsis and 56,45% septic shock. The majority of patients were immunologically competent (67,5%). Approximately 73,6% of the patients had one or more co morbidity, the most common were Hypertension, Diabetes and Chronic Renal Failure. The most frequent infection was Pneumonia or Empyema. All interventions were used in 2,4% of the patients and no intervention were achieved in 2,4%. No intervention alone has shown to be correlated to mortality, but the increasing number of interventions tended to decrease mortality, although it wasn't statistically significant. Patients with 4 or more interventions had a mortality rate of 51,2% compared to 69,2% of those who had 3 or less interventions (p = 0,092). Mechanic ventilation appeared the most significant intervention associated with increased mortality 67,1% vs 40,4% (p < 0,007).

TABLE 1 INTERVENTIONS AND MORTALITY CORRELATION

Interventions	Mortality	P
More or equal 4	51,2	0,092
Lesser than 4	69,2	

CONCLUSION. No intervention alone is more important than the others in the prognosis of sepsis. The more interventions are used the better is the prognosis. Respiratory failure needing mechanical ventilation was a predictor of mortality in our population.

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0106

THE EARLY ADMINISTRATION OF ANTIBIOTICS IN SEPSIS AND SEPTIC SHOCK PATIENTS: CHANGING OUR PRACTICES

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INTRODUCTION. The early administration of antibiotics after the diagnosis of sepsis and septic shock has been recommended widely by the medical literature as a good practice. The 4-hour rule between the prescription and injection of antimicrobials must be pursued as a marker of good performance.

METHODS. A prospective study was carried out in a surgical-clinical private ICU with 23 beds, between September 2006 and June 2007. It was a two phases protocol: before and after intervention. During the period of 4 months an auditing was implemented and the time was written down between the moment of the antibiotic prescription by the medical and the injection in patients with sepsis or septic shock. After that, an educative period was performed with the interdisciplinary ICU team with emphasis on the impact of the early administration of the antibiotics. After the training was carried out a new auditing occurred in the next 5 months.

RESULTS. In the period before the intervention, 9 patients were studied by total of 14 prescribed antibiotics. The median time of delay for the antibiotic administered was 6 hours and 6 minutes (402 minutes). Considering the 4 hour cut off (240 minutes), only 2 antibiotics reached the goal (14,2%) and none was administered up to 1 hour. Of 12 remaining antibiotics, the worse delay was 14 hours and 46 minutes (886 minutes). In the phase after intervention, 17 patients were accompanied and were prescribed 44 antibiotics. The average time was 3 hours and 27 minutes (207 minutes) and 70,5% (n = 31) were administered in up to 4 hours and 29,5% (n = 13) up to 1 hour.

CONCLUSION. The administration of antibiotics after 4 hours in patients with sepsis and after one hour in septic shock has been associated with an increase of morbidity and mortality. Our study showed that the practices in intensive care environment were changed through measures of education and continuous training. The excellence of care must be pursued tireless and consciously by the whole ICU team.

0107

SYSTEMIC TOBRAMYCIN CONCENTRATIONS IN CRITICALLY ILL PATIENTS TREATED WITH SELECTIVE DECONTAMINATION OF THE DIGESTIVE TRACT

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INTRODUCTION. Selective decontamination of the digestive tract (SDD) is applied in critically ill patients to prevent gut-derived Gram-negative and fungal infections and consists of topical application of non-absorbable antibiotics in mouth and stomach. However, components of SDD may reach the bloodstream due to shock-related gut barrier failure. The aim of this study is to determine whether the SDD component tobramycin is detectable in the systemic circulation in critically ill patients and to examine whether there is a relation between systemic levels of tobramycin and organ failure.

METHODS. We prospectively included critically ill patients urgently admitted to the ICU needing mechanical ventilation and SDD. Topical SDD consisted of polymyxin 100 mg, tobramycin 80 mg and amphotericin-B 500 mg administered four times daily by mouth and gastric tube. Exclusion criteria were treatment with tobramycin and an expected ICU stay.

RESULTS. We analyzed 32 out of 43 patients who had complete tobramycin sampling. Mean age was 64 yrs (SD 14), APACHE score 28 (SD 8) and SOFA score 9 (SD 3). Ten patients (31%) were admitted for sepsis and 10 (31%) after cardiac arrest. Serum tobramycin was detectable in 9 patients (36%) at 12 h and 17 (71%) patients at 24 h. Mean serum tobramycin levels were 0.03 mg/l (SD 0.05) and 0.07 mg/l (SD 0.08) respectively (p < 0.005). No relation was found between serum tobramycin, SOFA score and renal function. There was a positive correlation between serum tobramycin at 12 h and 24 h and arterial pressure at admission (both R = 0.47, p < 0.05).

CONCLUSION. In the majority of critically ill patients receiving SDD after acute ICU admission, tobramycin is detectable in serum, indicating loss of gut barrier function. Serum levels of tobramycin increase during the first 24 h, but do not reach toxic levels. Higher serum tobramycin correlates with a higher arterial blood pressure at admission, possibly reflecting a state of vasoconstriction causing gut hypoperfusion and loss of barrier function.

0108

CURRENT PRACTICE OF SELECTIVE DIGESTIVE DECONTAMINATION: A TELEPHONE SURVEY

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INTRODUCTION. Nosocomial infection remains an important cause of morbidity and mortality despite advances in antimicrobial therapy, better supportive care and the use of preventive measures. As such, the role of the selective digestive decontamination (SDD) is to eradicate bacteria from the oropharynx and the gastrointestinal tract, as they are the major sources of potential pathogens, reducing morbidity and mortality without resurgence in antimicrobial resistance. To assess the current awareness and use of SDD in the critical care setting we conducted a telephone survey of the intensive care units in England.

METHODS. The telephone interview (2007) was guided by a preformed questionnaire to evaluate the awareness and to collect data on current SDD usage.

RESULTS. We contacted 256 intensive care units directly; full data was obtained from 249 (Table 1 and 2).

TABLE 1

Number of units	249 (%)
Average size of the units (beds)	10.25
Number of units using SDD	15 (6)
Number of units not using SDD	234 (93)
Number of units opted out from using SDD	12 (4)
Number of units considering using SDD	2 (0.8)

TABLE 2

Reasons for not using SDD
1. Not sufficient evidence
2. Increase MRSA risk
3. Risk of antibiotic resistance
4. Does not work
5. Not available
6. Never heard of it
7. Being considered for use
8. Do not know

CONCLUSION. Despite of the current body of evidence that improves outcome, the results of our survey confirmed that SDD is poorly undertaken in English ICUs. Only, a large and positive randomised control trial in MRSA endemic areas and a clear antimicrobial resistance profile will clarify and persuade the critical care community to consider the use of SDD in the critically ill.

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Poster Sessions
Sepsis: Predisposition and outcome: 0109–0122

0109

THE IMPACT OF GENETIC POLYMORPHISMS ON INCIDENCE AND SEVERITY OF SYSTEMIC INFLAMMATORY RESPONSE SYNDROME (SIRS) IN PAEDIATRICS

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INTRODUCTION. The Systemic Inflammatory Response Syndrome (SIRS) is a state of unregulated disseminated inflammation that results in significant morbidity and mortality in critically ill patients. SIRS is characterised by an altered innate immune response to an insult and can lead to organ dysfunction secondary to microcirculatory changes. Mutations in genes encoding proteins involved in the innate immune response, resulting in failure of anti-inflammatory regulation, have been associated with increased incidence of SIRS. We aim to genotype functional polymorphisms in the following immune regulatory genes; Toll-Like Receptor 4 (TLR4), Macrophage Migration Inhibitory Factor (MIF) and Receptor for Advanced Glycation End-products (RAGE) in a case-control cohort recruited from Southampton and Great Ormond Street Paediatric Intensive Care Units (PICU's). We will assess relationships between genotype and the incidence and severity of SIRS, to improve understanding of the pathogenesis of SIRS in paediatrics.

METHODS. Informed assent was gained for 406 patients aged 0–17yrs with > 1 organ failure for > 12hrs. Blood samples were obtained, DNA extracted and genotyped using TaqMan® Allelic Discrimination. Clinical data were collected and patient outcome quantified using the Paediatric Logistic Organ Dysfunction (PELOD) score, Paediatric Index of Mortality (PIM) and length of stay (LOS) which was then compared with genotype.

RESULTS. Minor allele frequencies were TLR4-D299G 6.9%, MIF-G173C 18.5% and RAGE-T374A 18.9%. A non-significant association was seen between TLR4-D299G and incidence of SIRS ($p = 0.062$). MIF-G173C demonstrated greater LOS in PICU ($p = 0.018$), RAGE-T374A showed reduced LOS ($p = 0.016$) and PELOD scores ($p = 0.044$).

CONCLUSION. A positive non-significant association between TLR4-D299G and susceptibility to SIRS concurs with previous findings. Alongside this, secondary analyses of morbidity findings suggest genetic variation of innate immunity modifies clinical outcome in PICU's. Limitations in cohort size gives potential for false positive associations; independent replication of these findings is required before related treatment strategies can be reviewed.

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0110

TIME COURSE OF PRO- AND ANTI-INFLAMMATORY CYTOKINE LEVELS IN PATIENTS WITH BURN INJURY, THE PROGNOSTIC VALUE OF IL–10

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INTRODUCTION. Elevated levels of circulating cytokines have already been observed suggesting their important role in the pathophysiological responses following burn injury. However, the dynamism and the prognostic role of these cytokines are controversial. The purpose of this study was to determine the time course of pro- and anti-inflammatory cytokine levels, and their prognostic value in patients with burn injury.

METHODS. This prospective descriptive study with control group involving 26 patients suffering from burn injury (21 male, 5 female, mean age 48 ± 19 years). Blood samples were collected at the time of hospital admission and 5 consecutive days thereafter. Concentrations of IL-1ß, IL-6, IL-8, IL-10, IL-12p70, and TNF-alpha were concurrently measured in plasma from EDTA anticoagulated, and non-stimulated blood by a new, sensitive technique, the flow cytometric bead array (CBA Human Inflammation Kit, BD Biosciences, USA).

RESULTS. Total burn surface area was significantly higher in non-survivors ($n = 12$) compared to survivors ($n = 14$) (36.7 ± 18.0%, vs. 20.1 ± 6.3% $p < 0.001$). IL-6, IL-8, IL-10 presented elevated concentrations in both groups compared to healthy volunteers. IL-6 and IL-8 were moderately elevated on admission and started to increase markedly from day 2, with a peak value on day 4 after injury. IL-10 concentration was elevated at the time of hospital admission and gradually decreased thereafter. Receiver Operating Characteristic analysis of data on admission showed that at a level of 14 pg/ml IL-10 indicated the lethality with 83.3% sensitivity and 100% specificity. Significant differences ($p < 0.05$) between survivors and non-survivors in concentration of IL-6 were observed on day 4, in IL-8 on days 5 and 6, and in IL-10 on days 1, 2 and 3 after injury, all with higher levels in non-survivors. IL-6/IL10 and IL8/IL10 ratios were elevated in both groups of patients until day 3, but decreased thereafter in survivors. No significant changes could be found in the circulating levels of IL-1ß, IL-12p70, and TNF-alpha during the study period compared to the healthy volunteers.

CONCLUSION. Our results confirmed that cytokines play an important role in the post burn pathophysiological processes. Burn injury was accompanied by an acute anti-inflammatory response measured on admission that was significantly higher in non-survivor patients. The IL-10 level on admission had prognostic value. Pro-inflammatory cytokine levels overwhelmed the anti-inflammatory processes from the day after trauma but started to normalize earlier in surviving patients.

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0111

ANTI-OXIDANT GENOTYPE-PHENOTYPE RELATIONSHIPS IN PAEDIATRIC SYSTEMIC INFLAMMATORY RESPONSE SYNDROME

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INTRODUCTION. The Systemic Inflammatory Response Syndrome (SIRS) is a clinical manifestation of innate immune system activation which may result in organ damage. Free radical production is implicated in this process, both as a mechanism for direct cellular injury and in activation/modulation of intracellular signalling cascades within inflammatory cells. Antioxidant defences normally limit the potential damage of high free radical activity, but in critically ill patients this capacity is likely to be compromised. Genetic variation altering the expression and/or function of proteins involved in response to oxidative stress may therefore influence an individual's susceptibility to SIRS and its complications.

METHODS. A prospective cohort candidate gene/phenotype association study was performed. 406 individuals were recruited from Paediatric Intensive Care Units in Great Ormond Street Hospital and Southampton General Hospital. High resolution melt analysis or real time relative quantification PCR genotyping assays were developed for known functional polymorphisms in Nuclear Factor-Erythroid 2-P45-Related Factor 2 (NRF2 - a transcription factor involved in the expression of antioxidative genes) and Glutathione S-Transferase \mu1, \theta1 and \pi1 (GSTM1, GSTT1 and GSTP1). Genotypes were compared to phenotypic data collected in the first 48hrs after admission to PICU.

RESULTS. The minor allele frequencies were: NRF2 -617A 24.7%, GSTP1 105 V 29%, GSTM1 null 73.5%, GSTT1 null 42.6%. The incidence of SIRS in the cohort was 68.6%. No association was found between the gene variants studied and the incidence of SIRS. Secondary analysis showed an association between the GSTP1 105 V allele and the incidence of sepsis within the SIRS group ($p = 0.008$). The allele was also associated with length of stay on the unit ($p = 0.028$).

CONCLUSION. The findings suggest that the antioxidative gene variants studied do not play a significant role in determining individual risk of developing SIRS. However, the GSTP1 105 V allele may play a role in mediating immune defence against sepsis in SIRS patients.

0112

CLINICAL AND LABORATORY PROFILES IN PATIENTS WITH SEVERE SEPSIS

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INTRODUCTION. There is evidence, mainly from immunomodulating studies, that Gram positive sepsis may have distinct clinical and laboratory profile as compared to gram negative sepsis. The purpose of our study was to prospectively investigate the clinical and laboratory profile of critically ill ICU pts developing microbiologically proven severe sepsis in respect to isolated pathogen.

METHODS. We included pts developing severe sepsis and data recorded were demographics, diagnosis, length of ICU stay, outcome, severity of illness, site of infection, and microbiology results. Also, serum markers, including cytokines: TNF-a, IL-6, IL-10, sTNF-RI, and sTNF-RII.

RESULTS. We had 80 patients of which 30 (22 males; age 53.1 ± 18.2; medical vs. 14 surgical) had gram positive and 50 (37 males; age 51.6 ± 18.8; 29 medical vs. 21 surgical) had gram negative infection.
Acinetobacter baumanii, pseudomonas aeruginosa and s aureus were the most prevalent pathogens. Site of infection, serum markers, APACHE II, SOFA score, LOS and mortality were not significantly different between the groups. White Blood Cells and Neutrophil counts were significantly higher ($p < 0.05$) in patients with gram negative sepsis. There were no differences between the two groups in regard to serum cytokines measured (Table 1). Ratios of TNF-RI/TNFa, TNF-RII/TNFa, for IL10/TNFa, IL10/IL-6 were also not different between the two groups.

TABLE 1 CYTOKINES' CONCENTRATION IN GRAM POSITIVE AND IN GRAM NEGATIVE GROUPS OF SEVERE SEPSIS

	gram positive (n = 30)	gram negative (n = 50)	p
TNF-a (pg/ml)	20.3 (4.2–497)	49.5 (0–226.1)	ns
IL-6 (pg/ml)	304.3 (9.8–1100)	200.2 (13.5–1100)	ns
IL-10 (pg/ml)	7.3 (0–147.2)	5.3 (0–400)	ns
TNF-RI (pg/ml)	9,238 (4,764–42,865)	12,719 (2,227–38,724)	ns
TNF-RII (pg/ml)	20,594 (6,265–117,180)	22,457 (68–130,020)	ns

CONCLUSION. Our study failed to demonstrate any significant difference in clinical and laboratory findings at presentation of severe sepsis in respect to isolated pathogen except in total WBCs and neutrophils count. Maybe other factors, including underlying disease, may contribute to the inflammatory cascade seen in critically ill patients which affects studied variables.

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0113

TEMPORAL CHANGES OF MARKERS OF GENERAL TISSUE DYSOXIA IN PATIENTS WITH SEVERE SYSTEMIC INFLAMATION

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INTRODUCTION. Despite advances in modern ICU care mortality in severe sepsis and severe Systemic Inflammatory Syndrome(SIRS) remains high. One might speculate if tissue dysoxia is a common pathophysiology mecanism. In this prospective decriptive study we study temporal changes in markers of general tissue dysoxia.

METHODS. Adult patients with onset of SIRS and circulatory failure (need for inotropes/or vasopressors or mean arterial pressure < 70 mmHg after fluid challenge) for less than 6 h before study start were enrolled in study. Cardiac index(CI) and Intra Thorasic Blood Volume Index(ITBVI) were assesed by transpulmonal thermodilution. Calculated Oxygen consumption index(cVO2i) was calculated as cVO2i = CI*1,34*Hb* (SaO2-ScVO2), necessary parameters were analysed from arterial/cental venous bloodgas samples. Subcutaneous samples of glucose, pyruvate, lactate were collected by subcutaneous microdialysis. Subjects were studied for 7 days.

RESULTS. 53 consecutive patients were enrolled in this study (Median age 65, 68% Sepsis, 32% SIRS, Median APACHE II 24, ICU mortality 28%, 6 month mortality 40%). Significant change over time was found for: SC-Lactate, P-Lactate, SC-lactate/glucose ratio, CI and cVO2i. There was no change over time for ScVO2, ITBVI or SC-lactate/pyruvate ratio.

CONCLUSION. ScVO2 is a generally accepted end point of resuscitation, in our study patients still had a high mortality even though ScVO2 stayed within normal limits. An other well accepted markers of general tissue hypoxia is lactate. Subcutaneous as well as plasma lactate decrease over time compared to baseline in patients with severe SIRS, difference beeing that SC-lactate is slightly higher and peaks somewhat later, but both clears simultaneously at day 1. One might speculate if the clearance of lactate was dependent of an increase in circulation since this event appears at the same time as CI increase, whereas cVO2i remains constant. Likewise the higher tissue concentration and lag of SC-lactate might be due to initial poor capillary perfusion. The differances compared to baseline are minute, and question is if they are at all clinically relevant ? The decrease SC-Lactate/Glucose ratio and the similarities between trends implies that anaerobic metabolism rather than substrate overload is the source of SC/P-lactate production. One might postulate that subcutaneous microdialysis does not seem to add any additional clinical information in our study compared to P-lactate. CI has a biphasic increase with peaks at day 1 and day 5, this increase seems unrelated to preload. Interestingly VO2 also increases but only at day 5. One might hypothesize to the cause of this, a second hit, or resolution of cythopathic hypoxia?

This study shows that generally accepted markers of tissue dysoxia in patients with severe SIRS and high risk of dying are of limited value.

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0114

THE 2001 EXPANDED LIST OF SEPSIS CRITERIA - IT IS PREDICTIVE OF MORTALITY?

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INTRODUCTION. Sepsis is a frequent cause of admission to intensive care units (ICUs). In lasts decades there as been an attempted to redefine the systemic inflammatory host response in sepsis. While the classic definition of systemic inflammatory response syndrome (SIRS) remains a useful concept because of its high sensibility, the expanded list, proposed in 2001 by International Sepsis Definitions Conference, is expected to be more specific and therefore could be an interpreter of prognosis. We evaluate the influence of the number of SIRS criteria on ICU and hospital mortality.

METHODS. Concurrent data collection of patients with severe community-acquired sepsis admitted to our ICU from December 2001 to November 2007, regarding demographic characteristics, SAPS II, admission category, focus of infection and the sepsis criteria of the International Sepsis Definitions Conference, including: fever, hypothermia, tachycardia, tachypnea, altered mental status, hyperglycemia, leukocytosis, leukopenia, arterial hypotension, mixed venous oxygen saturation, creatinine increase, coagulopathy, thrombocytopenia, hyperbilirubinemia and hyperlactatemia and severity of sepsis.

RESULTS. During the study period, 1031 patients were admitted to the ICU, 214 had severe sepsis (of whom 64%, with septic shock). There were 128 males (60%) and 86 females (40%). The mean age was 59 ± 17. On average, the SAPS II score at admission was 45 (interquartile range, 37–57). Crude ICU mortality was 17% and 45%, respectively, in patients presenting with severe sepsis and septic shock. Prognostic factors identified by logistic regression identify age (OR 1.03, 95% CI 1,010-1,047), score SAPS II (OR 1.05, 95% CI 1,028-1,071), septic shock (OR 4.07, 95%CI 2.051-8,065), hypotension (OR 2,610, 95% CI 1,086-6,274) and hyperlactatemia (OR 2.49, 95%CI 1,373-4,502). Mortality was unaffected by the number of inflammatory response criteria assumed.

CONCLUSION. Our results confirm the prognostic significance of the gradation of severityfrom severe sepsis to shock, including hypotension and hyperlactatemia. Serum lactate is a sign of cryptic shock that should prompt clinicians to haemodynamic stabilization preventing progression for severe septic to shock, that in our model was associated with significantly higher mortality. ICU and hospital mortality were unaffected by the number of inflammatory response syndrome criteria.

0115

IS FERRITIN LEVEL A PREDICTOR OF MORTALITY IN CRITICALLY ILL PATIENTS WITH LONG INTENSIVE CARE UNIT STAY?

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INTRODUCTION. Serum ferritin is a frequently used marker of iron metabolism and also an acute-phase reactant. Several studies have shown that critically ill patients present a decrease in the availability of iron and an elevation of ferritin levels along with ongoing or escalating inflammation. Our aim was to determine if ferritin may be a prognostic marker in critically ill patients with long ICU stay.

METHODS. A prospective non-interventional study was performed in a mixed 19-beds ICU of a tertiary care university hospital. Inclusion criteria: all patients with an ICU LOS > 7 days admitted during 6 months. Exclusion criteria: chronic renal failure. Collected data: demographic data, severity scores, serum ferritin levels, transfusion status, ICU LOS and outcome. Based on Δ ferritin (Δf) (difference between highest value during ICU LOS and ferritin level on admission), patients were divided into 3 categories: Group A-Δf < 300 ng/mL; group B-Δf = 300–600 ng/mL; group C-Δf > 600 ng/mL. Statistical analysis was conducted using SPSS version 15.0.

RESULTS. The study enrolled 72 patients with a mean ICU LOS 14.8 days, a mean worst APACHE II score 24.3, a mean worst SOFA score 7.3 and a mortality rate 45.8%. Mean ferritin level on admission was 459 ng/ml with a mean Δf during ICU LOS 340 ng/ml. Mortality doesn't correlate with ferritin on admission, but significantly correlates with subsequently determined ferritin levels and also with Δf > 300 ng/ml ($p < 0.01$). A ferritin value of 650 ng/mL after first week of ICU stay was the cutoff value for identifying those who died.

TABLE 1 SEVERITY OF DISEASE, FERRITIN LEVELS AND OUTCOME

	all patients n = 72 (100%)	survivors n = 39 (54%)	deceased n = 33 (46%)	P value
APACHE II worst-mean	24.3	25.2	23.2	0.401
SOFA worst-mean	7.3	6.4	8.4	0.005
Ferritin on admission-mean	459	458	459	0.823
Ferritin on discharge-mean	658	536	773	0.0003
Mean ΔFerritin	339	273	418	0.001
Ferritin < 300 ng/mL -no(%)	37(51.3)	25(67.5)	12(32.4)	0.4
Ferritin = 300–600 ng/ml-no(%)	28(38.8)	13(46.4)	15(53.5)	0.004
Ferritin > 600 ng/mL-no(%)	7(9.7)	1(14.2)	6(85.7)	0.01
ICU LOS (days) - mean	14.8	15.3	14.2	0.267

CONCLUSION. Our study suggests that serum ferritin course may be used as a marker of mortality in critically ill patients with long ICU stay.

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0116

PROGNOSTIC VALUE OF AMINO TERMINAL PRO-B-TYPE NATRIURETIC PEPTIDE IN SEPTIC PATIENTS

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INTRODUCTION. The amino terminal pro-B-type natriuretic peptide (NT pro-BNP), has demonstrated high in septic patients. Our objective is to analyze the behavior of this marker and its prognostic value in a cohort of septic patients admitted to ICU.

METHODS. Prospective cohort study in septic patients who are admitted to ICU. The analyzed variables were demographic characteristics, severity scales, empiric antibiotic treatment, determination of NT-pro-BNP and mortality. A univariate analysis and multivariate logistic regression on mortality using SPSS 12.0.was conducted.

RESULTS. We included 108 patients, female 32%, mean age 64 (SD 16), mean APACHE II 18 (SD 7), mean SOFA 24 h 7 (SD 4). 54.6% were medical sepsis. Abdominal focus was the most frequent (42.6%) followed by pulmonar focus (29.6%) and urine focus (15.7%). 65.7% were septic shock. ICU mortality were 25% and hospital mortality were 31.5%. In the univariate analysis ICU mortality correlates with NTproBNP values at admission ($p = 0.01$), maximun NTproBNP ($p = 0.027$), admission creatinine ($p = 0.019$), APACHE II ($p < 0.001$), admission SOFA ($p = 0.007$), SOFA at 24 h ($p = 0.001$), inadequate empiric antibiotic treatment ($p = 0.008$), mechanical ventilation ($p = 0.002$), acute kidney failure ($p = 0.01$) and the presence of septic shock ($p = 0.001$). In the multivariate analysis mortality correlates with female sex ($p = 0.025$), age ($p = 0.044$), APACHE II at 24 h ($p = 0.001$) and medical sepsis ($p = 0.004$). NTproBNP not associate independently with hospital mortality. In the analysis of ICU mortality among patients with seriate NTproBNP determinations ($n = 76$) it is found that increasing values of NTproBNP was associated with increased mortality (OR 5.25 CI 95% 1.21–22.9; $p = 0.027$).

CONCLUSION. The admission values of NTproPNB of septic patients in the ICU do not add significant information on the prognosis, but are indicators of cardiovascular and renal dysfunction. The worsening of these values during admission appears to be associated with increased mortality in the ICU.

0117

THE EFFECT OF FOUR HAEMOSTATIC GENE POLYMORPHISMS ON THE OUTCOME OF SEVERE SEPSIS/SEPTIC SHOCK IN CRITICALLY ILL PATIENTS

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INTRODUCTION. Genetic variants of haemostatic factors leading to prothrombotic phenotypes of hypercoagulability and hypofibrinolysis might play an important role in the prognostic determination of septic critically ill patients. The objective of this study was to evaluate the effect of four haemostatic genetic variants, namely beta-fibrinogen -455G/A polymorphism, factor XIII (FXIII) V34L polymorphism, plasminogen activator inhibitor-1 (PAI-1) 4G/5G polymorphism and factor V Leiden (FVL) mutation on survival of critically ill patients with severe sepsis or septic shock.

METHODS. 73 critically ill patients with severe sepsis or septic shock were consecutively enrolled. Epidemiological, laboratory (hematology and biochemical) data, and comorbidities along with severity scores were recorded. Genotyping for beta-fibrinogen -455G/A, FXIII V34L and PAI-1 4G/5G polymorphism and FVL mutation was carried out in all patients. The primary outcomes were the 28-day and the 90-day survival.

RESULTS. Age, septic shock, severity indexes, prior steroid use, and arterial pH were the parameters identified as predictors of the 28-day and 90-day survival in both the univariate and the multivariate models. On the contrary, none of the examined polymorphisms was found to significantly affect either the 28-day or the 90-day survival.

TABLE 1 28-DAY SURVIVAL. TIME TO EVENT ANALYSIS' RESULTS

Baseline parameter	Univariate Cox PH mod HR	(95% CI)	p-value
Age	1.52	(1.16–1.99)	0.003
Septic shock	4.38	(2.01–9.54)	<0.001
PAI-1 genotype	1.36	(0.64–2.87)	0.43
Factor V Leiden mutat	0.98	(0.29–3.23)	0.97
FXIII V34L polymorphi	0.92	(0.43–1.96)	0.83
Fibrinogen-beta–455G/	1.28	(0.61–2.70)	0.51

CONCLUSION. Our data suggest that the importance of these haemostatic polymorphisms (β-fibrinogen -455G/A, FXIII V34L, PAI-1 4G/5G and Factor V Leiden mutation) as predictors of the prognosis of sepsis in critically ill patients is probably very small.

0118

CANONICAL EQUATION MODEL OF WHITE CELLS GENE EXPRESSION FOR RAPID (HOURS) DETECTION OF HIGH RISK OF DEATH AT DAY0 OF HUMAN SEPTIC SHOCK

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INTRODUCTION. No suitable early biological markers have been shown to predict outcome of human septic shock. Local inflammation may diffuse and activate circulating white cells, which in turn may alter remote organs. A rapid blood test would help to characterize patients with high risk of death and might help for therapeutic strategy, particularly concerning high tech drugs. As an early prognosis prediction, we propose a score including a selection of gene expressed at D0 in a population of patients with septic shock.

METHODS. Multicentric study (4 ICUs), 48 patients included at D0 of septic shock with at least 2 organ failure, SAPSII 59 (15) (median (IQR)), SOFA 10 (14). Gene expression analysis in blood immune cells (PMN removed by centrifugation gradient) by microarray (HG-U133 Plus 2.0, Affymetrix®). Differential analysis for D28 mortality (t-test) then selection of gene expression with fold change > 2 and p-value < 0.1. The model for mortality prediction associated a coefficient to each gene expression (PLS regression): $Y = \beta 1g1 + \beta 2g2 + \beta 3g3 + \ldots + \beta ngn$, βi = coefficient, gi = expression of selected gene.

RESULTS. From our population, we propose a score Y for mortality prediction including the expression of 8 selected genes: HLA-DRB4, FOSB, AREG, GPR109B, RBP7, THBS1, TLR7 and CTLS1. In this model, the ROC curve generated by cross-validation provided an AUC = 0.85 and for a threshold of 0.03, a sensitivity = 88%, precision = 75%, a specificity = 72%. Thus at D0, for a new individual, after measurement of gene expression of these 8 genes, score calculation $Y > 0.03$ would sign a good prognosis with classical resuscitation. Score $Y < 0.03$ would be in favor of new therapy administration.

CONCLUSION. Such a score for early prediction of mortality will be tested prospectively in a larger population. Gene coefficients (βi) will be adapted to other techniques of gene expression measurement. More rapid and easily available bedside technique might help the therapeutic strategy.

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0119

IMPACT OF DIFFERENT SIRS CRITERIA ON THE OUTCOME OF PATIENTS WITH SEVERE SEPSIS AND SEPTIC SHOCK

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INTRODUCTION. Objective: To evaluate the relation between different severe sepsis criteria as defined by 2001 International Sepsis Definitions Conference on mortality in patients with sepsis.

METHODS. Prospective study conducted from Jan06 to July07. A computerized protocol to improve management of sepsis was developed. Patients were eligible if they had severe sepsis or septic shock. When activated, SIRS criteria and organ dysfunction present at that moment are recorded in a database. Qualitative data are expressed as n (%) and quantitative ones as mean (SD) or median (interquartilic range) depending on they meet or not normality criteria Statistical test: Chi-square.

RESULTS. 481 cases were included. Of them 276(57.4%) had severe sepsis and 205(42.6%) septic shock. Three hundred and six (63.6%) were male. Mean age was 64.74 (16.43) years. ICU admissions 285 (59.4%).Frequency of different SIRS criteria at activation and their relationship with mortality is shown in Table 1 and organic dysfunction in Table 2. Mortality was 28.3%, 49 (17.8%) patients with severe sepsis and 87 (42.9%) with septic shock ($p < 0.0001$).

TABLE 1 SIRS CRITERIA

Factor	Alive n (%)	Dead n (%)	Total nb (%)	RR (CI 95%)	p
$T^a > 38\ ^\circ C$	177 (77.3)	52 (22.7)	229 (48)	0.68 (0.50–0.91)	0.008
$T^a < 36^\circ C$	40 (63.5)	23 (36.5)	63 (13.1)	1.34 (0.94–1.93)	0.125
Heart rate > 90	291 (72.4)	111 (27.6)	402 (84)	0.85 (0.59–1.22)	0.387
Resp rate > 24	249(70.5)	104 (29.5)	353 (73.8)	1.16 (0.83–1.63)	0.385
paCO2 < 32	103(70.5)	43 (29.5)	146 (30.6)	1.05 (0.78–1.43)	0.733
Leukocyte < 4000	35 (63.6)	20 (36.4)	55 (11.4)	1.33 (0.91–1.95)	0.163
Leukocyte > 12000	196 (73.4)	71 (26.6)	267 (55.7)	0.87 (065–1.15)	0.327

TABLE 2 ORGAN DYSFUNCTION

Factor	Alive n (%)	Dead n (%)	Total n (%)	RR (CI 95%)	p
MAP < 70	176 (68.8)	80 (31.3)	256 (53.2)	1.24 (0.93–1.66)	0.137
paO2/FiO2 < 300	189 (72.1)	73 (27.9)	262 (54.9)	0.96 (0.72–1.28)	0.777
Oliguria	73 (52.9)	65 (47.1)	138 (28.9)	2.26 (1.72–2.97)	<0.001
Impaired consciousness	72 (63.7)	41 (36.3)	113 (23.7)	1.40 (1.04–1.89)	0.033
Creat x 2	68 (54)	58 (46)	126 (26.4)	2.08 (1.59–2.74)	<0.001
Coagulopathy	52 (59.8)	35 (40.2)	87 (18.3)	1.56 (.15–2.12)	0.007
Bilirubin > 4	16 (50)	16 (50)	32 (6.9)	1.86 (1.28–2.72)	0.005
C protein x 2	78 (80.4)	19 (19.6)	97 (20.6)	0.64 (0.42–0.99)	0.031
Lactate > 3 mmol/l	61 (64.9)	33 (35.1)	94 (19.8)	1.31 (0.95–1.80)	0.107

CONCLUSION. the presence of organ dysfunction criteria is related to poorer outcome. We want to highlight the absence of association of initial MAP and lactate with outcome. In the case of lactate it may be due to a lack of it in 339 cases before activation of the protocol.

0120

THROMBOCYTOPENIA DURING INTENSIVE CARE UNIT STAY PREDICTS MORTALITY IN SEVERE SEPSIS AND SEPTIC SHOCK

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INTRODUCTION. Disseminated intravascular coagulation (DIC) is a common finding in severe sepsis and septic shock patients. Overt DIC has been related with an increased mortality. However, the isolated prognostic value of a thrombocytopenic episode during ICU stay on mortality is less clear.

METHODS. A prospective cohort with severe sepsis and septic shock patients in a 40 beds Intensive Care Unit in a University affiliated I level hospital was evaluated. A total of 1579 patients were admitted between May and December 2007. The lower platelets value during ICU stay was selected for analysis. Patients with history of thrombocytopenia, anticoagulants use and congenital or acquired coagulation disorders were excluded. Informed consent was obtained from each patient or patient's next of kin. Data were tested for normality and analyzed by unpaired t tests or Mann-Whitney U test as appropriated. Results are expressed as means or medians. Variables with p value < 0.03 in the univariate analysis were included in a multivariate logistic regression for further analysis of predictors of mortality.

RESULTS. A total of 195 patients with severe sepsis and septic shock were admitted. Thrombocytopenia during ICU stay was observed in 70 of them (35.9%). A higher APACHE II score was observed in thrombocytopenic group ($p < 0.0001$) and odds ratio for mortality in thrombocytopenic patients was 1.8 (95%IC 1.2–2.7, $p = 0.006$) when compared with non thrombocytopenic (Table 1). In a multivariated analysis adjusted by APACHE II score, thrombocytopenia kept association with mortality (adjusted OR 2.6 (95%CI, 1.2–5.6).

TABLE 1

	Thrombocytopenia, n70	No Thrombocytop, n115	p
Age (SD)	54.3 (19.7)	58.1 (17.9)	0.17
Male sex (%)	44.3	46.4	0.7
APACHE II	25.4 (7.4)	19.1 (6.5)	0.0001
Admission cause			0.5
Medical	90	84	
Surgical	10	16	
ICU LOS, days (median)	7	3	0.001
28 days mortality	42	23.4	0.007

CONCLUSION. Thrombocytopenia episode during ICU stay is related with increased mortality in severe sepsis and septic shock patients even after adjust other severity variables.

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0121

ENDOTOXIN ACTIVITY LEVEL IN SEPTIC SHOCK: ONLY A MARKER OF SEVERITY?

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INTRODUCTION. Aim of the study is to evaluate the clinical value of endotoxin activity assay (EAA) measurement in critically ill Septic Shock (SS) Patients (Pts)treated with conventional and "non conventional" therapies.

METHODS. In a 8 beds general ICU, we performed a prospective analysis of EAA level on 34 critically-ill Pts within 24 hours of SS diagnosis.EAA level, assessed by a rapid chemioluminescence assay (Spectral D.), ranges between 0 and 1 unit (low < 0.4, intermediate 0.4–0.6, high > 0.6).We evaluated EAA level in relation to severity of illness. At that time we performed a retrospective analysis on the clinical evolution and outcome of high EAA level (> 0.6) SS Pts (n = 16)treated with standard therapy (ST) according to SSC (ST group n = 11)or with ST plus PMX-B Hemoperfusion (PMX group n = 6) as adjuvant therapy. According to our ICU practice, adjuvant therapy with PMX-HP (twice, 2hr/session with interval of 24hr)was performed with:1)known or presumed gram negative infection, 2)worsening of haemodynamic instability in the next 6 hrs of diagnosis, 3)three organ failures.We evaluated EAA level in relation to severity of illness at T0 (SS diagnosis, start of HP-PMX) and at T1 (at 48hr, after PMX).Pts' follow-up was recorded in terms of discharge from ICU and death.Data results are expressed as mean values ± SD. T student test for paired values was used for statistical purpose ($p < 0.05 = *$).

RESULTS. Our results seem to evidence a good correlation between EAA levels and severity of illness as shown in Table 1. Equally EAA level correlates with ICU mortality in SS Pts (Table 1).Considering high EAA level SS Pts, the clinical profile of the two groups (ST vs PMX) was similar at T0. The PMX group showed a significant improvement of clinical profile compared to standard therapy group as evidenced by a significant reduction of vasopressor need, lactate and SOFA score from T0 to T1 ($p < 0.05$).ICU LOS was significantly longer in PMX group versus ST group ($p < 0.05$).More interesting PMX group resulted in a reduction of ICU/Hospital mortality when compared to ST group in high EAA level SS Pts (45 vs 16% NS due to small ample size).

TABLE 1

	EAA < 0.4 n = 6	EAA:0.4–0.6 n = 11	EAA > 0.6 n = 17
MAP (mmHg)	87 ± 5	80 ± 6	79 ± 17
Norepinephrine (ug/kg/min)	0.36 ± 0.2	0.43 ± 0.36	0.68 ± 0.53*
Lactates (mmol/l)	3 ± 1.5	3.9 ± 3.7	6.4 ± 5.8*
SOFA	9.7 ± 5	10 ± 3	12.6 ± 3.8*
CI(l/min/m2)	3.8 ± 1.2	4.1 ± 1.1	3.6 ± 2.1
ICU mortality (%)	0	17	37*

CONCLUSION. EAA level seems to be a good marker of severity in SS Pts. High level of EAA seems to correlate with worse prognosis in SS Pts.PMX-B Hemoperfusion seems to have a positive effect in high EAA level SS Pts.We can question if EAA could be a useful guide to institution of specific anti-LPS treatments.

0122

FACTORS PREDICTING MICROBIOLOGICAL DIAGNOSIS IN PATIENTS WITH SEVERE SEPSIS

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INTRODUCTION. although severity has been related with higher risk of bacteremia, data are scarce about likelyhood of achieving a microbiologial diagnosis in patients with sepsis.

METHODS. a computerized protocol for integral management of severe sepsis and septic shock (PIMIS) was implemented. Patients with severe sepsis or septic shock included between January 2006 and July 2007 were analized. Demographic, clinical and analytical and microbiological data had been collected. Qualitative data are expressed as n (%) and quantitative ones as mean (SD) or median (interquartilic range) depending on they meet or not normality criteria. Statistical tests: Chi-square, Mann-Whitney and binary logistic regression.

RESULTS. we included 481 cases, 306 (64.2%) male, with a mean age of 64.74 (16.43) years. They had severe sepsis in 276 (57,4%) cases and septic shock in 205 (42.6%). They were community-adquired in 341 (71.5%) cases, nosocomial non-ICU in 92 (19.3%) and ICU-adquired in 43 (9%). Causative microorganisms were identified 330 (68.6%) occasions, 226 were monomicrobial and 103 polymicrobial. Lung was the most frequent focus (215/45.4%). Microbiological diagnosis was most likely in patients with septic shock ($p < 0.0001$), in those requiring ICU admission ($p < 0.0001$) and in surgical patients (p 0.012). Focus with lower rate of microbiological isolation was pulmonar ($p < 0.0001$). Mean arterial pressure, lactate levels and SOFA score were not related to microbiological yield. To resolve the apparent contradiction showed by these results we designed a logistic regression model, which is displayed at Table 1.

TABLE 1

Factor	OR (CI 95%)	p
Age	0,991 (0,978–1,005)	0,197
Female	0,539 (0,339–0,857)	0,009
Septic shock	1,497 (0,803–2,792)	0,204
Initial SOFA	1,150 (1,041–1,271)	0,006
Abdominal*	1,873 (1,078–3,255)	0,026
Urinary*	6,411 (2,916–14,092)	<0,0001
Endovascular*	5,359 (1,482–19,383)	0,010
Other foci*	5,141 (1,601–16,508)	0,006
Unknown*	0,054 (0,007–0,422)	0,005

** Compared with pulmonar*

CONCLUSION. we confirm that severity is related to greater culture yield. Etiologic diagnosis was more difficult in patients with pulmonary infection than in other infections.

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Poster Sessions
Ventilator-associated pneumonia: 0123–0136

0123

EPIDEMIOLOGY OF ACTIVE CYTOMEGALOVIRUS INFECTION IN VENTILATED ICU PATIENTS

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INTRODUCTION. Viral infections are now described in ICU patients. The objective of the present prospective epidemiologic study was to assess the incidence, risk factors, and outcome of active Cytomegalovirus (CMV) infection in non immunosuppressed intensive care unit (ICU) patients.

METHODS. Two hundred and forty two non immunosuppressed ICU patients mechanically-ventilated for at least 2 days. Routine pp65 antigenemia and serology for CMV were performed at admission, and then weekly. Bronchoalveolar lavage (BAL) viral cultures were done when a pneumonia was suspected.

RESULTS. Thirty nine of the 242 ICU patients (16.1%) developed an active CMV infection, as diagnosed by positive antigenemia (85%) and/or positive rapid viral culture in BAL (26%). Antiviral treatment was initiated in 21 (54%) patients. In patients with active CMV infection, ICU (54% vs. 37%, P = 0.082) and in-hospital (59% vs. 41%, P = 0.058) mortalities were increased as compared to those in patients without active CMV infection. SAPS II at admission, ARDS, and active CMV infection were the three independent factors associated with ICU death on multivariate analysis. The patients with active CMV infection had longer mechanical ventilation and longer ICU stay and were significantly more prone to developing bacterial nosocomial infections (P < .001). Multiple regression analysis showed sepsis at admission (P = .014; odds ratio, 3.31), prior admission to other wards (P = .034; odds ratio, 2.59), blood transfusions (P = .040; odds ratio, 3.25), enteral feeding (P = .004; odds ratio, 3.12), and age (P = .029; odds ratio, 1.031) were independently associated with the occurrence of active CMV infection.

CONCLUSION. Active CMV infection is common among previously healthy patients under mechanical ventilation in a medical ICU. Impaired outcome associated with active CMV infection may justify systematic screening.

0124

BRONCHIAL IMMUNOGLOBULIN A LEVEL AND ONSET OF VENTILATOR-RELATED PNEUMONIA

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INTRODUCTION. Ventilator-related pneumonia (VAP) is a common cause of mortality in ICUs. Local defences associate mucociliary clearance and local secretory immune system within which the secretory immunoglobulin A (sIgA) plays the principal role. A first prospective study (1), performed in our 18-beds intensive care unit, has reported an increase of bronchial IgA levels in every ventilated patients between day-1 and day-3 of invasive ventilation. We hypothesized that a reduction in this enhanced bronchial IgA production might play a role in the development of VAP. We prospectively tested the hypothesis that increase in IgA/albumin ratios of less than 50% would predict of the onset of VAP.

METHODS. All adult mechanically ventilated patients were included in this prospective monocenter study, except those with: known cancer, AIDS, malignant hemopathy, IgA or IgG deficiencies, or immunosuppressive drug therapy. Bronchial washings were performed at day-1 and at day 3. Bronchial and blood levels of IgG, IgA and albumin were measured by nephelometry. In order to avoid dilution bias, we used sIgA/bronchial albumin ratio to compare the different samples. VAP were diagnosed using usual criteria.

RESULTS. 204 consecutive patients were included in 54 months. There were 59 (28.9%) patients with VAP. In univariate analysis, an increase of more than 50% in the sIgA/Albumin ratio was negatively associated with the onset of VAP (Hazard ratio HR: 0.54 with 95% confidence interval 95%CI: 0.30–0.95; p = 0.03). This negative association is confirmed in multivariate analysis (HR: 0.55; 95%CI: 0.31–0.98; p = 0.04).

CONCLUSION. These results are consistent with those of the first study [1]. After endotracheal intubation, sIgA/Albumin ratio increase between day-1 and day-3. If this increase is lower than 50%, the risk of VAP raised significantly. These results suggest to investigate the benefit/risk of immune therapy with IgA to prevent VAP.

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0125

INTENSIVE CARE ACQUIRED MRSA DOES NOT AFFECT MORTALITY

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INTRODUCTION. Methicillin Resistant Staphyloccocus Aureus (MRSA) was first described in 1961 and has been associated with healthcare associated infection (HAI) and chronic ill health. There is a perception that MRSA infection results in an increased mortality in the Intensive Care Unit (ICU), although there is little data to support this.

METHODS. Data collected prospectively from January 2000 to June 2007 was acquired from the ICU database and our institution's infection control database. ICU acquired MRSA infection was defined as infection diagnosed from a specimen collected 48 or more hours after ICU admission. All patients were routinely screened for MRSA at ICU admission. Only those patients with a valid APACHE II score were included.

RESULTS. During the study period 2528 patients were admitted to ICU and 2043 patients had a valid APACHE II score. There were 113 ICU acquired MRSA infections confirmed. This gives an infection rate of 5.5%. In the general ICU population the median length of stay (LOS) was 2.5 days (mean = 6.7 days). In those with ICU acquired MRSA the median LOS was 15 days (mean = 20.4 days). The median time to MRSA infection was 7 days (mean = 10.8 days). The severity of illness was identical in both groups with the APACHE II score being 22.5. The predicted mortality was 42.2% for the general ICU population and 41.4% for the MRSA group. Actual hospital mortality was 39% and 40.5% respectively.

CONCLUSION. ICU acquired MRSA infection does affect ICU outcome or hospital mortality in our ICU. MRSA infection occurs in those patients with a longer then average length of stay and may be a reflection of the length of stay rather than a cause of prolonged ICU admission.

0126

IMPACT OF THE VENTILATOR BUNDLE IN VAP

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INTRODUCTION. Ventilator-associated pneumonia (VAP) is frequent and has been associated with substantial morbidity, mortality and excess of cost. The so-called "ventilator bundle" is an array of measures that when implemented together in the ICU setting may decrease the risk of VAP. Our aim was to implement a four-step bundle and reduce VAP rates in a 12 bed general ICU.

METHODS. Four measures formerly described by The Institute for Health Care Improvement (IHI) as the ventilator bundle including head-of-bed at 45 degrees (HB), daily interruption of sedation (DIS), stress ulcer prophylaxis (SUP) and deep vein thrombosis prophylaxis (DVP) were adopted in the form of a check-list. Every four items of the bundle were checked during daily rounds and in another moment of the day as an audit from Dec 07 to Mar 08. The head-of bed at 45 degrees were measured with a device and the daily interruption of sedation was done by the staff nurse every day at eight o'clock in the morning, unless paralytic drugs were in use. Beside that, weekly meeting with the staff physicians and nurse, respiratory therapist, infectologist and medical director were incorporated in the week routine to discuss the possible difficulties in implementing the bundle.

RESULTS. During four months (from Dec 07 to Mar 08) 241 audits of bundle compliance were done. The rates of adhesion were: 82,5% for the HB; 95,8% for DIS; 97,5% for SUP and 98,3% for DVP. The previous rates of VAP were 32,5/1000 ventilator days (from Jan 05 to Nov 07) and the risk of a new case of VAP was 23% for each patient ventilated. The accumulated rate of VAP in the observation period was 10,4/1000 ventilator days and the risk of a new case fell to 8,6%(5 out of 58 patients). Additionally, the median time of ventilation fell from 11,3 (previous 13 months) to 8,3 days.

CONCLUSION. The use of the above described bundle of measures against VAP was proven to be effective in reducing the rates of VAP in a practical context.

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0127

PREVENTING VENTILATOR ASSOCIATED PNEUMONIA: WHAT IS THE EVIDENCE?

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INTRODUCTION. To summarize and compare the efficacy of all interventions that have been studied for the prevention of ventilator associated pneumonia (VAP) and to compare those data with current recommendations and guidelines.

METHODS. A quantitative systematic review of randomized controlled trials for the prevention of VAP (primary or secondary outcome). Pubmed, Embase, Cochrane-Database, Institute of Scientific Indexing and clinicaltrials.gov were searched and complemented with hand search of references. Odds ratios (OR) were determined using RevMan 4.2 and considered statistically significant if the upper 95% CI limit was less than 1.

RESULTS. A total of 1948 publications were screened of which 161 met the predefined in- and exclusion criteria. The following interventions were statistically significant (ordered according to effect size): weaning-protocols of non-invasive ventilation 0.16 (OR = 0.08–0.31), selective decontamination of the gut 0.32 (0.24–0.43), kinetic and rotational therapy 0.34 (0.23–0.52), sub-glottic suctioning 0.36 (0.23–0.54), aerosolized antibiotics 0.55 (0.34–0.87), systemic antibiotics 0.56 (0.32–0.99), oral care with chlorhexidine 0.61 (0.37–0.99), sucralfate instead of H2-antagonists 0.77 (0.64–0.93). In addition, antioxidant therapy 0.06 (0.01–0.76), physiotherapy 0.14 (0.03–0.70), trace element supplementation 0.15 (0.03–0.68), subglottic decontamination 0.17 (0.05–0.56), enterale vs. parenterale nutrition 0.30 (0.10–0.85) were statistically significant but investigated in one study only. All other interventions, e.g. special airway humidifier or filter, suction techniques or changing of breathing circuits failed statistical significance. This was also true for semirecumbent positioning 0.38 (0.09–1.70), early tracheostomy 0.66 (0.31–1.38) and prone position 0.79 (0.59–1.07).

CONCLUSION. The incidence of VAP can be reduced by a number of mechanical, chemical and antibiotic interventions, all of which most likely work through a reduction of microaspiration-related bacterial load. Current reviews or guidelines are not always supported by the currently available evidence.1 Understanding the reasons why interventions with limited efficacy get implemented into clinical practice while others with well documented and superior efficacy do not could be invaluable for health care policy initiatives.

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0128

VAPAWAY PROJECT: A EUROPEAN AUDIT OF VAP PREVENTION PRACTICES

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INTRODUCTION. We were interested in knowing how European ICU staff complied with recommendations on ventilator-associated pneumonia (VAP) prevention.

METHODS. We developed a web-based questionnaire (http://www.vapaway.eu/newsflash/vapaway-questionnaire.html).

RESULTS. 785 questionnaires were completed, coming mainly from Austria (n = 147), Germany (n = 128), France (n = 113), Spain (n = 72), Italy (n = 58), United Kingdom (n = 48), Switzerland (n = 39), Netherlands (n = 35) and Sweden (n = 26). Figures below indicate % of responses in agreement with recommendation.

Recommendations	Physicians' responses (n = 504)	Nurses' responses (n = 230)
Single patient room	39.5	32.6
Use of alcohol-based rub	89.9	97.4
infection surveillance progr	83.1	83.9
infection control team	74.8	73.0
MDRO patients screening	72.6	72.2
Oral rather than nasal intub	90.5	93.5
Use of NIV when possible	80.0	81.3
Regular check cuff pressure	75.4	90.9
Systematic semirecumbent	75.2	80.0
Oral rinse with chlorhexidin	42.7	45.7
Use of closed suction system	58.9	61.3
Use of subglottic drainage	26.2	28.7
Use of HME when possible	80.6	82.6
Infrequent HME change	47.4	46.5
Infrequent circuit change	31.5	23.5

CONCLUSION. If general organisation of infection control seemed widely implemented, more specific actions like use of chlorhexidine or no routine change of ventilator circuits were less often declared. Interestingly, still debated issues such as sub-glottic drainage were the least declared. Important differences in response rates among countries were noted: use of single patient rooms (22% in Austria v. 70% in France); regular check of cuff pressure (95% in Austria v. 55% in Italy). On the other hand, response rates to consensual issues such as use of NIV or oral intubation were very similar among countries. This large European survey on VAP prevention practices shows for the first time that countries adhere to most recommendations in a comparable manner. Similar response rates from nurses and physicians indicate a wide agreement on most features of VAP prevention within the ICU staff.

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0129

EPIDEMIOLOGY AND OUTCOMES OF VENTILATOR ASSOCIATED PNEUMONIA IN AN INDIAN MULTIDISCIPLINARY ICU

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INTRODUCTION. Ventilator-associated pneumonia (VAP) is reported to be the most common hospital acquired infection among patients requiring mechanical ventilation and also carries the highest mortality. We studied the epidemiology of VAP and its impact on morbidity and mortality in our ICU.

METHODS. We performed a prospective observational study on all adult patients admitted to our ICU between Dec 2005 and Nov 2006. Patients requiring more than 48 hrs of mechanical ventilation and who met the study criteria were enrolled. VAP was diagnosed using CPIS score. Primary outcome analyzed was hospital mortality. Secondary outcome measures analyzed were ICU length of stay and duration of mechanical ventilation. Statistical tests used were student's t test, chi-square test and multiple logistic regression.

RESULTS. 350 patients who met the criteria formed the study group. The overall incidence of VAP was 15.38 per 1000 ventilator days (n = 45). On multivariate analysis past h/o COPD (OR 5.3 [95% CI 1.2 - 22.6]) and prior antibiotic usage (OR 8.44 [95% CI 2.2 -32.2]) were risk factors for development of VAP. Late onset VAP were predominantly associated with multidrug resistant pathogens and had a higher mortality compared to those with early VAP (67.5% vs 12.5%, p 0.006).

TABLE 1 RISK FACTORS FOR VAP - UNIVARIATE ANALYSIS

	VAP (%)	NONVAP (%)	P Value
Smoking	31.1	22.9	0.23
COPD	24.4	7.5	0.001
Diabetes	33.3	24.6	0.2
Reintubation	17.8	7.2	0.02
Prior antibiotic usage	93.3	38.3	0.001

$p < 0.05$ is significant

TABLE 2 PRIMARY AND SECONDARY OUTCOMES

	VAP	NONVAP	P value
Mortality (%)	57.8	35.4	0.004
ICU LOS (mean ± sd)	21.8 ± 10	8.3 ± 5	0.001
Ventilator days (mean ± sd)	19.6 ± 10	6.7 ± 4.4	0.001

$p < 0.05$ is significant

CONCLUSION. VAP was significantly associated with increased morbidity and mortality in our ICU.

0130

BACTEREMIC AND NON-BACTEREMIC VENTILATOR ASSOCIATED PNEUMONIA IN PEDIATRIC PATIENTS: COMPARISON OF RISK FACTORS AND OUTCOMES

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INTRODUCTION. The objective of this study was to compare bacteremic and non bacteremic ventilator associated pneumonia (B-VAP and NB-VAP) in terms of risk factors, organisms and outcomes.

METHODS. A retrospective, single center, observational, cohort study was performed in a pediatric intensive care unit of a University Children's Hospital. All patients, requiring mechanical ventilation, and identified as having VAP in a 4-year prospective surveillance database (2004 – 2007) were included. Criteria of the CDC were used for the diagnosis of B-VAP and NB-VAP. The two groups were compared in terms of risk factors, organisms and outcomes.

RESULTS. During the study period, 39 patients developed 40 episodes of VAP, accounting for an incidence rate of 3.5 per 100 admissions and a density incidence rate of 3.2 per 1000 patient-days. B-VAP was documented in 11 patients (27.5%) of the 40 microbiologically confirmed VAP episodes. B-VAP developed later (18.5 +/− 15.9 vs 8.4 +/− 3.5 days; p = 0.002) and was more frequent in younger children (25 +/− 24.2 vs 146 +/−357 days; p = 0.27). There was no difference between the two groups concerning the use of antibiotherapy, invasive procedures and sedation.

Pseudomonas Aeruginosa, involved in 27.2% of bacteremic episodes and 31% of non bacteremic episodes, was the most common organism causing VAP in the two groups. The mortality rate was higher in the Bacteremic group (63.6% vs 20.7%; p = 0.02). The estimated relative risk of death for bacteremic cases was 3.6 (95%CI = 1.3 – 10.2).

CONCLUSION. B-VAP occured later during intensive care unit stay, was often caused by Pseudomonas Aeruginosa and was associated with increased intensive care unit mortality.

0131

IS PROCALCITONIN (PCT) A GOOD MAKER OF LUNG INFECTION IN THE POST-OPEATIVE COURSE OF LUNG TRANSPLANTION?

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INTRODUCTION. Procalcitonin (PCT) is widely proposed as a specific marker for relevant bacterial infections and sepsis. Patients with lung transplantation (LT) often have bacterial colonization of their airways. Thus, the diagnosis of respiratory infection remains difficult in this specific population. Furthermore, there is no data regarding the evolution of PCT levels in the post-operative period of LT nor about the value of PCT for the diagnosis of lung infection in these patients. Our aim was to study the usual kinetic of PCT levels after LT and to precise its value for the diagnosis of low respiratory tract infection (LRTI).

METHODS. All patients admitted to our surgical ICU during a 12-month period, for the LT post-operative period were included and gave their informed consent. Serum levels of PCT were measured using the TRACE technology (Kryptor-Brahms), on the morning usual blood sample, from day 0 to the ICU discharge. LRTI were assessed using the usual criteria, and confirmed by both the pneumologists and the intensivists.

RESULTS. During the study period, 26 patients (mean age 53 ± 10 years) underwent a LT, 14 were single-lung and 12 were double-lung transplantations; cardiopulmonary bypass was used in 3 cases. The underlying pathologies were: 13 emphysemas, 11 fibrosis, 1 cystic fibrosis and 1 histiocytosis X. Among these patients, 22 had pre-operative respiratory tract bacterial colonization. PCT levels increase in the post-operative period, with a maximum at day 1 (13 ± 20.3 ng/mL), then the decrease is progressive, with a normalization at post-operative day 7. Ten patients suffered from LRTI. Four had an early LRTI (before day 7), but their PCT levels did not increase. For the 6 late infections (after day 8), PCT levels did increase above 1 ng/ml.

CONCLUSION. In the immediate post operative course of LT, PCT levels are elevated and the diagnosis accuracy of PCT seems to be low. However, despite the immunosuppressive therapy given for the LT, PCT could be proposed for the diagnosis of LRTI after the first week following the surgery, since PCT levels are normalized and increase in case of LRTI.

0132

ASSESSMENT OF SEVERITY IN PATIENTS WITH VENTILATOR-ASSOCIATED PNEUMONIA USING A SIMPLIFIED PIRO-BASED SCORE

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INTRODUCTION. No score has been developed to assess severity and stratify mortality risk in ventilator-associated pneumonia. The objective of this study is to develope a severity assessment tool in ventilator-associated pneumonia (VAP) patients.

METHODS. A prospective observational cohort study in three multidisciplinary ICU's. All consecutive patients with suspicion of VAP were included. A severity assessment score was developed based on the PIRO concept including the presence of the following variables identified in multivariate analysis: Comorbidities (COPD, immunocompromise, heart failure, cirrhosis or chronic renal failure); bacteremia; shock, and ARDS. A simplified 4-variable VAP PIRO score was obtained at VAP onset and one point was given for each present feature. Statistical analysis was performed with SPSS 11.0.

RESULTS. We included 441 patients in study. The mean VAP PIRO score was significantly higher in non-survivors than in survivors (2.2 + 1.0 vs 1.0 + 0.9). Analysis of variance showed that higher levels of simplified VAP PIRO score were significantly associated with higher mortality ($p < 0.001$). Considering the observed mortality for each VAP PIRO score, the patients were stratified in 3 levels of risk: a) Mild; 0–1 points, b) High; 2 points, d) Very high; 3–4 points. Simplified VAP PIRO score was significantly associated with higher risk of death in Cox proportional hazards regression analysis in high risk group (HR 2.14 95%CI 1.19-3.86) and Very high risk group (HR 4.63 95%CI 2.68 – 7.99). ROC curves showed that simplified VAP PIRO score outperformed APACHE II at admission (AUC = 0.81 vs AUC = 0.53, $p < 0.001$) for severity assessment of VAP patients, with a better discrimination ability for ICU mortality. Medical resources utilization after VAP diagnosis was higher in high and very high risk levels when compared to patients in mild risk level, evaluated using length of ICU stay (LOS) (22.0 ± 10.6 vs 18.7 ± 12.8 days, $p < 0.05$) and duration of mechanical ventilation (18.3 ± 10.1 vs 15.1 ± 11.5 days, $p < 0.05$).

CONCLUSION. The simplified VAP PIRO score was a useful tool to assess severity and it was associated with higher ICU mortality and health resources utilization after VAP diagnosis.

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0133

CHARACTERISTICS OF PATIENTS WITH VAP ACCORDING TO ITS AETIOLOGY

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INTRODUCTION. Ventilator associated pneumonia (VAP) is the most frequent infection in the critically ill patient and with the highest morbidity and mortality. Its aetiology is influenced by several factors.

Objective: To investigate the factors associated with the most common microorganismes (MO) causatives of VAP.

METHODS. Prospective study performed through out 3 months in 2007 using the methodology and database of the ENVIN-HELICS study. The variables studied were: age, gender, pathology (EB), classifying patients as coronary (C), medical (M), surgical (Q), trauma (T); APACHE II score, Glasgow coma scale (GCS), time of onset of VAP, prior antibiotic treatment, extra renal depuration (DER), parenteral nutrition (NPT), immune system alterations, aetiology of VAP and the impact of the disease in the ICU' length of stay and mortality.

RESULTS. 644 out of 12.453 evaluated patients had 781 episodes of VAP. Mo involved were (%): P aeruginosa 146 (17,5), SASM 104 (12,5), A baumannii 98 (11,7), E coli 60 (7,2), Klebsiella pn 53 (6,3), H Influenzae 43 (5,1), E cloacae 38 (4,5) y SARM 34 (4,1). The characteristics of patients with the 5 more frequent MO are shown in Table 1.

TABLE 1

	P aeru	MSSA	A baumannii	E coli	MRSA	ALL
Age yr	58	51	54	61	60	58
Men (%)	69	66,7	70,5	81,8	58,1	70,3
GCS	10,5	9,1	9,6	9,7	10,6	10,1
APACHE II	20	18,4	20,5	18,7	20,7	19,8
Prior surgery %	26,3	10,1	10,5	22,8	19,4	16,5
Inmunosupp %	27,8	8,1	22,1	11,7	19,3	16
TPN %	4,9	21,1	29,	32,3	35,5	32,7
Extrar depur %	13,5	7,1	15,8	10,9	19,4	13,6
Mortality %	41,4	21,2	36,8	34,5	41,9	33

CONCLUSION. There were some differences in VAP related to the causal agent, although not enough to exclude other possible pathogens.

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0134

CLINICAL IMPACT OF VAP ON COPD PATIENTS

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INTRODUCTION. The aim of this study was to determine the clinical impact of VAP development in COPD patients.

METHODS. Prospective, observational multi-center study conducted in 27 ICUs of 9 European countries. Consecutive patients requiring invasive mechanical ventilation for > 48 h were included in the study. Statistic analysis was performed using SPSS 13.0. Patients admitted with trauma diagnosis were excluded.

RESULTS. Of the 2082 intubated patients that were included in the study, 395 (19.0%) had COPD. COPD patients were older (68.7 y vs 60.0 y, $p < 0.05$), but there was no difference in baseline severity between COPD and non-COPD patients, evaluated by SAPS II (47.0 vs 47.8). Of the 337 episodes of VAP, 57 (16.9%) were in patients with COPD. There were 199 (59.1%) late-onset VAP episodes. There were no significant differences in prevalence of early and late-onset VAP episodes or in etiology comparing episodes in COPD and non-COPD patients. Developement of VAP in COPD patients increased the risk of death (OR = 1.77;95%CI 1.01-3.10) compared to COPD patients without VAP. Moreover, in survivors, lenght of ICU stay (29.0 ± 22.7 vs 15.2 ± 15.0 days) and duration of mechanical ventilation (23.4 ± 21.4 vs 11.0 ± 12.6 days) were significantly more prolonged in COPD patients with VAP compared to those who did not develop VAP.

CONCLUSION. Development of VAP is associated with higher mortality and more medical resources utilization in COPD patients.

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0135

PSEUDOMONAS AERUGINOSA AND SEVERITY OF VENTILATOR ASSOCIATED PNEUMONIA

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INTRODUCTION. Pseudomonas aeruginosa (PA) is one of the most common causes of ventilator associated pneumonia (VAP) and was shown to be a independent risk factor for mortality. Using the SOFA score and the classification of sepsis, we prospectively analysed all the VAP which occurred in 2422 patients hospitalised for more than 2 days in a 26 bed general ICU of an university hospital during 4 years (2004–2007).

METHODS. Daily SOFA score was obtained. In addition, SOFAprevap and SOFApostvap were calculated as the sum of the worst OD/F occurring before or after VAP. All the infectious episodes were recorded.

RESULTS. There were 635 VAP observed in 475 patients, 166 VAP being related to PA in 132 patients. Compared to patients with VAP due to other causes, patients with VAP due to PA were older (69, 53–77 vs 62, 49–74) ($p = 0.017$) were hospitalized more often for medical reasons, (39.4% vs28%) ($p = 0.02$), were more often infected on admission (50% vs 31.2%) ($p = 0.0002$), had a longer length of stay before ICU (2, 0–9 vs 1, 0–3) ($p = 0.017$). The VAP due to PA were more often a second or more ICU acquired infection than the other VAP (48.2% vs 28.1%) ($p < 0.0001$). Mortality of patients with VAP due to PA was significantly higher than the mortality of the other patients (53% vs 34.1%) ($p = 0.0002$). However, the occurrence of septic shock or severe sepsis was not different between VAP due to PA (22.9% and 18.1% respectively) and VAP due to other germs (19.9% and 16.3% respectively). There was no difference between the SOFAprevap (9.8 +/− 4.4 vs 9.5 +/− 4.2) ($p = 0.61$) or the SOFApostvap (9.0 +/− 5.3 vs 8.2 +/−4.9) ($p = 0.20$) for the two groups.

By logistic multivariate analysis, only age, underlying disease, duration of hospitalisation before ICU, SAPS II score, and severity of VAP were significantly linked to hospital mortality.

CONCLUSION. PA is not an independant risk factor for morbidity and mortality. The previous clinical status and conditions are the main risk factors, therefore emphasizing the great susceptibility to infection of ICU patients.

0136

SOLUBLE TREM-1: LUNG AND SERUM LEVEL IN PATIENTS WITH BACTERIAL VAP

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INTRODUCTION. Human soluble Triggering Receptor Expressed on Myeloid Cells (sTREM-1) is 3o-kDa glycoprotein of immunoglobulin superfamily. In normal lung tissue TREM-1 is selectively expressed in lung alveolar macrophages, specialised in patogen clearens and is upregulated in the presence of bacteria and fungi. The aim of this study was to asses levels sTREM-1 in serum and lungs in patients with VAP.

METHODS. Cohort study include 31 patient contented criteria for ventilator associated pneumonia (VAP). Criteria enclose clinical, microbiologically, radiologically and labaratory findings in mechanically ventilated patients more than 48 hours and Clinical Pulmonary Infection Score (CPIS) > 6. Serum and lung level of sTREM-1 was obtained and the difference tested. The samples were analysed using ELISA technique and values expressed in pg/ml. Specimens for lung sTREM-1 were obtained in non directed bronchial lavage fluid and the serum speciments from peripheral blood.

Data difference were tested by Mann Whitney U test with $p < 0,05$ as significant.

RESULTS. There is a statistical significanse difference among sTREM-1 levels from serum and lungs in patients vith bacterial VAP ($p < 0,05$; $Z = 6$), with very high levels of sTREM-1 in lung speciments (mean value 1565 pg/l).

CONCLUSION. Soluble TREM-1 is in high concentration expressed in lung speciments patients with bacterial VAP.Levels of sTREM-1 can help in diagnosis bacterial pneumonia as standalone marker.

Poster Sessions

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0137

PROTHROMBIN COMPLEX CONCENTRATES IN ANTICOAGULANT REVERSAL – IS INDIVIDUALISED DOSING BETTER?

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INTRODUCTION. The optimal dose of prothrombin complex concentrate (PCC) in anticoagulant reversal (ACR) in patients requiring emergency surgery or experiencing acute bleeding has been debated in recent years,[1] with recommended doses historically derived from those used in the treatment of haemophilia B.[2] Current recommendations do not advise whether PCC dose for ACR should be fixed or individualised. Previous reports of uniform dosing with 30 IU/kg PCC in ACR demonstrated a final median INR of 1.4 (range: 1.2–2.2).[3] In line with the current prescribing information for Beriplex® P/N,[4] a recent phase III clinical trial based the dose of PCC on the initial INR adjusted for body weight. The reduction in INR following PCC administration was assessed as a sub-group analysis.

METHODS. Forty-three patients requiring ACR for emergency surgery (60.4%) or acute bleeding (39.5%) were recruited into the intention-to-treat (ITT) population. PCC dose was determined for three sub-groups based on initial INR of 2- < 4, 4–6, and > 6, with patients receiving 25, 35 or 50 IU/kg body weight (to a maximum of 100 kg body weight). Patients received Beriplex® P/N adjusted to the nearest 250 IU or 500 IU vial; the exact dose of Beriplex® P/N was measured as IU/kg of FIX. The INR was measured at regular intervals from 30 min to 48 hrs following PCC administration. The primary outcome was INR less than or equal to 1.3 30 min after PCC administration.

RESULTS. Of the 43 patients, 60.5% received Beriplex® P/N 25 IU/kg (INR 2- < 4), 16.3% received Beriplex® P/N 35 IU/kg (INR 4–6) and 23.3% received Beriplex® P/N 50 IU/kg (INR > 6). The median baseline INR was 2.8 (2.0–4.0), 5.0 (4.0–6.0) and 7.5 (1.9–17.4) for the three groups and the median exact dose of Beriplex® P/N administered was 25.3, 42.4, 59.9 IU/kg FIX, respectively. Overall, the median INR fell rapidly from 3.3 (1.9–17.4) at baseline to 1.2 (1.0–1.4) 30 min after administration. The primary outcome was reached in 40/43 patients; the remaining three patients had an INR of 1.4. The INR reduced rapidly at 30 min in all groups with the mean and median INR 30 min after administration lowest in the 50 IU/kg group. The maximal median INR after baseline was 1.3 in all groups. The maximal increase in coagulation factors decreased with increasing dose, but median 48-hr plasma levels were above baseline for all factors.

CONCLUSION. Individualised PCC dosing results in a rapid reduction in INR. The range of INR 30 min following PCC administration (1.0–1.4) is narrower than that reported in studies using uniform dosing.[3] Final maximal median INRs were within this range for all sub-groups. Current recommendations and dosing schedules should be further investigated in light of studies supporting the use of individualised dosing.

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0138

TRANCRANIAL DOPPLER SONOGRAPHY WITH A TRANSORBITAL APPROACH AS A CONFIRMATORY TEST IN THE DIAGNOSIS OF BRAIN DEATH

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INTRODUCTION. The accuracy of transcranial Doppler sonography (TCD) in the confirmation of brain death (BD) may be limited by the possible absence of temporal acoustic window, which prohibits the examination of the anterior cerebral circulation. We investigated whether the routine addition of transorbital Doppler of the carotid siphon (TOD) improves the accuracy of TCD in the assessment of BD.

METHODS. We evaluated 43 critical care patients (31 males, 46 ± 18 years old) with clinically and angiographically established BD due to head injury in 21 cases (49%), cerebral hemorrhage in 12 (28%), subarachnoid hemorrhage in 7 (16%), and cerebral infarction in 3 (7%). Blood pressure, heart rate, SpO2, and PCO2 were monitored throughout the study. All patients underwent transtemporal, transforaminal and transorbital Doppler examination of the basal cerebral arteries. Patients were excluded if episodes of hypoxia, arrhythmia, and hypotension occurred during the Doppler examinations.

RESULTS. In 35 patients oscillatory flow or systolic spikes were found in all approaches. In 6 patients oscillatory flow or systolic spikes were found only in the transforaminal and transorbital approaches. In 2 patients no flow was detected in all approaches. The addition of TOD increased the percentage of positive TCD diagnoses from 81% to 95%.

CONCLUSION. The addition of TOD increases the accuracy of TCD in the confirmation of BD and could be of clinical importance especially in the absence of a temporal acoustic window.

0139

CAN RAPID-TEG® REVOLUTIONIZE THE SEARCH FOR COAGULOPATHIES IN THE MULTIPLY INJURED PATIENT?

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INTRODUCTION. Coagulopathy in trauma is a major problem in treatment of multiply injured patients. We have shown in a retrospective analysis, that one third of multiply injured patients (ISS > 15) suffer from coagulopathy. Conventional coagulation screening tests (INR, aPTT, TT) measure only isolated steps of the coagulation cascade and take long time until results are available (more than 60 minutes). Alternatively, conventional thrombelastography, which is well known in liver and cardiac surgery, analyze every step of the cascade but take also up to 40 minutes. Recently, a new reagent is on the market called RapidTEG® (coagulation activated by the use of tissue factor), which focuses mainly on the clot strength and provides information within minutes.

METHODS. 20 prospective, consecutive multiply injured adult trauma patients (age > 16, ISS > 15). Device: TEG® 5000 (Haemoscope Corporation, Niles, IL) based in our resuscitation room.

RESULTS. We evaluated TEG in 20 ($m = 13$, $f = 7$) trauma patients. Median ISS: 29. Median age: 47 (range 16 to 87). We started TEG analysis 11 minutes (median, range: 2 – 18) after admission of the patient to ER. Information about the clot strength has been obtained 10 minutes after starting analysis. 50% were pathological, TEG based, thereof only 3 had pathological standard coagulation tests.

CONCLUSION. Uncovering trauma related coagulopathies is one of the major goals during the resuscitation period and rapid TEG seems to be a new suitable technique. The clinical importance of the TEG based findings needs to be clarified.

0140

STROKE IN PRE HOSPITAL SETTINGS

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INTRODUCTION. STROKE is a frequent pathology in all Emergency Departments associated with a increased morbidity carrying a social and economical burden. Stroke Units became the main responsible for diminishing the neurological sequelae, increasing the patient quality of life and health care for this patients.
Our institution evaluates all pre-hospital patients, including those with neurological signs, determining the treatment, the hospital and what kind of evacuation.

METHODS. The authors present 24 months of retrospective data from pre-hospital stroke patients, collected from two regional 112 databases. Stroke Units were implemented accordingly with the National Health Plan – High Authority for the Cardiovascular Diseases, covering now 70% of the territory.

RESULTS. Our data reveals 1768 patients (1044 males vs. 724 females) with acute neurological signs less than 3 h of onset. The median age was 64,5yrs (80–23yrs) and 95% of them presented hemi paresis and disarthria. Others clinical presentations were convulsions and coma.
Hypertension, diabetes and dyslipidemia were the most common associated morbidity (>45%).
Each patient was evaluated for a reperfusion protocol validated case by case, by the medical staff from each Stroke Unit. The acute symptoms should have less than 3 h and the patients should be in hospital before that time. The median time for transportation from scene to hospital was 34,98 min (10–106 min) during which Oxygen was delivered, blood pressure and glycaemia controlled, and neurological monitoring maintained.

CONCLUSION. The outcomes of these patients are being evaluated after the hospital discharge and the preliminary reports are very enthusiastic.
This retrospective study, involving pre-hospital stroke managing, should contribute to decrease the morbidity and mortality overall, facilitating the patient access to Stroke Units. The future is a nationwide coverage.

0141

ANTIPLATELET AND ANTICOAGULANT MEDICATIONS DO NOT INCREASE MORBIDITY OR MORTALITY FOR MINOR TRAUMATIC BRAIN INJURY

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INTRODUCTION. The aging population in the United States has led to a concomitant increase in the use of antiplatelet and anticoagulant medications for treatment of a variety of cardiovascular diseases. The literature suggest an increased risk of complications for patients who are injured while taking these medications, and a negative impact on outcome.

METHODS. Retrospective analysis of prospectively collected data. Patients suffering traumatic head injury while taking clopidogrel and/or coumadin were treated by a protocol that called for immediate CT-scan and laboratory evaluation, selective reversal of coagulopathy and/or thrombocytopathy, hospital admission for neurologic observation, and repeat CT-scan evaluation after 12 hours or in the event of significant neurologic change.

RESULTS. From March 1, 2007 through December 31, 2007 135 patients who had suffered significant head trauma while taking coumadin and/or clopidogrel were identified and treated by the described protocol. Of the 135 patients enrolled in the protocol the majority (128/135, 95%) were classified as having minor (GCS 13-15) head trauma. One hundred two patients (76%) had normal initial CT-scans of the brain. Twelve of the 102 patients received FFP and/or platelet transfusions. None of these patients demonstrated clinical deterioration nor delayed injury on follow-up CT scan. Thirty-three patients demonstrated evidence of a hemorrhagic and/or contusional brain injury on initial CT-scan evaluation. Twenty four of the 33 (73%) patients with radiographic evidence of traumatic brain injury received FFP and/or platelets. None of these patients showed any changes clinically or radiographic changes on 12 hour follow-up CT-scan of the brain. Ten patients with radiographically-apparent injury received no treatment to reverse the effects of their medications. Of these ten patients, nine presented with a Glasgow Coma Score of 14 or 15. None showed any clinical or radiographic worsening. One patient presented with a severe injury and a Glasgow Coma Score of 4. That patient was treated with comfort care only and was allowed to expire. Overall there were 5 deaths among 135 patients (mortality = 4%). Four of the five patients who died had been made comfort care only according to family wishes. The other death occurred as the result of complications from a peritraumatic myocardial infarction.

CONCLUSION. Patients with minor traumatic brain injury who are taking antiplatelet agents or anticoagulants can be managed successfully without an increase in morbidity or mortality using close observation and selective treatment of the pharmacologic coagulopathy and/or thrombocytopathy.

0142

RIFLE CRITERIA IN CRITICALLY INJURED PATIENTS – IS THERE A PREDICTIVE ABILITY?

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INTRODUCTION. Acute renal failure (ARF) is a devastating complication in critically ill patients. Yet, the definition and classification of ARF in the setting of the intensive care unit remain subjects of debate and there is a paucity of data that describes the impact of ARF on the outcome of trauma patients admitted to the intensive care unit. The Acute Dialysis Quality Initiative (ADQI) Group published a consensus definition (the RIFLE criteria) for ARF. As far we now this classification system is not validated for trauma patients.We sought to evaluate the ability of the RIFLE criteria to predict trauma patient's outcome.

METHODS. We performed a retrospective cohort study, on 436 trauma patients admitted to our intensive care unit from August, 2001 to September 2007. The charts of patients were reviewed for daily creatinine levels and urine output to determine the RIFLE class based on the worst of either criteria value. Age, gender, mechanism of injury, injury severity score (ISS), revised trauma score (RTS), length of hospital and ICU stay (Hosp LOS and ICU LOS) were obtained from our trauma database.

RESULTS. ARF occurred in 50% of intensive care unit trauma admissions, with maximum RIFLE class R, class I and class F in 23.4, 17.9 and 8.7%, respectively. The outcomes variables are displayed in the table. Forward stepwise multivariate regression analysis showed, after adjustment for covariates, that acute renal failure is not an independent predictor of mortality and that acute kidney injury is not determined by age, gender, mechanism of injury and ISS and RTS scores.

TABLE 1

	No injury	Risk	Injury	Failure	
Mortality %	37.2	23.5	19.2	23.7	$p = 0.006$
ICU LOS	5	8	9	13	$p < 0.001$
Hosp LOS	10	15	17	18	$p < 0.001$

CONCLUSION. The RIFLE classification is a very sensitive definition of acute kidney injury in trauma patients. Trauma patients have a high incidence of renal injury based in this classification and compared to that reported in general hospital populations, by others classification systems. The three classes of severity of acute kidney injury – risk, injury and failure – are independently associated with increased length of stay in ICU and hospital and therefore in resource use. However, trauma patients do not display a linear increase in mortality based on degree of renal injury. Therefore, it seems that RIFLE classification do not improve outcome prediction in this group of patients.

0143

TIME FROM HOSPITAL ADMISSION TO CT SCAN IN THE SEVERELY INJURED PATIENTS (ISS > 15). DATA FROM THE FIRST ITALIAN TRAUMA

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INTRODUCTION. The most important International Guidelines (1,2) for the treatment of the severe traumatized patients recommend ECO-FAST scan as the first clinical examination, in order to identify rapidly the presence of relevant intraabdominal and/or intrathoracic bleeding. However the Ecographic Scan sensibility to identify parenchymal injuries is lower than the CT's one. Therefore in many Italian hospitals, ECO-FAST is often skipped and total body CT is still performed as the first line diagnostic approach. In order to ascertain how long time it takes to perform a total-body CT in the severely injured patients, data from the First Italian Multicenter Trauma Registry (RIT) were analyzed.

METHODS. Data of all Major Trauma Patients admitted to three Italian Level 1 Trauma Centers over a period of 12 months, were analyzed. Only patients who were submitted to urgent CT performed within 120' from the admission in the E.R. were included into the analysis. The time span between admission to the E.R. and the acquisition of the first CT scan, was recorded as well as time from the first scan to the exit from the CT room.

RESULTS. An overall of 770 patients with ISS > 15, admitted from July 1st 2004 to June 30th 2005, were included in the analysis. Eleven patients died on admission to the ER before any radiographic procedure. An urgent CT was performed in 486 patients: the lag-time between the acquisition of the first CT scan is reported in Table 1. Seven patients died during the CT. The mean time from hospital admission to the first CT scan, was 45 minutes, with a great variability among the three hospitals. The least time from admission to CT was recorded in hospital B, where the CT scan was a "last generation machine" located just nearby the ER. Nevertheless, also in this case an average of 35' minutes were needed to obtain the first scan, and 15' more to complete the examination and get the patient out from the CT.

TABLE 1 TIME BETWEEN HOSPITAL ADMISSION AND FIRST CT SCAN

	Total	Hospital A	Hospital B	Hospital C
N of patients	468	160	141	167
Time admission-CT min	46'	65'	35'	45'

CONCLUSION. To perform a CT in the severe poli-traumatized patients (often under artificial ventilation) a longer time than expected is required. Too many patients still die during CT scan procedures. The choice of performing a CT as the first-line investigation for patients presenting hypotension due to severe hemorrhage, may lead to an unacceptable delay in access to the operating room and in unacceptable delay in life-rescue procedures. The seven deaths that occurred during CT scan, should be regarded as sentinel events to be further investigated. The ECO-FAST, which takes less than 5' to be performed, should be considered as the mandatory first-line diagnostic procedure in the E.R.

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0144

MORTALITY ANALYSIS OF POLYTRAUMA PATIENTS

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INTRODUCTION. Polytrauma patient is defined as a person who has suffered traumatic injures in more than one system or organ as a consequence of an accident. Traffic accidents are the main cause of death and they are considered epidemic in our society. The aim of our study was to analyse the main factors that influence on mortality of these patients.

METHODS. From our database of all traumatic patients treated at our hospital in the period from January 2006 to October 2007. We studied demographic data, trauma scores, CO3H, base deficit, red blood cells units administered and early surgery. Primary end points were mortality, early (during the first 24 hours) and late (after the first 24 hours). Statistical analysis was made with U-Mann-Whitney and T-Student test, when indicated.

RESULTS. 752 traumatic patients were treated at our hospital, median age 43 ± 18 years, 564 were males, 717 were blunt injuries with 445 traffic accidents and 110 fall injuries; mean ISS = 13.72 ± 10.9. Fifty-eight patients died (7.7%), most of them had had an ISS ≥ 15 and only 3 had an ISS ≤ 15. Thirty-five (60.3%) had and early death and 23 (39.7%) a late death. Main causes of early death were haemorrhagic shock (22), brain injury (7), cardiac tamponade (1) and death admission (5). Main causes of late death were multiorganic failure (9), brain death (8), respiratory failure (4), sudden death (1), septic shock (1). Multivariate analysis showed that hospital RTS, TRISS, CO3H and base deficit levels were related to mortality.

CONCLUSION. Hospital RTS, TRISS and metabolic acidosis are useful mortality predictors in all traumatic patients. Most of deaths occurred during the first 24 hours. So efforts should be directed to initial aggressive physiological restoration treatment.

0145

INTRACRANIAL HYPERTENSION CORRELATES WITH ICU MORTALITY AFTER HEAD TRAUMA

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INTRODUCTION. The severity of intracranial hypertension (IH) has been demonstrated to be correlated with a worse outcome after a major head trauma. [1] To date, several studies have met difficulties to establish an accurate cut-off value of intracranial pressure (ICP) able to predict a poor outcome in trauma patients. The purpose of the present research was to identify the levels of ICP at which a higher mortality rate could be better predicted.

METHODS. Data of 97 adult head trauma patients (age mean 44 ± 18) admitted at our intensive care unit (ICU) were prospectively collected during the 2007. Age < 18 was an exclusion criteria. ICP was continuosly monitored with a standard intracranial catheter and its values were sequentially collected at the ICU admission (ICP1) and after 48 hours (ICP48). ICP highest values (ICPmax), and mean ICP at 48 (ICP48) and 96 (ICP96) hours were also evaluated. Glasgow Coma Scale (GCS) at ICU admission and at the discharge from the ICU were calculated. ICU mortality was considered as the only end point of the study. Univariate, multivariate, and receiver operating characteristic (ROC) curve analyses were applied.

RESULTS. Mediane GCS was 6 and 12 at admission and discharge, respectively. Mortality rate resulted 25.7%. The results of univariate and multivariate analyses are reported in Table 1. ROC analysis, areas under the ROC curves, cut-off values of different ICP levels, and their relative sensibility and specificity values are shown in Table 2.

TABLE 1

	deads mean (SD)	alives mean (SD)	p <
ICP1	35,5 (28,2)	12,4 (9,9)	0,05
ICP48	47,5 (35,3)	10,2 (5,8)	0,05
ICP48 m	46,3 (28,8)	10,6 (5,2)	0,05
ICP96 m	33,9 (27,2)	10,3 (5,4)	0,05
ICPmax	83,1 (29,4)	22,1 (8,1)	0,05

TABLE 2

	AUC	CUT-OFF	SE-SP %
ICP1	0,85	20,91	97–80
ICP48	0,84	13	85–76
ICP48 m	0,9	17	75–95
ICP96 m	0,83	18	80–50
ICPmax	0,99	34	97–95

CONCLUSION. These finding are in line with results from other studies and confirm that the severity of IH correlate with bad outcome. We demonstrated that GCS did not correlate with mortality and, conversely, ICP values are good predictors of mortality rate. The monitoring of ICP is essential in head trauma patients and efforts should be done to extend this monitoring to all patients with head trauma.

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0146

MULTYDISCIPLINAR PROTOCOL IMPLEMENTATION FOR TRAUMATIC PATIENTS

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INTRODUCTION. Hemorrhagic shock is the first cause of mortality in traumatic patients. Treatment of these patients involves different specialist. The aim of this study was to analyse the impact of implementation of a multidisciplinary protocol in a tertiary University Hospital, with full time Angioradiology Department.

METHODS. Protocol discussion with all involved Departments was started at 2006 year and finally implemented at 2007 year. The primary objectives were conservative treatment of spleen injuries with angioradiologic embolization in the grades III-IV lesions and in grade I-II lesions in abnormal hemodynamic patients. Other recommendations were to offer embolization when the multiscan tomography detected active henmorrhagic lesions in the abdominal region. Comparison between pre-implementation (2005–2006) and post-implementation was compared.

RESULTS. During the pre-implemantation period 75% patients were male and the first mechanism of injury was traffic accident in 47.2%. During the post-implementation period 51% patients were male and also 51% were traffic accidents. The number of traumatic patients in the Observation Area increased as well the number of embolizations and laparotomies, during the postimplementation period.

	2005.2006	2007
N° patients/ISS/Exitus	459/27.1 +/− 9.8/56 (12%)	367/17.3 +/− 9/3 0 (8.2%)
N° embolizations/ISS/Exitus	15 (3.3%)/23.5 +/−10.4/3	18 (4.9%)/17.9 +/− 12.6/2
N° Laparotomies/ISS/Exitus	31 (6.7%)/27.1 +/− 9.8/6	25 (6.8%)/17.3 +/− 9/1

CONCLUSION. Multidisciplinary Protocol provides better implementation of arteriogaphy and embolization in the traumatic patients, and improves hemorrhagic treatment with less complications.

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0147

SHOULD CRITICALLY ILL NEUROLOGICAL PATIENTS BE TREATED IN A SPECIALISED ICU?

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INTRODUCTION. Traumatic brain injury (TBI) is a leading cause of premature death and disability and remains a major public health problem around the world. There has been an evolution in ICU with many being developed to focus on specific specialties but the impact of Neurological Intensive or Critical Care Units (NICU)remain uncertain.

OBJECTIVES. Determine if the outcome is superior for critically ill neurological patients treated in a NICU or general ICU, using an optimised literature review process.

METHODS. We searched Ovid & Medline and "grey literature" databases for articles published from 1992 to 2008. The search was undertaken using the terms "Neurointensive Care", "Head injury", "Outcome", "specialist personnel" and "Costs". References and proceedings of meetings were reviewed to identify other reports.No restrictions of age, gender, severity of injury or language were done.

RESULTS. 18 studies were identified. The studies were analysed based on three different topics:1.impact of NICU vs.Intensive Care Units and outcome,2.special personnel and 3.costs.
1-Patel et al, analyzed data retrospectively collected from the Trauma Audit and Research Network Database for patients with and without head injury presenting between 1989 and 2003 to assess mortality and cause of death.Mortality was increased by 26% in those patients treated in non-specialty intensive care units.Yang Xuejun et al compared the clinical outcome of NICU with general ICU in severe head injury. They described a significant increase in good recovery (54%) and significant decrease in mortality in those patients treated in an NICU.Mirski and Diringer analysed the impact of NICU treatment of patients with intracerebral haemorrhage (ICH). They found that patients treated in an NICU had a significantly improved mortality, functional outcome at discharge ($p < 0, 05$), a shorter hospital stay ($p < 0, 01$) and lower total cost of care ($p < 0, 01$) than those patients treated in medical or surgical ICUs.Diringer and Edwards compared mortality rate after ICH in patients admitted to an NICU with those admitted to a general ICU. The study was an analysis of data collected by Project Impact over three years from 42 ICUs (including 2 NIUCs). This group observed that not being in an NICU was associated with an increased in hospital mortality rate, for those patients with a severe ICH.
2-Varela, Bershad, Suarez and Patel reported, in 6 different studies, that specialised personnel improved the outcome of neurocritical care patients, decreasing the length of stay and reducing mortality. All of them concluded that specialised personnel are required for these patients.
3-Mirski reported a study analysing the costs and concluded that the cost per neurological critical care patient, managed in NICU was approximately 11% to 29% below that for care in other types of ICU.

CONCLUSION. Sub-specialty trained staff, following evidence-based protocols have been shown to improve patient outcome and reduce hospital expenditure. There are many studies reporting that patients with severe TBI admitted to NICU fare better than those admitted to general ICUs in terms of outcome, mortality and LOS at a much lower cost. Therefore, we concluded that there is sufficient evidence to recommend that all critically ill neurological patients should be treated in a specialised ICU.

0148

ANAPHYLAXIS TO PATENT BLUE DURING LYMPH NODE IDENTIFICATION

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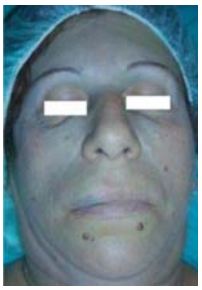
INTRODUCTION. Patent blue is used in multiple oncological procedures and an increasing number of cases of severe anaphylaxis in up to 2,7% of patients has appeared in the literature(1, 2). We describe a patient with an anaphylactic reaction to patent blue before breast cancer surgery.

METHODS. A 52 years old woman was submitted to subcutaneous injection of patent blue before going to the operating room for breast cancer surgery. Patient history revealed no previous allergies. Revision of medical prescriptions showed that patent blue was the only drug given to patient.

RESULTS. An anaphylactic reaction with angioedema, bronchospasm, cyanosis, profound hypotension and blue hives (Fig. 1), has started 4 h after patient venous puncture with latex free material, and within minutes after injection of patent blue. After treatment of the anaphylactic reaction, patient recovered completely within 30 minutes. Laboratory analysis showed normal blood counts, total IgE concentration of 53,5 IKU/L and normal basal mast cell tryptase concentration. Patient refused to be submitted to skin prick tests.



CONCLUSION. Prompt recognition and aggressive treatment of anaphylactic reactions to patent blue are critical to prevent an adverse outcome. Lymphatic mapping with blue dye should be performed in a setting where personnel are trained to recognize and treat anaphylaxis. With increasing implementation of this technique, the incidence of anaphylaxis to blue dyes can be expected to increase(3).

REFERENCE(S). (1) Acta Anesthesiol Scand 2004;48:1066; (2) Contact Dermatitis 2005:53:171; (3) Ann Allergy Asthma Immunol.2006;96:497–500.

0149

BASIC CEREBRAL MONITORING MODIFICATE SCALE (BCM-M) SENSIBILITY AND SPECIFITY TO MORTALITY PREDICTOR IN NEUROCRITICAL PATIENTS IN INTENSIVE CARE

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INTRODUCTION. The Basic cerebral monitoring scale (BCM) is specific for evaluate neurological patients and has determinate variables en relationship cerebral blood flow (CBF). There are two new variables into the scale: the age (prognosis value) and glucose (Metabolic value). For that reason we are taking about in this study of the Basic Cerebral monitoring modificate scale (BCM-M).
The aim of this work is to evaluate the sensibility and specificity of the basic cerebral monitoring modificate (BCM-M) scale in neurocrítico patients as mortality predictor.

METHODS. One hundred and eighty (180) neurocrítico patients were admitted to the ICU in the period from August to 2005 to December 2006, with diagnosis to: severe traumatic brain injury, aneurismal Subarachnoid hemorrhage, Cerebral Anoxic, and Intracranial hemorrhage, Post neurosurgery. The BCM (basic cerebral monitoring scale) and BCM-M (basic cerebral monitoring modificate scale) were applied to these patients to determinate the sensibility and specificity, and later compared with the Apache II, TISS and Glasgow scales in neurocrítico patients.

RESULTS. their ages were between 55 + - 17 and the patients deceased between 59 +/− 16, patients living between 52 +/− 17, stayed there from 8.9 days on average, mortality 35.5% The sensibility of MBC-M scale was de 79.8% with specificity de 73% values similar to MBC (Sensibility 80%, Specificity 73%) scale. The Apache II (sensibility 68.4%, Specificity 52.9%), Glasgow (sensibility 32% Specificity 12,2%), and Tiss (Sensibility 63.5%, Specificity 33.3%) scales, and the grades obtained were low significantly different in sensibility and specificity in relationship BCM-M scale, may be because those scales do not specific for neurocrítico patients.

TABLE 1 DISTRIBUTION BETWEEN ALIVE AND DECEASED ACCORDING TO BASIC CEREBRAL MONITORING

		4–17 points	18–32 points	
Alive		102	14	116
Deceased		26	38	64
Total		128	52	180
Sensibility	79.8%			
Specificity	73%			

CONCLUSION. The BCM-M scale, which is a mortality predictor with sensibility and specificity better to other scales used in intensive care for evaluate de neurocrítico patients.

GRANT ACKNOWLEDGEMENT. Colombia Society of Critical care medicine.

0150

IN-THEATRE ANGIOGRAPHY MAY SIGNIFICANTLY REDUCE TIME TO ANGIOGRAPHIC EMBOLIZATION OF UNCONTROLLED BLEEDING IN BLUNT TRAUMA

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INTRODUCTION. Transcatheter angiographic-embolization (TAE) is an effective means of controlling arterial bleeding in blunt trauma patients. TAE should be performed within 3 hours, as early TAE has been reported to be associated with a significantly lower mortality (1,2). However there is debate as to when angiography should be performed, relative to external fixation or surgical intervention for bleeding control (3,4). TAE is usually performed in a separate area from the Opearting Room (OR) and therefore the severely injured patients with ongoing bleeding need to be moved from the Emergency Room to either the OR or Angiography. This may bring to a life threatening delay in either surgery or TAE.

METHODS. In order to assess the time needed to perform angiography in the clinical practice, we analyzed data of the Italian Trauma Registry (RIT) concerning 12 months hospital admission for major trauma to 3 Italian Level 1 Trauma Centers. Among the 753 patients with ISS > 15 included in this analysis, 69 (8.3%) were submitted to early angiography. Embolization was performed in 50% of the cases.

RESULTS. The mean time from hospital admission to TA was 3 h and 12' with a median of 2h55', meaning that half of the TA are performed later than recommended. Due to the big distance between OR and Angiography, S. Camillo Hospital ranked as the worst. Data are reported in Table 1.

To improve this situation the emergency OR was recently equipped with a full angiographic equipment, in order to enable performing TA and TAE directly on the operative table before or during surgery. From October 1st 2007 to December 15, seven blunt trauma patients with uncontrolled bleeding from pelvic fractures have been submitted to TAE in the OR. Time from admission to trancatheter angiography in this serie was 1 h 47' as an average (40–215), compared to 3 h 30' of the previous period.

TABLE 1 TIME FROM HOSP ADMISSION TO ANGIOGRAPHY

Hospital	S. Camillo	Hospital B	Hospital C	Overall
Time	3 h 30'	3h28'	2h50'	3h12'

CONCLUSION. OR Angiography allows early TAE within the recommended time frame. Moreover it allows to check damage control efficacy and to repeat angiographic evaluation when needed without moving the patient.

REFERENCE(S). 1. Agolini SF, Arterial embolization is a rapid and effective technique for controlling pelvic fracture hemorrhage. J Trauma 1997 **2**. Wong YC Mortality after successful transcatheter arterial embolization in patients with unstable pelvic fractures: rate of blood transfusion as a predictive factor. J Trauma. 2000 **3**. Hamill J, Pelvic fracture pattern predicts pelvic arterial haemorrhage. Aust N Z J Surg. 2000 **4**. Tötterman A, A protocol for angiographic embolization in exsanguinating pelvic trauma: a report on 31 patients. Acta Orthop. 2006.

Poster Sessions
Quality improvement: 0151–0164

0151

MORTALITY IN ICU: INFORMATIONS ISSUED FROM DEATHS ROUNDS AND IMPACT ON QUALITY HEALTH CARE

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INTRODUCTION. ICU as a highly specialised discipline may be at risk of injury for critically ill patients with potential impact on survival.

Objective: We investigate the epidemiology of adverse events related to death in 18 beds medical universitary affiliated ICU using weekly morbidity-mortality meetings.

METHODS. Retrospective exhaustive medical chart analysis of all decedent patients in the unit from 01 january 2006 to 31 december 2007. Review of all incidents during ICU stay, each of them being then quoted according to their avoidability in death occurrence and classified as certain, possible, probable, not probable for direct relevance for death in ICU.

RESULTS. 330 medical charts were reviewed (100% decedents patients 62 +/−15.1yo, SAPS73.7 +/−23.1, 177(54%) with chronic health diseases, LOS 5.9 +/−8.5 days, mechanical ventilation 84%, vasopressor 41%, renal replacement therapy 15%). 141(43%) deaths resulted from care limitation. 93 incidents were identified occuring in 67(20%) patients and classified as organisational (22%), communication (15.2%), iatrogenic (8%), management (11.9%), delayed treatment (23.6%) or ethical (12%) factors. 77(82%) were considered as certainly or probably avoidable. For 20(21%) incidents (16 patients, 5%), incidents have contributed certainly or probably to death, 6 (8%)of them beeing assumed by consensus as probably or certainly preventable. Based of these data, procedures for triage, educational and training programs for nurses and residents were reviewed, improved or up-graded; need for acquisition of new equipments were pointed out, required and ordered.

CONCLUSION. 6% of deaths occuring in ICU are indue. Deaths rounds provide informations about daily practice and organisation we have to evaluate and question about. As an integrated part of a local quality improvement safety program they are useful tools well-designed for initiating auto-evaluation in various fields, promoting team performance better quality of care for patients.

0152

ACCURACY OF DEATH CERTIFICATION ON THE INTENSIVE CARE UNIT

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INTRODUCTION. Death certification has evolved over many years to its current state which is felt to be unsatisfactory. The process of death certification and the coroner system is currently undergoing a parliamentary review in the UK. Nearly all ICU deaths result from a complex interplay between one or more acute disease processes, usually on a background of multiple chronic pathologies. Correctly completed death certificates are a legal requirement, they are also a tool for targeting finite health resources, and they provide information and solace to a grieving family. We were concerned that our death certification process may not reflect the complexity of pathology that we see in our clinical practice. The aim of this study was to determine whether death certificates issued by junior doctors on our ICU were completed with sufficient detail and accuracy.

METHODS. We performed a retrospective analysis of 30 patients who died on our ICU between September 2007 and March 2008. The causes of death entered on the death certificate by the junior doctor were collected. The case notes were reviewed by a consultant pathologist and consultant intensivist who were asked to state how they would have completed the certificate using nothing other than the information contained within the notes. The intensivist and pathologist were blinded to cause of death entered on the certificate and to each others interpretation of the notes. They were also asked to state if the patient should have been refered to the Coroner for further investigation.

RESULTS. In only 15 (50%) cases the pathologist and intensivist agreed with the entry in the death certificate by the junior doctor. There was disagreement between the entry in the certificate by the junior doctor and one of the consultants in 14 (47%) of the cases. In 11 (33%) cases the pathologist and intensivist disagreed about the likely cause of death. In one case there was complete disagreement between the original death certificate, intensivist and pathologist. In 7 cases (23%) a death certificate was issued by the junior doctor while the intensivist and/or pathologist thought the patient warranted referal to the Coroner.

CONCLUSION. There were marked discrepancies between the issued death certificates and our subsequent analysis of the casenotes. Our data suggests that had these certificates been completed by senior doctors the causes of death would have been different in half of the cases. Furthermore, the consultant intensivist and pathologist placed a greater emphasis on the contribution of chronic pathology to the primary cause of death than the junior doctor and included more detail. We also feel there is insufficent understanding by junior doctors regarding referal of deaths to the coroner service. We suggest further training and senior input should be provided in death certification.

0153

QUALITY CONTROL WITH AUTOPSY ON A GENERAL INTENSIVE CARE UNIT

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INTRODUCTION. The postmortem examination has an important role in diagnostic quality control, may reinforce the degree of certainty in end-of-life (EOL) decision making and is a major tool in research and education[1].

METHODS. From November of 2005 to May of 2006, data were collected from a 10 bed ICU of a university hospital, regarding dead patients: demographic data, cause of admission, cause of death, EOL decisions, reason to do not perform the autopsy and clinicopathologic results.

RESULTS. 263 patients (153 males, 110 females), aged 16–92 yrs (mean 58y), day 1 SAPS II score 29 ± 12 (mean ± sd), day 1 SOFA score 6 ± 3 (mean ± sd) were admitted. The ICU mortality rate was 12% (31 patients) and the autopsy rate was 29% (9/31).
The assumed causes of death (number of autopsies) were: septic shock with multiple organ system failure (MOSF) -13 (2); brain death – 8 (4); hemorrhagic shock with MOSF - 6 (1); cardiogenic shock with MOSF - 2 (1) and others - 2 (1). Medicolegal autopsies were performed in 5 deceased patients admitted after head trauma (4) and cervical spinal cord injury (1).
Reported reasons by ICU physicians for not performing autopsy (22 cases) were: patient's family refusal - 1 (20% of the families asked for authorization); cause of death assumed to be known (either by clinical or surgical criteria) - 7 (32%); no reason - 14 (64%).
EOL categories of the autopsied (total deceased) were: cardiopulmonary resuscitation (CPR) 1 (1), brain death 4 (8), withholding life-sustaining treatment 2 (11) and withdrawing life-sustaining treatment 2 (11).
When comparing the premortem and the postmortem diagnoses, the pathological examination revealed unexpected findings (mesenteric ischemia, portal vein thrombosis and pulmonary thromboembolism) that may have contributed to death in 33% of the autopsies. Unsuspected L1 fracture was observed in one trauma case and was not considered relevant to the death of the patient.
The mean length of time between ICU admission and death was 8 days for those cases with relevant pathologic findings and 7 days for the others.

CONCLUSION. The autopsy rate related to the ICU mortality and the discrepancy verified between premortem clinical diagnoses and postmortem pathological diagnoses were adequate. Interestingly, the rate of autopsies after unsuccessful CPR and brain death was higher than after limiting life sustaining therapy. The number of deceased patients that were not autopsied (without a clinical relevant reason to support this decision), reinforce the need of institutional quality improvement programs.

REFERENCE(S). [1]. Clin Intensive Care 1998; 9:100–104.

0154

DEVELOPMENT OF A STATE-OF-THE-ART INFORMATION FEEDBACK METHOD ON QUALITY INDICATORS FOR INTENSIVE CARE

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INTRODUCTION. In 2006 the Netherlands Society for Intensive Care (NVIC) –in close collaboration with the Dutch National Intensive Care Evaluation (NICE) foundation- developed a set of quality indicators for Intensive Care Units (ICUs) as a tool to monitor and improve the quality of intensive care. Information feedback forms an essential part of the strategy to implement these indicators in daily practice.

METHODS. A literature review was performed to get an overview of elements of feedback methods reported to be effective. To analyse the requirements of future feedback recipients, we organized four expert panels with a total of 34 participants. Furthermore, we developed and disseminated a questionnaire among 81 participants of a NICE indicator training to collect data on their attitude regarding the (feedback on) quality indicators. The results of these methods formed the basis for the first draft of the state-of-the-art information feedback method. To evaluate this draft, we organized a three-hour focus group with 10 participants from different disciplines (physicians, nurses and managers), coming from a representative sample of Dutch ICUs.

RESULTS. The literature review yielded 40 papers. The response rate for the questionnaire was 100%. All methods showed the importance of timely feedback containing quality indicator data of an individual ICU compared to some benchmark, e.g. own historical performance (trends in time) or the national average. ICUs need to compose a quality improvement (QI) plan in order to develop and evaluate their QI actions. Organisational support to discuss the information feedback and to monitor the QI plan is regarded essential for effective management of quality improvement. Therefore, the main feature of the resulting state-of-the-art feedback method is a local multidisciplinary QI team. Members are trained in QI methods and are supported by instructed researchers. The team is responsible for composing a QI plan for their ICU and for initiating and coordinating actions that follow from that plan. As input for these actions, ICUs receive a monthly report on a selection of quality indicators, containing e.g. Statistical Process Control (SPC) charts to facilitate analysis of observed trends in time. Furthermore, they receive a quarterly feedback report on all indicators, containing different benchmarks. All reports are discussed during a monthly staff meeting, organized by the QI team.

CONCLUSION. This state-of-the-art information feedback method is based on literature and recipients' input. Its effectiveness in improving the quality of ICU care will be tested in a multicenter cluster RCT that starts in the second half of 2008.

0155

IMPLEMENTATION OF GUIDELINES FOR THE PREVENTION AND DIAGNOSIS OF INTRAVASCULAR CATHETER-RELATED INFECTIONS IN CRITICAL ILL PATIENTS

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INTRODUCTION. Catheter-related bloodstream infections (CRBSI) associated with the insertion and maintenance may cause significant morbidity, mortality and increases in health care costs. Evidence-based guidelines for the prevention and diagnosis have been developed to reduce CRBSI. The aim of this study was to evaluate the impact of the implementation of Guidelines for management of intravascular catheters (IC) in the incidence of CRBSI in our Intensive Care Unit (ICU).

METHODS. Prospective, observational study. During a one year period (January 07-January 08) a protocol of prevention and diagnosis of CRBSI based on the CDC Guidelines (1) was applied to each IC in our ICU. For each IC inserted the following data was registered: type of line (centrally inserted, peripherally inserted central catheter -PICC-, radial artery), number of lumens, site of insertion (subclavian, jugular, femoral, PICC), place of insertion (ICU, non-intensive wards), complications during insertion (pneumothorax, artery puncture, bleeding), catheterism length, infectious reasons for removal (phlebitis, exit-site infection, bacteremia, fever of unknown origin), microbiological data (culture of IC tip, blood culture). Full barrier precautions and 2% chlorhexidine were used in all cases during IC insertion. Each IC placed underwent daily surveillance looking for catheter insertion site infection and signs of CRBSI. Upon removal suspected IC tips were cultured and blood cultures were obtained. The application of guidelines impact was compared with historical data years before.

RESULTS. A total of 224 IC were inserted, 160 in ICU and 64 in non intensive wards. 8.9% were subclavian, 19.2% yugular, 8.9% femoral, 57.6% PICC, 5.4% arterial. The most commonly complication of IC insertion was bleeding (1,8%). The median catheterism length was 4 days. 13.8% catheters were removed for infectious reasons. All CRBSI (3 episodes) were due to Staphylococcus epidermidis. The rate of CRBSI per 1000 catheter-days after implementation of the guidelines decreased significantly (Table 1).

TABLE 1 CATHETER-RELATED INFECTIONS IN CRITICALLY ILL PATIENTS

year	Rate of CRBSI per 1000 catheter-days
2004	3,45
2005	5,20
2006	6.76
2007	2,26

CRBSI = catheter related blood stream infections

CONCLUSION. The incidence of CRBSI was reduced after implementation of Guidelines for the prevention and diagnosis of intravascular catheter related infections.

REFERENCE(S). (1) Centers for Disease Control and Prevention 2002. Guidelines for the prevention of intravascular catheter related infections. MMWR; 51 (RR-10): 1–34.

0156

CATHETER RELATED BLOOD STREAM INFECTION: PROSPECTIVE EXAMINATION OF EFFICACY OF MEASURES TO REDUCE INCIDENCE IN A TOTAL PARENTERAL NUTRITION POPULATION

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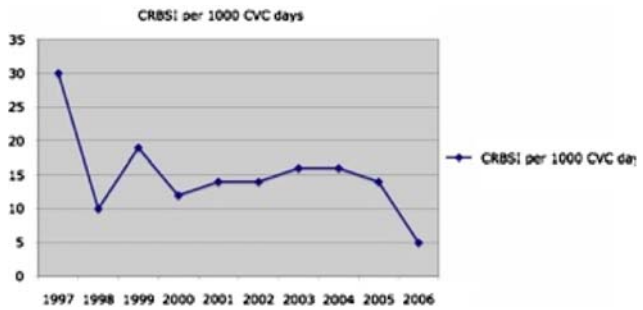
INTRODUCTION. Tracking CRBSI has merit as a health care quality index, and is advocated as an accreditation device for hospitals1.

Pronovost in 2006 demonstrated how packages of interventions reduced CRBSI2. We examined efficacy of measures introduced to reduce CRBSI in patients with CVCs for TPN.

METHODS. Tertiary referral centre with hospital-wide TPN service. We prospectively collected data on patients referred for TPN from 1997–2006. Measures aimed at CRBSI reduction: TPN sister appointment, education programmes, designated personnel and protocols for CVC insertion, CVC placement records, sepsis audit committee.

RESULTS. 1197 patients, 2087 CVCs were examined over 12,266 CVC days. Figure demonstrates falling incidence.



CONCLUSION. CRBSI is decreasing, representing a good index of health care quality improvement. This provides supportive evidence for the Pronovost paper advocating introduction and maintainance of packages of measures2. Benefits include reduced patient morbidity, mortality, and financial savings.

REFERENCE(S). 1 Amarasingham. J Am Med Inform Assoc 2007;14(3):288–94.
2 Pronovost. NEJM 2006; 355(26):2725–32.

0157

FEASIBILITY OF SETTING UP A HIGH-QUALITY AND LOW-COST ACCESS TO CRITICAL CARE USING TELEMEDICINE CONSULTATION SERVICE FOR A COMMUNITY HOSPITAL

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INTRODUCTION. Telemedicine has been demonstrated to be effective in addressing intensivist staffing and clinical outcomes in the intensive care unit. The commercially available telemedicine programs are expensive and only afforded by large, multi-hospital health systems. As part of our institutional telehealth steering project, we evaluated the feasibility of setting up a remote telemedicine ICU(TM-ICU) consultation service for a community hospital affiliated with our institution. The goal was to improved access to high-quality and low-cost critical care service to the affiliate ICU. We present the report of feasibility of setting up a high-quality and low-cost TM-ICU consultation service for a small-to-medium sized hospital.

METHODS. The goal of this project was to improve the quality and access to critical care at our affiliate 8-bed mixed ICU with no intensivist coverage, by leveraging technology and education. Our TM-ICU consultation service, an application service provider model, can be accessed by small-to medium-sized hospitals and includes three components: A business plan and organizational structure, a high-speed video-conferencing link from the nursing station and the patient's room at the affiliate ICU, including a mobile unit with high-resolution camera, stethoscope, speakers, and microphone allowing the intensvist to perform clinical examination and review real-time bedside data, and the hospital-based clinical care and radiology information system that allows the intensivist to access all elements of clinical information during consultation. The technical and clinical component is password protected and HIPAA and Leapfrog compliant. The clinical components consist of clinical care and education pieces, and include telemedicine ICU consent, multiple disease and procedure specific critical pathways and protocols to streamline patient care. All multiprofessional ICU team members at the affiliate ICU were trained with fundamental critical care support course and have free access to the intensivists, nurses, and other members of the ICU at the parent institution. The charge nurse and the on-call intensivist at the parent ICU performed daily TM-ICU rounds with the affiliate ICU staff and were available for consult. The individual physician caring for the patient in the affiliate ICU was able to implement recommendations and follow patient's progress.

RESULTS. A pilot run of the project consisted of real-time TM-ICU consults and a demonstration to the local insurance payer. A billing code was approved by the local insurance payer. Preliminary results showed that a broad range of critical care patients could be managed effectively through daily remote critical care consultation. All consults were dictated. All users were satisfied with its functionality. Our service allowed us to implement ICU quality indicators and bundles. The cost was significantly less compared with the traditional eICU model.

CONCLUSION. We demonstrate successful setup of a TM-ICU consult service for small-to-medium sized hospital. This represents a paradigm shift from the transportation of patients to the main hospital to the provision of critical care services at the point of need. Reimbursement support is unique to this model. A more detailed prospective evaluation of this model is warranted.

REFERENCE(S). Crit Care Med. 2000; 28(12): 3925–31./J Intensive Care Med. 2004; 19(5): 297–8.

0158

ANALYSIS OF CRITICAL INCIDENTS REPORTED IN A GENERAL ICU OVER A SIX-YEAR PERIOD

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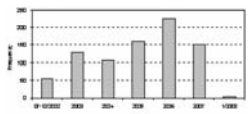
INTRODUCTION. Increasingly, critical incident (CI) reporting is being regarded as part of ongoing quality management. CI databanks also aim to improve health and safety issues for patients as well as staff. The aim of this study was to identify frequent causes of adverse events in critical care, with the potential to harm patients, staff or visitors, by analysing data from a voluntary and optionally anonymous critical incident reporting system.



METHODS. In our 13-bed, general, adult ICU critical incidents have been routinely recorded since mid-2002. All CIs were classified in different main categories: Equipment-related, Administrative, Clinical, Pharmaceutical-related, Health & Safety, Transfer-related, and Environmental. The period July 2002 to January 2008 inclusive (79 months) was analysed to determine the commonest types of incidents, whether the rate was changing over time and whether any specific strategies for reducing them could be deduced.

RESULTS. 364 different types of CI were reported, resulting in a total of 830 CIs during the period analysed. The frequencies within the main categories are shown in Table 1. Although there was a small positive trend over time of the total number of CIs reported (Fig. 1), and for each of the major categories, this was not statistically significant.

The largest single causes of CIs included availability of pharmaceuticals (39 reports) and transfers out due to a shortage of beds (34 reports).

TABLE 1

Main Category	Frequency
Administrative	148
Clinical	161
Environmental	13
Equipment-related	261
Health and Safety	44
Pharmaceutical-related	192
Transfer-related	11
Total	830

CONCLUSION. The critical incident database helped to identify frequent causes of adverse events in critical care. Improvements in quality of care following implementation of preventative strategies such as introduction of regular equipment training sessions will have to be assessed further in future studies.

0159

ANALYSIS OF THE COLLABORATION OF THE HOSPITAL STAFF IN THE EVALUATION OF THE KNOWLEDGE THOUGH A ANONYMOUS INQUIRY

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INTRODUCTION. The detection of omissions in the education of the hospital staff is fundamental in improving the quality and minimizing medical inconsistencies. To obtain viable results, collaboration of the staff is needed. The analysis of knowledge by means of a anonymous inquiry enhances the collaboration. We use for example the analysis of knowledge about the recommendations of the Spanish department of transport, about patients with cardiovascular pathology driving a vehicle, because non compliance with these rules have serious legal consequences.Evaluation of the knowledge of the hospital staff of the cardio vascular department about the recommendations about conducing of the department of transport at the time of discharge of patients with different cardiac diseases by means of an anonymous inquiry.

METHODS. Transversal observational study with collection of data by means of inquiries of 20 multiple choice questions presented to medical staff, interns and residents of the departments of cardiology, cardio vascular surgery and the intensive care unit of the regional University Hospital Carlos Haya, Malaga. Hospital of the third level. The ten questions concern matters about the time after this discharge from the hospital during which the patients who suffered a cardiac event are not allowed to drive, using as reference the Spanish norms according to the guide of clinical practice from the Spanish and European society of cardiology.

RESULTS. We evaluated in an anonymous and improvised way, all the staff of the concerned departments: cardio vascular surgery, cardiology, the intensive care unit. N56. Chief of service 3 Head of department 4 Consultants 25 Residents 24. The percentage of the medical staff which collaborated was 83,9% (n 47).

The % of right answers between de different professional status were: chiefs 0%, heads 50%, consultants 72%, residents 100%. The results in the different evaluated areas were: pacemarker 51% and 33%, stent implantation 51% and 28%, coronary by-pass surgery 56% and 44%, valvular surgery 16% and 14%, Acute myocardial infarction 57% and 44%, Instable angina II/IV 33% and 21%, Instable angina III/IV 28% and 23%, AID implant 65% and 44%. The two percentages were reffered to the patients the first one is for normal drivers and the second one is for professional drivers.

CONCLUSION. The anonymous evaluation of hospital staff is very useful at the time of detecting deficits in knowledge in the hospital staff and correct them with appropriate training programs. The professional status influences the level of collaboration, being that residents and consultants have the highest response rates.

0160

KNOWLEDGE OF MEDICAL STUDENTS ABOUT INTENSIVE CARE SPECIALITY AND FUNTIONING OF AN ICU. NATIONAL ENQUIRY

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INTRODUCTION. To assess level of knowledge and acceptance among medical students about the speciality of Intensive Care.

METHODS. Enquiry performed among medical students from the following universities: Autonoma y Complutense University of Madrid, Salamanca University. Extract/sample obtained from an on-going/prospective study.

RESULTS. 314 students responded. 93% aged between 20–40 (interval: 20–35 years) and 75,8% are female. 53,5% of participants belong to 2ª period (clinical years i.e not pre-clinical education). 85,7% refer to study medicine on vocation followed by a 6,7% which refer to study influenced by family/tradition. Class average marks were satisfactory (43,3%) and 18,2% had pending subjetcs from previous years. Weekly study time amounts to more than 8 hours (53,8%). 74,2% have personal contact with some doctor. They know ICUs through different ways: televisión (37,9%), personal experience (22,3%), references through colleges (33,8%) and others (13,7%); a 17,5% has no knowledge.

ICUs are associated to different specialities: intensive care medicine (81,7%), internal medicine (47,7%), ""reanimadores ""…, cardiologists (23,4%) and general medicine (10%). The mayority think that patients treated in ICUs are mainly coronary (61,5%), postoperative (67,8%), respiratory patients (59,2%), politraumatized (85%) and neurologic patients (61,5%). Regarding treatments employed, the most widely known are: nasogastric sondage (61,5%), central lines (67,5%), orotraqueal intubation (83,1%), mechanical ventilation (87,9%), antibiotics (59,6%), i.v sedation (67,5%), i.v analgesia (68,2%), total parenteral nutrition (TPN) (53,1%), tracheostomy (50,6%); they consider of less common use: peripheral lines (49%), antiarritmics (49,7%), ""sequencial muscle relaxation""(sucinil colina ¿??) (27,7%), lumbar puncture (23,6%), Swan-Ganz catheter (33,2%), thoracocentesis (28,3%), enteral nutrition (37,6%), transient pacemaker (37,3%), permanent pacemaker (16,6%), transfusions (45,5%), pericardiocentesis (24,8%), arterial canalization (37,3%), helicoidal CT-scan use (15,6%), tracheostomy (36,6%), continuos hemofiltration (24,2%) and dyalisis (16,6%). 99% believe that funtioning of ICU spans 24 hours. Regarding organ donation, they believe the Intensive Care physician participates in maintenance of the donor (71,7%), although little in the detection (37,3%) and obtaining the consent form from families (38,2%). 45,9% consider the speciality of Intensive Care as a proffesional option to follow.

CONCLUSION. The Intensive Care speciality is only partially known by medical students who show many gaps regarding the funtioning of ICU.

0161

RAPID RESPONSE SYSTEM COMBINED WITH SIMULTANEOUS EMERGENCY CALL SYSTEM IN WHOLE HOSPITAL

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INTRODUCTION. The system of in-hospital Rapid Response System (RRS) is desired to be set up. Our Critical Care and Emergency (CCE) Center had functioned as a voluntary Rapid Response team (RRT) in response to the simultaneous emergency call system, or in-hospital whole paging system, Doctor Call (DC) system. The object of this study is to clarify the usefulness and problem of our DC and MET system.

METHODS. We retrospectively examined the medical records and the records of DC. Our DC system is as follows; A staff who find a collapse of a patient or a patients requiring urgent medical support ask another staff to call DC by the nearest fixed in-hospital phone, DC is announced in all area of the hospital except bed room of patients. At night, DC is not announced in the bedroom of patients and passage of the wards. We bring an AED and instruments for resuscitation. In the lower floor of our hospital (outpatients department, examination area, and many medical secretary and non-medical consulting office), we have appointed obligated staffs, usually nurses, who should bring monitor, oxygen, emergency cart and stretcher. Non-medical office workers go to the scene and documented the recording form. We CCE Center staff individually go to the scene directly, without gathering and completion of the team. Our completion of the team is confirmed at the scene.

RESULTS. The data of 34 cases were enrolled. Many events occured in wards or diagnostic and treatment room in the outpatients' department in 29%, examination room in 6%, and other non-medical area such as waiting hall, passage, etc. in 65%. Patients were found by doctor in 21%, nurse 18%, patients' family 6%, non-hospital-staff persons 12%, and other non-medical staffs in 43%. The reasons why bystanders decided to start up DC system are cardiac arrest in 12%, unresponsiveness in 26%, convulsion in 12%, falling-down in 29%, sitting down in 3%, injury by oneself in 3%, and lying in 15%. The mean time interval between activation and arrival at the scene and between the time of onset and arrival are 0.75 and 1.40 minutes.
In 2 inpatients, bystander at first called a doctor on night duty of the ward with hesitation for using this system. We experienced 6 cases of CPA in DC system including these 2 cases, 33% of whom were survived without any functional disturbance, 49% died after temporary ROSC, and 18% died without ROSC. Except these 2 cases, patients were managed by doctors as bystanders before DC in 25%, by RRT at first in 53% within 3 minutes, by staffs of general ICU in 6% within 1 minute, and by other generalists and specialists in 16% within 2 minutes.

CONCLUSION. Although our RRT system is thought to work well, it is necessary to be helped by other doctors working nearer the scene than RRT. It is thought necessary to educate the importance of emergency call and RRT system even at night for all hospital staff.

0162

UNISEVEN REGISTRY – IMPORTANT IN CLINICAL PRACTISE

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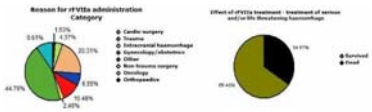
INTRODUCTION. Since 1998 recombinant activated factor VII (rFVIIa) is available for the treatment of the bleeding; although primarily developed and registered for the treatment of haemophilia with inhibitors. Increasing number of reports is available describing "off-label" use of this medication also in patients without pre-existing bleeding disorders as "rescue therapy" in case of sever life-threatening bleeding in trauma and/or surgical patients as well as in patients with post-partum haemorrhage (PPH) and intra-cranial bleeding (ICH).

METHODS. The "rescue mode" of rFVIIa use in those patients, however limits "per-se" possibilities of its further investigation in terms of "evidence – based medicine". It is difficult to set up ethical clinical trials and this was one of the main reasons for the development of UniSeven Registry – registry gathering information about clinical use of rFVIIa in life-threatening bleeding in non-haemophilia patients. This registry is used to monitor all reported episodes, when rFVIIa was used in the situation described above in Czech Republic since 2002.

RESULTS. In presence UniSeven registry became international database with four more European countries involved (Slovakia, Hungary, Slovenia, Poland). To date, more than 600 episodes of rFVIIa use in life threatening bleeding has been recorded; 460 of them in Czech Republic. Data in UniSeven Registry enable us to asses the efficacy of the treatment as well as its safety. This is done mainly, but not only, by the comparison of the blood products, catecholamine, plasma expanders and crystalloids use in the given period before and after rFVIIa administration. The site and type of the bleeding as well as other concomitant medication, medical and/or surgical intervention is also recorded. Main output from the registry is overall survival rate currently 65%) but much more information can be obtained from the registry.



CONCLUSION. Setting up UniSeven Registry significantly contributed to our efforts when preparing national guidelines for treatment of life threatening bleeding. Many professional societies in Czech Republic were involved in creating those guidelines. To date, guidelines for the treatment of life threatening bleeding in trauma and surgical patients have been published and guidelines for the treatment of PPH are shortly before finishing.

0163

ICU AND PATIENT SAFETY: A CHANCE FOR IMPROVEMENT

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INTRODUCTION. Italian Health Care Ministry is working for risk management improvement in our country;the Anaesthesiological Society (SIAARTI) has identified a Study Group for Clinical Risk Management (SG-CRM). The SG-CRM has chosen a proactive approach risk management and has suggested some tools to prevent adverse events in OR and ICU(1).ICU and critical patients represents a complex system in which caregivers must know that in their context human errors and adverse events might be frequent and patient safety initiatives must be introduced.Mistakes can be made by nurses and doctors;poor leadership and comunication, working overload and inadequate skill are common causes of human errors. The priority is improve a safety culture and a system able to identify criticism and to learn from mistakes. The Safety WalkRound (SWR) is a known tool for risk prevention described by the Joint Commission to connect senior leadership to risk management and to spread a culture of safety into the health care system(2).

METHODS. A multicentric study aboutSWRwas performed in2007by SIAARTI in4General ICUs, including the 9beds Chieti University ICU. The structured interview ofSWRwas performed through 4meetings. The ICUs team (doctors, nurses and trainees), after exposure on methods, was interviewed during daily duty, discussing5groups of arguments with a member of theSG-CRM and a responsible of the Hospital Quality System. The topics of interview questions: (a) error, (b) prevention of error, (c) communication teamwork and leadership, (d) error discussion (e) relationship with ICUs patient and family.

RESULTS. In the4meetings,8/9physicians and27/34nurses and 8 3rdyear trainees have been interviewed in small groups. The results were discussed with the Service Director and theSG-CRM member.60%of interviewed declared to have found a potentially severe error in the last period, without having any safety culture.95%of the participants (90%of trainees)has developed a personal practice to prevent errors.100%of nurses and physician in training identified as a problem the insufficient unity of the team work.88%of all discussed whit other health workers about error and near misses and100%were scared about personal legal consequences when reporting an error.Maybe for this reason90%declared that the safety isnt an argument to be debated with patients and family.

CONCLUSION. In ourICU, theSWR have been useful to being a self-keeping process (approved by local health care and quality system), useful to educate clinicians and managers toCRM and safety culture. TheICUteam voluntarily proposed to gather Near Misses system and to schedule SWRmeetings every 6 months, to lead to continuous quality improvement through reviewing and introducing new protocols. Trainees and CRMteaching has a basic role in creating a no blame culture, to be felt as an integral part in team daily work and in continuing quality betterment.

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GRANT ACKNOWLEDGEMENT. SIAARTI.

0164

ANXIETY AND DEPRESSION FOLLOWING DISCHARGE FROM INTENSIVE CARE

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INTRODUCTION. Psychological morbidity is observed with a relatively high incidence in patients even after a short admission to the intensive care unit (ICU) (1). The identification of these patients may be difficult without the use of a screening test soon after their critical illness. The Hospital Anxiety and Depression Scale (HADS) is a simple and reliable tool to identify patients with anxiety and depression following critical illness (2). Therefore we studied HADS as soon as possible after critical illness and before attending the follow-up clinic.

METHODS. In a 6 beds mixed (predominantly medical) ICU in a community hospital, all adults (> 18 years) ICU survivors during a 14 months period and with a minimum stay of 72 hours were included. One month after ICU discharge or soon after hospital discharge they were sent the HADS using regular mail. A score of 11 or more indicated a definite case of anxiety or depression. Values are expressed as mean (SD).

RESULTS. Among the 76 eligible patients, 49 (64,5%) answered the HADS. The mean age was 61 (15)years. Their mean SAPS II score was 38,1 (14,2) and mean length of ICU stay was 6 days. 39 (79,6%) patients had mechanical ventilation during a mean duration of 7 (6,5) days. Mean scores for anxiety were 5,3 (4,0). 6 of 48 patients (12,5%) qualified as a case of anxiety. Mean score for depression were 3,6 (3,4). There were 3 cases (6,3%) of depression.

CONCLUSION. The HADS is a screening tool which may help to determine which patients with anxiety or depression should be evaluated further by mental health professionals after ICU.

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Poster Sessions
Circulatory issues and prognosis: 0165–0177

0165

AMPLIFICATION OF RESPIRATORY INDUCED ARTERIAL PRESSURE VARIATIONS DURING SPONTANEOUS BREATHING USING AN INSPIRATORY/EXPIRATORY RESISTOR – A METHOD TO ASSESS FLUID RESPONSIVENESS?

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INTRODUCTION. Assessment of hypovolemia and fluid responsiveness in spontaneously breathing subjects is often demanding. During controlled ventilation, increased arterial pressure variations induced by changes in intrathoracic pressure have been shown to indicate fluid responsiveness. However, during spontaneous breathing arterial pressure variations are minor and difficult to detect. We hypothesized that an inspiratory/expiratory resistor would amplify the intrathoracic pressure changes and the arterial pressure variations during spontaneous breathing. The aim was to test this hypothesis in hypo-, normo- and hypervolemic animals.

METHODS. In eight prone, tracheotomized, anesthetized and spontaneously breathing pigs (20–25 kg) 30% of the blood volume was removed by venesection. The pigs breathed in a randomized order either through an inspiratory and an expiratory resistor, generating pressures of 7.5 cmH_2O counteracting airflow (resistor) or only through the tracheal tube without any resistor (no-resistor). Hemodynamic and respiratory variables were measured during the 2 breathing modes. Measurements were again performed after that blood volume had been restored by a HES solution (Voluven, Fresenius Kabi, Denmark) and after that HES corresponding to 20 and 40% of blood volume had been infused. Statistics: Non-parametric ANOVA, Mann Whitney rank sum test and linear regression. Significance level; $p < 0.05$.

RESULTS. Stroke volume was 21 (18, 30) ml (median and interquartile range) during hypovolemia, 51 (43,65) ml during normovolemia ($p < 0.001$) and 62 (50, 73) ml and 64 (53, 67) ml during 20% and 40% hypervolemia, respectively. Corresponding values for systolic pressure variation (SPV) (resistor) were 14 (8,17)%, 4 (2,6)%, 5 (4,7)%, and 4 (3,6)%, and for SPV (no-resistor) 5 (3, 7)%, 2 (2,3)%, 2 (2,2)%, and 2 (1,3)%. There were statistical significant differences between the breathing modes at all volemic levels, except at normovolemia, and within the breathing modes between hypo- and normovolemia. Pulse pressure variation followed the same trend. Linear regression showed R2 for SPV (resistor) and change in cardiac output of 0.46.

CONCLUSION. Arterial pressure variations were amplified during spontaneous breathing by use of an inspiratory/expiratory resistor, and increased variations were easily detected during hypovolemia. These variations were significantly reduced after fluid resuscitation and not markedly changed by hypervolemia. This suggests that an inspiratory/expiratory resistor could be useful when predicting fluid responsiveness during spontaneous breathing.

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0166

CORONARY ARTERY BYPASS GRAFTING IN VERY OLD POPULATION. THE WEIGH OF THE STRATEGY

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INTRODUCTION. Safety and efficacy of off-pump coronary artery bypass (OPCAB) has been demonstrated in the general population as well as in high-risk patients. This retrospective study was aimed to evaluate if OPCAB can confirm its role in a particular high-risk subset of patients: the octogenarians.

METHODS. From November 1994 to December 2002, 138 patients older than 80 years underwent coronary artery bypass grafting (CABG), 52 (37.7%) on-pump (ONCAB) and 86 (62.3%) off-upmp (OPCAB). The two groups were similar for all investigated preoperative and operative characteristics but emergencies (25.6% OPCAB vs 48.1% ONCAB, $p = 0.007$), diabetes (22.4% vs 7.7%, $p = 0.028$); moreover OPCAB patients showed lower number of diseased vessels ($p < 0.001$). Actuarial survival curves were obtained by means of Kaplan-Meier method.

RESULTS. Early mortality and morbidity were 4.3% (3.5% OPCAB vs 5.8% ONCAB, p ns) and 11.6% (11.6% OPCAB vs 11.5% ONCAB, p ns), respectively. In ICU stay was 13 ± 7 OPCAB vs 21 ± 15, $p = 0.023$. Mean follow up time of 7.5 ± 1.9 years. Seven-year freedom from death any cause (60.9 ± 5.5 OPCAB vs 57.9 ± 7.0 ONCAB, p ns), from cardiac death (84.1 ± 4.3 vs 84.2 ± 5.7, p ns), from cardiac events (81.0 ± 4.7 vs 82.3 ± 5.7, p ns) and from any event (57.8 ± 5.7 vs 56.3 ± 7.1, p ns) were not statistically different between the two groups.

CONCLUSION. In octogenarians OPCAB seems not to have any protective effect in the early postoperative time. In long-term period, OPCAB provides outcome, due to any or cardiac causes, similar to the one achieved by more conventional ONCAB. However, OPCAB seems to offer lower in-ICU stay which is surely more comfortable for this older subset of patients higher prone to develop respiratory complications, infection and plague.

GRANT ACKNOWLEDGEMENT. SIAARTI.

0167

PERIOPERATIVE RISK FACTORS FOR PROLONGED MECHANICAL VENTILATION FOLLOWING CARDIAC SURGERY IN NEONATES AND YOUNG INFANTS

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INTRODUCTION. Prolonged mechnical ventilation (PMV) after cardiac surgery in children has been reported to be associated with a high postoperative morbidity and mortality, as well as increased ICU and hospital resource utilization. Little has been done to identify the predictors of PMV in neonates and young infants who represent a special subset of children. The purpose of this study was to evaluate the perioperative risk factors for PMV in neonates and young infants undergoing cardiac surgery to correct or palliate congenital heart disease.

METHODS. Clinical records of 172 consecutive children aged $\leq$ 3-month including 42 neonates were reviewed. PMV was defined as MV $\geq$ 72 hrs following operation. Univariate analysis was performed to compare demographic data, pre-, intra-, and post-operative variables of patients who required PMV with that of patients requiring MV $<$ 72 hrs (non-PMV, NPMV). Comparisons were performed using the unpaired t-test or the Mann-Whitney U-test for continuous variables, and the Chi-square test or the row means score difference test for categorical variables. A stepwise logistic regression analysis was used to evaluate the independent risk factors for PMV following cardiac surgery. The predictive ability of the final model was assessed by using area under the receiver operating characteristic curve.

RESULTS. Sixty-one patients required PMV after cardiac surgery. The median duration of MV was 150 hrs (72–600 hrs) in PMV patients, while 28 hrs (4–70 hrs) in NPMV patients. The independent risk factors for PMV were risk adjustment for surgery for congenital heart disease (RACHS-1; OR = 6.60, P = 0.041), nosocomial pneumonia (OR = 54.78, P = 0.001), postoperative low cardiac output syndrome (OR = 37.06, P = 0.001), postoperative cumulative positive fluid balance (OR = 10.06, P = 0.032), and extubation failure (OR = 15.61, P = 0.027). The area under ROC cure for this final model was 0.940.

CONCLUSION. In neonates and young infants undergoing cardiac surgery, a model based on RACHS-1, nosocomial pneumonia, postoperative congestive heart failure, fluid retention postoperatively and extubation failure may be able to predict the possibility of prolonged ventilation duration, and assist clinicians in resource allocation and patient management. Prospective validation of this predictive model with larger numbers in multi-center would be necessary.

0168

PROGNOSTIC VALUE OF B-TYPE NATRIURETIC PEPTIDE IN CRITICALLY ILL PATIENTS

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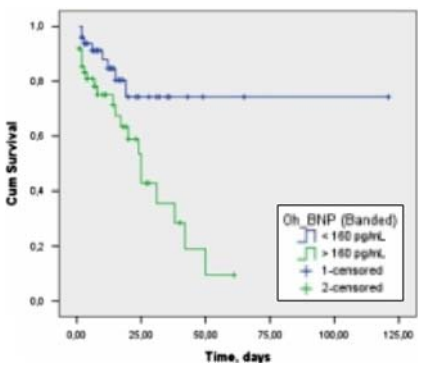
INTRODUCTION. Plasma B-type natriuretic peptide (BNP) is used to screen for cardiac dysfunction in the emergency department and outpatient population. However, in the critically ill patient, BNP do not necessarily reflect just ventricular dysfunction and its prognostic value in predicting these patients mortality and morbidity remains controversial. We sought to determine the prognostic value of BNP in an unselected cohort of patients admitted to an intensive care unit (ICU).

METHODS. We evaluated 98 consecutive ICU patients admitted during 3-month period; admission BNP was measured and population was divided in two groups: A - BNP >=160 pg/ml (n = 49); B: BNP $<$ 160 pg/ml (n = 49).

RESULTS. Group A patients were more frequently older, with prior history of heart and renal failure. In this group, we observed more often pulmonary rales, atrial fibrillation and lower diastolic arterial pressure. Also, the use of vasopressors was significantly higher than in group B (64.9% vs. 35.1%; p = 0.026); patients receiving these drugs had a mean level of BNP higher than those who did not (700.5 vs. 284.4 pg/ml, p = 0.001). Group A patients had also higher values of Acute Physiology and Chronic Health Evaluation (APACHE) II score (p = 0.003) and had a significantly higher in-ICU mortality (73.3% vs. 26.7%; Log-Rank p = 0.005 – Fig. 1) and intra-hospital mortality (65.0% vs. 35.0%; Log-Rank p = 0.023).



CONCLUSION. Critically ill patients with BNP level >=160 pg/ml had significantly higher intensive care unit and intra-hospital mortality. In the studied population BNP was a good predictor of in-hospital mortality. BNP is potentially a very useful diagnostic tool, as it might facilitate treatment of emergency and ICU patients.

0169

WHICH FACTORS MIGHT PRODUCE HIGHER MYOCARDIAL DAMAGE AFTER CORONARY ARTERY BYPASS GRAFTING

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INTRODUCTION. It has been clearly demonstrated that postoperative increment of CK-MB release can reduce significantly early and mid-term survival, even in absence of a clear picture of perioperative myocardial infarction (MI). This retrospective analysis was aimed to identify pre- and operative risk-factors yielding higher myocardial damage after coronary artery bypass grafting (CABG).

METHODS. From January 1995 to December 2002, 4634 patients underwent isolated CABG. CK-MB release was assessed each postoperative day and the peak value was used for the analysis. Receiver operating characteristic (ROC) curve was used to identify a cut-off value of CK-MB peak > 30UI/L (specificity and sensitivity of 75%) associated with a significant increment of 30-day mortality cardiac-related. Pre- and operative variables were entered in a binary logistic regression having as primary end-point the CK-MB release > 30UI/L (100 bootstrap samples). The results were reported as odds ratio (OR), 95% confidence interval (CI) and p-value.

RESULTS. A CK-MBpeak > 30UI/L was found in 1624 (35%) patients. Thirty-day cardiac mortality in this subset of patients was 2.6% versus 0.8% in 3010 patients with a CK-MB peak ≤ 30 UI/L ($p < 0.001$). Table 1 reports the results of logistic regression.

CONCLUSION. Age and urgency were unmodifiable variables which might produce higher CKMB release after CABG. The use of cardiopulmonary bypass produces an ischemic-reperfusion damage yielding stunned and/or necrotic myocardium. In the second case, CK-MB release increases in postoperative period along with left ventricular dysfunction. Furthermore, stunned myocardium cannot solve with time, producing apoptosis with further impairment of myocardial function. It is clear that the longer CPB time, the higher CKMB release. Finally, it is very important for both surgeon and anaesthesiologist to keep the patient stable over the operation and immediately after, to avoid hypotension or arrhythmias that can produce deeper myocardial damage.

GRANT ACKNOWLEDGEMENT. SIAARTI.

0170

COMPARISON OF A PROSPECTIVE COHORT WITH AN INTERVENTIONAL STUDY INTO POST-OPERATIVE GOAL DIRECTED THERAPY

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INTRODUCTION. Goal Directed Therapy (GDT) based on manipulation of oxygen delivery (DO2I) has been shown to demonstrate an improvement in patient mortality and morbidity in selected patient groups. This study compares a prospective cohort group who had post-operative GDT delivered by a nurse-led protocol, with a previous interventional study from the same unit.

METHODS. Data were collected on all patients (510) receiving GDT as part of routine clinical practice over an 18 month period and were compared with data from a previous study [1]. 497 episodes of data were suitable for analysis.

RESULTS. The cohort group was younger than the study patients (64 (16) vs. 67 (11) years, $p = 0.05$). Fewer patients had an elective procedure 77.3% vs. 89% ($p = 0.002$). Case mix varied with less vascular (12.3% vs. 23%, $p = 0.004$), urological (16.3% vs. 21%, $p = 0.08$) and upper gastro-intestinal (GI) (0.6% vs. 20%, $p = 0.0001$) and more lower GI (36.8% vs. 20%, $p = 0.0005$)operations in the cohort group.

TABLE 1

	Audit (n = 497)	Protocol [1] (n = 62)	p value	Control [1] (n = 60	p value
Colloid Volume (ml) during protocol	1034 (556)	1907 (878)	0.0001	1204 (898)	0.04
Patients receiving dopexamine	207 (41.7%)	55 (88.7%)	<0.0001	1 (1.6%)	0.006
No. pts with DO2I > 600 ml min-1 m-2	278 (56.2%)	49 (79%)	0.07	27 (45%)	0.13
LoS in hospital (days)	19.1 (23.2)	17.5 (20.8)	0.6	29.5 (34.8)	0.004
No. patients with complications	213 (42.9%)	27 (43.6%)	0.51	41 (68.3%)	0.0003

CONCLUSION. Complications and hospital length of stay for patients in the cohort study were similar to that in the GDT group, although less inotrope and fluid were used resulting in a lower achievement in target DO2I These outcomes may be partly explained by the change in case mix. The reduction in fluid and inotropes to achieve the haemodynamic target may present the reality of clinical practice, where opinion and workload may reduce evidence based and timely intervention. In this case series patients were managed primarily by senior ICU nurses who although familiar with the protocol may not have been as confident to intervene as the original researchers.

Despite the poorer achievement of targets, this data demonstrates that research can be successfully put into routine clinical practice. However it highlights the need for continuing education and audit to assess overall effectiveness. Further analysis is required to identify whether case mix may have provided the improved outcomes.

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0171

NT-PROBNP IN MECHANICALLY VENTILATED PATIENTS WITH DUCHENNE MUSCULAR DYSTROPHY

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INTRODUCTION. Duchenne Muscular Dystrophy (DMD) is an X-linked recessive disease. DMD patients previously died mainly from pulmonary problems. However, as advances in respiratory care increase life expectancy, morbidity and mortality due to cardiomyopathy may rise. Detecting cardiomyopathy in DMD can be a particularly frustrating problem to patients and physicians due to the elusive and non-specific symptoms that may be caused by a variety of disorders. The best way to identify DMD patients with cardiomyopathy has yet to be defined. Echocardiography remains the standard diagnostic modality for cardiomyopathy in DMD patients and consensus meetings advise annual echocardiograms after the age of 10. However, scoliosis and poor echocardiographic acoustic windows in adult DMD patients hamper accurate assessment. Multigated cardiac radionuclide ventriculography (MUGA) is not affected by these problems and has been found to be sensitive in detecting subclinical DMD cardiomyopathy. We now present our initial experience with plasma NT-proBNP measurement in the screening and diagnosis of cardiomyopathy in mechanically ventilated DMD patients.

METHODS. Retrospective study, 13 patients. Echocardiography classified left ventricular (LV) function as preserved or depressed. Plasma NT-proBNP was determined using immunoassay. LV ejection fraction (LVEF) was determined using MUGA.

RESULTS. Median NT-proBNP was 73 ng/l (25–463). Nine patients had a NT-proBNP < 125 ng/l. 4 patients showed a MUGA LVEF < 45%. DMD patients with depressed LV function (n = 4) as assessed by echocardiography had significantly higher median NT-proBNP than those (n = 9) with preserved LV function: 346 (range 266–463) ng/l versus 69 (range 25–257) ng/l ($p = 0.003$). NT-proBNP significantly correlated with depressed LV function on echocardiogram and with LVEF determined by MUGA.

CONCLUSION. Although image quality of MUGA is superior to echocardiography, the combination of echocardiography and NT-proBNP achieves similar results in the evaluation of left ventricular function and is far less expensive, time consuming en burdensome for the patient. We therefore advise to add NT-proBNP to echocardiography in the routine cardiac assessment of DMD patients.

0172

C REACTIVE PROTEIN AND THE LEVEL OF ANGIOGRAPHIC ABNORMALITIES IN THE ACUTE CORONARY SYNDROME AND STABLE ANGINA

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INTRODUCTION. The C reactive protein (CRP) is a marker of inflammation which has been incorporated in the prognostic stratification of ischemic coronary events. The CRP has been related to the angiographic complexity of the lesion causing the acute coronary syndrome without ST- elevation (NSTEMI) in patients with single vessel disease. However, in the light of the theory of multi vessel abnormalities, the inflammation is not a focal problem, but generalized through all of the endothelium and can potentially destabilize more than one lesion at the same time. In this study we tried to investigate whether the level of the CRP could predict the existence, not only of more complex lesions but also multiple lesions.

METHODS. We studied 89 consecutive patients who underwent a diagnostic and/or therapeutic coronary angiogram, classified according to the clinical presentation in patients with stable angina (n = 51) and NSTEMI (n = 38). The measurement of CRP with high sensibility test was compared with the number of visible lesions on the angiogram (lesions which constituted 10% of the diameter of the vessel) in each patient. We performed a bi-variable correlation for the variables number of coronary lesions and level of CRP in each group.

RESULTS. The most significant data of each group are shown in table below:

The Pearson correlation coefficient was 0,01 in the stable angina group and 0,003 in NSTEMI.

Clinical Presentation	Stable Angina (n = 51)	NSTEMI (n = 38)	Stadistic significance
AGE	62,20 ± 12,32	66,11 ± 12,18	p = 0,14 (ns)
LEVEL CRP	5,85 ± 7,14 mg/L	19,92 ± 19,31 mg/L	p < 0,01
MEAN NR. LESIONS	2,73 ± 1,48	2,66 ± 1,49	p = 0,83 (ns)

CONCLUSION. We did not find a correlation between the level of the CRP and the number of visible lesions on the coronary angiogram. The CRP as marker of inflammation is capable of detecting situations if clinical instability but there is no correlation with larger extension of angiographic coronary disease.

0173

HEART FAILURE WORSENING DURING ACUTE MYOCARDIAL INFARCTION. PROGNOSTIC FACTORS

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INTRODUCTION. Our objective is to identify the main preexisting factors involved in the heart failure worsening during the acute myocardial infarction (AMI).

METHODS. we analyse 9,060 cases of AMI admitted in an Intensive Care Unit (ICU) with Killip score at admission lower than IV who were recruited from 1/1/2000 to 31/12/2004 in the PRIMVAC registry. Heart failure worsening (HFW) was defined as in-ICU maximum Killip score greater than Killip at admission. We performed a preliminay univariate analysis (Student T-test and chi square) followed by a binary logistic regression to adjust for confounders. All the variables were forced to remain in the model. Minitab Statistical Packet was used. The results are presented as mean, percent or Odds Ratio (OR).

RESULTS. The mean age was 65.2 years (SD 12.6) and 75.4% were males. Killip score at admission was I 75.9%, II 14.6% and III 9.6%. Accordig to definition 16.4% presented HFW. Age (69.6 vs 64.0), female gender (20.7% vs 14.7%), previous AMI (21.7% vs 15.1%), diabetes (20.8% vs 14.1%), Q wave on ECG (17.6% vs 12.3%) and high bood pressure (17.6% vs 14.7%) were positively associated with HFW. In the other hand cholesterol (14.6% vs 17.1%) and smoking habit (12.3% vs 18.5%) seems to be protective factors against WHF. After multivariate analysis only age (OR 1.03), female gender (OR 1.18), previous AMI(OR 1.47), Killip II score at admission (OR 1.88), diabetes (OR 1.35) and Q wave on ECG (OR 1.77) remainded as strong predictors of HFW. Hipercholesterolaemia, smoking habit and high bood pressure loosed their statistical significance.

CONCLUSION. In our population a pattern of diabetic old woman with pre-existing AMI, Q waves on ECG and Killip II at admission strongly suggests a new onset or worsening heart failure.

0174

TACHYARRHITMIA IN NON-ST SEGMENT ELEVATION ACUTE CORONARY SYNDROME AND ANTIPLATELET TREATMENTS

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INTRODUCTION. The rate of tachyarrhitmia (Tch) is rarely described in non-ST segment elevation acute coronary syndrome. Its relationship with different combinations of antiplatelet treatment has not been assessed yet.

METHODS. We performed an observational study to assess the association between antiplatelet therapy and Tch events. Patients were recorded from a regional registry in Spain. Three combinations of antiplatelet treatments were considered for assessment: aspirin plus tirofiban, aspirin plus clopidogrel, or aspirin plus clopidogrel plus tirofiban. Presence of Tch in any type of antiplatelet treatment was evaluated. Demographical variables, Tch events and aditional antiischemic treatments were registered. Statistical analysis: chi-square was employed to asses the association between Tch and antiplatelet treatment. A p value < 0.05 was considered statistically significant.

RESULTS. Six hundred patients were included in the registry and five hundred and thirty five patients received one of the three combinations of antiplatelets described. Mean age was 67.2 (SD 12). Man/female ratio was 2.2. Triple antiplatelet treatment was the most usual. Rate of Tch is shown in Table 1. Ventricular Tch (VT) was present in 2.2% of patients and supraventricular Tch (SVT) in 5.2%. Both types of Tch were more frequent when tirofiban was not administered. Association between Tch and antiplatelet strategy was next to statistical significance. No death was related to VT or SVT. There were no differences for betablockers or calcium antagonists use between antiplatelet strategies.

TABLE 1 TCH AND ANTIPLATELETS STRATEGIES

Treatment	AAS + clopidogrel + tirofiban N = 265 (49,5)	AAS + tirofiban N = 133 (24,9)	AAS + clopidogrel N = 137 (25,6)	p value
VT	4 (1,5)	2 (1,5)	6 (4,4)	0,055
SVT	16 (6)	2 (1,5)	10 (7,3)	

Numbers in brakets denote %

CONCLUSION. Tch are rare in non-ST segment elevation acute coronary syndrome. The rate of VT in our serie was similar to other previously reported. Tch events could be associated to the antiplatelet strategy althoug the mechanism of this association needs to be investigated. Further studies are needed.

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0175

THE PROGNOSTIC IMPACT OF ACUTE RENAL FAILURE ON EARLY AND LATE OUTCOME OF PATIENTS UNDERGOING CORONARY ARTERY BYPASS GRAFTING

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INTRODUCTION. The aim of this retrospective analysis was to evaluate the weight acute renal failure (ARF) occurring soon after coronary artery bypass grafting (CABG) upon early and late outcome.

METHODS. From January 1988 to December 2002, 5757 patients underwent isolated CABG. Average age was 63 ± 10 years; 939 (16.3%) were females; 1319 (22.9%) were urgent cases; 173 (3.0%) showed chronic renal failure (creatinine ≥ 2 mg/dl); extracardiac vasculopathy was present in 1017 (17.8%) cases; mean EF was 58.4% ± 13.1%. Cardiopulmonary bypass was employed in 3349 (58.2%) patients. Acute renal failure was defined as postoperative blood creatinine ≥ 2.0 mg/dl, if the preoperative value was normal, or increment of at least 1 mg/dl if preoperative renal function was altered (creatinine ≥ 2 mg/dl).

RESULTS. Overall rate of postoperative ARF was 3.6% (207 patients). Early mortality was 2.5% (143); it rose up to 8.2% (17) in 5550 patients who did not experience postoperative ARF whereas it was 2.3% (126) in patients with postoperative ARF ($p < 0.001$). Stepwise logistic regression confirmed that postoperative ARF was a risk factor for increased early mortality (OR = 3.8, 95%CI = 2.3–6.8, $p < 0.001$). Postoperative median in-ICU stay (20 vs 16 hours, $p = 0.020$). was significantly higher in patients with ARF. Ten-year actuarial survival was 85.9% ± 0.5 (86.7% ± 0.5 in patients with no-ARF and 60.6% ± 4.6 in those ones with ARF, $p < 0.001$). Cox analysis confirmed that ARF was an independent variables for lower 10-year survival (HR = 3.5, 95%CI = 2.7–4.7, $p < 0.001$).

CONCLUSION. This retrospective analysis confirmed that presence of acute renal failure soon after isolated CABG might impair significantly both early and late mortality. Moreover it increases significantly postoperative in-ICU stay reducing the possibility to perform fast-track; this lead surely higher patient discomfort.

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0176

ISOLATED LEFT DESCENDING ARTERY OCCLUSIVE DISEASE

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INTRODUCTION. The percutaneous angioplasty (PTCA) has higt incidence of restenosis in case of occlusive coronary lesion. Can Left Anterior Small Thoracotomy (LAST) provide good early and long-term results in patients with isolated left descending artery (LAD) occlusion?

METHODS. From November 1994 to December 2004, 143 patients with isolated LAD occlusion.

Underwent LAST operation. Average age was 59 +/− 10 years (32–81). Logistic EuroSCORE was 2.7%. In 135 cases left internal mammary artery (LIMA) was directly anastomosed to the LAD, whereas in 8 cases LIMA was lengthened with an inferior epigastric artery in 5 and with a saphenous vein in 3 cases.
Contraindication were:
A the site for anastomosis is below the second diagonal branch; therefore our attention has to be addressed to this portion of the LAD;
B an intramyocardial, calcified, small-sized (< 1.5 mm) LAD should be avoided, when these anastomic aspects can be recognized before surgery at angiography;
C sometimes the heart is rotated to the right; in this situation the position of the LAD becomes substernal and anastomosis is impossible to do.

RESULTS. Thirty-day mortality was 0.7% (1 patient). No patients experienced any myocardial infarction (AMI) or cerebrovascular accident. Mayor complication occurred in 3 cases (2.1%), (1 death, 2 acute respiratory failure). Mean intensive care unit and postoperative ward stay were 7 +/− 6 hours and 3 +/− 1 days, respectively. After a mean of 85 +/− 23 months, 5(3.5%) patients died, 2 (1.4%) had an AMI, 1 (0.7%) of them in the grafted area. After a mean of 42 +/− 26, 7 (4.9) patients complained angin. In 3 (2.1%) casesa further operation was needed in the grafted area (GA). The remaining 4 patients received a PTCA for the treatment of progressive disease in circumflex or right coronary. Seven years clinical outcome was: survival 94.5 +/− 2.0, freedom from cardiac death 96.0 +/− 1.8, freedom from AMI 99.9 +/− 0.9, from AMI in the GA 99.2 +/− 0.9, freedom from redo/PTCA 93.8 +/− 2.3, from redo/PTCA in the GA 97.6 +/− 1.7. Among 137 survivors, 60 (43.8%) patients had an angiographic control showing a patency rate of 94.5% (mean follow up of 26 +/− 18 months).

CONCLUSION. Last operation can be safety performed in patient with isolated LAD occlusion providing good long-term clinical and angiographic results.

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0177

PERIPHERAL VERSUS CENTRAL ARTERIAL BLOOD PRESSURE MONITORING IN CRITICALLY ILL PATIENTS ON VASOPRESSORS: AN OBSERVATIONAL STUDY

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INTRODUCTION. It has been suggested that radial artery pressure significantly underestimates femoral arterial pressures in critical care patients receiving high-dose vasopressor therapy leading to excessive administration of these drugs even when mean arterial pressures (MAP) are utilised[1]. Central to peripheral arterial pressure variation is a well recognized phenomenon especially in the setting of cardiac surgery. Subsequent studies have been inconclusive.

METHODS. This was a retrospective opportunistic observational study in a general Intensive Care Unit (ICU). All patients on vasopressor infusions who had a central (femoral) arterial catheter changed to or from a peripheral (radial) arterial catheter during 2006–07 were included. Mean arterial pressure and vasopressor dosing was extracted for 12 hours around the time of the line change. Pre planned summary statistics (area under the curve, mean vasopressor dose) were constructed for each example. Significance was estimated using the Wilcoxon signed rank test.

RESULTS. 155 case notes were reviewed, and 18 patients met the inclusion criteria. The results are described in the Table 1. Initially 7 of these patients had central arterial monitoring while 11 had peripheral monitoring.

TABLE 1

	Peripheral value	Central value	p value
MAP AUC	70.04	69.60	0.92
Vasopressor dose AUC	10.35	11.12	0.57

CONCLUSION. Measurement of mean arterial blood pressure in peripheral or central arteries appears to be clinically interchangeable even in the presence of vasopressors. A prospective study with simultaneous arterial measurements on patients treated with high dose vasopressors may be warranted.

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0179

ANTI-INFLAMMATORY EFFECT OF ROPIVACAINE IN ENDOTOXIN-INJURED ALVEOLAR EPITHELIAL CELLS: ELUCIDATION OF CELLULAR SIGNALLING

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INTRODUCTION. Ropivacaine is a new local anaesthetic that seems to have protective effects in inflammatory situations. As previously shown by our group ropivacaine exerts anti-inflammatory actions in the endotoxin-induced lung injury model [1].

Aim of this study was to investigate the intracellular signalling pathway leading to decreased inflammation after ropivacaine administration in an in vitro model of acute lung injury. We therefore focused on the role of protein kinase C (PKC) and the prosurvival kinases ERK and Akt, the latter two presumably being involved in the NFB-pathway leading to cytoprotection [2].

METHODS. Monolayers of alveolar epithelial cells (AEC) were stimulated with 20 μg/ml lipopolysaccharide (LPS) and co-incubated with ropivacaine in a final concentration of 1 μM (controls exposed to phosphate-buffered saline, PBS). Four different groups were designed: PBS/PBS, PBS/ropivacaine, LPS/PBS and LPS/ropivacaine. LPS and ropivacaine were added at the same time to the cells for 4 h. PKC activity was assessed using a PepTag assay for non-radioactive detection. Activation of ERK and Akt via phosphorylation was determined by Western blotting, using a monoclonal anti-phospho-ERK (pERK) and a polyclonal anti-phospho-Akt (pAkt) antibody. Densitometry was performed, using 3 different experimental setups.

RESULTS. Assessing PKC showed that this intracellular signalling pathway does not seem to be involved into ropivacaine-induced AEC protection. pERK levels, however, were significantly increased by 40% in the LPS/ropivacaine group in comparison to the LPS/PBS group ($p < 0.05$). No conclusive data were found for pAkt.

CONCLUSION. Our study shows for the first time that the anti-inflammatory and cytoprotective effect of ropivacaine might be mediated through phosphorylation of ERK.

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Poster Sessions
Signaling pathways in acute lung injury: 0178–0191

0178

DOWNREGULATION OF VENTILATION-INDUCED LUNG INJURY BY E-SELECTIN-DIRECTED DEXAMETHASONE-IMMUNOLIPOSOMES

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INTRODUCTION. Although lifesaving, mechanical ventilation (MV) may cause serious damage to both healthy and diseased lungs (ventilation-induced lung injury, VILI). We hypothesized that downregulation of inflammation in the lung will positively influence VILI. In inflammation, endothelial cells play an important role e.g. in recruitment of immune cells to affected tissue via expression of adhesion molecules like E-selectin. The present study was designed to investigate whether lung inflammation associated with MV can be modulated by selective delivery of dexamethasone (Dex) into activated endothelial cells of the inflamed lung with anti-E-selectin immunoliposomes. By using this strategy, the systemic negative side effects of Dex can be prevented (Asgeirsdottir et al, Mol Pharmacol, 2007).

METHODS. Mice were anesthetised, tracheostomised and connected to a Servo 900C ventilator with a distribution system allowing simultaneous MV of 6 mice. Mice were ventilated in a pressure-controlled mode at a fractional inspired oxygen concentration of 0.5 and inspiratory/expiratory ratio of 1:1. MV was initiated with either a peak inspiratory pressure of 12 cmH_2O (resulting in VT ~ 7.5 mL/kg) or 20 cmH_2O (resulting in VT ~ 15 mL/kg). Positive end-expiratory pressure was set at 2 cmH_2O in both ventilation strategies; respiratory rate was 100–110 and 70 breaths/min, respectively. Naive mice were used as a reference group. Dex or anti-E-selectin immunoliposomes containing Dex were given intravenously at initiation of ventilation. After 5 hrs of MV, arterial blood gasses were collected to determine deterioration of lung function. Local inflammation was assessed by measuring myeloperoxidase (MPO) activity, which is a parameter for the number of infiltrating granulocytes.

RESULTS. 5 hrs of high pressure MV caused a decrease in oxygenation levels compared to low pressure MV, suggesting that lung function was deteriorated after high pressure ventilation. Both ventilation strategies caused an elevation of MPO activity in the lung compared to the reference group. Administration of anti-E-selectin immunoliposomes containing Dex inhibited MPO activity following both low and high pressure MV with 59.8 and 43.1%, respectively. The effects of systemic free Dex administration were more pronounced (89.4 and 90.2%).

CONCLUSION. Systemic administration of anti-E-selectin immunoliposomes containing Dex downregulates MV induced lung inflammation.

0180

G PROTEIN COUPLED RECEPTORS MEDIATE FIBROBLAST CHEMOTAXIS INDUCED BY BRONCOALVEOLAR LAVAGE FLUID OF ARDS PATIENTS

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INTRODUCTION. Alveolar fibrosis in the late phase of ARDS derives from an abnormal wound healing process. Fibroblast chemotaxis is a critical step in lung repair and fibrosis. Several chemoattractants are present in the broncoalveolar lavage (BAL) fluid of ARDS patients. Chemotaxis is mainly mediated by G-protein coupled receptors, which trigger in turn multiple intracellular signalling pathways. Our hypothesis is that BAL fluid of ARDS patients induces fibroblast chemotaxis and can be inhibited by blockade of G-protein coupled receptors.

METHODS. A chemotaxis assay was performed using lung fibroblasts (NIH-3T3) stimulated with BAL from patients with early or without ARDS. To chemically inhibit G-protein coupled receptors, fibroblasts were pre-treated with pertussis toxin (PTX). The number of migrated cells in response to BAL stimulation was counted. Stimulation of fibroblast with medium or stromal cell-derived factor (SDF)-1 were used as negative and positive controls respectively.

RESULTS. The average number ± SD of migrated cells in response to different stimuli are shown in Table 1.

TABLE 1

PTX treatment	medium	BAL from ARDS patients	SDF1
- -	29 ± 10	86 ± 49**	50 ± 12**
100 ng/ml	25 ± 4	7 ± 4*	3 ± 2*

*** p < .05 BAL and SDF1 vs medium; * p < .05 BAL vs BAL PTX and SDF1 vs SDF1 PTX*

CONCLUSION. G-protein coupled receptors are involved in fibroblast migration induced by alveolar fluid milieu of patients with ARDS. Therefore, the development of specific drugs designed to inhibit G-protein coupled receptors may represent a potential therapeutic treatment to prevent formation of alveolar fibrosis in ARDS.

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0181

ATF3 IS ACTIVATED IN VENTILATOR INDUCED LUNG INJURY

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INTRODUCTION. In spite of its benefits, mechanical ventilation (MV) has been shown to cause ventilator-induced lung injury (VILI). Therefore, we wanted to identify novel molecular targets involved in reducing the harmful effects of MV (VILI). To investigate this we used a number of different methods to identify specific genes and proteins involved in VILI.

METHODS. To identify potential novel genes and proteins involved in VILI we i) performed microarray analysis on previously published VILI animal model data, ii) exposed human bronchial epithelial cells (Beas-2b) in vitro to mechanical cyclic stretch (30 cycles/min for 4 hours), iii) performed western blot analysis on these stretched and non-stretched cells, and iv) validated the regulation of the newly discovered protein(s) in a 'hemorrhagic-shock-resuscitation' rat model of VILI in vivo. These rats were mechanically ventilated with either high (25 ml/kg) or low (6 ml/kg) tidal volume (TV).

RESULTS. Activator transcription factor 3 (ATF3) was identified by microarray analysis as one of the main genes involved in VILI. The presence of this factor was validated in vitro in the mechanically cyclic-stretched Beas-2b cells. Western blot assays confirmed expression of ATF3 in the stretched cells and their absence in the static cells. We further confirmed the regulation of ATF3 in a 'hemorrhagic-shock-resuscitation' rat model of VILI in vivo. Rats exposed to high TV causing VILI had significantly higher ATF3 expression after 4 hours of ventilation compared to rats receiving low TV.

CONCLUSION. These data collectively show that expression of ATF3 is stretch dependent and specific targeting of this factor in clinical settings could reduce VILI in patients receiving MV.

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0182

THE ROLE OF POLY(ADP-RIBOSE) POLYMERASE 1 (PARP-1) IN ACUTE RENAL FAILURE ASSOCIATED WITH VENTILATOR INDUCED LUNG INJURY

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INTRODUCTION. Mechanical ventilation (MV) is a life-saving therapy for many patients with respiratory failure but has detrimental consequences resulting in ventilator-induced lung injury (VILI). MV can potentially lead to the development of an overwhelming inflammatory response and multiple organ dysfunction syndrome (MODS). Acute renal failure (ARF) is the most prevalent form of organ dysfunction in patients treated with MV. However, the factors leading from mechanical stress to the initiation and propagation of VILI and ARF remain uncertain. Poly (ADP-ribose) polymerase (PARP) enzyme has been shown to be overactivated during VILI. Pharmacological inhibition of PARP by PJ-34 reduced lung injury and preserved kidney function with a decreased renal apoptosis. We hypothesized that pharmacological inhibition of PARP by PJ-34 mitigates kidney dysfunction by preserving endothelium function.

METHODS. 24 Sprague Dawley rats (weight 310 $\pm$ 10 g) received intratracheal instillation of lipopolysaccharide at 10 mg/kg, followed by 3.5 hrs mechanical ventilation with either high tidal volume (Vt) of 19 ml/kg and PEEP 0 cmH_2O (HV) in the presence or absence of the PARP inhibitor PJ-34, or low Vt of 6 ml/kg and PEEP 5 cmH_2O (LV) serving as a control group. Arterial blood gases, hemodynamic measurements and urinary output were analyzed hourly. Renal blood flow was assessed at the beginning and at the end of the experiment. Kidney interlobar arteries were isolated thereafter and endothelium dependent vasodilation was tested by incubating the arteries with acetylcholine.

RESULTS. As expected, we found that lung injury was increased in the HV group compared to the LV group and PJ-34 treatment mitigates lung dysfunction in HV group. Kidney endothelium function was tested by its ability to induce dilatation after acetylcholine stimulation. Interlobar renal arteries isolated from the HV group showed an impaired ability to dilate compared to the LV group. Endothelium dysfunction was also associated with reduction in renal blood flow of approximately 80% in the HV group compared to the LV group and with decreased urine production. Treatment with PJ-34 restored vascular reactivity, renal blood flow, and preserved urine production. PJ-34 protective effect is probably due to its ability to reduce NF-kB as shown by a decreased intensity of NF-kB nuclear staining in kidney sections in PJ-34 treated group.

CONCLUSION. Application of PJ-34 reduces kidney dysfunction in a rat model of VILI by preserving endothelium function, probably reducing NF-kB activation. Our study suggests a novel potential therapeutic approach to mitigate the consequences of VILI by using the PARP inhibitors.

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0183

EFFECTS OF PERFLUOROCARBONS ON PHAGOCYTOSIS AND KILLING OF STAPHYLOCOCCUS AUREUS BY HUMAN POLYMORPHONUCLEAR NEUTROPHILS

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INTRODUCTION. Perfluorocarbons (PFC) are used for partial and total liquid ventilation of critically ill patients suffering from ARDS. ARDS is often based on pneumonia and patients with ARDS for other reasons are at increased risk of acquiring infections especially bacterial pneumonia. Staphylococcus aureus is one of the leading infective agents for hospital acquired pneumonia. Phagocytosis and killing of pathogenic microorganisms by human polymorphonuclear neutrophils (PMN) are of high relevance for the prognosis of patients suffering from bacterial infections. Several effects of PFC on the humoral and cellular immunity have been published. The aim of our study was to determine the direct effect of different PFC (perfluorodecalin, perfluorooctan, and perfluorooctyl bromide) on phagocytosis and killing of Staphylococcus aureus by human PMN.

METHODS. Whole-blood samples were taken from healthy volunteers and incubated with PFC for 60 min in a concentration of 10% and compared to a drug-free control. Head-space gas chromatography was used to analyze the PFC-loading of the blood cells. To measure phagocytosis fluorescence-labelled S. aureus (ATCC 25923) was added to the blood resulting in a bacteria: PMN ratio of 5:1. Phagocytosis was stopped after 5, 15, 30, and 60 min and samples were subsequently analysed by flow-cytometry. To evaluate the influence of PFC on killing of S. aureus whole-blood was incubated with 0 (control), 0.1, 1, 10, and 50% PFC, respectively. Killing of bacteria in whole-blood was determined after three hours of incubation by plate counting. To investigate the influence of PFC on the growth of S. aureus in the absence of PMN fetal-calf-serum (FCS) was used as a cell free control.

RESULTS. After the 60 min of incubation blood cells were saturated with PFC. Phagocytosis of S. aureus by PMN was slightly accelerated in the presence of PFC compared to the PFC-free control. We found a PFC-concentration dependent decrease in gross killing of S. aureus in whole-blood assays with PFC in comparison to control. Growth of S. aureus in FCS revealed a PFC-concentration dependent increase.

CONCLUSION. Our data reveal an influence of all PFC tested on the velocity of phagocytosis and the gross-killing of S. aureus in whole-blood. The accelerated phagocytosis indicates a moderate direct influence of PFC on the PMN. The concentration dependent increase in growth of S. aureus in cell-free FCS in the presence of PFC might be due to better growth conditions in this environment. The observed concentration dependent reduction of gross-killing of S. aureus in the presence of PFC indicates a more relevant influence of PFC on S. aureus than on PMN. Considering these results PFC may have an additional effect on the course of bacterial infections.

0184

EXOGENOUS SURFACTANT TREATMENT ALTERS INFLAMMATORY MEDIATORS DURING LUNG ISCHEMIA-REPERFUSION INJURY

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INTRODUCTION. Lung ischemia-reperfusion injury (LIRI) adversely affects patient recovery after lung transplantation due to impaired gas exchange. Surfactant replacement therapy is believed to improve gas exchange and lung function, but the effect on inflammation is less well described. Therefore, the object of this study was to explore the effect of exogenous surfactant on inflammatory and apoptotic factors in the lung in a rat model of LIRI.

METHODS. The left lung of rats was subjected to ischemia for 120 minutes and reperfusion for up to 240 minutes. Sham-animals underwent sham-surgery and mechanical ventilation for the above mentioned time points. Rats received intratracheally porcine surfactant or saline either prior to ischemia or just after ischemia. Lungs were analyzed for histopathology and the expression of inflammatory and apoptotic markers.

RESULTS. LIRI resulted in worsened lung histopathology and increased inflammation compared to sham-operated animals. Exogenous surfactant resulted in less inflammatory cell infiltration and oedema compared to saline-treated animals. Furthermore, surfactant decreased activated caspase-3 expression in the lung. Strikingly, surfactant resulted in increased expression of myeloperoxidase, MIP-2, and i-NOS in the lung compared to saline-treated animals. Finally, at 4 hours of reperfusion surfactant increased IL-6 and IL-10 expression in the lung suggesting that surfactant alters the cytokine balance to an anti-inflammatory profile.

CONCLUSION. This study showed a significant improvement of lung histology after surfactant therapy accompanied by less apoptosis and a shift in cytokine balance toward an anti-inflammatory profile.

0185

3 NITROTYROSINE EVOLUTION IN PATIENTS ON MECHANICAL VENTILATION COMPARED TO SEPTIC MECHANICALLY-VENTILATED PATIENTS

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INTRODUCTION. During sepsis and mechanical ventilation Nitric Oxide (•NO) is produced by lung cells. We study if pulmonary 3-nitrotyrosine (3-NT) and •NO production are increased in critically ill mechanically ventilated patients (MV) and in mechanically-ventilated septic patients.

METHODS. We studied 50 patients with sepsis within the first 48 hours of sepsis and 22 mechanically ventilated patients. Sepsis and shock were defined according to American European consensus. Lung injury was defined by Murray score. 3-Nitrotyrosine (3NT) in the bronchoalveolar lavage fluid (BALF) was analyzed by ELISA. Respiratory variables were taken from the ventilator readings. 3NT Variables were expressed as median and interquartile range, respiratory and evolution variables were expressed as mean and SD. A p value less than 0.05 was considered significant. Variables were compared by using non parametric tests.

RESULTS. Age was 51 ± 19 yr and 46 ± 13 yr, PEEP was 13 ± 5 cm H20 and 7 ± 2 cm H20, Compliance was 37 ± 17 mL/cm H_2O and 49 ± 21 mL/cm H_2O, oxygenation index was 25 ± 7 and 20 ± 4, lung injury score was 2 ± 1 and 0.8 ± 0.4, in S and MV respectively. In sepsis multiple organ failure score and frequency of shock was 6 ± 3 and 54%, respectively.Values of 3 NT are presented in table. 3NT was detected in all BALF samples, septic patients showed high values and they increased to the day 7 of evolution. No differences between survivors and non survivors were detected.

TABLE 1 3-NITROTYROSINE IN BALF

	MV	Sepsis	Sepsis Non survivors	survivors	MV Non survivors	survivors
Admission	49 (16–104)	86 (30–315)	37 (30–353)	186 (37–621)	39 (20 – 40)	50 (65–81)
7 days	156 (40–333)	435 (35–2900)*	1676(3–3366)	291 (113–1663	252 (40–60)	126 (40 – 236)

** P = 0.04 vs admission in sepsis group*

CONCLUSION. Alveolar protein nitration is increased in septic and in mechanically ventilated patients. This is not related to the degree of lung injury. Alveolar protein nitration is further increased in septic patients. If protein nitration is due to mechanical stretching or inflammation should be addressed in further studies.

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0186

LUNG IMMUNE AND COAGULATIVE HOST RESPONSE IN PATIENTS WITH ACUTE EXACERBATIONS OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE (AEOCPD)

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INTRODUCTION. Infective events frequently sustain the onset of AECOPD and the activation of Toll like receptors (TLRs)exerts an important role in the trigger of the innate responses against infections, the role of specific TLRs in severe AECOPD is largely unknown. Recent studies showed a link between inflammation and coagulation in patients with acute lung injury (ALI) and acute respiratory distress syndrome (ARDS). The major goal of this study was to explore the correlation between pulmonary innate immunity and lung coagulation host response.

METHODS. All pts required mechanical ventilation. Pts were classified into 3 groups: 1) acute respiratory failure, without ARDS and without chronic pulmonary underlying events (controls; n = 10); 2)(> 15 pack/year) with acute respiratory failure, without ARDS but with COPD (n = 14). All pts fulfilled the diagnostic criteria of COPD (ref GOLD) with historical post-bronchodilator FEV1/FVC ratio of less than 70% and FEV1 < 80% but >=50%; 3) ARDS resulting from non-pulmonary underlying events and without COPD (sepsis, n = 7). Broncholalveolar wash samples (mini BAL) were evaluated for the expression of TLR4, of TLR2 and of human beta defensin 2 (HBD2), for IL-8 and IP-10 concentrations and for the ability to modulate the chemotactic activity toward neutrophils or lymphocytes. Coagulation markers registered: Tissue Factor, Thrombomodulin, D dimer, Protein C, Plasminogen activator inhibitor-1 (PAI-1)

RESULTS. AECOPD showed increased neutrophil numbers, increased expression of TLR4 and of HBD2, reduced concentrations of IP-10, reduced chemotactic activity toward lymphocytes. Total TLR4 expression positively correlated with the numbers of neutrophils, total HBD2 expression correlated with CPIS clinical score. TLR2 expression, IL-8 concentrations and the chemotactic activity toward neutrophils were not statistically different among the study groups. In pts with ARDS, pulmonary edema fluid levels of protein C were higher in group 2 and the same data were registered for tissue factor expression and d-dimer. Compared with plasma from controls and pts with acute cardiogenic pulmonary edema, baseline protein-C levels were low and baseline PAI-1 levels were elevated in ALI/ARDS. TF antigen levels were significantly higher in patients with ALI/ARDS, but no significant differences were registered among groups.

CONCLUSION. Early ALI and ARDS is characterized by decreased plasma levels of protein C and increased plasma levels of PAI-1 that are independent risk factors for mortality and adverse clinical outcomes. Correlation between innate immunity and coagulation pulmonary response is statistically significant in group 2 and 3 and these two groups show the same type of correlation.

0187

EFFECTS OF RED BLOOD CELL TRANSFUSION ON SYSTEMIC AND ALVEOLAR CYTOKINES LEVELS IN PATIENTS WITH ACUTE RESPIRATORY DISTRESS SYNDROME

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INTRODUCTION. INTRODUCTION. Cellular base of acute respiratory distress syndrome remains largely unknown. Recently, red blood cell transfusions (RBCT) have been involved in the pathogenesis of ARDS.

METHODS. This prospective, observational study was aimed to investigate the influence of RBCT on systemic and alveolar cytokines levels in twenty-three consecutive patients with ARDS and hemoglobin (hb) levels lower than 100 g/L. ARDS diagnosis was carried out by ATS-ESCIM criteria and severity was assessed by Murray score. Transfusion criteria depended of physician in charge of the patient, but in general, RBCT was indicated to maintain hb levels near to 90 g/L.

Patients were divided in transfused (N: 11) and non transfused (N: 12). Blood samples were drawn each patient at baseline (within 24 hours of diagnosis of ARDS) and 24 hours after diagnosis (when 11 patients had been transfused). Plasma and pulmonary (by telescoped blind catheter introduced into broncho alveolar (BAL)tree, through of endotracheal tube) samples measuring pro inflammatory (TNF &, IL 1, IL6) and anti inflammatory (IL4, IL8 and IL10) cytokines by ELISA. Multiple variable including demographic, severity criteria and cytokines levels between both groups of patients, were calculated. Comparisons between two groups were performed using Mann-Whitney U test. ($p < .05$ was considered significative)

RESULTS. Both groups were homogeneous regarding to multiple baseline variables, including age, APACHE, severety criteria for ARDS.Increment of IL-6 levels (from baseline to 24 hours, either in plasma or BAL)were significative higher in transfused than non transfused patients. Increment of IL-1 (plasma)were higher in transfused patients. Increment of IL-4 (plasma) were lesser in transfused patients (see Table 1).

TABLE 1 CYTOKINES NEVELS

	No Transfused n = 12	Transfused n = 11	P value
IL 1 plasma Me [P25- P75]	0.938[0.55- 3.07]	−0.56[(−1.10)- 0.26]	P = 0.012
IL 6 BAL Me [P25- P75]	−0.622 [(−33.4)–22.59]	86.93[2.79- 3.51].	p = 0.037
IL 4 plasma Me [P25- P75]	0.55[0.01–1.56]	−0.56[(−1.01)-(−0.26)]	P = 0.09

CONCLUSION. RBCT produce pro inflammatory effects to systemic and bronchoalveolar tree.

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0188

EFFECT OF HYPEROXIA ON RESPIRATORY SYSTEM MECHANICS AND CYTOKINE PRODUCTION DURING HIGH VOLUME LUNG VENTILATION IN RATS

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INTRODUCTION. Mechanical overdistension and hyperoxia can independently cause lung injury. Hyperoxia has been shown to increase ventilator lung injury but severity of damage is time- and dose- dependent. (1,2,3). Clinical use of normobaric hyperoxia for several hours is still considered harmless or even recommended (e.g. to reduce the risk of postsurgical wound infection) (4,5). In humans, the first respiratory symptoms have been reported after 6 h oxygen exposure (6), and ultrastructural alterations are evident within 14 h at 70% O2 (7).

We hypothesized that hyperoxia in combination with large tidal volumes would not accentuate respiratory system mechanics and cytokine production, if we use it only over a short time period.

METHODS. Eighteen male adult Sprague-Dawley rats, instrumented under ether anesthesia with vascular catheters on previous day, were anesthetized, tracheostomized, connected to ventilator and randomly allocated to groups of hyperoxia (FiO2 1,0; group O; N = 9) or normoxemia (FiO2 0,2; group H; N = 9). Mixture of helium and oxygen (80:20) was used for ventilation of normoxemic group. After 2 hours of mechanical ventilation (respiratory rate 60 min-1, tidal volume 30 ml.kg-1, PEEP 0 cm H_2O) inspiratory pressures were recorded, rats were sacrificed, P-V curve of respiratory system constructed, bronchoalveolar lavage and aortic blood samples obtained.

RESULTS. Group H animals in comparison to group O animals exhibited only lower median airway pressure (3,8 ± 0,3 vs 4,6 ± 0,5 cmH_2O, $p < 0.05$) and slight left side shift of P-V curve, without significant difference, no differences in biochemical or immunological markers in serum, resp. BAL samples was found.

CONCLUSION. The use of hyperoxia compared with normoxemia in combination with potential injurious ventilation did not result in a significant increase of cytokine production or marked changes in respiratory system mechanics.

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0189

SERUM INTERLEUKIN-6 RESPONSE DURING WEANING FROM MECHANICAL VENTILATION

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INTRODUCTION. Among the pathophysiological mechanisms related to weaning outcome, the role of systemic inflammatory response is unknown. The aim of this preliminary study was to assess the course of different systemic inflammatory mediators during withdrawal of mechanical ventilation in a mixed population.

METHODS. A prospective clinical study was conducted in mechanically-ventilated patients. 30-min spontaneous breathing trials ($n = 29$) were performed in 26 patients. Blood samples were drawn before and at the end of the trial. An additional sample was also drawn 24 hours later in a subset of patients.

RESULTS. Serum levels of interleukin-6 increased from mechanical ventilation to spontaneous breathing in the overall population ($p = 0.003$), but did not discriminate between weaning failure and success. In the subgroup of chronic obstructive pulmonary disease patients, serum interleukin-6 increased from mechanical ventilation to spontaneous breathing in those who failed the weaning attempt ($p = 0.03$), while these levels remained unchanged in those who tolerated spontaneous breathing. In patients who remained ventilated due to a failed weaning attempt, serum levels of interleukin-6 decreased after 24 hours while on mechanical ventilation ($p = 0.04$). Moreover, in 3 extubated patients who subsequently developed respiratory failure after extubation, serum levels of interleukin-6 tended to increase 24 hours after extubation ($p = 0.11$). There were no changes in the remaining inflammatory mediators.

CONCLUSION. Increased serum IL-6 response is associated to spontaneous breathing failure in ventilated patients with chronic obstructive pulmonary disease. The potential utility of interleukin-6 to predict respiratory failure after extubation warrants further studies in larger populations.

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0190

INCREASED LUNG INFLAMMATION CAUSED BY LOW-PRESSURE VENTILATION AND LUNG ISCHEMIA-REPERFUSION INJURY

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INTRODUCTION. Lung ischemia-reperfusion injury (LIRI) is a major complication observed after lung transplantation. A better understanding of the mechanisms of LIRI could be helpful to develop new therapeutic strategies. In this study we wanted to explore the inflammatory and apoptotic consequences of LIRI using an in vivo rat model.

METHODS. The left lung of Spraque-Dawley rats was subjected to ischemia for 120 minutes and reperfusion for up to 240 minutes. Ventilated-control animals underwent sham-surgery and low-pressure mechanical ventilation for the above mentioned time points. Lung tissue was analyzed for histopathology and for the expression of inflammatory mediators.

RESULTS. Low-pressure ventilated-controls showed an enhanced response in myeloperoxidase-activity, MIP-2, interleukin-6, and caspase-3 expression compared to naïve animals. However, LIRI-animals showed faster kinetics of pulmonal myeloperoxidase-activity and caspase-3 expression. Moreover, only LIRI-animals showed increased iNOS and interleukin-6 expression and had a decreased interleukin-10 expression in the lung compared to ventilated-controls. Furthermore, lungs of LIRI-animals contained much more cellular infiltrates compared to ventilated-controls.

CONCLUSION. Low-pressure mechanical ventilation induces a late time-dependent effect on inflammation in the lung, whereas LIRI induces an acute effect on lung inflammation. In addition, LIRI deteriorates lung histology much more than ventilation only.

0191

EFFECT OF ACTIVATED PROTEIN C ON CELL CONTRACTION OF HUMAN ALVEOLAR EPITHELIAL CELLS SUBJECTED TO THROMBIN

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INTRODUCTION. Acute lung injury (ALI) is characterized by disruption of the alveolar-capillary barrier. The physical integrity of the alveolar epithelial cell monolayer is governed by the force balance between centripetal forces arising from cytoskeletal tension and adhesive forces that tether cells to each other and to the extracellular matrix (1).Proteins of the coagulation cascade such as Thrombin (THR), a serine protease which is implicated in the regulation of permeability in ALI and contracts alveolar epithelial cells (AEC)(2), or Activated Protein C (APC), that induces barrier-protective signalling in the endothelium (3), could modulate this balance of forces. AIM: To study the effects of THR and APC on the contraction of alveolar epithelial cells by means of traction microscopy (TM)

METHODS. Two days before TM measurements, AEC were platted on collagen-I coated polyacrylamide gels with embedded fluorescent microbeads (200 nm). On the day of experiments, cells were incubated for 3 h with APC (50 \mug/ml) or vehicle (control) ($N = 18$). Fluorescence images of the surface of the gel were taken to assess the distribution of beads both during baseline, and 5 and 10 min after addition of thrombin (0.5 U/ml). At the end of the challenge, cells were detached with trypsin and a fluorescence image of the relaxed gel was acquired. The corresponding total force (F) exerted by the cell on the substrate was then computed.

RESULTS. Treatment with APC did not induce significant change in F. THR induced approximately a 2.5-fold increase in F in control cells. Treatment with APC significantly ($p < 0.05$) reduced the increase in F induced by THR at 5 min (from a 2.6 ± 0.2 fold increase to a 1.98 ± 0.14 fold increase) and at 10 min (from a 2.8 ± 0.2 fold increase to a 2.1 ± 0.2 fold increase).

CONCLUSION. These data may contribute to interpret the protective effect of APC in Acute Lung Injury.

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Poster Sessions

Sepsis: Cardiovascular therapies: 0192–0205

0192

EFFECTS OF DIFFERENT FLUID REGIMENS ON INTESTINAL MOTILITY IN PIGS SUBJECTED TO INTRA-ABDOMINAL INFECTION OR ENDOTOXIN INFUSION

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INTRODUCTION. Gut motility is impaired in sepsis. Inadequate perfusion, systemic and local inflammatory responses, and therapeutic interventions may all contribute. The aim of this study was to assess the effects of intra-abdominal infection, endotoxemia and two different fluid regimens on in-vitro jejunal contractility and relaxation.

METHODS. 48 anesthetised pigs were randomly assigned to endotoxin infusion ($n = 16$), fecal peritonitis ($n = 16$), or placebo ($n = 16$), and each group further to either high (20 mL/kg bwt, $n = 8$) or moderate (10 mL/kg bwt, $n = 8$) fluid resuscitation for 24 hours or until death, if earlier. Cardiac output was measured by thermodilution and regional abdominal blood flows by ultrasound Doppler. Afterward, in-vitro jejunal contractility and relaxation were measured using acetylcholine and sodium nitroprusside (SNP), and the effect of nitric oxide synthase inhibition was assessed. Dose response was expressed as a percentage from baseline at each concentration added. We reported the maximum dose response values. The dose response effects of each drug and the group (model of sepsis) and fluid volume interaction were tested by ANOVA repeated measures. Vascular reactivity data from the same groups of animals are presented in another abstract.

RESULTS. Both sepsis models resulted in a hyperdynamic circulation and relevant mortality (13% to 75%). Gut perfusion was well preserved and regional blood flows increased from baseline to end values without differences between the groups. Acetylcholine-induced maximal jejunal contractility was reduced in the endotoxin ($141 \pm 34\%$ of baseline) and peritonitis ($135 \pm 26\%$) groups when compared to controls ($156 \pm 61\%$; drug-effect-group interaction: $p = 0.04$), and SNP-induced relaxation was also reduced in endotoxin ($17 \pm 14\%$) and peritonitis ($23 \pm 13\%$) groups when compared to controls ($31 \pm 17\%$; drug-effect-group interaction: $p = 0.03$). Neither fluid regimen, model of sepsis nor in vitro inhibition of nitric oxide synthase had an effect on the results.

CONCLUSION. In both models of sepsis, in vitro intestinal contractility and relaxation were reduced. Since neither changes in intestinal perfusion nor the nitric oxide pathway can explain these changes, systemic mediators other than nitric oxide are likely to be involved.

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0193

PROTECTIVE ROLE OF IMMEDIATE HIGH VOLUME RESUSCITATION IN A SHORT-TERM MODEL OF PERITONITIS-INDUCED ACUTE RENAL FAILURE

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INTRODUCTION. Severe sepsis is characterized by systemic inflammation and organ dysfunction. Conflicting results exist regarding the appropriate use of fluids. The aim of the present study was to compare the effects of two different fluid regimens on renal function in a model of local intra-abdominal infection and during systemic endotoxemia.

METHODS. Prospective, randomized, controlled study in 48 anesthetized, mechanically ventilated pigs (weight: 37–42 kg). Pigs were randomized into three groups (fecal peritonitis, systemic endotoxemia and controls), and each group further into either moderate (M; 10 ml crystalloids/kg/hr) or high (H; 15 ml crystalloids and 5 ml HES kg/hr) fluid administration (n = 8/group). Fecal peritonitis was induced by administration of 1 g/kg body weight of autologous feces into the abdominal cavity, and endotoxemia by infusion of endotoxin (0.4 mg/kg/hr) into the vena cava. Cardiac output (thermodilution), renal blood flow (ultrasound Doppler), urinary output, creatinine clearance and fractional sodium excretion were measured over six hours. Statistics: repeated measurement ANOVA, p: time-group interaction.

RESULTS. Urinary output increased in high volume groups, but decreased in PM from 74 ± 35 to 32 ± 20 ml/hr ($p < 0.001$). Creatinine clearance and fractional sodium excretion decreased only in the PM group, from 41.2 ± 21.9 to 15.3 ± 9.4 dl/hr ($P < 0.046$) and from 1.4 ± 1.7 0.4 ± 0.35 ($P < 0.025$), respectively.

TABLE 1

		C 10 ml kg	C 20 ml kg	E 10 ml kg	E 20 ml kg	P 10 ml kg	P 20 ml kg	ρ^
RVR	Baseline	14.3 ± 4	14.5 ± 6	17.1 ± 10	22.1 ± 16	12.9 ± 4	14.4 ± 10	
	End	14.3 ± 4	12.3 ± 5	13.3 ± 7	25.6 ± 18	15.8 ± 4	13.2 ± 4	*0.01*
Systemic DO_2 (ml kg min)	Baseline	11.1 ± 2	9.4 ± 3	9.9 ± 2	10.7 ± 2	10.6 ± 2	9.5 ± 2	
	End	11.6 ± 3	10.7 ± 3	11.5 ± 3	13.1 ± 5	15.6 ± 3	14.2 ± 3	*0.001*
Systemic VO_2 (ml kg min)	Baseline	48 ± 0.5	4.5 ± 1.2	4.8 ± 1	5.1 ± 1.3	4.8 ± 1.1	4.7 ± 0.4	
	End	48 ± 0.8	4.2 ± 0.9	5.1 ± 1	4.7 ± 1.3	5.4 ± 1.9	5.5 ± 1.1	*0.09*
Renal DO_2 (ml kg min)	Baseline	0.66 ± 0.2	0.61 ± 0.1	0.58 ± 0.2	0.58 ± 0.4	0.68 ± 0.2	0.67 ± 0.3	
	End	0.67 ± 0.2	0.74 ± 0.2	0.79 ± 0.4	0.79 ± 0.6	0.59 ± 0.1	0.92 ± 0.5	*0.03*
Renal VO_2 (ml kg min)	Baseline	0.17 ± 0.1	0.17 ± 0.1	0.19 ± 0.1	0.18 ± 0.1	0.2 ± 0.1	0.18 ± 0.1	
	End	0.2 ± 0.1	0.19 ± 0.1	0.22 ± 0.1	0.17 ± 0.1	0.15 ± 0.1	0.21 ± 0.1	*0.5*
Renal artery flow (ml kg min)	Baseline	5.2 ± 1.7	4.9 ± 1.4	4.7 ± 1.8	4.8 ± 3.2	5.5 ± 1.6	5.6 ± 2.3	
	End	5.4 ± 2.2	6.6 ± 2.3	5.7 ± 2.5	6.3 ± 4.6	4 ± 1	6.2 ± 2.7	*0.004*

P*: Repeated measurements ANOVA, time-group interation

CONCLUSION. Using two models-peritonitis and endotoxin-infusion-we show that peritonitis induces ARF, which could be rescued by immediate aggressive fluid resuscitation including HES. No conclusions on long term effects can be made.

GRANT ACKNOWLEDGEMENT. Supported by grant 3200BO/102268 from the Swiss National Fund.

0194

EFFECTS OF NOREPINEPHRINE ON ENDOTOXIN-INDUCED ACUTE RENAL FAILURE IN ANESTHETIZED PIGS

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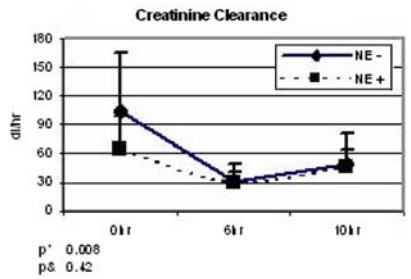
INTRODUCTION. Septic shock is characterized by hypotension and decreased systemic vascular resistance. During sepsis, however, renal vasoconstriction has been observed. The combination of "endogenous" vasoconstriction and use of vasopressors to increase blood pressure could be detrimental to the kidney function. The aim of the study was to compare LPS-induced renal dysfunction in the presence or absence of the vasopressor norepinephrine (NE).

METHODS. 13 anesthetized pigs received endotoxin (E. coli LPS B0111:B4, 0.4 μg/kg/h) and were subsequently randomized to NE treatment (n = 7) or placebo (n = 6) for 10 hours. All pigs received Ringer's lactate solution 5 ml/kg/h. NE dose was adjusted at two-hour intervals to achieve 15 mm Hg increases in mean arterial blood pressure up to 95 mmHg.

RESULTS. Mean arterial blood pressure (83 ± 9 to 95 ± 7 mmHg vs. 75 ± 5 to 64 ± 3 mmHg; $p < 0.05$), cardiac index (112 ± 19 to 204 ± 70 vs. 97 ± 13 to 136 ± 47 ml·min–1·kg-1, $p = 0.06$) and systemic DO2 (16.3 ± 2.8 to 33 ± 8 vs. 12.9 ± 1.5 to 17.6 ± 3.4 ml·min-1·kg-1, $p < 0.008$) increased "more" over time in the NE group than in controls (Statistics: repeated measurements ANOVA [RMA], time-group interaction). Systemic VO2 was not different between groups. Urinary output decreased in both groups, from 4.2 +/− 2.2 to 1.7 +/− 1.5 ml/kg/hr in NE and from 3.3 +/− 3.3 to 1.4 +/− 0.3 ml/kg/h in controls (Repeated measurements ANOVA [RMA]: time effect $p = 0.004$ and time-group interaction not significant). Also, creatinine clearance decreased in both groups significantly (RMA: time effect P* = 0.008 and time-group interaction P& not significant) (Fig. 1).



CONCLUSION. Norepinephrine neither contributed to nor prevented endotoxin-induced acute renal failure during the first 10 hours of endotoxemia in fluid-resuscitated, anesthetized pigs.

GRANT ACKNOWLEDGEMENT. Supported by grant 3200BO/102268 from the Swiss National Fund.

0195

THE MICROCIRCULATORY EFFECTS OF FLUIDS IN EARLY AND LATE PHASES OF SEVERE SEPSIS

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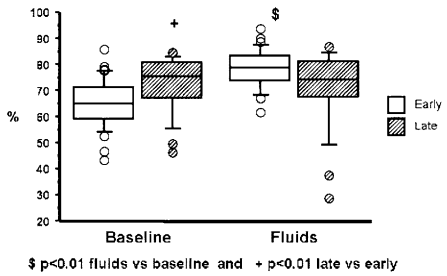
INTRODUCTION. Fluid therapy is a cornerstone in the management of severe sepsis but its microcirculatory effects are not well defined. We hypothesized that fluids may improve the microcirculation in the early but not in the late phase of severe sepsis.

METHODS. We used a Sidestream Dark-Field (SDF) imaging device (Microvision Medical, Amsterdam) to evaluate the sublingual microcirculation in 55 patients with severe sepsis within the first 24 h (N = 35) or more than 48 h (N = 20) of resuscitation. Hemodynamic and microcirculatory measurements were obtained before and after fluid challenge. At each time, 5 sequences of 20 seconds each were recorded and stored under a random number. An investigator blinded to the patient's clinical course and sequences order, analyzed the images semi-quantitatively. Small vessels were defined by a diameter < 20 μm. Statistical evaluation included ANOVA and non parametric tests. A p value < 0.05 was considered to be significant.

RESULTS. There was no significant difference in the time course of arterial pressure and cardiac index in both phases.
The proportion of perfused capillaries (Fig. 1) increased during fluid challenge in the early but not the late phase (differences $p < 0.001$).



CONCLUSION. These results suggest that fluid administration improves the sublingual microcirculation in early but not in the late phase of severe sepsis, when the microcirculatory alterations are less severe

0196

ONE YEAR SURVIVAL AFTER ARGININE VASOPRESSIN THERAPY FOR ADVANCED VASODILATORY SHOCK

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INTRODUCTION. During the last decade, arginine vasopressin (AVP) has increasingly been used to as a rescue drug to treat advanced vasodilatory shock (1). The question if such a rescue therapy with AVP simply facilitates shock reversal or also translates into a reasonable long-term survival has not been addressed so far. Given the high disease severity in these patients, it is imaginable that even though shock reversal may be achieved most patients do not survive to hospital discharge.

METHODS. In this study, we retrospectively evaluated the one year survival rates among patients receiving a supplementary arginine vasopressin (AVP) infusion because of advanced vasodilatory shock due to sepsis, systemic inflammatory response syndrome (SIRS) or after cardiac surgery. Between January 1999 and December 2006 all medical records of a surgical intensive care unit (ICU) in a tertiary hospital were reviewed for patients who received AVP because of advanced vasodilatory shock. Demographic and clinical data, length of ICU stay, ICU and one year survival, and causes of death after ICU discharge were retrieved. Kaplan Meier curves and log rank tests were used to display and compare survival rates.

RESULTS. Two-hundred-one patients were included. ICU survival was 39.8% (80/201). After ICU discharge, thirteen of 80 patients died within one year after start of AVP resulting in a one year survival rate of 33.3% (67/201). Three of these thirteen patients died after discharge from hospital. In nine patients, the cause of death was attributed to the same diseases which lead to ICU admission. One year survival of patients with shock after cardiac surgery (42.1%) was higher than in patients suffering from SIRS (22.6%, $p = 0.005$) or sepsis (28.3%, $p = 0.06$).

CONCLUSION. If advanced vasodilatory shock can be reversed with AVP and patients discharged alive from the ICU, one year survival rates appear to be reasonable despite of severe MODS. Patients developing vasodilatory shock after cardiac surgery have a survival benefit when compared to patients with either septic shock or SIRS.

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0197

VASOPRESSIN RESPONSE TO OSMOTIC STIMULATION IN SEPTIC SHOCK

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INTRODUCTION. It has been shown that circulating vasopressin levels were lower in septic shock than in cardiogenic shock and decrease with the course of septic shock, reaching low value after the third day. The mechanisms underlying the decrease in vasopressin levels, so-called relative deficiency, are unknown, although an impairment of its synthesis is mostly considered. An alteration of the osmoregulation is conceivable but has never been assessed. The purpose of this study was to assess the change in plasma vasopressin level during an osmotic challenge in septic shock patients.

METHODS. Ten advanced septic shock (> 3 days from shock onset) patients were included (age 65.1 [53.4 – 73.9] yrs; male/female 5/5; SAPSII 63.5 [53.2 –73]; SOFA 10.5 [7.8 –12]). The osmotic challenge consisted on infusing 500 mL of hypertonic glucose (with 24 g of NaCl) over 120 minutes. Plasma vasopressin levels were measured 15 mn before and at five different times (H0, H + 15, + 45, + 75 and + 105 mn) during the osmotic challenge. Systemic systolic and diastolic arterial pressures, heart rate and central venous pressure were recorded continuously. Data were expressed as median [interquartile]. Quantitative variables were compared by nonparametric procedures (Wilcoxon rank-sum test), Repeated-measures analyses of variance were done with the Friedman test.

RESULTS. During the osmotic challenge, plasma osmolality increased from 289 (286 - 292) to 304 (301.5 – 310.5) mosmol/kg ($p = 0.005$), plasma sodium concentration from 137 (137 - 139) to 145.5 (144 – 148) mmol/l ($p = 0.005$), and plasma vasopressin levels from 2.9 (2.7–3.8) to 5.8 (2.8 – 11.8) pg/ml. Four patients were non responders (No elevation of plasma vasopressin levels despite a significant increase in osmolality), four responders (similar response to healthy volunteers) and two ultra-responders (high levels of plasma vasopressin). Blood pressure, heart rate and central venous pressure remains steady throughout the test, except blood pressure in the ultra responders. In responders and ultra-responders, the dose-response curve was always linear.

CONCLUSION. These preliminary findings confirm that plasma vasopressin is low in the late phase of septic shock and suggest that osmoregulation can be impaired during septic shock. These results have to be confirmed and differences between responders and non-responders studied in a larger cohort.

0198

COMBINED ARGININE VASOPRESSIN AND LEVOSIMENDAN IMPROVES CARDIOPULMONARY HEMODYNAMICS IN OVINE SEPTIC SHOCK

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INTRODUCTION. Myocardial dysfunction and pulmonary hypertension are frequent complications in septic shock.1,2 Levosimendan, a calcium sensitizer, improves myocardial contractility at low energy costs but may decrease mean arterial pressure (MAP) by simultaneously stimulating adenosine triphosphate-sensitive potassium channels.3 The present study was conducted as a prospective, randomized, laboratory experiment to investigate the effects of combined levosimendan and arginine-vasopressin (AVP) on cardiopulmonary hemodynamics in ovine septic shock.

METHODS. Twenty-one ewes were anesthetized and instrumented for chronic hemodynamic monitoring using an established protocol. A median laparotomy was performed to take faeces from the caecum under sterile conditions. After baseline measurements had been performed, the faeces were injected into the peritoneal cavity. A second set of measurements was taken after the onset of septic shock (defined as MAP < 60 mmHg). The animals were then randomly assigned to receive either AVP (0.5 mU/kg/min) or AVP and levosimendan (0.2 microg/kg/min; each $n = 7$) from the onset of septic shock to the end of the 24-h study period. The control group ($n = 7$) received only the vehicle. If necessary, norepinephrine (NE) was titrated to maintain MAP at 70 ± 5 mmHg in all groups.

RESULTS. Baseline characteristics did not differ between groups. Following 8 h of septic shock, stroke volume index and left ventricular stroke work index were significantly higher in animals receiving the combination therapy as compared to AVP treatment alone ($p < 0.001$ and $p = 0.035$, respectively) and the control group (each $p = 0.006$). Ten hours after the onset of septic shock, CI was higher in the levosimandan group as compared to AVP-treated animals ($p = 0.026$) and controls ($p = 0.043$). Only combined levosimendan and AVP reduced pulmonary vascular resistance index (PVRI) within 4 h after the onset of shock ($p = 0.034$). NE requirements were similar between groups.

CONCLUSION. Our data suggest that combined AVP and levosimendan may be a useful therapeutic option to treat cardiopulmonary dysfunction related to hyperdynamic septic shock.

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0199

LACK OF HEMODYNAMIC RESPONSE TO VASOPRESSIN PREDICTS MORTALITY IN REFRACTORY SEPTIC SHOCK

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INTRODUCTION. Preserved cardiac and vascular responses to catecholamine stimulation are associated with better prognosis in septic shock. The purpose of our study was to analyze the prognostic value of cardiovascular responses after initiation of vasopressin (VP) in addition to norepinephrine (NE) in severe septic shock.

METHODS. Septic shock patients who required VP in addition to NE were retrospectively identified from computerized database. Cardiovascular responses for VP were defined as a change of NE dose and a change of cardiac index during first six hours after start of VP. The hospital mortality was recorded.

RESULTS. 29 septic shock patients with VP were identified. Three patients were excluded because they expired before six hours had elapsed. Hospital mortality of remaining 26 patients was 76% (19/26). Mean age was 57 ± 11 years and APACHE II score 26 ± 8. Median dose of NE before start of VP was 0.72 mug/kg/min (25–75th percentiles 0.44–1.22 mug/kg/min) and median dose of VP was 2 IU/h (25–75th percentiles 1.8–4.1 IU/h).

Median change of NE dose during first six hours was −0.09 mug/kg/min (25–75th percentiles −0.21–0.14 mug/kg/min), or −15.8% (25–75th percentiles −33.6–26.0%) of the initial NE dose. The change of NE dose after initiation of VP predicted mortality accurately by ROC-analyses (AUC 0.850, 95% CI 0.702-0.998, $p = 0.007$). The best predictive cut-off point was the decrease of NE dose by 15%, which was use to separate VP-responders ($n = 13$) and VP-non-responders ($n = 13$). Mortality of VP-responders was 46% while it was 100% in VP-non-responders ($p = 0.005$).

Median change of cardiac index after initiation of VP was −0.9 l/min/m^2 (25-75th percentile -1.7-0.48 l/min/m^2), which was not predictive of survival according to ROC-analyses (AUC 0.417, 95% CI 0.056-0.777, $p = 0.63$).

CONCLUSION. The inability to wean norepinephrine by 15% or more during first six hours after initiation of vasopressin predicts dismal outcome in septic shock.

0200

HAEMODYNAMIC EFFECTS OF AMIODARONE IN SEPTIC SHOCK PATIENTS WITH ACUTE ATRIAL FIBRILLATION

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INTRODUCTION. Despite new advances in treatment, sepsis is associated with high mortality rates and high healthcare costs (1). Supraventricular arrhythmias, including atrial fibrillation (AF), are not rare among these patients in both surgical and non-surgical intensive care units (ICU), and they are also related to poor prognosis (2). Amiodarone is widely used to treat these cardiac events in non-septic patients but no data about its use in sepsis context are available.Objective: To determine the haemodynamic effects of amiodarone in patients with shock septic and acute AF. Design: Observational and retrospective study (January 2000-December 2007) of patients with septic shock, pulmonary artery catheterization and acute AF treated with amiodarone. Setting: A mixed ICU of a university hospital.

METHODS. We registered demographic data, comorbidities and the presence of risk factors for AF (metabolic acidosis, hypoxemia, electrolyte disorders, and use of dobutamine). Before and 24 h after amiodarone administration we recorded mean arterial pressure (MAP), heart rate (HR), central venous pressure (CVP), left ventricular systolic volume (LVSV), cardiac output (CO) and doses of norepinephrine.

RESULTS. We found and studied 10 patients with septic shock, pulmonary artery catheter, an acute atrial fibrillation and were treated with amiodarone. 60% were male and the medium age was 66.4y. 60% had hypertension, 30% were diabetic, 20% had previous history of angor and 40% had systolic dysfunction on a previous echocardiogram. Metabolic acidosis (70%) or hypoxemia (30%) was present before the arrhythmic event; 50% received dobutamine. After the administration of amiodarone, 80% of patients returned to sinus rhythm. When we compared the haemodynamics, we observed a significant decrease in HR (133.7 ± 36 bpm vs. 84.8 ± 11 bpm; $p < 0.05$), an increment in LVSV (40.5 ± 7.5 ml vs. 74.2 ± 15.5 ml; $p < 0.05$) and in CO (4.7 ± 0.7 L/min vs 5.8 ± 1.5 L/min; $p < 0.05$) with no changes in MAP (74.6 ± 10 mmHg vs. 79.2 ± 10 mmHg) nor CVP (11.3 ± 4.3 mmHg vs. 10.0 ± 2.7 mmHg). Norepinephrine also decreased (0.70 ± 0.35 ug/Kg/min vs. 0.25 ± 0.22 ug/Kg/min; p = 0,08).

CONCLUSION. Amiodarone increased systolic volume and CO with no other haemodynamic effects and brought about a return to sinus rhythm in shock septic patients with new onset AF.

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0201

DOES DROTRECOGIN ALFA REDUCE MORTALITY IN SEPTIC PATIENTS IN THE INTENSIVE CARE UNIT?

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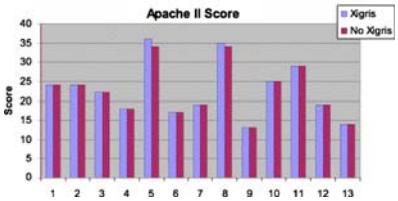
INTRODUCTION. The well-known PROWESS trial[1] had demonstrated an absolute mortality reduction of 6.1% (P = .005) in patients with severe sepsis with the use of Drotrecogin Alfa Activated (DAA). It was a randomized, double- blind, placebo-controlled, multi-center trial. The study showed that patients with Acute Physiology and Chronic Health Evaluation scores (APACHE II) greater than 25 benefited the most.

METHODS. We compared two groups of septic patients with similar APACHE II scores. Each group consisted of 13 patients, one group received DAA while the other group did not receive DAA. We compared the length of stay in Intensive care and the survival in each group.

RESULTS. The mean length of stay in the group who received DAA was 21 days; those who did not receive DAA had an average length of stay of 14 days. Mortality rate in the DAA group was 69% and 44% in the non-DAA group.



CONCLUSION. In our unit, septic patients who received DAA had longer ICU stays and higher mortality rates than patients who did not receive DAA. Several studies had shown the earlier DAA was started, the better the outcome. Other factors that might have had an affect on the efficacy of DAA in these trials are the application of early goal directed therapies in managing septic patients. Larger studies are needed to confirm DAA's role in the management of septic patients.

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0202

DROTRECOGIN ALFA (ACTIVATED) IN SEPSIS AND SEPTIC SHOCK: THE FLORENCE EXPERIENCE

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INTRODUCTION. Recombinant human activated protein C (Drotrecogin alfa (activated), DAA) is known to reduce mortality when compared with placebo. We report preliminary results of DAA administration in a 3-years experience in our Intensive Care Unit (ICU).

METHODS. We analyzed data of 23 patients with severe sepsis/septic shock admitted to our ICU from Oct 2003 to Dec 2006 (Table 1) and divided in 2 groups depending on timing of DAA therapy (< 24 h; > 24 h) since diagnosis. All patients were managed according to guidelines and received DAA (Xigris, Eli Lilly, IN).

RESULTS. Clinical data of patients in respect to timing of DAA administration are summarized in Table 2. No serious bleeding (defined as any intracranial haemorrhage, any life-threatening bleeding, a requirement of ≥ 3 units of packed red blood cells per day for 2 consecutive days) was observed. DAA infusion was interrupted 2 h prior to any invasive or surgical procedure and resumed within 1 h after any minor percutaneous and 12 h after any major surgical procedure.

TABLE 1 CLINICAL CHARACTERISTIC OF PATIENTS ENROLLED
N = 23; mean age: 48.2
Gender: M: F = 18: 5 (78%:22%)

Recognized site of infection: n = 19 (82.6%)	Lung: n = 12 (52.1%); Abdomen: n = 7 (30.4%)
Source: Community/Nosocomial	10/13 (43.5%/56.5%)
SAPS II	50.9
SOFA (mean ± sd)	11.1 ± 1.8
APACHE II (mean ± sd)	25.6 ± 6
Pathology on admission	Trauma 26%; Post surgical 17%; Medical 57%

TABLE 2 CLINICAL DATA OF TREATED PATIENTS IN RESPECT TO TIMING OF DAA ADMINISTRATION

	DAA within 24 h (n = 11)	DAA after 24 h (n = 12)
Age (years) (mean ± sd)	43.5 ± 12.7	52.9 ± 16
SAPS II on admission (mean ± sd)	51 ± 10.2	50.8 ± 11.5
Length of stay in ICU (days) (mean ± sd)	43.1 ± 22.8*	69.6 ± 15.5
Mortality at 28 days	9.1%*	58.3%
APACHE II (mean ± sd)	25.1 ± 3.5	26.2 ± 2.1
SOFA (mean ± sd)	11.1 ± 2.1	11.1 ± 2.2

*Statistical analysis: Student's t-test (*P < 0.05)*

CONCLUSION. Our results confirm that early treatment with DAA is linked with a better prognosis at 28 days and a shorter length of stay in ICU (Table 2). Mean age in the two groups was different, but organs failure scores were similar (Table 2). Notably, 4 patients developed Abdominal Compartment Syndrome and underwent to decompressive laparotomy during DAA infusion (interrupted as indicated above) without significant bleeding. Our experience supports that early treatment with DAA improves the outcome and reduces the mean duration of ICU stay.

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0203

ANTICOAGULANT TREATMENTS IN ICU PATIENTS WITH SEVERE SEPSIS AND SEPTIC SHOCK: IS THERE ROOM FOR DROTRECOGIN ALPHA [ACTIVATED] IN REAL LIFE?

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INTRODUCTION. The effect of drotrecogin alpha [activated] in patients (pts) with severe sepsis and septic shock might be influenced by concomitant treatment with heparin. We aimed to determine the prevalence of this treatment in such ICU pts.

METHODS. Prospective survey in 7 medical or medical-surgical ICUs from March to July 2007. All pts with severe sepsis and septic shock were consecutively followed from admission to discharge.

RESULTS. 160 pts (age 69 years, SAPS II 50.5, admission SOFA 9, hospital death rate 44%) were included. Reasons for admission in ICU were mainly shock (n = 70) and acute respiratory failure (n = 48). Severe sepsis occurred in 131 pts and septic shock in 119. Infection sites were: pneumonia (n = 94), peritonitis (n = 30), urosepsis (n = 10), other (n = 44). 30 pts were bacteremic. 27 pts needed surgery or drainage. 1513 patient-days (pt-days) were surveyed (median 8 days per pt). Median min platelet count was 176000/mm3 (extremes 1000–854000). 32 pts had at least 1 day with a platelet count lower than 30000/mm3 representing 100 pt-days. On admission, 50 pts had an absolute contraindication to high dose anticoagulant treatment and 6 pts had an indication to high dose anticoagulant treatment. Anticoagulant treatment was administered during 1071 pt-days (71%) in 134 pts (84%), and at a high dose during 191 pt-days (13%) in 24 pts (15%). Drotrecogin alpha [activated] was theoretically indicated during 557 pt-days (37%) (> or = 2 organ failures) in 121 pts (76%) but was administered during 12 pt-days in 4 pts only. Administration of drotrecogin alpha [activated] was contraindicated during 230 pt-days (41%) in 68 pts (56%) because of hemorrhagic risk (n = 50) or platelet count < 30000/mm3 (n = 32). 84 bleeding events occurred in 35 pts: digestive (n = 31), cutaneous (n = 25), nasal or oral (n = 12), tracheal (n = 8), intra-cranial (n = 3), miscellaneous (n = 5).

CONCLUSION. During severe sepsis and septic shock, contraindications to high dose anticoagulant treatment (31% of pts on admission, 41% of pts-days during ICU stay), bleeding events (22% of pts) and indications for high dose anticoagulant treatment (13% of pt-days) make actual indication for drotrecogin alpha [activated] treatment both rare and hazardous.

0204

EFFECT OF DROTRECOGIN ALFA (ACTIVATED) ON SOLUBLE CD 163 LEVELS IN SEPTIC PATIENTS

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INTRODUCTION. Soluble CD 163 (sCD163) is a macrophage-specific serum marker and is involved in the regulation of inflammation. Importantly, the extracellular part of CD163 is cleaved from the cell-membrane by proteolytic activity upon toll-like receptor activation. This shed CD 163 molecule (sCD163) is detectable in body fluid compartments and is regarded to reflect activation and proliferation of macrophages in inflammatory conditions.

We investigate the levels of soluble CD 163 levels in human blood mononuclear cells of septic patients after treatment with Drotrecogin alfa activated in vitro.

METHODS. We determined soluble CD163 levels in the supernatant of fresh isolated blood mononuclear cells (PMC′s) of 4 septic patients after addition of Drotrecogin alfa (activated) in concentrations of 50, 500 and 5000 ng/ml for 6 h in vitro and in serum of the 4 patients and healthy controls. Soluble CD163 supernatant levels were measured with ELISA-method. Statistical analysis with ANOVA were performed.

RESULTS. Levels of sCD163 in the supernatant of PMC′s of septic patients increased after incubation with Drotregocin alfa (activated) in concentrations of 50 and 500 ng/ml in vitro. After incubation with 5000 ng/ml Drotregocin alfa (activated) levels of sCD163 decreased. SCD163 serum levels of septic patients were significantly higher compared to healthy controls.

CONCLUSION. The ability of Drotregocin alfa (activated) to up-regulate sCD163 production in human blood mononuclear cells may represent a new molecular mechanism, by which Drotregocin alfa (activated) controls mediators of systemic inflammation and sepsis, possibly reflecting the anti-inflammatory properties of these drug.

0205

ARTERIOVENOUS DIFFERENCES OF THROMBELASTOGRAPHY, HAEMATOLOGICAL, BIOCHEMICAL AND COAGULATION PARAMETERS IN PATIENTS WITH SEPTIC SYNDROME

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INTRODUCTION. Patients with septic syndrome often have catheter inserted in artery as well as central vein and both are used for blood sampling in practice. Our aim was to find out if routine blood test results obtained from arterial blood mirror those from central vein and whether they are interchangeable or not.

METHODS. 21 patients aged 26–80, 14 males and 7 females, who met criteria of septic syndrome defined by ACCP-SCCM were enrolled in our study. Subjects were divided into various subgroups according to gender, source of infection, stage of sepsis, with and without circulation support and APACHE score. Haematological, biochemical and coagulation parameters were analysed in samples taken from both vessels and thrombelastography (TEG) was performed.

RESULTS. Statistically significant differences were found between samples taken from artery and vein such as: higher erythrocytes count in artery (A) compared to vein (V) ($A > V$, $p = 0.03$) and higher haemoglobin level in artery ($p = 0.035$). In male group, there were differences in erythrocytes count ($A > V$, $p = 0.045$), antithrombin (AT) level ($A > V$, $p = 0.025$) and neutrophils to lymphocytes ratio ($A > V$, $p = 0.048$). In patients with abdominal source of infection, there were differences in D-dimmers ($A > V$, $p = 0.042$) and in C-reactive protein ($A > V$, $p = 0.024$). Patients with thoracic source of infection had higher level of AT in arterial blood sample ($p = 0.036$). In the group without pharmacological circulation support differences were found in platelets counts ($A > V$, $p = 0.044$) and TMA (time to maximal amplitude-TEG parameter) ($A < V$, $p = 0.02$) while in the group with circulation support differences were found in erythrocytes count ($A > V$, $p = 0.035$) and haemoglobin level ($A > V$, $p = 0.031$). Patients with APACHE score up to 10 had higher arterial platelets counts ($A > V$, $p = 0.034$), while patients with APACHE score over 10 had higher arterial erythrocytes count ($A > V$, $p = 0.006$), INR (International Normalized Ratio) ($A > V$, $p = 0.006$) and AT level ($A > V$, $p = 0.029$). Positive correlation of TMA with stage of sepsis ($r = 0.45$; $p = 0.04$) was observed. Also, individual differences in many TEG parameters were observed, which could not be generalized.

CONCLUSION. The presence of described differences suggests the need for a strict consistency in regards to the site of blood sampling for a correct assessment of pathophysiological processes in organism. Moreover, according to our findings, it seems that arterial blood better reflects seriousness of hypercoagulability in initial stages of development of septic syndrome.

0207

ACCEPTANCE BY PROFESSIONALS OF ORGAN HARVESTING FROM NON-HEART-BEATING DONORS 1 YEAR AFTER THE INITIATION OF THE PROGRAMME IN A FRENCH ACADEMIC HOSPITAL

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INTRODUCTION. A non-heart-beating donor (NHBD) programme was started in our institution February 2007, in addition to an existing brain-dead donor (BDD) procedure. Ethics committees have raised concern about psychological impact on transplant personnel and prompted the health care teams involved in this activity to perform an ethical assessment.

METHODS. Monocentric prospective study. An anonymous questionnaire was written together with a psychologist, and sent to the professionnals involved in this NHBD programme (transplant coordinators, intensive care, recovery room and operating room nurses, nursing auxiliaries (NA), intensivists, anesthetists, urologists and residents). The aim was to assess the acceptance and feelings and to extrapolate possible improvements of our approach. The NHBD protocol in our institution includes the use of an external cardiac massage (ECM) machine (Autopulse® Zoll) and an aortic double-balloon catheter (DBC).

RESULTS. Sixty health care providers (HCP) have answered the questionnaire (35 nurses including 6 OR nurses, 5 NA, 9 intensivists and anesthetists, 4 urologists, 4 residents). The most striking recollections were the external aspect of the body (hemorrhage, trauma…) for 30% of HCP, the ECM machine (16%), the distress shown by the family (14%). When awaiting the arrival of a NHBD, HCP experienced stress (36%), anguish (12%) or a feeling of imminence (14%). MCE machine was perceived as violent (47%), noisy (40%), impressive or barbaric (26%, 28%) but useful and effective (35%). HCP found aortic DBC simple to use (24%) while the exsanguination caused disgust (43%), like bleeding someone (40%). 22% felt like asking themselves "Is this really part of my job?" When organ retrieval was not done (medical contraindication, refusal …), 56% felt disappointed.

Table 1 summarized the most frequently cited words when given a list best describing organ retrieval in NHBD and BDD. To improve acceptance, HCP proposed to allocate a specific room to this activity, to get more information about the donors, and to be granted a wage incentive (20%).

TABLE 1

Words	NHBD %	BDD %
Necessary	65	67
Teamwork	55	50
Useful	53	50
Stressful	48	18 *
Afflicting	45	23 *
Disgusting	21	2 *

* for $p < 0.05$

CONCLUSION. Care for NHBD was perceived as more stressful, afflicting and impressive than for BDD. However organ retrieval from donors was not questioned and was globally quoted as necessary, useful and interesting.

Poster Sessions
Organ donation: 0206–0215

0206

SUCCESFUL KIDNEY TRANSPLANTATION FROM A DONOR WITH SEVERE DISSEMINATED INTRAVASCULAR COAGULATION AND IMPAIRED RENAL FUNCTION

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INTRODUCTION. Disseminated intravascular coagulation (DIC) is characterized by the widespread activation of coagulation, initially resulting in intravascular formation of fibrin and ultimately causing thrombotic vessel occlusion. There is reluctance to transplant kidneys from donors with DIC because of previously reported primary non-function in 33% of cases. This case report however describes the result of transplantation of one of the kidneys from a patient with DIC, whereas the other was pathologically examined.

METHODS. Case report.

RESULTS. A 41-year-old male with isolated neurotrauma was intubated on-site with a Glasgow Coma Scale of E1M1V1. CT-brain showed multiple skull fractures, diffuse cerebral oedema, blood around the brainstem, in the subarachnoid space and the fourth ventricle. After ICU admission he became hypertensive with systolic blood pressures above 200 mmHg which normalized after mannitol-infusion. DIC developed as evidenced by an activated prothrombin time of 57 (control: 30 s), fibrinogen level of 0.2 g/l (2.5–4.0 g/l) and platelet count of 56.000/mm^3 (150.000–400.000 mm^3). Renal function deteriorated (serum creatinin peaked at 282 μmol/l), while adequate urine output was maintained throughout ICU-stay. 16 hours after admission neurophysiological examination confirmed the clinical suspicion of brain-death and the patient's family consented to organ donation. The organs were harvested 28 hours after hospital admission. Treatment of DIC consisted of 2 units of FFP and 3 units of packed cells prior to and during the surgical procedure. The left kidney was transplanted resulting in "immediate function". The right kidney was rejected for transplantation. Pathological examination revealed severe fibrin thrombi in the glomerular capillairies and acute tubular necrosis. Severe DIC, even in the presence of rising creatinin values, does thus not per se result in immediate or delayed graft dysfunction. Although abnormalities can (initially) be found on pathological examination, the transplanted kidney's functional capabilities can potentially return early.

CONCLUSION. Controversy remains whether or not to accept kidneys from donors with DIC for transplantation. Our patient with severe DIC donated both kidneys. The right kidney was refused and showed evident signs of DIC and acute tubular necrosis. The left kidney was transplanted and showed "immediate function". It is reasonable to assume that the pathological findings in both kidneys were comparable; we therefore argue that DIC is not an absolute contraindication for kidney donation and transplantation.

0208

SURVEY OF FAMILY WITNESSED BRAIN STEM DEATH TESTING IN INTENSIVE CARE UNITS

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INTRODUCTION. It is common to permit relatives to witness cardiopulmonary resuscitation in the UK (1).It has also been suggested that allowing relatives to observe brain stem death (BSD) testing may enhance their understanding and acceptance that their loved one has died (2). The extent to which Intensive Care Units (ICUs) permit or facilitate relatives watching brain stem death testing is unknown.

METHODS. A telephone survey of a selection of British ICUs was performed asking about experience with relatives witnessing BSD testing.

RESULTS. 48 UK ICUs with an average of 447 admissions per year participated. Relatives were allowed to observe BSD testing in only 21(44%). Of these 29% (6/21) routinely invited relatives in to observe. Whilst 52% (11/21) permitted relatives to watch if they specifically asked and 19% (4/21) if it was felt that it may improve the family's understanding of the concept of BSD. The perceived benefits are; accepting that all treatment options were exhausted (33%), accepting the death (76%) and help with grieving (9%). Although most ICUs limited the family's presence to the second test 38% (8/21) did allow the family to be present during both sets of tests. No ICU had experienced any problems with the family witnessing BSD testing. The commonest reason for not allowing the family to be present was having never been asked. Six of these 27 ICUs would have permited family to observe if they asked. The next most common reason for not allowing the family to watch BSD testing was staff reluctance.

CONCLUSION. A large minority of ICUs allow relatives to witness brain stem death testing. Further research is needed to demonstrate whether it is of benefit to the relatives.

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0209

ASSURING QUALITY CARE WITHIN THE IMMIGRANT POPULATION IN THE ORGAN DONATION PROCESS

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INTRODUCTION. The immigrant population in Spain has increased by 9–12% in recent years. The cultural complexity also affects hospitals and particularly end-of-life decisions, among which is the possibility to donate organs.

AIM: To study organ donation interview protocol when dealing with immigrants.

METHODS. To analyse family interview registers of all potential donors in University Hospital Vall d'Hebron (2002–2007) comparing native and immigrant population characteristics. We consider: nationality, length of stay in Spain, number of people present at interviews, relationship, level of education, length and number of interviews, knowledge about Spanish Transplant Law (presumed consent), donor card, knowledge about transplants, outcome of interviews (reasons for agreement or disagreement).

RESULTS. 233 family interviews were performed. 28 (12%) corresponding to immigrant families: 10 Latin America, 6 Africa, 7 Asia, 5 Europe. The percentage of family refusals was slightly higher 6 (21%) vs. 42 (18%) ns. Neither were there significant differences regarding length of ICU stay 1.9 ± 5 vs. 2,3 ± 4.9, nor in the gender of the decision-taker, number of people present during the interview, possession of donor card, nor knowledge of the Spanish Transplant law. Limited health literacy was 18 (64%) in immigrants vs. 30 (14%) native population.

However, we found significant differences in length of interview (114 ± 97 minutes vs. 40 ± 35 and number of interviews 3,34 ± 1,6 vs. 1,2 ± 1,2. The most common reason given for donation was reciprocity 21 (75%) vs. 70 (34%) follow by solidarity 16 (57%) vs. 160 (78%). "Living will" organ donation in the immigrant population was 2 (7,1%) vs. 32 (14, 7%). In the native Spanish population the most frequent reason given was deceased's expressed refusal 30 (71%) and in immigrants 3 (10%) concerns over physical image of corpse, 2 (7,1%) mistrust of the health systems, 2 (7,1%) religious convictions.

CONCLUSION. Assuring quality of care and cultural competence in medical staff is crucial for organ donation.

The immigrant population requires greater input in terms of time and dedication, probably due to cultural differences and literacy disadvantages.

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0210

ORGAN PROCUREMENT IN THE ELDERLY, WITHDRAWING AND WITHHOLDING, A DIFFICULT ISSUE

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INTRODUCTION. To know the reality about withdrawing and withholding life sustaining treatment in elderly patients with GCS < 8 on admittance susceptible to developing brain death and when such treatment limitation is acceptable.

METHODS. Prospective-descriptive study of all patients admitted in ICU or similar areas with GSC£ 8, 1200 bed-hospital with 60 critical beds. Study period: 2001–2007. The study group was patients > 70 years old. An archive was designed by transplant coordinators with:demographic, clinical, surgical data, outcome and time spent in the process.

RESULTS. We retrieved 121 patients, 61% men 39% female. Mean Age: 75 +/−4.

From: ICU Gen. 47%, 39 ICU Trauma, 11% A&E and 3% other areas.

Admittance pathology: medical 62%(brain haemorrhage 40%) or traumatic 38% (accidental brain damage 18%).GCS distribution on admittance (%): GCS = 3 17, GCS > 3<6: 58 and GCS > 6<9: 25.

Evolution: to brain death (BD) 41 (34%). 69 (58%) died (including those in BD but not suitable as donors) 3% remained in PVS and 20% improved.

There is no relation between gender and evolution to BD, although there is a higher number of female donors. Only 21 (18%) of potential donors became effective donors This possibility diminished with age, 70–75: 22%, 75–80:13% and > 80:6%.

Analysing time spent in the process: first time (from admittance to detection) 1,5 +/−4 days. Second time (detection to donation or death): 7 +/−12 and hospital stay: 9 +/−13.

Considering life support withdrawal by age, the incidence of withdrawal is 51% in 70–75y and 63% in older than 80. In 55% of patients a unilateral, clinical decision was taken to limit treatment. Approximately 50% are patients developing BD who could not become donors due to medical contraindications (in general neoplasm or HVC) or family refusal (7%). In Spain this cannot be considered withdrawing in the strict sense because it is mandatory to remove unnecessary support. Intubation removal is unusual, we only find it in 1,5% of cases. Related to time, 63% of withdrawal decisions are made in the first 48 h, with a second incidence point at day 7–8: 12%.

When the decision is to withhold (3%), the scenario is quite different. It usually takes place in A&E and more than half the cases include family involvement.

CONCLUSION. Elderly patients with GCS < 8 provide an opportunity to expand the organ donation pool.

There is relevant incidence of withdrawal and less withholding in this group. However, we must ascertain if the low number of BD could be improved by delaying this decision. That is to say, instead of deciding in the first 48 h, maybe a consensus can be reached to wait a further 4 or 7 days to achieve BD.

0211

THE GIFT PROJECT – THE FIRST NATIONAL SURVEY ON ORGAN DONATION IN BELGIUM

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INTRODUCTION. End 2006, the Belgian Federal Public Service (FPS) Health, Food Chain Safety and Environment launched a national project – the Gift Project – that aimed to gain insight about the organ donors' potential in Belgium and to improve organ donors' detection and management in Belgian intensive care units (ICU).

METHODS. Sixty three hospitals with no transplantation activity participated in the project. Data were entered into a dedicated web based database licensed to the FPS. Data were collected for all patients who died in the ICU. Variables collected were related to patients' characteristics, circumstance of patients' death, brain death (BD) diagnosis, family consent, donors' referral and organs' retrieval.

The primary endpoint of the Gift Project was to characterize Donation after Brain Death (DBD) and Donation after Cardiac Death (DCD) among the participating ICUs.

RESULTS. Over the 1-year period, 5213 deceased patients were entered in the database. Of these, 1784 (34%) had no contra-indication to organ donation on admission. Table 1 depicts the more relevant results of this survey. Among the 8% of patients who died in the ICU from BD, 65% were identified as potential donors and 34% were eventually donors. Six percents of the ICU deceased patients were applicable for DCD. Of them, 10% were identified as potential DCD and 5% became donors.

TABLE 1 ORGAN DONORS DETECTION

	DBD	DCD
Patients' applicable for organ donation*	424	320
Identified	277	33
Referred	199	23
Effective donation	145	15

**Patients with either BD criteria or compatible for NHBD and with less than 65 y.o*

CONCLUSION. The present survey provides, for the first time, a true estimate of the actual yearly potential for organ donation in a significant sample of Belgian ICUs (63/117 hospitals, 54%) with no transplantation activity. The Gift Project seems to have contributed to the 6.6% increase of organ donors (from 26 to 27.7 donor/million inhabitants). However, although Belgium has reached a high organ donors rate, it appears that there is still room for an improvement.

0212

INVASIVE PROCEDURES, LENGTH OF STAY, COSTS AND ICU MORTALITY IN NONAGENARIANS IN THE INTENSIVE CARE UNIT (ICU): A CASE CONTROL STUDY

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INTRODUCTION. Elderly population is expected to double in the next forty years and the fastest growing group is made of nonagenarians. There is ongoing debate about the health care cost and clinical benefit that ICU admission may add to these patients. However, data on outcomes, length of stay (LOS) and aggressive treatment of very elderly patients admitted to the ICU is still scarce. The objective of this study was to investigate use of invasive procedures, LOS, costs, and mortality in nonagenarians in the ICU.

METHODS. We conducted a retrospective analysis of data from 2005 to 2007, in a 30 bed mixed medical/surgical ICU. Patients older than 90 years old were identified. Demographics, comorbidities, admission diagnosis and ICU LOS, as well as need for mechanical ventilation (MV), invasive arterial monitoring and central venous catheter (CVC) were recorded. Nonagenarian patients (cases) were then matched with controls (age minus 20 ± 4 years), for gender, admission diagnosis (medical vs surgical), disease severity (SAPS II ± 3 points) and ICU outcome. ICU LOS, frequency and duration of invasive arterial monitoring and CVC were analyzed. Continuous variables are shown as mean (± SD) and compared using Wilcoxon signed rank test and one-way analysis of variance (ANOVA) for nonparametric data; chi squared test was used for categorical variables; paired t test was used to compare cases and controls.

RESULTS. A total of 2724 patients were admitted during the study period. Eighty five (3%) were older than 90 years old, and 45% had a surgical diagnosis on admission. Mean SAPS II was 41.7 ± 11.4 points. Twenty patients (23%) required MV and mortality was higher among nonagenarians when compared with patients between 75 and 90, 65 and 75 and younger than 65 years old (8 vs 2.8 vs 1.1 vs 0.7%, respectively; $p < 0.0001$). ICU LOS was longer for nonagenarians compared with younger matching controls (10 ± 19.1 vs 4.9 ± 7.3 days respectively; $p = 0.02$). Frequency of invasive arterial monitoring didn't differ between the two groups (28 vs 27%) but the use of CVCs was more frequent in older patients, without reaching statistical significance (91 vs 67%; $p = 0.09$). Venous catheters were maintained longer in older patients by physicians (6.1 ± 11.4 vs 3.7 ± 7.6 days; $p = 0.07$). Hospital costs were similar in both matched groups (24332 ± 38429 vs 17257 ± 22700 euros; $p = 0.27$).

CONCLUSION. Nonagenarian patients had higher mortality than other age groups admitted to the ICU. ICU LOS, costs and requirement of invasive endovascular catheters were similar in patients over 90 years old, when compared to matching controls. Prospective studies are necessary to check ICU interventions and costs matched to long-term survival of patients older than 90 years.

0213

LACK OF CORRELATION BETWEEN ELDERLY PATIENTS' WISHES AND THE LEVEL OF CARE PROPOSED BY THE PHYSICIANS

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INTRODUCTION. Emergency physicians often estimate but not collect elderly patients quality of life (QOL) and wish to be resuscitated. Because this estimation is often inaccurate(1), we compared patients wishes and perceived QOL to estimation made by physicians.

METHODS. Survey performed on scene. Inclusion criteria: patients > 80y/o treated for a life-threatening pathology. First part of the questionnaire (patients evaluation of QOL and wishes to be resuscitated) completed by a nurse and a medical student; second part (estimation of QOL and desire for care by the medical team) by the physician and the driver blindly from patients answers. QOL assessed using a Visual Analogical Scale (VAS) ranging from 0 to 10. Data as median ± SD. Comparisons using Student t and Chi^2 tests.

RESULTS. 17 questionnaires completed between as preliminary data. Main results are presented in Table 1. Diagnosis were: cardiovascular disease (7), sepsis (3), pulmonary disease (2), haemorrhage (2), trauma (1), NA (2). Despite similar evaluation of QOL (patients: 6 ± 3 vs physicians: 7 ± 2, $p = 0.10$), wishes of resuscitation were different between patients and physicians. While physicians would have provide ICU cares to 13 patients, 11 patients wanted to be resuscitated. Among the 4 patients who would not have been resuscitated by the physicians, 2 wanted to be resuscitated. Five of the 6 patients who did not want to be resuscitated, would have been resuscitated by the physicians. Patients desire tended to be affected by the Karnosky score ($p = 0.07$), but not by the fact to live alone ($p = 0.55$).

TABLE 1

	n = 17
age	87 ± 5
gender (F/M)	12/5
Karnofsky score	60 ± 20
Patients VAS for QOL	6 ± 3
Physicians VAS for QOL	7 ± 2
Lives alone (yes/no)	9/8
Daily external help (yes/no)	6/11
Reasons for ICU refusal:	
fear to be in pain	2
fear of prolonging of life	2
wish to dye at home	2
no more wish to live	2

CONCLUSION. Emergency physicians do not often take into account patients' wishes. These preliminary data suggest a lack of correlation between elderly patients' wishes and the level of care proposed by the physicians.

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0214

COMPARISON OF THE SHORT TERM OUTCOME OF CRITICALLY ILL ELDERLY WITH THE VERY ELDERLY

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INTRODUCTION. Management of the critically ill elderly poses a challenge to choose between aggressive treatment and limitation of life support. Published literature points towards age alone, not being an independent predictor of outcome. Data on outcome in this population therefore are required to help the clinician in appropriate decision making in this population.

METHODS. Retrospective chart review of males > 65 years and females > 60 years from May 2006 till December 2007. Data collected included age, gender, disease category, comorbidities, mechanical ventilation days, length of stay in ICU and hospital, APACHE II, SOFA, premorbid functional status, End of Life decisions and mortality. Patients who did not require any form of resuscitation (fluids, vasopressors or ventilatory support) and elective post surgical patients were excluded from the study. Setting: A 12 bed Medical – Surgical Intensive Care unit in a tertiary care centre in India.

RESULTS. There were 830 admissions of which 322 (38.9%) were elderly. 123 (14.81%) were critcially ill. The study population was divided in 2 groups – elderly (≥ 60 and ≤ 74 years) and very elderly (≥ 75 years).73 (59.4%) were elderly and 50 (40.6%) were very elderly. The mean age was 67.8 years in the elderly and 81.04 years in the very elderly. There were 38 (52.05%) males & 35 (47.9%) females in the elderly and 30 (60%) males & 20 (40%) females in the very elderly. The primary organ involvement in the elderly group was: respiratory 44 (60%), sepsis 7 (10%), malignancy 2 (2.7%), neurological 6 (8%), renal 4 (5.5%), cardiac 7 (9.6%) and in the very elderly group was: respiratory 22 (44%), sepsis 5 (10%), malignancy 1 (2%), neurological 8 (16%), renal 5 (10%) and cardiac 8 (16%) (NS). Co morbidities were present in 71 (97.3%) in the elderly and 47 (94%) in the very elderly (NS). The mean APACHE II was 14.43 in the elderly and 17.1 in the very elderly (NS). The mean SOFA score was 1.32 (median 1.0) in the elderly and 1.96 (median 1.0) in the very elderly (NS). The mean LOS stay in ICU was 2.15 days in the elderly and 4.1 days very elderly (NS). The mean LOS stay in the hospital was 8.21 days in the elderly and 7.16 days in the very elderly (NS). NIPPV (non invasive ventilation) was used for 1.58 days in the elderly and 1.2 days in the very elderly ($p = 0.04$).Mechanical ventilation days were 2.15 days in the elderly and 1.32 days in the very elderly (NS). The functional status was: independent 60 (82%), partially dependent 6 (8.2%), fully dependent 6 (8.2%) in the elderly and 36 (72%), 8 (16%) and 6 (12%) in the very elderly respectively (NS). There were in all 26 (21.14%) deaths of which 13 (17.8%) were among the elderly and 13 (26%) among the very elderly (NS).EOL decisions were taken in 8 (61.54%) in the elderly and 7 (53.85%) in the very elderly (NS).

CONCLUSION. There was no significant difference in the outcome measures in term of mortality, ICU & hospital LOS and end of life decisions between the elderly and the very elderly, supporting the view that age alone should not impact on decision making in this population.

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0215

QUALITY OF LIFE OF THE OLDEST ELDERLY PATIENTS AFTER ICU STAY

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INTRODUCTION. The elderly part of the population is expected to grow, notably for the oldest. Health related quality of life (QOL) is a crucial issue. Data on QOL is necessary to design pre-ICU triage guidelines and post-ICU rehabilitation programs. The aims of our study was to evaluate QOL in the oldest part of the elderly population with specifically designed QOL scales.

METHODS. Monocentric observational study to evaluate QOL of the oldest elderly after ICU stay. We prospectively included all the patients aged 80 or more admitted to the ICU between the 1 Jan. 2005 and the 31 Dec. 2006. Triage wasn't influenced. On top of the usual descriptive data we recorded their self sufficiency by using a modified Katz Index of Activities of Daily Living (ADL) on 6 points. To assess 1-year outcomes patients were contacted on the phone to record their self sufficiency and QOL. We used QOL scales validated for the general population (WHOQOL-26) and the elderly population (WHOQOL-OLD). WHOQOL express QOL as numeric variables with a maximal score of 100 (best) for each one of the assessed domains.

RESULTS. There were 115 consecutive admissions (108 patients) of 80 years old patients; They were aged 84 ± 3, 54.7% were males, they had a median ADL score before admission of 6. Most frequent severe underlying diseases were diabetes 22.6%, cardiovascular 29.2%, pulmonary 20.8%, renal 9.4%. 60.4% were transferred from ward with a median duration of hospital stay of 6.3 days before ICU admission. Sixty-five % were medical admissions, 20% unscheduled surgery and 15% scheduled surgery. The most frequent reasons for admission were: respiratory failure 21.7%, MODS & septic shock 22.7%, other shock 13.2%, acute renal failure 21.3%, COPD 9.4%, coma 8.5%. SAPS2 score was of 45 ± 18.3, LOD score: 5.4 ± 3.5, SOFA score: 6.4 ± 3. Duration of ICU stay was of 10.2 ± 13.2 days, 59.4% were mechanically ventilated, 45.3% received vasopressors, 62.3% had a central venous catheter.

A decision to withdraw or withhold therapies was taken in 36.8% and 18.9% patients died after life support withdrawal. 66 Patients were discharged alive from the ICU; of which 8 died in the hospital. 26 died during the next year, leaving 32 surviving patients to be assessed. Six refused to answer our questionnaires; 3 were demented and unable to respond. 23 patients had their QOL assessed. They were 83.5 ± 3.7 years old, mostly (72%) males with a good self sufficiency (76.2% had an ADL of 6/6). Their quality of life was good with an overall WHOQOL-26 score of 69.4 ± 12 (physical: 59.6 ± 13.9, psychological: 68.8 ± 16.8, social: 68.4 ± 16.7, environment: 79.3 ± 13.4) and the following scores in the WHOQOL-OLD domains: sensory 64.7 ± 30 autonomy 63.6 ± 12.6, death 77.9 ± 20, activity 69.7 ± 17, social 60.5 ± 22, intimacy 68.2 ± 18.2. When we asked them if they would accept to be hospitalized again in the ICU in case they would need it, 76.2% responded yes.

CONCLUSION. In this narrow population of previously self sufficient very elderly ICU survivors quality of life was good. Most patients would accept another ICU stay if required. This questions actual triage rules sometimes based on age as they should give more room to QOL and self sufficiency.

Poster Sessions
Pathophysiology of sepsis II: 0216–0229

0216

RELATION OF HEART RATE VARIABILITY AND TH1/TH2 BALANCE IN PATIENTS WITH SEPSIS AND SEPTIC SHOCK

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INTRODUCTION. There is strong evidence that autonomic nervous system (ANS) controls body's systemic response to inflammation. The aim of this study was to assess the possible association between heart rate variability (HRV), estimating indirectly ANS outflow and being extrapolated from the electrocardiogram (ECG) and Th1/Th2 cytokine levels and relate them with final outcome (resolution of sepsis or development of septic shock), in a cohort of septic patients.

METHODS. We daily assessed HRV in the time domain [standard deviation of RR intervals (SDNN)] and in the frequency domain [low frequency LF, high frequency HF, LF/HF as an indicator of sympathovagal balance (msec2/Hz)], the two values of standard deviation (SD1 and SD2), as indicators of the dispersion of RR points obtained from the Poincaré plot and measured C-reactive protein (CRP), Th1 (TNF-alpha, IL-1b) and Th2 (IL-1ra, IL-6 and IL-10) cytokine serum levels, in twenty patients admitted to our Intensive Care Unit with a primary diagnosis of sepsis. Patients with a previous history of arrhythmia, trauma brain injury and immunodeficiency were excluded from the study. The ECG signal was daily recorded for 10 minutes under sedation and mechanical ventilation from a standard lead II ECG, obtained with monitors (Marquette 8000, GE, Milwaukee, USA). For off-line biosignal measurements we used the advanced HRV analysis tool for Windows, developed from the Department of Physics of the University of Kuopio, Finland. Correlation analysis with Pearson's test was performed on log-transformed HRV and cytokine data whether differences between patients with sepsis ($n = 12$) or development of septic shock ($n = 8$) were evaluated by analysis of variance.

RESULTS. CRP blood levels exhibited negative correlations with LF ($r = -0.78$, $p < 0.01$), LF/HF ($r = -0.61$, $p < 0.05$) and SDNN ($r = -0.79$, $p < 0.01$). LF/HF was inversely associated with SD1/SD2 ($r = -0.56$, $p < 0.05$), IL − 10 ($r = -0.66$, $p < 0.01$) and IL − 1ra ($r = -0.58$, $p < 0.01$) and positively correlated with TNF-alpha ($r = 0.73$, $p < 0.01$), whereas HF exhibited positive correlations with all Th2 cytokines ($p < 0.001$). Mean SDNN, LF/HF, IL-6 and CRP levels proved to be significantly different between patients with sepsis versus septic shock.

CONCLUSION. Our data support the hypothesis that LF/HF parallels pro-/anti-inflammatory balance whereas low HRV indices are associated with an unopposed hyper-inflammatory response (high CRP and Th1/Th2 levels), indicating uncoupling between autonomic outflow and immune response in patients with septic shock.

REFERENCE(S). Tracey KJ. The inflammatory reflex. Nature 2002; 420: 853–59.

GRANT ACKNOWLEDGEMENT. The 2007 Edwards minimally invasive heamodynamics award.

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0217

11ß-HYDROXYLASE AS RATE LIMITING STEP IN CORTISOL SYNTHESIS IN SEPSIS

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INTRODUCTION. In patients with severe illness treatment with hydrocortisone has been shown to decrease length of shock and catecholamine dependency, however survival time was better only in subgroups of patients.

The adrenal function of 54 patients (21 in cardiogenic and 34 in septic shock) was compared with 34 control patients. We have analyzed the steroid hormone synthesis pathway within the adrenal gland in a prospective study using the established high dose stimulation test.

METHODS. The plasma levels of ACTH, active renin and the steroid hormone pathway was analyzed before and 60 minutes after stimulation with cosyntropin. All hormones were determined by chromatography as well as by commercially available assays. In surviving patients the test was repeated after recovery.

RESULTS. At baseline septic and cardiogenic patients showed elevated levels of progesterone, 17-hydroxprogesterone and cortisol compared to controls despite normal low ACTH levels in all patients. DHEAS levels were elevated only in septic patients. In septic shock aldosterone levels were similar to control in spite of 10-fold increased active renin levels, whereas cardiogenic shock patients had increased levels of both, aldosterone and active renin. In addition, 5-fold increased levels of 11-deoxycortisol were found already before stimulation.

After ACTH challange, the levels of testosterone, 17ß-estradiol and DHEAS remained constant, whereas all precursors of cortisol increased in all patients. In controls or cardiogenic patients, stimulation leads to significantly increasing values of cortisol and aldosterone and decreasing levels of cortison. In patients with sepsis, however, the increase of cortisol and aldosterone and the decrease in cortisone was blunted and 11-deoxycortisol increased further. 11-deoxycortisol levels were not related to free cortisol. After recovery from shock, the adrenal response to cosyntropin stimulation was no longer altered.

CONCLUSION. ICU-patients had higher levels of cortisol precursors and elevated 11-deoxycortisol independent on free cortisol levels. These findings indicate a rate limiting step in the synthesis of cortisol at the level of 11-hydroxylase in sepsis.

0218

ANGIOPOIETIN-2 LACKS ASSOCIATION WITH CARDIOPULMONARY FUNCTION BUT CORRELATES WITH SEVERITY OF ILLNESS AND MORTALITY IN MEDICAL PATIENTS WITH SEVERE SEPSIS

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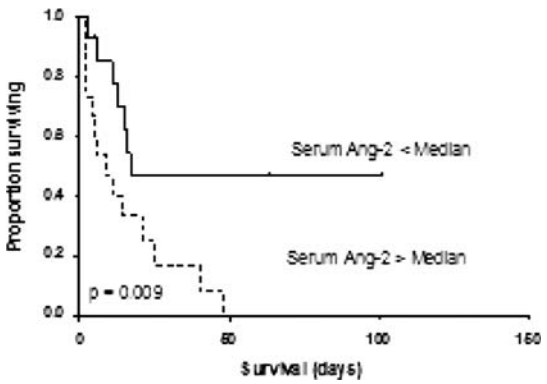
INTRODUCTION. Endothelial activation is a devastating key event in sepsis that leads to impaired vasomotor tone, leukocyte recruitment and capillary leakage. Recently, the endothelial specific angiopoietin (Ang)-Tie ligand-receptor system has been identified as an essential regulator of endothelial activation in preclinical models of acute lung injury and endotoxemic shock. Binding of circulating angiopoietin-1 (Ang-1) to the Tie2 receptor protects the vasculature from inflammation and leakage, whereas binding of Ang-2 antagonizes Tie2 signaling and disrupts endothelial barrier function. Here, we ask whether levels of circulating Ang-1 and Ang-2 correlate with severity of illness, cardio-pulmonary function and mortality in critically ill medical patients with severe sepsis.

METHODS. Design: Prospective study. Setting: Medical ICU at a tertiary care university hospital.
Patients: Ang-1 (IRMA) and Ang-2 (ELISA) were measured in sera of 29 healthy controls and 29 ventilated patients with sepsis.



RESULTS. Median serum Ang-2 levels were significantly elevated in critically ill patients compared to healthy controls. In contrast, Ang-1 levels were significantly lower in patients compared to controls. Ang-2 levels correlated closely with SOFA and APACHE II scores, thus indicating severity of illness. No association was detected between Ang-2 and cardio-circulatory or pulmonary function as assessed by transpulmonary thermodilution technique (PiCCO® system). Ang-2 was identified being a strong predictor for survival that yielded the same discriminatory ability than the APACHE II score.

CONCLUSION. A marked imbalance of the Ang/-Tie system in favor for Ang-2 potentially contributes to vascular barrier dysfunction in septic medical patients. Although individual Ang-2 levels do not indicate pulmonary or cardio-circulatory function, they might serve as a new biomarker to predict survival in patients with sepsis-induced pulmonary dysfunction. Strategies to control the deleterious effects of Ang-2 might be essential to prevent endothelial activation, inflammation and barrier dysfunction in critically ill patients.

0219

DOWN-REGULATION OF ENHANCED INFLAMMATORY RESPONSE WITH HUMAN PURIFIED C1-ESTERASE INHIBITOR (C1INH) IN PATIENTS WITH SEPSIS

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INTRODUCTION. It was reported that severe inflammation in patients with sepsis resulted in sustained activation of compliment. Increased consumption and functional deficiency of C1INH as the only endogenous inhibitor of all 3 pathways of complement system might be operative in pathogenesis of uncontrolled systemic inflammation in sepsis. We assessed the effects of human purified C1INH on complement-depended pathways of systemic inflammatory response in patients with sepsis.

METHODS. In terms of open-label prospective study human purified C1INH (Bicizar, BioGenius LLC, Russia) was administered at total dosage of 12000 U (infusion of 6000U, 3000U, 2000U, 1000U every 12 hours). Twenty patients meeting ACCP/SCCM sepsis criteria on admission were recruited to the treatment group so far. Those patients ($n = 22$) with sepsis who did not receive C1INH infusion were put together as the control. C3, C4, interleukin-6, C-reactive protein (CRP) and procalcitonin (PCT) measurements were carried out at baseline, and on 2,3,5 and10 days after exogenous C1INH infusion. Blood samples for C1INH activity were also obtained on 5 min, 30 min, 1, 2, 4, 6, 8, 10, 12, 36 hours, 3, 5, 10 and 28 days after infusion. C1INH, C3 and C4 kinetics was described by Cmax, Tmax, AUC0-10 days. Patients in both groups had no substantial differences in basic demographic characters, concomitant diseases and treatment options.

RESULTS. The severity index measured with SAPS 2 at the entry showed no differences between the studied group (24 (13–47)) and the control (26 (13–41), $p > 0.05$). In patients with the lower C1INH baseline activity (healthy volunteers: 0.8–1.4 U/l 95% CI) the levels of C3 ($r = 0.684$, $p < 0.01$) and C4 ($r = 0.719$, $p < 0.01$) were likely to be decreased on admission. The initial values of C1INH (1.69 U/l(0.96–2.65 U/l)) significantly increased already within 24 hours (2.63 U/l (1.36–3.58 U/l); $p = 0.002$) after C1INH infusion whereas both C3 (0.86 g/l (0.43–2.01 g/l)) and C4 (0.18 (0.05–0.52 g/l)) displayed elevation on the third day - (1.02 g/l (0.56–2.31 g/l); $p = 0.004$) and (0.26 g/l (0.1–0.47 g/l); $p = 0.01$), respectively. Activity of C1INH ($p < 0.01$) as well as levels of C3 ($p < 0.05$) and C4 ($p < 0.05$) was also higher in the studied group on same days than in control. Rate of CRP concentration drop was faster in patients received C1INH (130 mg/l(28–293 mg/l)) and displayed significance comparing with control (185 mg/l (72–343 mg/l); $p = 0.022$)on the 3 day of the study. It was likely that those patients with elevated PCT values at the onset of sepsis had bigger C1INH AUC0-10 h after 6000 U infusion ($r = 0.635$, $p < 0.05$). The mortality rate ($p = 0.09$, Log Rank Mantel-Cox) in patients received C1INH was 2/20 patients (10%) whereas in control 8/22 patients (36%).

CONCLUSION. The observed increase in C1INH activity, C3 and C4 levels with concomitant significant drop in CRP values on the 3rd day after human purified C1INH infusion could reflect down-regulation of systemic inflammatory response. The potency of super physiologic dosages of C1INH to contain complement-mediated systemic inflammatory reaction in sepsis should be further studied in large-scale trials.

0220

ASSESSMENT OF LIVER DYSFUNCTION IN CRITICALLY ILL PATIENTS WITH TRANSCUTANEOUS NEAR INFRARED SPECTROSCOPY (NIRS)

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INTRODUCTION. Systemic disorders such as sepsis and trauma and therapeutic interventions employed in critically ill patients can ultimate lead to organ dysfunction. Impairment of tissue oxygenation is the common pathology in all these disorders. Near-infrared spectroscopy (NIRS) is a non-invasive, light based technique that can be used for the measurement of liver oxygenation. We investigated whether liver tissue oxygenation, as measured by NIRS, may be correlated with conventional hepatic serum markers and subsequently be used to assess liver dysfunction (LD) in the critically ill.

METHODS. Eleven patients (10 M/1F) admitted to a multidisciplinary intensive care unit (ICU) were prospectively examined during a 7-day period. Patients had a mean age of 66 ± 13 years and a SOFA score of 5.3 ± 2. Tissue oxygenation index (TOI) representing the ratio of oxygenated hemoglobin to total hemoglobin was calculated with the NIRO-200™ device (Hamamatsu, Photonics, Japan). NIRS measurements were performed at a sample rate of 0.5 sec for a mean period of 3 min. Liver TOI was taken as the mean value over the period of the measurement. The correct positioning of the optodes was guided by ultrasound (US). Liver function was monitored daily by measuring serum bilirubin and liver transaminase levels.

RESULTS. Liver TOI values ranged from 43 to 87%. The width of the tissue between the skin and the liver, as measured by US, was 1.7 ± 0.5 cm. Serum examination revealed bilirubin values of 1.8 ± 2.6 mg/dl, SGOT 92 ± 115 U/l, SGPT 63 ± 57 U/l, γ-GT 125 ± 145 U/l, ALP 206 ± 139 U/l. Statistical analysis revealed a significant correlation ($p < 0.05$) of the liver TOI with bilirubin ($r = -0.80$) and SGOT ($r = -0.67$).

CONCLUSION. Liver tissue oxygenation may serve as a potential noninvasive parameter for evaluating LD in critically ill patients. To draw definite conclusions with regard to the usefullness of liver NIRS in clinical practise, further studies are needed.

0221

CYTOKINES DETECTED IN THE INTESTINAL LUMEN AFTER ISCHEMIA AND REPERFUSION

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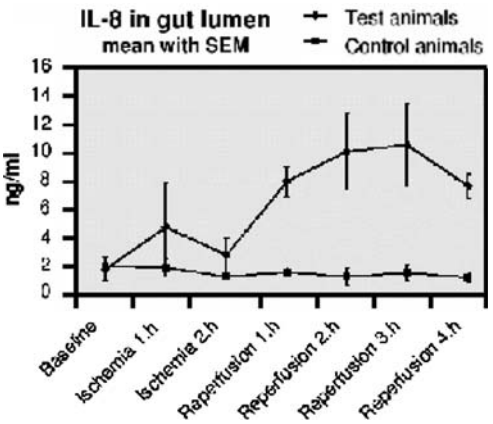
INTRODUCTION. The gut is thought to be a "motor" in development of multiple organ failure. Alterations in permeability, inflammation and mucosal blood flow are important mechanisms. In vitro studies have shown secretion of cytokine-like proinflammatory proteins (HMGB1) from the apical part of enterocytes, and secretion of other peptides from small intestinal neuroendocrine cells stimulated by cytokines (IL-1b). The aim of this study was to investigate whether cytokines really are present in vivo in the intestinal lumen in a pig model of intestinal ischemia and reperfusion, and whether they can be detected with intraluminal Microdialysis (MD).

METHODS. Eight pigs (five experimental and three controls) were anaesthetized and mechanically ventilated. The superior mesenteric artery was cross clamped for 120 minutes, followed by 240 minutes of reperfusion. A MD catheter (CMA, Custom made, cut off 100 kDa, membrane length 10 mm) perfused with PBS Tween 0,05% at a flow of 1 µl/min was inserted into the lumen of the jejunum. Samples were collected in 60 min fractions and cytokines were measured from the samples with a bead based multiplex cytokine assay analysed by flow cytometry (Luminex 100).

RESULTS. In the test animals IL-8 rose from a mean baseline value of 1,49 ng/ml (SEM 0,81) to a maximum of 10,64 ng/ml (SEM 3,67) after 180 min of reperfusion, as compared to control animals with a baseline value of 1,7 ng/ml (SEM 0,76) and maximum value of 1,23 ng/ml (SEM 0,61) also after 180 min reperfusion (Fig. 1). We also analysed for IL-1b and TNF-α. Many samples were below the limit of detection which was about 0,01 ng/ml for IL-1b and 0,02 ng/ml for TNF-α, and values above this showed no clear trend or difference between the groups.



CONCLUSION. Cytokines are released to the intestinal lumen after ischemia and reperfusion, and can be detected by microdialysis. Whether they are released to the lumen due to altered intestinal permeability or secreted from apical parts of intestinal cells are unclear.

0222

MIF IN SEPTIC SHOCK: EARLY BUT NOT LATE LEVELS PREDICT MORTALITY

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INTRODUCTION. Our group demonstrated that macrophage migration inhibitor factor (MIF) is significantly elevated in early sepsis and high levels correlate to death. However, its kinetics during sepsis evolution is still poorly elucidated. Our aim was to examine MIF kinetics during the first week of septic shock, and to correlate its levels with clinical and laboratorial parameters and 28th day outcome.

METHODS. Sixty-four patients with septic shock were included in the first 48 hours of diagnosis. Patients were folllowed in the basis of Surviving Sepsis Campaign Guidelines (2004). Clinical and laboratorial data were collected. SOFA score was applied in the first week of evolution. MIF levels were measured by ELISA (Duoset kit, R&D Systems, USA), at day 1, 2, 3, 5 and 7 after patient′s inclusion. We analysed the kinetics of SOFA and MIF levels up to day 7, and their correlation with 28th day mortality.

RESULTS. Lethality was 47% in the first 28 days after septic shock. SOFA score was statiscally different after the third day between survivors and nonsurvivors: 8.4 ± 3.1 vs 9.9 ± 3.2 points on day 1; 7.9 ± 2.9 vs 9.4 ± 3.2 on day 2; 6.2 ± 3.4 vs 8.9 ± 3.4 on day 3; 4.9 ± 3.7 vs 8.7 ± 3.4 on day 5; and 4.7 ± 3.0 vs 8.6 ± 2.8 on day 7, respectively ($p = 0.01$). MIF levels were higher in nonsurvivors in the first day of inclusion (2454 ± 1975 vs 3745 ± 2064 pg/ml, $p = 0.03$). MIF levels were not statiscally different after the 2nd day of evolution. MIF kinetics showed high levels in nonsurvivors at day 1, with subsequent decrease afterwards. On the contrary, survivors showed increasing levels during the first week after diagnosis, with peaking values at day 5. SOFA score and MIF levels did not correlate with each other in the first week of septic shock.

CONCLUSION. MIF levels showed higher early levels in nonsurvivors of septic shock. MIF kinetics presented different behaviors depending on outcome, with an increasing slope up to 5th day of evolution. Secondary factors may influence MIF levels later in septic shock.

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0223

RAPID ALTERATIONS OF RED BLOOD CELL RHEOLOGY IN CRITICALLY ILL PATIENTS

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INTRODUCTION. Although alterations of red blood cells (RBCs) rheology (deformability and aggregability) have been described in critically ill patients, especially with sepsis (1,2); these studies included a limited number of patients and patients with comorbidities that could influence the RBC rheology. We investigated in a large intensive care (ICU) population, the RBC rheology at admission and the possible role of these comorbidities.

METHODS. RBC rheology (deformability and aggregation) was assessed by the Laser assisted Optical Rotational Cell Analyser (LORCA, Mechatronics Instruments BV, AN Zwaag, Netherlands). The RBC deformability was determined by the elongation index (EI) in relation to the shear stress (0.3 to 50 Pa) applied on the RBC membrane surface. Aggregation was appreciated by the aggregation index (AI). We also collected the diagnosis at ICU admission (sepsis or not), Apache 2 and SOFA scores, comorbidities, hemogram, lactate and mortality. Statistical comparisons between groups were done by Student t-test or Kruskal Wallis. A p value < 0.05 was considered as statistically significant. Roles of comorbidities were analysed by a multilinear regression where EI and AI were the dependent variables.

RESULTS. The study included 196 consecutive ICU patients (160 without and 36 with sepsis) and 20 healthy volunteers. Septic patients were more likely to have anemia, coagulation abnormalities and comorbidities. RBC deformability was altered for the majority of shear stress studied in septic compared to non-septic patients and volunteers. AI was also greater in septic patients than in volunteers (67.9 [54.7–73.5]) vs 61.8 [58.2 - 68.4] %, $p < 0.05$). Only sepsis and hematologic diseases influenced the EI (both $p = 0.005$). Other comorbidities like cancer, diabetes mellitus, cirrhosis, terminal renal failure had not effects. AI was related to the degree of organ failure (SOFA score), the RBC count and the fibrinogen concentrations.

CONCLUSION. Rapid alterations of the RBC rheology are generally observed in ICU patients, especially in those with sepsis. Underlying comorbidities, except for hematological diseases, do not significantly influence these abnormalities.

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0224

HEME OXYGENASE-1 POLYMORPHISMS AND PLASMA CONCENTRATIONS IN INTENSIVE CARE UNIT PATIENTS

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INTRODUCTION. Heme oxygenase -1 (HO-1) is a heat shock protein upregulated by various stress stimuli, for example ischemia-reperfusion. HO-1 has anti-apoptotic, anti-inflammatory, and anti-oxidant effects, which also may be beneficial in critically ill patients.

METHODS. Prospective study to investigate HO-1 gene polymorphisms and plasma concentrations, and their association in critically ill intensive care unit (ICU) patients. Blood samples were collected as soon as possible after ICU admission, the following morning, and 48 hours after the second sample. HO-1 plasma concentration was measured by human HO-1 ELISA kit (Stressgen, Victoria, Canada). Three single nucleotide polymorphisms were determined, −413A/T, +99G/C, and +877C/T, by allelic discrimination using the 5' nuclease TaqMan assay on an ABI Prism 7000 Sequence Detection System (Applied Biosystems, Foster City, CA). The dinucleotide GTn repeat length polymorphism in the HO-1 promoter was genotyped by PCR and fragment analysis using a capillary sequencer (ABI3730xl DNA Analyzer, Applied Biosystems).

RESULTS. We studied 244 critically ill ICU patients. The first-day plasma HO-1 concentrations obtained from the study patients ($n = 160$) were significantly higher than the values of healthy controls ($n = 58$) (median 6.9 ng/ml vs. 1.5 ng/ml, $p < .001$). The HO-1 concentrations were higher in ICU nonsurvivors than in survivors at admission (median 11.4 ng/ml vs. 6.6 ng/ml, $p = .001$), but not in hospital nonsurvivors. The area under the curve (AUC) in ROC analysis showed a good discriminative power for the first-day HO-1 concentrations regarding ICU mortality (AUC = 0.82, 95% confidence interval 0.72–0.92). The investigated HO-1 polymorphisms did not correlate with the mortality rate, but the +99GC genotype and the -413 T allele were associated with lower HO-1 plasma concentrations. Patients with the +99GC genotype had lower first-day, third to fourth day, and maximum HO-1 values than patients with +99GG genotype (median 5.7 ng/ml vs. 7.4 ng/ml, $p = .02$; $p < .001$; $0 < .001$; respectively). Patients with the -413T allele also had lower maximum HO-1 plasma concentrations and lower HO-1 on third to fourth day compared to patients with the -413AA genotype ($p = .03$).

CONCLUSION. Increased concentrations of HO-1 are found in plasma of critically ill patients. The first-day HO-1 concentrations are significantly higher in patients dying in ICU, and the HO-1 gene polymorphisms -413A/T and +99G/C appear to affect its plasma levels.

GRANT ACKNOWLEDGEMENT. Supported, in part, by EVO grant from Helsinki University Central Hospital, Helsinki.

0225

RELATION BETWEEN INFLAMMATORY RESPONSE AND CIRCULATED LEVELS OF S100B PROTEIN IN CRITICALLY ILL PATIENTS WITH SEPTIC SHOCK

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INTRODUCTION. Septic patients frequently exhibit increased serum levels of S-100B protein, attributable to the severity of septic encephalopathy (1). However, this has been recently questioned (2). We hypothesized that other mechanisms involving the inflammatory response might stimulate the secretion of S100B. To this end, the relationship of serum S100B to cytokine IL-6 levels was examined in patients with septic shock.

METHODS. A total of 20 ICU patients, with a mean age of 61 + 14 yrs, who met the American College of Chest Physicians/Society of Critical Care Medicine criteria for septic shock, were included. The illness severity was assessed by the APACHE II and SOFA scores. None suffered from neurological disease or head injury before the start of septic shock. Blood samples were taken for blood gas, lactate, IL-6, CRP and S100B measurements at the start of septic shock and every 24 h for a maximum of eight consecutive days.

RESULTS. Mean values of APACHE II and SOFA scores were 21 and 13 respectively. Initial serum S100B protein values were increased (median 0.53 μg/l; interquartile range 0.36 - 2.5) and remained above the normal values in the majority of the patients during the whole study period. Serum IL-6 levels followed roughly the same pattern (median 343 pg/ml; interquartile range 106 – 958 pg/ml). S100B levels were positively correlated with IL-6 ($p < 0.01$), lactate ($p < 0.05$) and APACHE II score ($p < 0,05$) whereas IL-6 was correlated with CRP levels ($p < 0.05$), lactate ($p < 0.01$), norepinephrine dose ($p < 001$) and APACHE II score ($p < 0.05$). Survivors compared to nonsurvivors had significantly lower levels of S100B ($p < 0.03$), IL-6 ($p < 0.001$), lactate ($p < 0.02$), noradrenaline dose ($p < 0.001$), APACHE II and SOFA scores, and higher values of oxygen content ($p < 0.001$). The severity of illness was independent predictor of the ICU outcome.

CONCLUSION. The significant correlation of S100B with IL-6 implies a possible connection of S100B release with the inflammatory response. The correlation of S100B with the illness severity and outcome indicates a possible role of S100B protein in the prognosis of patients with septic shock.

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GRANT ACKNOWLEDGEMENT. Supported in part by Thorax foundation.

0226

THE INFLAMMATORY RESPONSE OF TYPE 2 DIABETIC PERSONS DURING EXPERIMENTAL ENDOTOXEMIA COMPARED TO HEALTHY SUBJECTS

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INTRODUCTION. Type 2 diabetes is characterized by chronic systemic low-grade inflammation (1,2), indicating alterations in immune function. However, the response to a standardised inflammatory stimulus in type 2 diabetics compared with healthy individuals has never been examined.

The aim of this study was to study the inflammatory response in type 2 diabetic persons compared with healthy subjects following a bolus injection of E. coli endotoxin as a model of systemic inflammation.

METHODS. After ethical approval, a thorough physical examination and informed consent, 24 healthy men and 24 men with type 2 diabetes underwent endotoxin injection (0.3 ng/kg). Measurements of leucocyte subpopulations (polymorphonuclear cells [PMNs], monocytes and lymphocytes), noninvasive mean arterial pressure (MAP), heart rate (HR) and temperature were done hourly from baseline until 8 hours after endotoxin. Data were log-transformed where considered appropriate. Repeated measurement analysis of variables were performed using SAS Mixed Models. Significant changes from baseline were analysed post hoc by paired Students t-tests, while unpaired t-tests were used for comparison of the changes from baseline between diabetics and healthy subjects.

RESULTS. The two groups were comparable with regard to age, BMI, baseline leucocyte subpopulations, MAP, and temperature. In both groups, endotoxin injection was associated with a depression in lymphocyte count, which was less pronounced in type 2 diabetics ($P = 0.002$). Post hoc analyses showed that this difference occurred from 3 hours post endotoxin and onward.

Temperature, HR and PMNs increased and monocytes decreased without any differences between groups. A time-dependent effect on all leucocyte subpopulations ($P < 0.0001$) as well as on HR, temperature ($P < 0.0001$) and MAP ($P < 0.05$) was found. Diabetics had a significantly higher heart rate ($P < 0.05$) than non-diabetic subjects at all times.

CONCLUSION. In the present study, the presence of type 2 diabetes was associated with a less profound lymphopenia after endotoxin injection. The data suggest that the inflammatory response is altered in type 2 diabetes. Further study is needed to determine the specific mechanisms responsible for this phenomenon, as well as its clinical implications.

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0227

CECAL LIGATION AND PUNCTURE SEPSIS IS ASSOCIATED WITH REDUCED ADENYLYL CYCLASE EXPRESSION

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INTRODUCTION. One reason for the fatal inflammatory response causing organ injury and death in sepsis is the loss of immune modulatory mechanisms. The intracellular signaling mediator cyclic adenosine monophosphate (cAMP) is a potent modulator of innate immune cell activation, and elevation of cAMP by phosphodiesterase inhibitor treatment can increase survival in endotoxemia (Coimbra, 2005). We have previously demonstrated that expression of cAMP-producing adenylyl cyclases (AC) are attenuated by bacterial lipopolysaccharide (LPS) in vivo and in Kupffer cell cultures (Risoe, 2007). Here we explore AC gene expression and regulation in a rat model of cecal ligation and puncture (CLP) sepsis and in liver cells isolated from this model.

METHODS. Wistar rats were subjected to CLP procedure or sham operated, and after 10 or 18 hours organs were removed. Hepatocytes, liver sinusoidal endothelial cells (LSEC) and Kupffer cells were isolated 18 hours after CLP/sham-operation. RNA was isolated and analysed for AC mRNA expression.

RESULTS. We found significantly attenuated liver expression of AC6 (P value 0.0336) and AC9 (P value 0.0144) mRNAs in CLP animals compared to sham, an attenuation also found in Kupffer cells (AC6 P value 0.0134; AC9 P value 0.0623) isolated from the model. AC9 was also attenuated in spleen (P value 0.0154) and kidney (P value 0.0091) after 18 hours. AC7 mRNA was only attenuated in spleen (P value 0.0183, 18 h), and appeared to increase in kidney, liver and LSEC.

CONCLUSION. CLP sepsis is associated with reduced AC mRNA expression in spleen, kidney, liver and Kupffer cells, which may reduce cAMP production and impair cAMP-mediated immune modulation.

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0228

EXPRESSION OF NOS ISOFORMS, HEXOKINASE AND MAMMALIAN TARGET OF RAPAMYCIN (MTOR) IN MUSCLE DURING ENDOTOXIC SHOCK

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INTRODUCTION. Sepsis induces alterations in the skeletal muscles characterized by impairment of translation processes and increased catabolism. The different isoforms of nitric oxide synthase (NOS) play key-roles in muscle trophicity (1). Hexokinase (HK) regulates the transformation of glucose in glucose-6-phosphate, a phosphorylation step contributing to muscle glucose uptake regulation. In muscle, the expression of HK during sepsis is unknown. The mammalian target of rapamycin (mTOR) is a major regulator in the translational control of protein synthesis. We investigated the expression of NOS isoforms, HK and mTOR in an acute model of shock induced by endotoxin (LPS) in anesthetized rats.

METHODS. 8 Wistar rats (250–350 g) were anesthetised by chloral hydrate ip. A biopsy of the right gastrocnemius muscle was taken at baseline. Septic shock was induced by injection of 26 mg/kg of LPS from Salmonella Typhimurium (L6511; Sigma ®) injected ip. Rats were given morphine 2.5 mg/kg sc. After 6 hours, the animals were sacrificed and a second biopsy was performed in the left gastrocnemius muscle. 30 mg of tissue were homogenized and total RNA was extracted using the RNAse fibrous tissue mini kit (Qiagen). After DNAse treatment (using RNAse-Free DNAse set, Qiagen), a dose of 1 μg of total RNA was retro-transcribed in cDNA using the M-MLV reverse transcriptase (Invitrogen) and 50 ng were amplified by Real Time PCR assay with a SYBR Green master mix (Applied Biosystem). All reactions were performed using an ABI Prism 7500. Specifically-designed primers were used for the analysis of gene expression of NOS Isoforms, HK and mTOR (Quantitect Primer Assays, Qiagen). Each gene was normalized on the expression of beta-actin. Results were expressed as median [25–75%] values.

RESULTS. Two rats died before the end of the experimentation. Expression of NOS isoforms was significantly modified with down-regulation of NOS1 (40 [33–76], $p = 0.065$) and NOS 3 (52 [44–59]%, $p = 0.002$), and up-regulation of NOS 2 (521 [317–584]%, $p = 0.002$). Hexokinase expression was enhanced (232 [139- 291]%, $p = 0.002$). mTOR expression was significantly decreased (68[49–73]%, $p = 0.002$).

CONCLUSION. In this acute animal model of septic shock characterized by muscle hypotonia, we observed significant changes in terms of mRNA expression of key-enzymes for muscle function. The hypotonia of the muscle might account for the reduction of mRNA of NOS-3. This is thefirst demonstration of increased expression of HK in muscle biopsy in an acute model of sepsis. Our findings of decreased expression of m-TOR is in agreement with previous findings of decreased protein synthesis in sepsis and impaired regulation of mTOR pathways (2).

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0229

HLA-DR POLYMORPHISM IN SEPTIC SHOCK WITH AT LEAST TWO ORGAN FAILURE

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INTRODUCTION. Major histocompatibility complex class II includes highly polymorphic genes which have been associated with various inflammatory diseases and infection susceptibility. Among these genes, HLA-DRB cluster encodes for protein subunit of HLA-DR molecule which presents antigen to T lymphocyte. At the onset of sepsis, the decrease in monocyte HLA-DR expression has been proposed as a prognosis marker. Hypothesis: during sepsis, HLA-DRB polymorphism is associated with 1) prognosis, 2) monocyte HLA-DR expression and 3) organ failure severity.

METHODS. 4 functional genes encoding for HLA-DR protein have been studied (HLA-DRB1, DRB3, DRB4, DRB5) in 187 septic shock patients with at least 2 organ failure. Genomic DNA extraction: salting-out technique from fresh peripheral blood leucocytes. Genotyping of 13 alleles of HLA-DRB1 (generic typing): high resolution DNA based typing (allelic level) using the PCR-Sequence Specific Primers (PCR-SSP) amplifications. Presence of HLA-DRB3, DRB4 and DRB5 genes (variant haplogroups) was deduced from the known association with HLA-DRB1 alleles: HLA-B3 and HLA-DRB1 (*03,*11,*12,*13,*14); HLA-DRB4 and HLA-DRB1 (*04,*07,*09); HLA-DRB5 and HLA-DRB1 (*15, *16). D0 monocyte HLA-DR by flow cytometry. Statistics: Chi2 of Pearson.

RESULTS. 64% males, age: 63 y.o. (18–94), SAPSII 46 (37–57), SOFA 8 (6–11). Mortality 26% at D7, 38% at D28. 87% Caucasian, 8% African, 2% Asian. Frequencies: 70% HLA-DRB3, 49% HLA-DRB4, 24% HLA-DRB5. No association between DRB1 alleles and prognosis either monocyte HLA-DR expression. Patients homozygous for HLA-DRB3 (23% of the population) presented less severe organ dysfunction: 21% with SOFA < 8 versus 45% in the rest of population ($p < 0.004$).

CONCLUSION. In septic shock, HLA-DRB1 polymorphism was not associated with prognosis. HLA-DRB3 homozygosy was associated with less severe organ dysfunction. HLA-DRB genotype might be important for the evolution of severe sepsis and may help to characterize patients at high risk of mortality.

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Poster Sessions
Mechanical ventilation: Patient-ventilator interaction: 0230–0243

0230

FIO2 AND ARDS DEFINITION DURING LUNG PROTECTIVE VENTILATION

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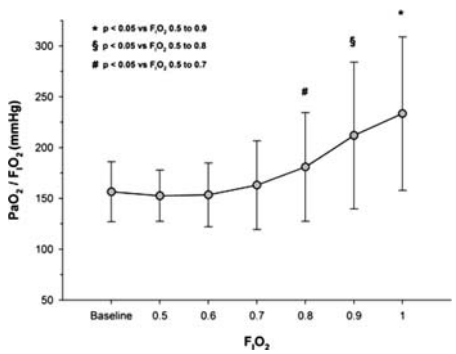
INTRODUCTION. PaO2/FIO2 ratio (P/F) is the marker of hypoxemia used in the AECC definition on lung injury. A high FIO2 level has been reported to variably alter P/F (1,2). In this prospective randomized controlled study, we investigate the effect of high FIO2 levels on the course of P/F in patients with acute respiratory distress syndrome (ARDS).

METHODS. Twenty-four ARDS patients with a P/F between 100 and 200 mmHg at FIO2 0.5 (baseline), received low-volume controlled ventilation (VT = 6 ml.kg-1 PBW) with a PEEP at 2 cmH_2O above the lower inflection point if present, or 10 cmH_2O. The following FIO2 levels were applied randomly for 20 min: 0.5, 0.6, 0.7, 0.8, 0.9 and 1. Data are mean ± sd.

RESULTS. Increasing FIO2 above 0.7 was associated with a significant increase in P/F ($p < 0.001$, Fig. 1). The mean P/F change between FIO2 0.5 and 1 (Delta P/F) was 46 ± 31%. Sixteen patients (67%) had a P/F > 200 at FIO2 1 while P/F was < 200 at FIO2 0.5.



CONCLUSION. P/F increased significantly with a FIO2 > 0.7. P/F variation, induced by a switch from FIO2 0.5 to 1, was responsible for the move of two-thirds of patients from the ARDS to the ALI stage of the AECC definition.

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0231

EFFECT OF GAIN LEVEL ON RESPIRATORY PATTERN VARIABILITY DURING NEURALLY ADJUSTED VENTILATORY ASSIST (NAVA): COMPARISON WITH PRESSURE SUPPORT VENTILATION (PSV)

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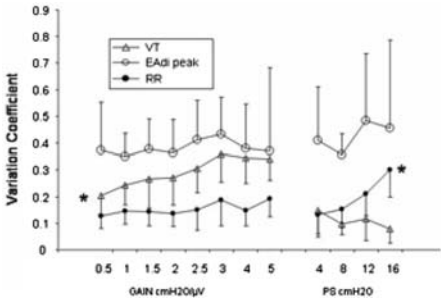
INTRODUCTION. Neurally Adjusted Ventilatory Assist (NAVA) is a new ventilation mode in which the assistance is delivered in proportion to the electrical activity of the diaphragm (EAdi). EAdi is measured by means of an esophageal catheter mounting an array of electrodes. During inspiration the ventilator deliver a pressure proportional to EAdi. The factor of proportionality can be adjusted (NAVA gain). Aim of the study is to assess the effect of different gain and pressure support level on breath by breath variability of patients effort (estimated as the peak of EAdi) and how variability of patients effort is translated in variability of tidal volume (VT), and respiratory rate (RR).

METHODS. We studied 10 patients undergoing PSV. PSV and NAVA were applied in random order. All patients received increasing levels of gain (0.5-1-1.5-2-2.5-3-4-5 cmH_2O/\muV) during NAVA and increasing level of pressure support (4-8-12-16 cmH_2O) during PSV. We computed the coefficient of variation (CoV) of Rr, VT, and EAdi peak from the breath by breath data of the last 5 minutes of each recorded step.

RESULTS. Results are shown in Fig. 1. EAdi showed similar CoV during NAVA and PS, with no effect of either gain or PS level. CoV of VT was higher during NAVA compared to PSV. CoV for EAdi was higher than that of RR and VT during both NAVA and PSV. CoV of VT increase with increasing gain during NAVA, while it showed a decreasing trend with increasing PS. CoV of RR did not changed with NAVA gain, but increased with increasing PS levels.



CONCLUSION. Breath by breath variability of patient effort is not affected by support level either during NAVA or PSV. During NAVA ventilatory output variability is more related to variability of diaphragmatic activity than during PSV. VT variability became similar to that of EAdi at higher gain levels.

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0232

PATIENT –VENTILATOR INTERACTION DURING PSV AND PAV + : A PHYSIOLOGIC STUDY

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INTRODUCTION. During PSV the presence of asinchrony between patient neural activity and ventilator mechanical activity may lead to a prolongation of mechanical ventilation. PAV is a mode of ventilation able to reduce patient-ventilator dyssinchrony, allowing to assist patient activity in proportion to patient effort. However, the need for regular respiratory mechanics measurements had always represented a major obstacle to its use. PAV + is a new software that allow to automatically adjust flow and volume gain factors to respiratory system resistance and elastance measured values (1).

The aim of this physiologic study was to compare PSV and PAV + in a group of intubated patients who failed more than 2 weaning attempts.

METHODS. 10 patients affected by ARF, ventilated in PSV (set in order to obtain a 6–8 ml/Kg VT and SpO2 ≥ 93%) were switched on PAV + set in order to obtain the same mean PAW. Pav + period lasted for 1 hour after which the patients were switched back in PSV. ABGs, respiratory pattern, hemodynamics and patient-ventilator interaction (Pes, Pgas and Pdi) were evaluated at the end of each study period.

RESULTS. No significant differences were found between PSV and PAV in terms of ABGs, hemodynamics, Ti, Ti/Ttot, SwingPes, Swing Pdi, PTPes and PTPdi. The patient-ventilator interaction analysis showed that during PAV + the 83% of VT was in phase with the Tineu, while during both PSV trials only 71% and 61% of VT was in phase with Tineu, prolonging mechanical insufflation. During PAV + , compared to PSV, there was a significantly longer Timepress ($p < 0.01$), a significantly shorter Delaytrexp ($p < 0.01$), no significant differences in Delaytrinsp. During PAV + the Timeass was significantly longer than during PSV ($p < 0.01$).

CONCLUSION. The results of this study suggest that when PAV + and PSV are set at the same mean PAW no significant differences are observed in ABGs, respiratory pattern and inspiratory effort. However, PAV + improves patient-ventilator interaction significantly reducing the incidence of expiratory asynchrony and thus increasing the Time of assistance.

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0233

VARIABLE VENTILATION MAY IMPROVE LUNG FUNCTION IN ALI/ARDS PATIENTS

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INTRODUCTION. Variable Ventilation (VV) has been recently described as a new ventilatory modality mimicking the spontaneous variability in physiologic breathing pattern (1). The hemodinamic and respiratory effects of VV were never evaluated during low tidal volume ventilation in ALI/ARDS patients.

METHODS. We studied 6 anesthetized and intubated ALI/ARDS patients (60 ± 17 yrs, 4 M/2F, PaO2/FiO2 161 ± 4 with PEEP 11 ± 1 cmH_2O) ventilated according to the NIH low tidal volume protocol (Vt 6–8 mL/Kg of predicted body weight and Plateau Pressure < 30cmH_2O). Using a Servo 300 ventilator connected to a personal computer, we delivered VV, i.e. a random sequence of Vt from a uniform probability distribution falling between 0% (i.e. standard CPPV), 20%, 40%, 60% of the mean Vt (1). Each level of variability was applied for 60 minutes, measuring continuously hemodinamic and respiratory parameters. Gas exchanges and EELV with helium dilution technique were assessed at the end of each period.

RESULTS. VV was well tolerated in all the patient, with no significant haemodinamic changes. Increasing variability was associated to an increase in EELV and an improvement in oxygenation, while CO2 exchange and death space remained unchanged.

TABLE 1

	VV 0%	VV 20%	VV 40%	VV 60%
MAP (mmHg)	77 ± 9	75 ± 11	78 ± 15	77 ± 10
PaO2/FiO2	161 ± 28*	174 ± 39	182 ± 3alpha	186 ± 34alpha
PaCO2 (mmHg)	44 ± 7	44 ± 10	44 ± 10	44 ± 11
EELV (mL)	851 ± 208*	935 ± 255	936 ± 247	973 ± 252alpha

*Mean DS; *p < 0.05 One-way RM ANOVA; alpha: p < 0.05 Bonferroni vs 0%*

CONCLUSION. Introducing a randomly varying breathing pattern during protective mechanical ventilation strategy may help to improve lung recruitment and gas exchange.

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0234

EXPIRATORY ASYNCHRONY: COMPARISON BETWEEN PAV AND PSV

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INTRODUCTION. Patient-ventilator asynchrony is a source of increased workload and lack of comfort. Pressure support ventilation (PSV) has not completely solved these problems. It is theoretically assumed that proportional assist ventilation (PAV) would allow a sharper synchronization, particularly from inspiration to expiration (1), but that was not confirmed on a mathematical model (2). In order to test this hypothesis in clinical conditions, we designed a prospective crossed study, comparing PAV an PSV.

METHODS. This study receveived local ethical comitee approvement. Patients were included in one surgical ICU, during weaning of mechanical ventilation. Collected parameters were: flow and proximal airway pressure (Paw), oesophageal pressure (Poeso), and electromyogram (EMG) of the diaphragm using an oesophageal probe.

The protocol consisted on one period of PAV compensating 80% of the patient's work of breathing (elastance and resistances beeing estimated by the "runaway" method), followed by a period of PSV set so as the mean inspiratory Paw was equivalent to that in PAV.

The main goal was to compare the delay between the end of the diaphragmatic activity and the point of zero flow between inspiration and expiration in the two modes.

RESULTS. Nine patients were included: the mean inspiratory Paw was 13 ± 6.1 cmH_2O during PAV and 13.5 ± 5.5 cmH_2O during PSV, the mean intrinsic PEP was 3.4 ± 1.9 cmH_2O. Mean neural inspiratory time was 663 ± 216 msec in PAV and 639 ± 210 msec in PSV.

There was no significant difference of inspiratory termination delay between the two modes (EMG termination to zero flow delay = 202 ± 119 msec in PAV and 166 ± 105 msec in PSV).

CONCLUSION. Our patients characteristics were concordant to those of previous studies (3). This study confirms expiratory asynchrony in PSV, and shows that this also occurs in the same sense in PAV. Despite its theoretical advantages, PAV does not improve, in our study, patient-ventilator expiratory synchrony. This could be due to control-system delay time (2).

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0235

PATIENT-VENTILATOR INTERACTION DURING WEANING FROM MECHANICAL VENTILATION: NEURALLY ADJUSTED VENTILATORY ASSIST (NAVA) VS PRESSURE SUPPORT VENTILATION (PSV)

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INTRODUCTION. High levels of pressure support ventilation (PSV) may cause 1) ventilator trigger failure in response to neural inspiratory efforts, defined as wasted inspiratory efforts (WIE); 2) patient-ventilator asynchrony, leading to weaning failure (1). Since neurally adjusted ventilatory assist (NAVA) is controlled by the electrical activity of the diaphragm (Edi), it may be superior in maintaining synchrony during high levels of support. The aim of this study was to evaluate the effects of NAVA on the synchrony and diaphragm unloading in patients undergoing weaning from mechanical ventilation.

METHODS. Five patients on PSV during the weaning process were randomly switched to NAVA and $NAVA_{high}$ support. PSV level was set by the clinician in charge, then NAVA was set to obtain a similar peak airway pressure, and $NAVA_{high}$ was set to a pressure 10 cmH_2O above PSV. The following parameters were calculated: neural (RR_n) and ventilator (RR_v) respiratory rates, WIE (RR_n - RR_v), tidal volume (VT), peak airway (Paw_{peak}), esophageal (Pes) and transdiaphragmatic (Pdi) pressures, esophageal (PTPes) and diaphragm (PTPdi) muscle effort, and Edi. Additionally, Edi_{max} was measured at total lung capacity to normalize Edi to its maximal value (Edi/Edi_{max}).

RESULTS. ANOVA for repeated measures and post-hoc Fisher's PLSD test. Results are mean ± sd * = PSV vs NAVA or $NAVA_{high}$, † = $NAVA_{high}$ vs NAVA.

PTPes and EAdi/$EAdi_{max}$ were similar to PTPdi.

WIE were observed in 4 out of the 5 patients during PSV and disappeared on both NAVA and NAVAhigh except in 1 patient who presented WIE also during spontaneous breathing. Breathing pattern, EAdi/$EAdi_{max}$ and respiratory muscle effort were similar during both PSV and NAVA, while during $NAVA_{high}$ a trend of increased VT and reduced Edi/Edi_{max} and inspiratory effort was present.

TABLE 1

VARIABLE	PSV	NAVA	$NAVA_{high}$
Paw_{peak}, cm H_2O	14.1 ± 5.5	15.5 ± 4.6	21.6 ± 9.2*†
V_T, L	0.48 ± 0.13	0.44 ± 0.11	0.52 ± 0.08
WIE, breaths/min	3.4 ± 3.0	0.6 ± 1.3*	0.8 ± 1.3*
PTPdi, cm H_2O.s/min	98 ± 120	109 ± 81	85 ± 47

CONCLUSION. We conclude that during weaning from mechanical ventilation, NAVA may prevent WIE, impairment of inspiratory muscle electrical activation, and unloading compared to PSV.

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0236

TWO CYCLING OFF MODES IN PRESSURE SUPPORT: STUDY OF RESPIRATORY MECHANICS, BREATHING COMFORT AND ASYNCHRONY PATTERNS

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INTRODUCTION. The cycling off of PSV can be manually adjusted in modern ventilators, but it's usually fixed (5% or 25% of peak flow). Improper choice of this termination criterion (TC) can promote patient-ventilator asynchrony. A closed loop system for TC automatically adjust during PSV was recently described. The aim of our study was to compare two different cycling off modes of PSV, a fixed and other automatic, about ventilatory mechanic variables, breathing comfort and asynchrony patterns.

METHODS. From January 2005 to October 2006, a heterogeneous group of patients on PSV was analyzed. Each patient was ventilated with two different TC ventilators, a fixed (5% of peak flow) and other automatic, according a randomized sequence (Fixed5%/Auto/Fixed5% or Auto/Fixed5%/Auto). A total of nine record phases of five minutes from each patient (three in each ventilator) were realized to obtain the ventilatory mechanic variables and asynchrony patterns. The breathing comfort was evaluated by a Visual Analogue Scale. To statistical analysis were applied ANOVA, Mann-Whitney U test and regression linear.

RESULTS. 16 patients were analyzed, 8 in each randomized sequence. The effective TC of the fixed TC ventilator was significantly lower than that with automatic TC [12% (6 – 23) vs 31% (23 – 39); p = 0] and the time constant was more prolonged (1,7 ± 0,8 s vs 1,5 ± 0,5 s; p = 0,01). The highest TC (automatic TC) resulted in a lower VT (518 ± 102 ml vs 484 ± 88 ml; p = 0), Ti (1,3 ± 0,3 s vs 1 ± 0,3 s; p = 0) and Te (2,2 ± 0,9 s vs 1,7 ± 0,8 s; p = 0) and a higher f (19 ± 6 bpm vs 24 ± 8 bpm; p = 0) and Ve (9 ± 2 l/min vs 11 ± 3 l/min; p = 0). It also resulted in a lower P0.1 (2,4 ± 1 cmH_2O vs 1,8 ± 0,9 cmH_2O; p = 0), as well as a lower PTP at all tested conditions (p < 0.001). The higher comfort was found in the highest TC (4,5 ± 1,2 vs 3,7 ± 1,3; p = 0) and the asynchrony events showed no significant differences between both modes.

CONCLUSION. The automatic TC provides an improvement in the patient-ventilator synchrony in patients under IMV when compared with the fixed TC. The mechanical variables alterations caused by automatic TC resulted in a lower patient effort and a higher breathing comfort. No differences were observed as at the numbers of asynchrony patterns.

0237

COMPARISON OF ENERGY EXPENDITURE AMONG THREE ASSISTED VENTILATORY MODES

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INTRODUCTION. Partial ventilatory support has been proposed to allow spontaneous breathing activity ventilation avoiding adverse effects of controlled mechanical ventilation and to gradually withdraw ventilatory assistance in the weaning process. However, so far, are few data comparing the energy expenditure among assisted ventilatory modes such as pressure support ventilation (PSV), airway pressure release ventilation with pressure support ventilation (Bilevel + PSV) and assisted pressure control ventilation (A-PCV).

METHODS. Prospective, randomized, crossover study was conducted in a surgical and a clinical ICU as well as in the intermediate respiratory care unit (IRCU) of a tertiary care hospital. Ten clinically stable and spontaneously breathing patients after long-term mechanical ventilation were included. The patients were randomized to ventilate on PSV, Bilevel + PSV or A-PCV with the same level of inspiratory pressure (Puritan-Bennett 840, Covidien). Indirect calorimetry was performed during each mode during 60 minutes. Oxygen consumption (VO2), energy expenditure (EE), CO2 production (VCO2) and respiratory quotient (RQ) were computed. Respiratory variables, such as capnography (ETCO2), dynamic compliance and minute ventilation were continuously measured. Gas exchange was evaluated during the study period. For statistical analysis, One Way ANOVA Repeated Measures followed by Tukey test was used to compare different variables.

RESULTS. All patients tolerated the three ventilatory modes without signs of discomfort. Energy expenditure during Bilevel + PSV was higher compared to PSV (1570 ± 281 Kcal vs. 1422 ± 265 Kcal; $p < 0,05$) but similar to A-PCV. Gas exchange and other parameters were not different among the different modes.

CONCLUSION. Bilevel + PSV resulted in higher energy expenditure compared to PSV.

0238

RELATION BETWEEN ESOPHAGEAL AND OTHER INTRATHORACIC PRESSURES DURING PRESSURE SUPPORT VENTILATION

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INTRODUCTION. Estimation of respiratory effort is useful in assessment of patient-ventilator synchrony and during weaning. Pleural pressure changes also influence cardiovascular system. In clinical practice, pleural pressure is usually substituted by esophageal pressure (Pes). The aim of this analysis, which is part of evaluation of pulse pressure variation during pressure support ventilation, is to estimate Pes changes from changes in airway or vascular pressures.

METHODS. Patients ventilated on pressure support mode without obvious clinical interference with the ventilator with indwelling pulmonary artery catheter were eligible. Esophageal catheter was placed and the position was confirmed by inspiratory occlusion test (dPes/dPairway > 0.8). Esophageal pressure was measured by Viasys Avea ventilator as a mean of 3 consecutive breaths. Maximal inspiratory pressure (MIP) was measured during inspiratory occlusion. Arterial, central venous (CVP) and pulmonary artery pressures including occlusion pressure (PAOP) were recorded before and after fluid challenge (500 ml hydroxyethyl starch) using S5 Collect software and analyzed offline. Data are presented as median (range). Correlation, regression and Bland-Altman analysis were used for statistical evaluation.

RESULTS. Ten patients included into the study had inspiratory decrease in Pes (dPes) 16.5 (3 – 25) cm H20. There was a good correlation between dPes and MIP: $r2 = 0.6705$, $p = 0.002$, $dPes = 0.81 + 0.63 * MIP$. Inspiratory decrease was 7 (1–16) mmHg for CVP and 17 (2–24) mmHg for PAOP. Association between dPes and PAOP was better ($r2 = 0.56$; $p < 0.001$; $dPes = -0.56 + 0.94*PAOP$) than between dPes and CVP ($r2 = 0.420$; $p < 0.001$; $dPes = 7.18 + 1.11*CVP$). Correlation between PAOP a dPes decreased after fluid challenge from $r2 = 0.81$ to $r2 = 0.33$. After transformation according to regression equation, Bland-Altman analysis of MIP and PAOP to dPes showed no bias with 95% confidence interval ± 7.7 and ± 8.0 cm H20; respectively.

CONCLUSION. Patients on pressure support ventilation without evident ventilatory interference can have major inspiratory effort. In most of them, both MIP and inspiratory decrease in PAOP could be used for estimation of pleural pressure changes.

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0239

WHAT IS THE ACTUAL TIDAL VOLUME APPLIED IN THE FIRST 24 HOURS IN PATIENTS WITH SEVERE SEPSIS OR SEPTIC SHOCK AND WITH ARDS/ALI?

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INTRODUCTION. A low tidal volume (Vt) is recommended for the ventilation of patients with ARDS or ALI ($PaO2/FiO2 < 300$). The endpoint of this observational study was to report the actual tidal volumes and respiratory frequencies applied in a population of mechanically ventilated patients in severe sepsis or septic shock with ALI/ARDS.

METHODS. We reported the ventilatory parameters (Vt, Vt reported to the ideal body weight, respiratory frequency) during the first 24 hours of the management of patients and ARDS or ALI, who had been included in an observational study on severe sepsis in 15 ICUs during 2006. The results are reported in real value, percentage or median with the 5th and 95th percentiles. The comparisons were realised using the chi 2 and the Wilcoxon Mann Whitney tests. A $p < 0,05$ was considered as significant.

RESULTS. 445 patients were included in the initial study (mortality rate 34%). Among those, 304 patients (69%) needed mechanical ventilation during the first 24 hours. 285/307 (93%) suffered from an ALI with 231 (75%) with a $PaO2/FiO2 = 114$ [53–270]. There were 89 women (32%), age = 67 (36–87), IGS II score 47 (29–81), SOFA score 8 (3–14), weight 76 (47–111). The height was measured in 154/285 patients (46%, 170 (150–181)). The comparison between the patients who had been measured and those who had not been measured are shown in the table.*: $p < 0,05$ between the measured and the non measured patients (test de Wilcoxon Mann Whitney).

TABLE 1 STUDIED PARAMETERS 285 PATIENTS WITH ALI/ARDS

	Results
Lowest Vt(ml) in the non measured patients	500 [320–700]
Lowest Vt (ml) in the measured patients	450 [328–650]*
Lowest Vt applied (ml/kg of IBW) IBW: ideal body weight	8 [6–10]
Highest respiratory frequency in the non measured patients	20 [14–39]
Highest respiratory frequency in the measured patients	20 [14–36]*
Highest PEEP applied in the non measured patients	6 [0–12]
Highest PEEP applied in the measured patients	6 [2–12]
Mortality rate at day 28 in the non measured patients	53 (34%)
Mortality rate at day 28 in the measured patients	53 (40%)

CONCLUSION. The mechanically ventilated patients in severe sepsis present in majority an ALI or an ARDS. 54% of these patients are not measured and half of the patients who are measured receive Vt > 8 ml/kg of ideal body weight. When the patients are measured, the applied Vt are naturally lower. Therefore, the measurement of the height of he patients remains an important step in the application of a protective ventilation strategy. This strategy is currently applied in only 25% of the ADRS/ALI patients (1)

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0240

PROTECTIVE MECHANICAL VENTILATION IMPROVES DIAPHRAGM DYSFUNCTION IN A PNEUMONIA MODEL

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INTRODUCTION. Pneumonia and mechanical ventilation (MV) may impair the diaphragm force-generating capacity. Little is known about the impact of different ventilatory strategies on diaphragm contractility in the presence of an established pulmonary infection.

METHODS. 18 rats with established Streptococcus Pneumoniae pneumonia were randomly assigned to: infected controls (not ventilated), protective MV (6 mL/kg, PEEP = 5), injurious MV (12 mL/kg, ZEEP). Six non-infected rats served as healthy controls. Blood pressure was monitored during MV and blood gases were taken at time 0 and at 3 hrs. After 3 hours of ventilation the diaphragm was excised and its contractility was studied in vitro.

RESULTS. There was no difference in blood pressure or blood gases during the period of MV between the groups. Pneumonia reduced diaphragm contractility by ~ 50% or more, which was partly reversed during protective ventilation, but not during injurious ventilation (Table).

TABLE 1

	Specific force			
Stim Freq (Hz)	Healthy controls	Infected controls	Injurious MV	Protective MV
20	15.3	5.7*	4.7*	7.1*
50	19.8	9.9*	9.7*	12.3*§
100	20.6	10.6*	11.3*	13.4*§

** $p < 0.05$ vs healthy controls, § $p < 0.05$ vs infected controls and injurious ventilat*

CONCLUSION. In established pneumonia diaphragmatic contractility is impaired. Independent of oxygenation or systemic blood pressure differences mechanical ventilation with a protective strategy ameliorated this dysfunction, suggesting that ventilator-induced biotrauma also affects diaphragm function.

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0241

ADVERSE EVENTS WITH MANUAL HYPERINFLATION PERFORMED BY NURSES IN CRITICALLY ILL PATIENTS

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INTRODUCTION. Manual Hyperinflation (MH) is a frequently and often routinely performed maneuver as part of airway management in intubated and mechanically ventilated intensive care unit (ICU)–patients. Although it is to be expected that patients benefit from MH through mobilization of airway secretions and prevention of sputum plugging, MH is possibly also associated with undesired adverse effects. We investigated whether MH causes potentially harmful adverse events in a heterogeneous population of critically ill patients and identified patients at risk for side–effects of MH.

METHODS. Prospective observational study, conducted in a 28–bed ICU of a university hospital. We observed the effects of MH maneuvers 15 minutes before, during and 15 minutes after MH. The ventilation pattern of MH including generated pressure, flow and volume, were registered. Hemodynamic and respiratory parameters were collected.

RESULTS. Data of 107 MH–maneuvers performed by 57 ICU–nurses were collected. During none of the observed MH–procedures significant changes in mean arterial pressures were noted. There was significant but small increase in heart rate ($p = 0.009$). Central venous pressure did not alter during or after MH. End–tidal CO2 and SpO2 slightly increased after the procedure; only the increase in end–tidal CO2 was significant ($p = 0.003$). In 7 of the 107 (6.5%) maneuvers an adverse event was observed. In 5 cases the adverse event consisted of agitation requiring additional sedation. In one patient agitation was accompanied by ventricle tachycardia. One patient had a significant decrease in SpO2 after MH, which required additional oxygenation. One patient suffered a decrease in mean arterial pressure requiring an increase in inotropic support.

CONCLUSION. Hemodynamic and respiratory parameters are not affected by MH–maneuvers. However, 7 out of 107 procedures resulted in an adverse event, in most cases agitation. In view of the stressful experiences associated with MH it is questionable whether MH should be applied routinely.

0242

EVALUATION OF CLONIDINE USE FOR SEDOANALGESIA IN CRITICALLY ILL PATIENTS UNDER PROLONGED MECHANICAL VENTILATION

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INTRODUCTION. To minimize patient's discomfort in the intensive care unit (ICU), analgesia and sedation have become an integral part of critical care practice. Alpha-2 adrenoceptor agonists might have an interesting future in ICU. Clonidine administration produces specific sympatholytic effects and interferes in favor of a pro-inflammatory response, which might be favourable to maintain immune balance in critically ill patients. The objective of this study is to evaluate clonidine use for sedoanalgesia in ICU patients.

METHODS. Historical cohort studies, approved by Ethical Committee. Files from the patients admitted to the ICU/HU/UFSC from January/2006 to December/2006 who received sedatives and analgesics for a period longer than 7 days. Demographic, clinical and therapeutic data of these patients were remarked. The patients medicated with clonidine and other sedatives and analgesics constituted G1. G2 was constituted by the ones who were not medicated with clonidine. The diary average doses of clonidine administrated were registered. Value of heart rate (HR), systolic arterial tension (SAT) and the diuresis were verified before administering clonidine and 6/24 hours after. ANOVA, t tests of Student and $\chi 2$ (significant $p < 0,05$) were used for statistical analysis.

RESULTS. Fifty five patients were analyzed. Fifteen (27%) belonged to G1 e 40 (73%) to G2. The APACHE II score was similar in both groups (G1 = 20.4 and G2 = 20.7). The mean age of the patients was 44 years (G1) and 56.4 years (G2). In both groups 40% of patients were between 51–70 years old and 20% were between 30–50 years old. The mean ICU length-of-stay (LOS) was 15.7 (G1) and 12 (G2) days ($p < 0.05$). The mean hospital LOS was 33.6 and 25.4 days to G1 and G2, respectively ($p < 0.05$). The diary clonidine mean doses in G1 was 1,21 μg/kg/h. The mean time of clonidine administration was 8,13 days. Sixty percent of G1 patients had HR lower than 60 bpm ($p < 0.05$) and 13% had SAT lower than 100 mmHg. Diuresis variation was not observed. This finding was not clinically important. Three patients (20%) died in G1 and 24 (60%) in G2. This result was significant ($p < 0.01$).

CONCLUSION. Administration of clonidine, as a co-adjuvant for prolonged sedation and analgesia in critically ill patients did not provoke important adverse effects. Although both groups had similar APACHE II, the patients medicated with clonidine presented a significant lower mortality rate.

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0243

NORMAL OR HIGH CENTRAL VENOUS OXYGEN SATURATION (SCVO2) DOES NOT EXCLUDE TISSUE HYPOXIA IN SEPTIC ICU PATIENTS

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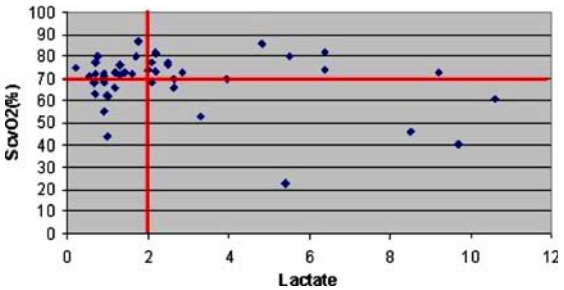
INTRODUCTION. Current Surviving Sepsis Campaign guidelines recommend the use a central venous oxygen saturation (ScvO2) > 70% as a resuscitation goal. However, the low oxygen extraction ratio that is associated with sepsis may lead to high or normal ScvO2 values.

METHODS. Prospectively collected and retrospectively analyzed data from 12 European ICU's of 44 septic patients who had central venous oxygen saturation and serum lactate levels measured at the time that a PiCCO catheter was inserted.

RESULTS. There was no correlation between ScvO2 and either cardiac output or lactate (Fig. 1). ScvO2 > 70% was present in 29 patients (66%) and ScvO2 < 70% in 15 (34%). Plasma lactate level > 2 mmol/L was observed in 14 (48%) of the patients with ScvO2 > 70%, and in 7 (47%) of the patients with ScvO2 < 70% (Fig. 1).



CONCLUSION. Our findings are more in line with recent reports (1,2) of significantly higher ScvO2 values in septic patients than those reported by Rivers et al (3). In addition, septic patients may still have tissue hypoxia in the presence of normal or high ScvO2. This category of patients does not seem to exist among the patients of the Rivers study, in which ScvO2 > 70% was reported to be invariably associated with lactate < 2 mmol/L (4). These findings raise questions about the suitability of ScvO2 to direct hemodynamic management in septic patients.

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Poster Sessions
Assessment of uid resuscitation: 0244–0253

0244

COMPARISON OF THE PERFORMANCE OF A NEW PULSE-CONTOUR ANALYSIS CARDIAC OUTPUT MEASUREMENT (VIGILEO®) WITH THE TRADITIONAL THERMODILUTIONAL METHOD IN PATIENTS WITH INDUCED THERAPEUTIC HYPOTHERMIA AFTER CARDIAC ARREST

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INTRODUCTION. Induced mild hypothermia is a recommended therapy after cardiac arrest. With hypothermia, clinical assessment of the volume status and the response to treatment aiming to improve tissue perfusion can be difficult. In this situation, non-invasive cardiac output measurement could be useful. Unfortunately, arterial pulse contour is altered by temperature and the performance of devices using arterial blood pressure contour analysis to derive cardiac output may be insufficient.

METHODS. Mild hypothermia (32°C–34°C) was induced in six patients after out-of-hospital cardiac arrest and successful resuscitation. Cardiac output (CO) was measured both by conventional thermodilution using a PA catheter and cardiac output monitor (Vigileo II, Edwards Lifescience) and bypulse contour analysis using an arterial line and the Vigileo monitor (Edwards Lifescience) during 210 –750 minutes of hypothermia and the corresponding periods of normothermia (> 36°C). Continuous CO as indicated on both monitors was logged on a laptop every 2 seconds. These data were analyzed after resampling with sampling rates of one and five per five minutes. Bland-Altman analysis was used for comparison of the two methods.

RESULTS. 2187 matching data pairs were analyzed. Median CO during hypothermia was 4.30 l/min and during normothermia 5.62 l/min ($p < 0.001$, Mann-Whitney Rank Sum Test). During hypothermia, mean bias (difference between methods) was −0.45 l/min, and the limits of agreement (mean difference ± 1.96 standard deviation) were −2.18 to 1.29 l/min. During normothermia, mean bias was 0.78 l/min with limits of agreement of −1.67 to 3.24 l/min ($p < 0.001$, Mann-Whitney Rank Sum Test). The percentage error (± 1.96 SD of bias as percentage of mean cardiac output) was ± 42% during hypothermia and ± 44% during normothermia. Using the 5 minutes intervals, during hypothermia 49.7% of the changes between 2 intervals showed in the same direction, but only 13.2% of these minitrends differed > 10% between the methods. The corresponding numbers during normothermia were 50.1% for the same direction and 13.6% for the differences.

CONCLUSION. Although bias was acceptable for clinical purposes under both hypo- and normothermia, the limits of agreement were large. Only 50% of all changes in CO followed the same direction, however, these changes were generally small. Interestingly, pulse contour analysis overestimated thermodilution cardiac output during hypothermia, while the opposite was true during normothermia. These preliminary data suggest that large temperature changes interfere with the performance of the Vigileo device.

0245

HAEMODYNAMIC MANAGEMENT IN HIP REPLACEMENT: STANDARD MANAGEMENT VS GOAL DIRECTED THERAPY

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INTRODUCTION. Several studies have shown that increasing oxygen index (DO2I) delivery in high risk surgery during the perioperative period improve patients' outcome. We tested if goal directed therapy (GDT) in elective hip replacement decreases postoperative complications.

METHODS. Twenty patients were randomized either to a control group (CTRL group, n = 10) or to an oxygen delivery group (GDT group, n = 10). Anaesthesia was performed through a spinal block (15 mg Levobupivacaine) in both groups. In the CTRL group fluid management was guided by clinical judgement.In the GDT group, cardiac output (CO) was continuously monitored through a Vigileo Monitor (Edwards Lifesciences, Irvine, USA). Fluid challenges were given until a response in stroke volume (SV) less than 10% was observed. Then if DO2I was still less then 600 mL/m^2, dobutamine was started. In the GDT group an intraoperative Hb threshold of 10 gr/dL was set as value for blood transfusion.

RESULTS. CTRL and GDT groups were similar for age, sex, weight and height. Baseline heart rate and mean arterial pressure were not statistically different between groups. In the GDT group 8 of 10 patients reached a DO2I higher than 600 mL/m^2, with 2 of 10 patients showing a DO2I higher than 600 mL/m^2 at the baseline. Fluid administration was significantly higher in the GDT group (Table 1). 5 patients in the GDT group received dobutamine. All patients in the GDT group received blood transfusions, with one patient in the CTRL group. No patients received neither noradrenaline nor FFP. Postoperative complications, were reduced in the GDT group, as well as blood transfusions (Table 2).

TABLE 1 INTRAOPERATIVE FLUID ADMINISTRATION

Fluid and inotropes administered	CONTROL GROUP	TREATMENT GROUP
crystalloid mL	2090 ± 341	3195 ± 1210*
colloid mL	620 ± 173	1950 ± 734*
red blood cells, n of patients, average mL	1/10, 900	10/10*, 625 ± 203
total volume infused mL	2800 ± 495	5770 ± 1718 *
dobutamine n of patients	0/10	5/10*

*Intraoperative Fluids and Inotropes administration. * = $p < 0.05$*

TABLE 2 POSTOPERATIVE COMPLICATIONS

	CTRL GROUP	GDT GROUP
red blood cells, n of patients, average mL	9/10, 655.0 ± 100	5/10, 295.0 ± 107*
mean number of complications per patients	2.8 ± 0.3	0.8 ± 0.33**
lenght of stay, days	9.4 ± 0.3	10.7 ± 1

*Postoperative complications, * = $p < 0.05$, ** = $p<0.001$*

CONCLUSION. Intraoperative GDT decreases postoperative complications. Targetting DO2I intraoperatively leads to a bigger administration of crystalloids, colloids, red blood cells and inotropes. The higher requirement of intraoperative blood transfusion is matched by less blood transfusions in the postoperative period.

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0246

EFFECTS OF FLUID RESUSCITATION METHODS ON BURN TRAUMA INDUCED OXIDATIVE STRESS

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INTRODUCTION. It has been proven, that burn injury is associated with severe oxidative stress reaction. The aim of our prospective, randomized study was to examine the effect of two types of fluid resuscitation regimes on the oxidative stress in patients suffering from burn injury.

METHODS. Sixteen patients admitted to critical care unit of the university hospital were involved in the study. Inclusion criteria were the presence of flame burn injury affecting more than 20% of body surface area and in-hospital fluid resuscitation started within 3 hours after injury. Patients were randomized into two groups. In the HUO-group (n = 8) the fluid resuscitation was guided by the hourly urine output (HUO), in the ITBVI-group (n = 8) by the intrathoracic blood volume index (ITBVI). Central venous blood samples were taken from the patients at admission and in the mornings of the next 5 days. White blood cell (WBC) count of the patients, the percentage of granulocytes, lymphocytes and monocytes were determined. As oxidative stress markers the levels of malondialdehyde (MDA), protein sulfhydril (PSH) groups in plasma and reduced gluthation (GSH), the activity of myeloperoxidase (MPO), catalase (CAT) and superoxide dismutase (SOD) enzymes and phorbol-12 myristate-13 acetat (PMA) induced free radical generating capacity (ROS) were measured. Blood samples from 9 healthy volunteers were used as control.

RESULTS. WBC count normalized by the 3rd day in both groups, but the relative number of granulocytes was significantly ($p < 0.05$) higher in HUO-group compared to ITBVI-group from the 4th day of trauma. Plasma MDA level ($p < 0.05$) was elevated during the observation period, while ROS production in whole blood was elevated from the 3rd day of trauma ($p < 0.05$) in both groups compared to healthy volunteers. The lag phase between PMA stimulation and ROS production was significantly longer in the ITBVI-group than in the HUO-group from day 4 ($p < 0.05$) and the rate of ROS production was significantly higher in the HUO-group than in the ITBVI-group on day 6 ($p < 0.05$). The level of PSH ($p < 0.05$) was significantly lower and the activity of CAT ($p < 0.05$) was significantly higher in both groups than in healthy volunteers while no significant differences could be found in the activity of SOD and in the plasma level of GSH compared to healthy volunteers. There were no significant differences between ITBVI and HUO-groups regarding PSH and GSH level, CAT and SOD activity.

CONCLUSION. Our results confirmed that burn injury induces pronounced oxidative stress in the humans. The main finding of this study is that fluid resuscitation regimes influence the prooxidant status, mainly the granulocyte function, but do not affect the antioxidant status in burned patients.

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0247

EFFECTS OF FLUID RESUSCITATION ON MICROCIRCULATION ASSESSED BY NEAR INFRARED SPECTROSCOPY IN SEPTIC PATIENTS

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INTRODUCTION. The near infrared spectroscopy (NIRS) assesses the haemoglobin saturation in the tissue (StO_2). Induction of transient ischemia followed by hyperaemia (forearm occlusion and release) provides additional information on the ability of microvessels to be recruited through the analysis of the StO_2 re-ascension slope.

OBJECTIVE. To examine whether saline infusion aimed to improve systemic haemodynamics in septic shock patients was able to affect regional microcirculation assessed by NIRS indices.

METHODS. We included 35 patients with septic shock equipped with a PiCCO" monitoring system. The thenar muscle StO_2 was continuously measured with Inspectra" model 650 (Hutchinson Technology) before and during pneumatic arm cuff inflation (until StO_2 by 40% is reached) and after deflation, which allowed calculating the StO_2 re-ascension slope (slope).

Mean arterial pressure (MAP), cardiac index (CI), central venous oxygen saturation ($ScvO_2$) and StO_2 measurements were performed before and after infusion of 500 ml of saline. Two groups of patients were identified. In 20 patients (responders) the CI increased > 15% after saline infusion, while in 15 patients (non-responders) CI did not increase > 15%. We also collected MAP, StO_2 and the slope in 15 healthy volunteers.

RESULTS. In healthy volunteers the MAP was 89 mmHg (68–101), StO_2 was 82% (75–90) and the slope was 2.29%/s (1.46–3.36).
In responders saline infusion increased ($p < 0.05$) MAP from 74 (40–118) to 85 mmHg (60–112), CI from 2.37 (1.43–4.35) to 3.02 L/min/m^2 (2.19–5.66), $ScvO_2$ from 68 (26–82) to 71% (39–88) and the slope from 0.86 (0.24–2.14) to 1.07%/s (0.40–2.83). In this sub-group StO_2 did not change from 76% (50–91) to 76% (51–91).
In non-responders, no change the studied parameters was observed after fluid infusion: MAP: from 69 (60–101) to 77 mmHg (48–113), CI: from 3.46 (1.33–5.66) to 3.36 L/min/m^2 (1.44–6.18), $ScvO_2$: from 73 (55–77) to 72% (57–79), the slope: from 1.34%/s (0.52–4.3) to 1.46%/s (0.36–4.4), StO_2: from 81 (70–92) to 79% (70–90).

CONCLUSION. In responders, the increase in CI in response to saline was associated with an increase in $ScvO_2$ and MAP but not in StO_2. However the slope was improved suggesting recruitment of microvessels with fluid infusion.
In non responder saline infusion did not change the studied values (macrocirculatory as well as NIRS parameters).

0248

COMPARISON OF VENOFUNDIN VS. GELOFUSINE INFLUENCE ON HEMODYNAMIC PARAMETER IN POST CARDIAC SURGERY PATIENTS

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INTRODUCTION. Gelofusine (4% modified fluid gelatin) and Venofundin (6%HES 130/0.42) are often used for volume replacing therapy, while the choice of them for a particular patient is sometimes unclear. Ultrasound dilution method (UD) that can routinely measure cardiac output and blood volumes (COstatus, Transonic Systems Inc. Ithaca, NY, USA) in ICU patients using isotonic saline as an indicator was recently introduced. The purpose of the study was to compare the hemodynamic outcomes of volume replacing therapy by both solutions using COstatus.

METHODS. Hemodynamic data was collected in 29 adult ICU patients post cardiac surgery. The measurements were made before and 30 min after infusing 500 ml of Venofundin (BBraun) or 500 ml of Gelofusine (BBraun). UD technology [1] was used to measure cardiac index (CI), stroke volume index (SVI), central blood volume index (CBVI) and total end diastolic volume index (TEDVI). Central venous pressure (CVP) and mean arterial pressure (MAP) were also recorded.

RESULTS. A total of 19 sets of measurements were analyzed from the Venofundin group and 16 sets from the Gelofusine group. Each measurement set included injecting 25 ml of isotonic saline atleast 2–3 times. There were 58% responders (CI more than 10% change) in Venofundin group and 50% responders in the Gelofusine group with a mean increase of CI by 28% and 30% respectively. In contrast to the patients in Gelofusine group, the patients in the Venofundin group produced significant changes in all the measured volume parameters (Table 1). A negative correlation was observed between the pre-infusion values of CBVI and TEDVI and their volume loading induced changes: R = −0.72 and R = −0.60, respectively.

TABLE 1 PERCENTAGE CHANGE INDUCED IN HEMODYNAMIC PARAMETERS BY VOLUME LOADING

	CI	CBVI	TEDVI	SVI	CVP mmHg	MAP mmHg
Venofundin Changes	16 ± 18%*	12 ± 18%*	10 ± 12%*	16 ± 18%*	3.3 ± 1.6*	4.0 ± 9.0
Gelofusine Changes	13 ± 21%*	5.3 ± 19%	1.1 ± 11%*	10 ± 21%*	1.9 ± 3.6 *	2.4 ± 14

*Mean ± sd; * - statistically significant difference ($p < 0.05$)*

CONCLUSION. Venofundin and Gelofundin fluid tests produced similar results in initiating CI changes. The volume changes were more pronounced in the Venofundin group. Both CBVI and TEDVI could possible be used as indicators of cardiac preload.

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0249

PICCO IS MORE RELIABLE THAN VIGILEO FOR TRACKING THE THERAPEUTIC CHANGES IN ARTERIAL PRESSURE CURVE-DERIVED CARDIAC INDEX IN SEPTIC PATIENTS

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INTRODUCTION. The PiCCO and Vigileo devices both provide a continuous estimation of cardiac index by analysing the arterial pressure curve (APCI). For this purpose, the PiCCO estimates the arterial resistance and compliance by calibrating cardiac index with transpulmonary thermodilution. By contrast, the Vigileo device estimates the arterial compliance and resistance on the basis of a complex statistical analysis of the arterial waveform including matching with empirical data. We compared the accuracy of the PiCCO- and Vigileo-APCI for tracking the changes in cardiac index induced by a fluid infusion and changes in the dose of norepinephrine in septic shock patients.

METHODS. We included 36 unstable patients with severe sepsis or septic shock (age 50 ± 7yrs, mean arterial pressure 50 ± 8 mmHg, 22 receiving norepinephrine). Volume expansion (500 mL saline over 10-min) was administered in 27 patients and the dose of norepinephrine was increased in 7 patients. We measured the cardiac index before and after the therapeutic intervention (at the end of fluid infusion and 30 min the increase in the dose of norepinephrine). Cardiac index was simultaneously measured by three METHODS. APCI from the PiCCOPlus device (v7.0), APCI from the Vigileo device (vo1.10) and cardiac index from the transpulmonary thermodilution with the PiCCO device (TPCI), here considered as the reference. For the PiCCO-APCI, calibration was performed just before the therapeutic intervention. After the therapeutic intervention, the TPCI was measured after that the PiCCO-APCI was recorded.

RESULTS. The treatment increased TPCI by 17 ± 19% from 2.9 ± 0.9L/min/m2. Considering the effects induced by volume expansion, the changes in TPCI (expressed as % changes from baseline) were better tracked by the % changes in PiCCO-APCI ($r = 0.73$) than by the changes in Vigileo-APCI ($r = 0.35$). Considering the small subgroup of 7 patients in whom treatment consisited in increasing the dose of norepinephrine, TPCI increased by 5 ± 10% from 2.8 ± 1.1L/min/m2 and mean arterial pressure by 22 ± 9% from 50 ± 11 mmHg. In these patients, the % changes in TPCI were better tracked by the changes in PiCCO-APCI ($r = 0.90$) than by the changes in Vigileo-APCI ($r = 0.29$).

CONCLUSION. Our study suggests that the PiCCO-APCI is more accurate for tracking the changes in cardiac index than the Vigileo-APCI in unstable septic patients. This may be due to the fact that the PiCCO benefits from calibration of APCI with thermodilution. Furthermore, the empirical database of arterial waveforms on which the Vigileo estimation is based did not include unstable septic shock patients.

0250

CENTRAL VENOUS PRESSURE AND SATURATION CORRELATE POORLY WITH OXYGEN DELIVERY OF PATIENTS UNDERGOING MAJOR ABDOMINAL SURGERY

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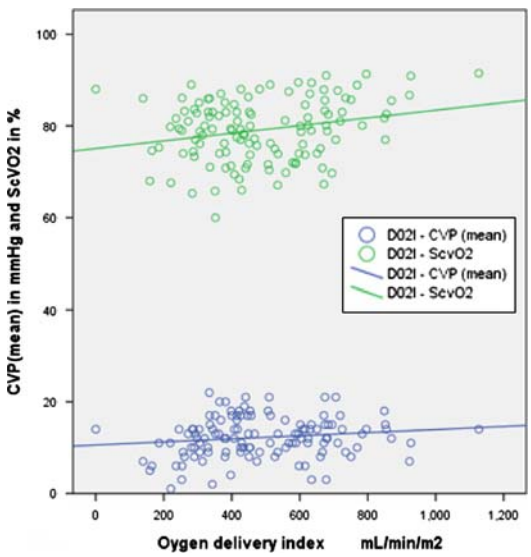
INTRODUCTION. Central venous catheters are inserted in patients undergoing major surgery to guide intravenous fluid therapy. Central venous pressure (CVP) and saturation (ScvO2) are thought to be related to cardiac output and hence oxygen delivery. We examine whether static measurements of these variables correlate with oxygen delivery index (DO2I).

METHODS. An observational study set in a major London teaching hospital. Cardiac output monitoring was established using trans oesophageal doppler (Deltex). The anaesthetic team were blinded to these measurements. CVP was measured using Edwards transducer and ScvO2 was obtained by intermittent sampling of venous blood taken from the distal lumen of the central line.

RESULTS. A total of 43 pts included with 444 and 123 paired CVP- DO2I, and ScvO2-DO2I points, respectively (Graph 1). DO2I correlated poorly with both CVP ($r = 0.115$, $p = 0.016$) and ScvO2 ($r = 0.244$, $p = 0.007$).



CONCLUSION. Static indices measured from central venous catheters correlate poorly with DO2I during major surgery.

0251

GOAL DIRECTED INTRAPOERATIVE FLUID MANAGEMENT: CENTRAL VENOUS PRESSURE (CVP) VS. CENTRAL VENOUS SATURATION (SCVO2)

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INTRODUCTION. Continuous measurement of ScvO2 can help the evaluation of the balance between oxygen supply and demand (1). The aim of our prospective, randomised, controlled, clinical trial was to investigate the effect of CVP and ScvO2 guided intraoperative fluid management on the postoperative inflammatory response and intraoperative fluid demand.

METHODS. After local ethics committee approval and written informed consent 39 patients who underwent major abdominal surgery were enrolled to the study. Patients were randomized into CVP ($n = 20$) and ScvO2 ($n = 19$) groups. Beside routine monitoring of vital signs such as heart rate, invasive blood pressure and CVP, ScvO2 was also continuously measured (CeVOX, PULSION Medical Systems, Germany) in the ScvO2 group. CVP was kept: ≥ 8 mmHg in CVP group and ScvO2 ≥ 70% in ScvO2 group with bolus colloid infusions during surgery. If the mean arterial pressure fell < 60 mmHg, a bolus of ephedrine was administered. Vital parameters were recorded in every hour during the operation then on the first and the second postoperative day. Laboratory samples were taken right before and after surgery and on the first and the second postoperative day. For statistical analysis Mann-Whitney test and Independent-Samples T-test (SPSS for Windows version 11.5) was used.

RESULTS. There was no significant difference between the two groups in the intraoperative fluid requirement, the dose of ephedrine and in the postoperative inflammatory marker levels. The patients in ScvO2 group needed less colloid than in the CVP group but the difference was not significant: median = 500 (IQR = 250–1000) ml vs. 1000 (500–1000) ml, $p = 0{,}165$. The mean ScvO2 in the whole sample under the operation was 81,7 ± 7,8%.

CONCLUSION. The preliminary results of this study, such as the tendency in less fluid requirement in the ScvO2 group justifies the completion of the trial to come to firm conclusions. The observed high ScvO2 (∼ 80%), which is in accord with previously reported data (2), suggest that "normal" or "target" values for anaesthetized patients during major abdominal surgery should be redefined.

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0252

IINCREASED IN-VITRO RESPONSE OF HEPATIC ARTERIES TO NOREPINEPHRINE AFTER PRIOR IN-VIVO EXPOSURE TO ENDOTOXEMIA

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INTRODUCTION. Fluid administration and vasopressors are cornerstones of the treatment for septic shock. This study addresses the ex-vivo reactivity of splanchnic arteries to norepinephrine after previous exposure to either primary abdominal infection or endotoxemia and to different rates of fluid administration.

METHODS. 48 anesthetized pigs were randomly assigned to endotoxin infusion (E, $n = 16$), fecal peritonitis (P, $n = 16$), or placebo (C, $n = 16$), and each group further to either high (H, 20 mL/kg bwt, $n = 8$) or moderate (M, 10 mL/kg bwt, $n = 8$) fluid resuscitation for 24 hours or until death, if earlier. Cardiac output was measured by thermodilution and regional abdominal blood flows by ultrasound Doppler. Afterward, hepatic (HA) and superior mesenteric artery (SMA) ex-vivo vascular reactivities were analyzed using the tissue bath method. Dose-response curves were constructed for nor-epinephrine (NE). Results are expressed as mean ± sd. We report the maximum dose response values. ANOVA was used to test for drug, group, and fluid regimen effects, and their interactions. Jejunum motility data from the same groups of animals are presented in another abstract.

RESULTS. There were no effects of peritonitis/endotoxemia/volume on cardiac output, SMA and HA blood flows. At the end of the experiment % change from baseline was in cardiac output was 36 ± 38%, 44 ± 46% and 38 ± 48% in E, P and C, respectively; $p = 0.8$. Superior mesenteric % change at the end of experiment was 21 ± 31%, 44 ± 39% and 44 ± 36% in E, P and C, respectively; $p = 0.4$. Hepatic artery blood flows increased in all groups to 92 ± 132%, 55 ± 121% and 50 ± 82% in E, P and C, respectively (time effect, $p < 0.001$). Mortality was 69% (fecal peritonitis) and 44% (endotoxin). Norepinephrine-induced maximal in-vitro tension in hepatic and superior mesenteric arteries is indicated in the table.

TABLE 1 DOSE RESPONSE MAXIMUM EX VIVO VASCULAR REACTIVITY VALUES

	CM	CH	EM	EH	PM	PH
HA*,&	2 ± 1	2 ± 1	3 ± 2	4 ± 2	2 ± 1	3 ± 2
SMA*	3 ± 2	2 ± 1	3 ± 3	3 ± 3	3 ± 2	2 ± 2

** dose effect $p < 0.001$, & dose group effect $p < 0.001$. Units are tension in grams*

CONCLUSION. Endotoxemia and intra-abdominal infection have different effects on in-vitro hepatic arterial contractility. A high amount of fluid administered in vivo does not seem to interfere with vascular contractility. Potential clinical consequences of these findings should be addressed in further studies.

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0253

PREOPERATIVE IMMUNE RESPONSE AND BLOOD TRANSFUSION IN PATIENTS UNDERGOING CARDIAC SURGERY

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INTRODUCTION. Study purpose: To evaluate the influence of preoperative type I and II immune responses on blood transfusion requirements in 71 consecutive patients undergoing cardiac surgery.

METHODS. Prospective and observational trial. Patients were divided into two groups according to the primary outcome variable: blood transfusion requirements—less or equal than 2 units (n = 35) and more than 2 units of red blood cells (n = 36). Preoperative immune response was assessed by flow cytometry, measuring the proportion of CD4 + T cells producing cytokines, including Th1 response [interferon (IFN)-γ and tumor necrosis factor (TNF)-α] and Th2 response [interleukin (IL)-4 and -10)]. Two logistic regression analyses (including and not including immunological variables) were used to select and weight perioperative variables associated with increased risk of transfusion.

RESULTS. Three variables were found to be independent predictors of transfusion requirements when immunological variables were not included: preoperative platelet count, hemoglobin and hypertension. The model was well calibrated (Hosmer-Lemeshow 0.46) and discriminative (C-index 0.70) with optimal sensitivity and specificity of 74% and 83%, respectively. When all the variables were included, preoperative hemoglobin, cardiopulmonary bypass time and the preoperative proportion of CD4 + T cells producing TNF-α were associated with increased risk of transfusion (Hosmer-Lemeshow 0.33, C-index 0.93, sensitivity 86 and specificity 70%), whereas platelet count and hypertension were not.

CONCLUSION. A low preoperative Th1 immune response, as assessed by the proportion of CD4 + T cells producing TNF-α, was associated with higher blood transfusion rate.

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0254

IS ADMISSION HYPERGLYCAEMIA AN INDEPENDENT PREDICTOR OF MORTALITY IN A MIXED ICU POPULATION?

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INTRODUCTION. Hyperglycaemia on hospital admission irrespective of the admitting diagnosis is a common finding and is found to be associated with increased mortality. Patients with newly diagnosed hyperglycaemia have a significantly higher mortality rate and a lower functional outcome than patients with known history of diabetes or normoglycaemia.

METHODS. Observational prospective study in a mixed ICU in the period of 2004–2007 (n = 1200). Admission hyperglycaemia was defined as a random blood glucose level of 200 mg/dl or more. Collected demographic data: severity of illness scoring system and organ dysfunction (SAPS II score, APACHE II score and SOFA score), blood glucose levels, type of admission, length of hospital and ICU stay and hospital outcome.

Considered prognostic variables: hyperglycaemia, body mass index (BMI), SAPS II score, APACHE II score, SOFA score, sepsis, renal dysfunction/failure, use of vasoactive drugs, enteral and parenteral feeding and length of mechanical ventilation.

Multivariate analysis was applied to all prognostic variables.

Data are presented as means $\pm$ standard deviation. All analyses were performed using SPSS 14.0.

Base-line and outcome variables were compared with the use of chi square and ANOVA. Logistic regression equation and odds ratio were used to evaluate the impact of the demographic and clinical variables in the mortality rates. P value < 0.05 was considered significant.

RESULTS. 1200 patients were enrolled, 176 were diabetics (236.9 $\pm$ 100.2 mg/dl), 301 were hyperglycaemics (278.6 $\pm$ 117.0 mg/dl) and 723 were normoglycaemics (138.5 $\pm$ 33.5 mg/dl). The mortality rate in patients with new hyperglycemia was 47.2%, in normoglycaemics 39.4% and in diabetics 39.2% ($p < 0.0001$). The adjusted multivariate analysis for SAPS II (O.R. 1.03; 95% CI 1.02 to 1.03; $p = 0.0001$), APACHE II (O.R. 1.01; 95% CI 1.00 to 1.02; $p = 0.074$), vasoactive drugs (O.R. 2.04; 95% CI 1.53 to 2.71; $p = < 0.0001$) were associated with higher mortality rates.

CONCLUSION. The analysis of our data does not support the results observed in other studies where admission hyperglycaemia was considered an independent marker of in hospital mortality in a mixed ICU population. This study showed that the most important variables associated with mortality prediction were SAPS II, APACHE II and the use of vasoactive drugs.

0255

CAN HYPERGLYCAEMIA AT ADMISSION AFFECT OUTCOME IN CRITICALLY ILL PATIENTS?

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INTRODUCTION. Hyperglycaemia at admission has been associated with a poor outcome resulting in increased mortality and a prolonged intensive care and hospital stay.

METHODS. Prospective observational cohort study. Data collected from a mixed ICU.in the period of 2004–2007 (n = 1200). Admission hyperglycaemia was defined as a random blood glucose level of 200 mg/dl or more. Collected demographic data: severity of illness scoring system and organ dysfunction (SAPS II score, APACHE II score and SOFA score), blood glucose levels, type of admission, length of hospital and ICU stay and hospital outcome.

Considered prognostic variables: hyperglycaemia, body mass index (BMI), SAPS II score, APACHE II score, SOFA score, sepsis, renal dysfunction/failure, use of vasoactive drugs, enteral and parenteral feeding and length of mechanical ventilation.

Survival was evaluated with Kaplan-Meier curves using the blood glucose level at admission in patients with diabetes mellitus and undiagnosed diabetes. All analyses were conducted using SPSS14.0.

RESULTS. Survival by blood glucose level shown by Kaplan-Meier survival curves demonstrated that there is a significant statistic correlation between the patients with admission hyperglycaemia, diabetes and normoglycaemia. Patients with hyperglycaemia at admission have lower survival rates than diabetics and normoglycaemics.

CONCLUSION. We identified that new hyperglycaemia has a clear correlation with mortality.

0256

HIGH DOSE CORTICOIDS DO NOT SEEM TO INDUCE AN INCREASED RISK OF POSTOPERATIVE HYPERGLYCEMIA IN NEUROSURGICAL ICU PATIENTS

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INTRODUCTION. Short-term, high dose intravenous methylprednisolone is widely used in the peri-operative course of brain tumor surgery. Impact of blood glucose levels on final ICU outcome is well known and therefore close monitoring of blood glucose in the early hours after the neurosurgical intervention may be warranted. In this paper, we evaluated the postoperative blood glucose levels in patient admitted to the ICU after brain (tumor, hematoma, cerebrovascular) surgery, comparing pts with or without high dose peroperative corticoid administration.

METHODS. From 2004 to half 2007, 694 pts admitted to the ICU after brain surgery were monitored for blood glucose concentrations. 368 pts had received 15 mg/kg BW methylprednisolone in the early peroperative phase and 213 pts of them already received corticoids pre-operatively. Blood glucose levels were assessed every 2 hours of the first 18 hours of postoperative ICU admission.

RESULTS. Within the first 2 hours of postoperative ICU admission, 128 pts (18.44%) revealed a blood glucose level higher than 180 mg/dl, while 249 pts (35.87%) revealed blood glucose levels between 120–180 mg/dl. There was no significant difference in blood glucose level between pts having received corticoids peroperatively (20.4% > 180 mg/dl and 33.5% 120–180 mg/dl) or not (18.3% > 180 mgl/dl and 37.2% 120–180 mg/dl). In 231 pts (33.28%), iv titration of insulin (for a mean period of 10.3hrs) was necessary to maintain further glucose levels within normal ranges (below 120mg/dl). There was no significant difference in insulin need between pts having received corticoids peroperatively or not. Increased postoperative blood glucose levels were significantly correlated to urgent intervention, prolonged postoperative ICU stay (more than 24hrs), intracranial bleeding (SAH or head injury) and pre-existing diabetes. Increased blood glucose levels were significantly more observed in pts newly administered methylprednisolone during craniectomy compared to those pts already receiving preoperative corticoids.

CONCLUSION. Postoperative hyperglycemia is a well known result of peroperative stress and is related to outcome after prolonged ICU stay. Overall, we did not find a higher incidence of postoperative hyperglycemia, nor a higher need for insulin treatment, in neurosurgical patients receiving high doses methylprednisolone as part of their treatment for brain tumor surgery. Nevertheless, overall blood glucose monitoring in postoperative neurosurgical patients seems recommended as one third of patients required iv insulin titration to maintain normal glycemia levels.

0257

HEAD INJURY IN A PICU – 5 YEAR EXPERIENCE IN A NEUROTRAUMA CENTER

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INTRODUCTION. Traumatic brain injury (TBI) is the leading cause of paediatric morbidity and mortality in developed countries. Outcome of these children improves if they are treated in paediatric trauma centers or in adult trauma centers with added qualifications to treat children. Since 2002 our PICU is part of the Neurotrauma center for the south region of Portugal.

METHODS. Retrospective study of admissions due to politrauma and isolated TBI during a five year period (2003–2007).

RESULTS. During this period 268 children were admitted with trauma (13% of total PICU admissions) - 238 clinical records were retrieved for analysis. Median age was 7 years (8 days – 16 years), M/F 2/1. Fifty five percent were assisted by the national medical emergency institute (INEM), 31% were immediately intubated and ventilated and 43% were transported directly to the trauma center. Median PRISM score was 6 (0–49) and PTS 8 (-4 – 12).

TBI was present in 207 cases, most commonly due to motor vehicle accidents (60%) and falls (33%). On admission 42% children presented with severe TBI (Glasgow Coma Scale (GCS) $<= 8$) and 25% with moderate TBI (GCS 9-11). In 79% of children, CT scan identified lesions, most frequently intracranial haemorrhages (parenchymal, subdural and epidural), brain oedema and skull fractures.

Clinical signs of elevated intracranial pressure (ICP) developed in 92 (44%) patients. An ICP monitoring catheter was inserted in 25 children and initial measurements was > 20 mmHg in 17. Neurosurgical treatment was needed in 24 patients (epidural/subdural haematomas evacuation – 21; decompressive craniectomy – 5). Fifty five percent of patients were ventilated and 11% needed inotropes. Median length of PICU stay was 3 days (1–38). Mortality rate was 7% (14/207). Thirteen of these patients had GCS <= 4 on admission.

CONCLUSION. TBI represents a significant number of admissions in our unit. The need for mechanical ventilation, cardiovascular support and early neurosurgical intervention in such big number of patients plus the optimization of supportive care justify completely the assistance in a PICU of a neurotrauma center.

0258

HYPOTHERMIA AFTER OUT OF HOSPITAL ARREST - NOT WITHOUT PROBLEMS?

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INTRODUCTION. The ALS Task Force of the International Liaison Committee on Resuscitation recommends that unconscious patients with spontaneous circulation after sustaining an out of hospital cardiac arrest should be cooled to 32–34C for the first 24 hours when the initial rhythm is ventricular fibrillation.

We report two such patients who developed ischaemia of abdominal organs following induced hypothermia.

METHODS. A 66 year old male with a past medical history of myocardial infarction and hypertension sustained an out of hospital cardiac arrest. Two shocks were delivered at the scene, which restored cardiac output. In ITU he was cooled to 32–34 C for the next 24 hours. He then went on to develop ischaemia of the bowel requiring surgery. Troponin T and echocardiogram were normal.

A 72 year old, know to have ischaemic heart disease and peripheral vascular disease. sustained an out of hospital cardiac arrest and was resuscitated. Cardiac rhythm was ventricular fibrillation. He was cooled to 32- 34 C for the next 24 hours. Despite being on prophylactic low molecular weight heparin, he developed splenic and liver infarcts and died.

RESULTS. Bernard et al reported that 21 out of 43 patients treated with hypothermia (49%) after an out of hospital cardiac arrest survived and had a good outcome.Holzer et al reported favourable neurological outcome in 55% of patients managed with hypothermia after a cardiac arrest. Induced hypothermia is recognised to cause haemorrhagic complications. However thrombosis has not been reported as a sequelae. Poulas et al showed that hypothermia at all levels caused significant impairment of cell deformity, and an increase in viscosity.

CONCLUSION. We postulate that arterial thrombosis and organ infarction could be a potential complication of induced hypothermia in patients with vascular risk factors. It is conceivable that changes in blood rheology related to cooling could lead to thrombotic complications in an already compromised circulation.

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0259

EVALUATION OF THE ADMINISTRATION OF THE FACTOR VII IN THE MASSIVE BLEEDING RESISTANT TO THE CONVENTIONAL TREATMENT

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INTRODUCTION. The massive haemorrhage is a vital emergency whose therapeutic success is dependent time. It is estimated that the 30–40% of the deaths from massive haemorrhage after multiple trauma are potentially reversible. Our objective was to analyse the cases of massive haemorrhage resistant to the conventional treatment which received treatment with recombinant Factor VII.

METHODS. A collection data form was designed in order to evaluate the admitted patients with massive haemorrhage resistant to conventional treatment, during the period 2004–2008. Items related to the quantity of transfused products, hemodynamic parameters, period of diagnosis and treatment, monitorization, coagulopathy, complications and other analytic parameters were gather for that purpose during the first 24 hours. The previous conditions to the administration of the recombinant Factor VII were analysed.

RESULTS. We identified 14 patients: medium age 50,5 years, the mortality per month was 28%. The medium of the SOFA in the admission was of 9. The average quantity of hemoderivated pre and post rFVIIa administration was: Concentrated red blood cells pre 3229 ml and 1022 ml post; Plasma pre 1446 ml and post 591 ml; Platelet pre 414 ml and post 167 ml. In the diagnosis of haemorrhage the 81,8% presented coagulopathy, the 42,8% had a shock, the 71,4% presented a temperature of $< 35,5$°C and the 35,7% had a heart rate > 100. The 71,4% presented belated complications.
Fibrinogen was administered in the 28,5% of the cases, amchafibrin in the 14,2% and vitamin K in the 28,5%. The rewarming up with an electrical blanket was of 35,7%. The 64,2% and 78,5% required inotropic and vasoactive drugs, respectively. The 50% needed continuous venovenous hemodiafiltration techniques.
The rFVIIa was administered in every case with a medium of 16,5 h (rank 120 h-2,5 h) in the beginning of the bleeding. The medium dose was of 94,28 μg/kg (rank 137,2-68,6 μg/kg). A 28,5% of patients required a second dose which it was of 68,6 μg/kg with an interval between doses of 4,75 hours as a median time. Before the administration of the rFVIIa, the 42,8% presented a temperature > 36°C, Platelets > 50 109/U in the 91,6% of the cases and Fibrinogen > 50 mg/dl in the 85,7%. There were no previous data of fibrinogen in the first dose in the 50%. The pH was $> 7,2$ in the 91,6% of the cases. We found a statistically significant reduction in the necessity of transfusion of concentrated red blood cells ($p < 0,05$), fresh frozen plasma ($p < 0,05$). We analysed the coagulopathy previous to the administration of the rFVIIa and the time of it. The INR and the APTT were normalized in the 77% of the cases in a statistically significant way ($p < 0,05$). The 35,7% of the patients required surgical treatment or endoscopic post administration.

CONCLUSION. The massive haemorrhage resistant to the conventional treatment must be analysed to establish improvement points in the multidisciplinary treatment. The rFVIIa reduces the necessity of transfusion.

0260

IS MORTALITY OF TRAUMATIC BRAIN INJURY INFLUENCED BY THE COEXISTENCE OF AN EXTRACRANIAL TRAUMA? PRELIMINARY RESULTS

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INTRODUCTION. A potential bidirectional interaction between traumatic brain injury (TBI) and extracranial injury would increase mortality when these two injuries coexist. Our aim has been to analyze if an extracranial trauma was itself an independent predictor of mortality in patients with TBI.

METHODS. Prospective, observational study performed in our high technology centre from January to December 2007. Our study included a total of 80 patients who sustained TBI and were admitted in critical care units. We have analyzed severity of TBI, the coexistence of an extracranial trauma which had been broken down into different types and each group mortality. The statistical analysis has been implemented by means of Chi-square test and Fisher test.

RESULTS. A total of 80 patients were included, 35 out of them were severe TBI (43,7%), 19 moderate (23,75%), 4 mild (5%). Severity of TBI were not assessed on 20 and 2 were noted blind to TBI variable.

A total of 31 patients resulted with TBI alone, 10 died (32%). Overall mortality of patients with TBI associated to an extracranial trauma, and mortality of different types of extracranial trauma are shown in Table 1. About patients with severe TBI associated to an extracranial trauma 38% died, compared to 42,9% death in patients with severe TBI alone. On the other hand patients with moderate TBI associated to an extracranial trauma 20% died, compared to patients with moderate TBI alone, 11% only died, however differences in both cases were not significant.

TABLE 1 MORTALITY IN PATIENTS WITH TBI AND EXTRACRANIAL TRAUMA

	Patients with extracranial injury	Death (%)
Total patients	n = 49	14 (28,5%)
Bone injury	n = 28	8 (28,6%)
Thoracic injury	n = 30	13 (43'3%)
Abdominal injury	n = 11	5 (45,4%)
Pelvic girdle fracture	n = 7	2 (8%)

CONCLUSION. The existence of an extracranial trauma associated to TBI is not a prognosis factor of mortality, regardless of types of injuries found. Althought we found the variable extracranial trauma was not itself an independent predictor of mortality in patients with TBI, it is necessary to extend the number of cases in order to draw definitive conclusions.

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0261

RISK OF TRANSPORT FOR BRAIN CT

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INTRODUCTION. Brain CT (BCT) scans are an important diagnostic tool for intracranial disorders. In ICU patients reasons for BCT scans vary, but in most hospitals this investigation implies a transport to the radiology department. We assessed the risk of patient transport for ICU patients who needed a BCT.

METHODS. Prospective observational study in a mixed medical and (neuro) surgical intensive care of an university hospital. Between May 2007 and January 2008 all ICU patients in whom a BCT was requested were included. As we evaluated safety during transport and no interventions were performed, the medical ethical committee of our hospital decided that informed consent was unnecessary. The physician completed a specially designed radiology request form including: neurological reason for BCT request, patient characteristics. The ICU nurses and physician transporting the patient to the radiology department registered changes in hemodynamics, ventilation, intracranial pressure (ICP) and other adverse events. Data were collected on hemodynamic instability (a rise or decline of MAP of > 10%), oxygenation (decline in saturation of > 5%) and changes in PCO2 (assessed in arterial blood gas). Patients were divided in two groups; surgical patients are patients suffering from intracranial bleeding and trauma.

RESULTS. Between May 2007 and January 2008 117 BCTs in 95 patients were evaluated.

Adverse events, other than shown in the table, did not occur.

TABLE 1

	Overall (n = 117)	surgical (n = 79)	medical (n = 38)
Time of transport (min, mean SD)	38 (14.9)		
Ventilated patients (n)	98 (84%)	65 (82%)	33 (87%)
Decline in oxygen sat. > 5%	8 (6.8%)	7 (8.9%)	1 (2.6%)
Increase pCO2 > 0.5 kPa	10 (8.5%)	6 (7.6%)	4 (11%)
HD instability	8 (6.8%)	3 (3.8%)	5 (13%)

CONCLUSION. In this study we found that transport of ICU patients did not result in serious complications. With our ICU transport set up 6.8% had a decline in oxygenation and a similar percentage of the patients experienced a change of blood pressure of more than 10%. This can results in significant changes in cerebral perfusion pressure when ICP is raised. As only a very small group of patients had ICP monitoring, we can not draw any conclusions on this issue.

0262

PSEUDO-SUBARACHNOID HEMORRHAGES ACCOMPANYING DIFFUSE CEREBRAL EDEMA

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INTRODUCTION. Increased attenuation of basal cisterns and subarachnoid spaces on CT scans is a characteristic finding of acute subarachnoid hemorrhage (SAH). But these findings may be found on brain CT in the absence of blood in subarachnoid space and is called pseudo-SAH. We present five cases of pseudo-SAH in patients with diffuse cerebral edema.

METHODS. We conducted a case-note study in 1 year-period and report four cases of pseudo-SAH.

RESULTS. Case 1. A 39-year old male patient was admitted after successful resuscitation from asphyxic cardiac arrest.On 3 days of ICU, blood pressure suddenly increased over 200 mmHg with anisocoric pupil on papillary light reflex. Non-enhanced brain CT showed severe cerebral edema and increased attenuation in basal cistern and subarachnoid space which was compatible findings of SAH. On enhanced brain CT, findings of severe cerebral edema was observed but there were no findings of increased attenuation in basal cistern and subarachnoid space and there was no abnormal findings in CT angiogram. Case 2. A 37-year old female patient was admitted after ingestion of oral hypoglycemic agents intentionally. Her initial level of consciousness was coma and blood sugar level was 1 mg/dl. In spite of glucose infusion she did not awake. Brain CT showed severe cerebral edema and increased attenuation in basal cistern and subarachnoid space. Follow-up brain CT was taken two days later, and the findings of increased attenuation in basal cistern and subarachnoid space were disapperared. Case 3. A 22-year old male patient was admitted after ingestion of toxic amount of valproic acid intentionally.On second days of ICU, emergency brain CT was undergone and brain CT showed severe cerebral edema and increased attenuation in basal cistern and subarachnoid space. But there was no abnormal findings in CT angiogram. Case 4. 47-year old male patient was admitted after successful resuscitation from cardiac arrest. Two days later brain CT showed severe cerebral edema and increased attenuation in basal cistern and subarachnoid space.

CONCLUSION. Pseudo-SAH may be seen on CT scans in case of marked cerebral edema. Physician should be aware of this potential mimics of SAH when evaluating patients with diffuse cerebral edema.

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0263

SPONTANEOUS HAEMORRHAGIC STROKES UNDER NEUROMONITORING WITH INTRACRANIAL CATHETERS

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INTRODUCTION. We present our experience with multimodal neuromonitoring in patients with spontaneous hemorrhagic strokes.

METHODS. It's about 7 patients, 3 men and 4 women with an average age of 50.4 years. Three of them suffered from spontaneous intracerebral hematomas due to arterial hypertension, arteriovenous malformation rupture and aneurysm rupture respectively, for which they underwent emergency surgical hematoma evacuation. The two patients with the vascular malformations were treated successively with embolization. The remaining four patients suffered from spontaneous subarachnoid hemorrhage due to aneurysm rupture, three of which underwent embolization. All patients were admitted to the Intensive Care Unit (ICU) and intraparenchymal catheters were placed in each of them, monitoring the intracranial pressure, brain tissue oxygen and microdialysis.

RESULTS. The short-term outcome in three months period (Glasgow Outcome Scale, GOS) was 1 for 3 patients, 2 for 1 patient, 3 for 2 patients and 4 for 1 patient. In two of the patients the neuromonitoring values resulted in hyperdynamic treatment (HDT) for incipient vasospasm, the prediction of which was anticipated one to three days before its imaging confirmation. The neuromonitoring values were conform to the patients' clinical course and related to the outcome.

CONCLUSION. The multimodal neuromonitoring by intrapernchymal brain catheters seems to predict outcome in patients with spontaneous hemorrhagic strokes, while can guide the therapeutic decisions to a certain degree, especially regarding early therapy of vasospasm.

0264

TWO PATIENTS WITH CYCLIC BLOOD PRESSURE VARIATION AFTER CARDIAC ARREST

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INTRODUCTION. Cyclic blood pressure (BP) and cardiac output variation in varying frequencies and depth have been observed in critically ill patients (1–4). The slower cyclic variations are sometimes named Traube-Hering-Mayer waves.

First-order cyclic variations have waves with a length of about 1 s and are periodic variations in BP corresponding to each heartbeat.

Second-order waves have a duration of about 5 s and are corresponding to respiratory variation.

Third-order waves typically last 10-160 s and can be caused by various pathological states, such as brainstem ischemia.

Fourth-order waves, can vary in length from minutes up to hours. These waves are believed to be caused by impaired tissue oxygen delivery.

These cycles have also been seen in patients with raised intracranial pressure and during sleep cycles (5).

METHODS. We present 2 patients with strong cyclic BP variation after cardiac arrest.

RESULTS. A 67-year-old male was admitted after CPR. He showed a cyclic variation of systolic BP between 80 and 150 mm Hg with a cycle of 1/minute. There was only a slight variation in heart rate during this period. The cyclic variation disappeared after clonidine was administered. The patient recovered and could be discharged from the hospital in good neurological condition.
The second patient was a 60 year old female, also admitted to the ICU after cardiac arrest and CPR.
This patient was hyperthermic and showed hypocalcaemia. During therapeutic hypothermia, cyclic BP variation with a cycle of one per 10 minutes was observed. She died without regaining consciousness.

CONCLUSION. Slow cyclic BP variation can infrequently be observed in post CPR patients. These slower waves are sometimes called Traube-Hering-Mayer waves, but can best be termed "repetitive synchronized cyclical oscillations". The clinical relevance is unknown.

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0265

FULFILLMENT OF GUIDELINES FOR MANAGEMENT OF SEVERE HEAD TRAUMA IN ICU

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INTRODUCTION. According to the guidelines for management of severe traumatic brain injury (TBI), we designed a protocol to be applied in our high technology hospital. The aim of our study was to observe the correct protocol application about management of severe head trauma patients in the Intensive Care Unit (ICU).

METHODS. A prospective observational study from January to December 2007, included patients with head trauma who were admitted in ICU. The type of analgesics, sedatives and muscle relaxants, use of hyperosmolar therapy, barbiturates and steroids administration, antiseizure prophylaxis, presence of intracranial hypertension and use of intracranial pressure (ICP) monitoring, jugular venous oxygen saturation (SjO2) monitoring have been evaluated.

RESULTS. A total of 354 trauma head patients were admitted in the hospital, 55 (15,5%) out of them in ICU. About them, severe TBI was present in 30 (55%), moderate in 10 (18%), mild in 12 (22%) and in 3 patients the Glasgow score wasn't assessed. The mean age was 47,25 years (18–86), men were 47 (85,5%) and women 8 (14,5%). ICP was monitored in 19 (63,3%) of severe TBI, 6 (60%) of moderate and 3 (25%) of mild. Patients with severe TBI were not monitored in case of poor prognosis or good evolution after neurological reassessment. From the patients with ICP monitoring, the cerebral perfusion pressure (CPP) was below 60 in 20 (71,4%) in somewhere evolution, which was not influenced in mortality. Fifteen patients (79%) had intracranial hypertension, who were treated with: use of muscle relaxants besides sedation in 11 (83%), use of hyperosmolar therapy with manitol in 12 (80%) and hypertonic saline in 9 (60%), moderate hyperventilation (PCO2 30 –35 mmHg) were used in 5 (33%) and hyperventilation with PCO2 below 30 mmHg in 2 (13%), with regard to these ones only 50% of each group had SjO2. Barbiturate therapy was used in 4 (27%). A total of 16 patients (29%) received steroids treatment, 8 out of them were submitted to craniotomy and the indication was made by surgeons as an antiinflamatory postoperative therapy, 5 patients received metilprednisolone as therapy associated with face trauma. The use of steroids seemed unjustified in the 3 patients left. Antiseizure prophylaxis were used in 13(43%) patient with severe TBI.

CONCLUSION. According to the percentage of antyedema treatment, it can be estimated we have followed the sequence algorithm in the management of intracranial hypertension that was recommended in the protocol, but the use of first level therapies as the hyperosmolar therapy and muscle relaxants could be improved. On the other hand the use of SjO2 monitoring in patients under hyperventilation treatment and the use of steroids should be rectified in the management of these patients.

0266

PROGNOSIS UTILITY OF GLASGOW COMA SCALE SCORE TENDENCY IN PATIENTS WITH TRAUMATIC BRAIN INJURY

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INTRODUCTION. The Glasgow Coma Scale (GCS) score is widely used in the initial and serial assessment of patients with head trauma. The GCS score is more frequently used than the GCS score tendency. The aim of this study was to evaluate the prognosis utility of GCS score tendency in patients with Traumatic Brain Injury (TBI) during the first 5 days in ICU.

METHODS. Retrospective study. Records of 65 patients who were admitted into the ICU (UMAE 1, Bajío) with diagnosis of Traumatic Brain Injury were revised. In each case, GCS scores were collected on the day of admission to the ICU and every day during the first 5 days in the ICU. Only such cases in which GCS registrations were deemed reliable (coinciding same score, same day and same shift by diverse physicians and/or intensive care nurses) were included. If patients were sedated, GCS scores were included only during daily interruptions of the infusion of sedative drugs. Either Chi-Square test or Fisher exact test was used, as applicable, for the analysis of hospital mortality differences among diverse subgroups. Values of $p < 0.05$ were considered significant.

RESULTS. Hospital mortality was 35.4% (23/65 patients). 13 patients showed GCS scores during the first 24 hrs in the ICU (GCS-d1) > 8 (mortality = 0%); 35 patients showed GCS-d1 scores from 6 to 8 (mortality = 31.4%) and 16 showed GCS-d1 scores from 3 to 5 (mortality = 68.75%), $p < 0.01$. Mortality on patients with GCS-d1 score < 9 was 44.2% (23/52). In the subgroup of patients with GCS-d1 score from 6 to 8; patients who increased their GCS score over 8 on the 5th day (GCS-d5) or who maintained it between 6 and 8, had a 12% hospital mortality (3/25), versus 80% mortality (8/10) in those patients who had a GCS-d5 < 6 ($p = 0.0026$). In the subgroup of patients with GCS-d1 score from 3 to 5; patients who increased their GCS score over 5 on the 5th day had a 33.3% hospital mortality (2/6), versus a 90% hospital mortality (9/10) in patients who stayed the first 5 days with a GCS score < 6 ($p = 0.035$).

CONCLUSION. GCS score tendency in patients with Traumatic Brain Injury during the first 5 days in the ICU has a prognosis utility in hospital mortality.

0267

ELETROENCEPHALOGRAM AND STATUS EPILEPTIC NON CONVULSIVE (SENC) -SEPSIS, GLASGOW COMA SCALE, SOFA SCORE AND SOFA SCORE MODIFIED

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INTRODUCTION. The Status epileptic non convulsive (SENC) occurs with high rate of deaths varies with age, condition and neurological dysfunction associated.Describe the differences found in the values obtained in the range of Glasgow Coma, SOFA Score and m-SOFA Score (SOFA Score without the analysis of from Glasgow Coma Scale) at the time of hospitalization and dignostic in patients with SENC.

METHODS. Analysis of records in the period with the calculation of the Glasgow Coma Scale, SOFA Score and m-SOFA Score (SOFA Score without the analysis of the Glasgow Coma Scale).

RESULTS. N = 63. Age (year) mean (range) 69 (21–93); male 37/63(59%);Female 26/63 (41%); Sepsis in 19/63- 30%;Shock Septic 2/63(3%);Time of the hospitalization in days mean (range): 33 (2–133);ICU 26 (4–110);Deaths 36/63 (57%).
For patients with SENC: 11/63 (18%) Age (year) mean (range): 67 (29–92);6(55%) male;5(45%) female;Sepsis as final diagnosis: 6/11 (55%);Time of hospitalizationin days mean (range) = 43(2–133);UCI 35 days (4–110);Deaths (81.8%) 9/11;Hidantal therapeutic in (54.5%) 6/11;4/11(36%) renal insufficiency (Dialysis); Below we have respectively the values obtained for mean, median, range, standard deviation, confidence interval for the 63 patients:
GCS-I: 13/14/3/15/3/IC95% 12 – 14 GCS- E: 10/10/3/15/4/IC95% 9 – 11
SOFA-I: 8/8/0/15/4/IC95% 7 – 8
SOFA-E: 9/9/0/18/4/IC95% 8 – 10
mSOFA-I: 7/7/0/14/3/IC95% 6- 7
mSOFA-E: 7/8/0/15/4/IC95% 6 – 8
Below we have respectively the values obtained for mean, median, range, standard deviation, confidence interval for patients with SENC:
GCS –I: in internation: 13/14/6/15/3/IC95% 11 – 15
GCS-E - in diagnostic: 8/8/3/14/3/IC95% 6 – 11
SOFA-I - in internation: 7/7/2/12/3/IC95% 5- 9
SOFA-E- in diagnosis: 10/9/3/5/15/IC95% 7- 11
mSOFA-I- in internation: 6/6/2/11/3/IC95% 4 – 8
mSOFA- E- in diagnosis: 7/7/2/12/3/IC95% 5–9
It was considered statistically significant variation between the ECG of hospitalization and at the time of diagnosis, with SENC with $p = 0.0015$; I.C. 95% = 2.08 to 7.55.

CONCLUSION. Age > 65 years, scores on the GCS, SOFA, SOFAm ratify the high incidence of deaths in the population with SENC, as there are already reports in the scientific literature. The presence of sepsis in 54.5% of cases of patients with SENC may also justify the high incidence of óbitos.Use of the hidantal in 54.5% of cases does not seem to have prevented the emergence of SENC, which has already found in the scientific literature as of usual occurrence for the characteristics of the study population.

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Poster Sessions
Resource management: 0268–0281

0268

PREDICTING DIFFERENT LEVELS OF CARE IN A HIGH-VOLUME POSTOPERATIVE CARDIAC SURGERY INTENSIVE CARE UNIT

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INTRODUCTION. Classification of care on an Intensive Care Unit (ICU) has become an important issue for healthcare management and policy on the ICU. Defining different levels of complexity of care might lead to a more effective use of nursing resources i.e. the number of nurses and also the level of nursing skill requirements.

METHODS. In a high-volume tertiary University-affiliated hospital in the Netherlands, criteria (Table 1) were defined to differentiate the level of care for an ICU and Medium Care (MC) Unit for patients undergoing cardiac surgery in 2006 and 2007. Time of reaching MC-level after admission on the post operative ICU was assessed for all patients. To measure the relationship between reaching MC-level and patient characteristics, the peri-operative Standard Euroscore (EUs) was used (N = 2054). The patients were divided in three groups: Category 1 = EUs 0–3 (N = 663), Category 2 = EUs 4–6 (N = 646), Category 3 = EUs > 6 (N = 745).

RESULTS. Of all patients undergoing cardiac surgery, 54% reached MC-level within 8 hours after admission on the ICU (Fig. 1). The Euroscore appeared to be an independent predictor for postoperative hours of IC-level. In the groups with EUs 0–3 and EUs 4–6, respectively 70% and 56% of the patients reached MC-level within 8 hours. In the group with EUs > 6, only 37,5% of the patients reached MC-level within 8 hours.

TABLE 1 MC CRITERIA

Breathing:	Detubated patient, saturation > 92%
Hemodynamics:	MAP > 65 mmHg No signs of myocardial ischemia Minor inotropic support Stable cardiac output
Temperature:	≥ 36°C (rectal T)
Drain production:	< 1 ml/h/kg
Urine production:	> 0,5 ml/h/kg
Neurological:	Ramsey 2–3

CONCLUSION. The level and hours of care on a postoperative Cardiac Surgery Intensive Care Unit can be predicted using the Euroscore. This may provide a useful tool for planning patients on the ICU and the according requirements for the level of the nursing staff.

0269

COMPARISON OF THE ALLOCATION OF INTENSIVE CARE IN ENGLAND AND THE UNITED STATES

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INTRODUCTION. Intensive care is a limited and expensive health care resource. Yet, little is known about the comparative availability and use of intensive care between countries. We compared intensive care use between England and the United States (US), hypothesizing that England, with lower per capita spending on healthcare, uses less intensive care across all patient groups compared with the United States (US).

METHODS. Retrospective analysis of Hospital Episode Statistics (HES) data for England, and state discharge data for seven US states in 2001. We calculated age-specific hospitalization rates, with and without intensive care, for all hospitalized patients, and for subgroups of patients who had specific medical diseases and surgical procedures.

RESULTS. Age-standardized annual hospitalization rates per 1,000 population were similar in both countries (110.5 in England, and 105.3 in the US). Only 2.5% of all hospital discharges in England received intensive care compared with 19.3% in the US. Among sub-groups analyzed, patients with neoplasms and cerebrovascular disease had five to ten times higher use of intensive care in the US compared with England, whereas for patients who had pneumonia, or who received hip replacements, intensive care use was only twice as high in the US compared with England (Fig. 1). For other specific surgical procedures, intensive care admission rates were very similar.

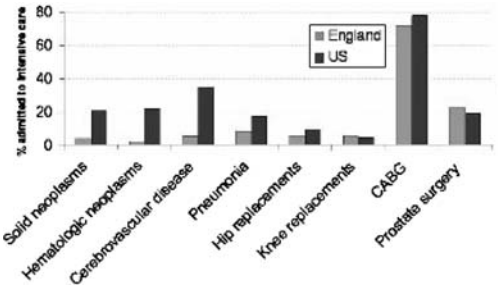

Figure 1. Use of Intensive care for sub-groups of patients hospitalized in England and the United States

CONCLUSION. The overall use of intensive care in the US is seven-fold greater than in England. This difference in use varies greatly depending on the individual medical diagnosis or surgical procedure.

0270

COMPARISON OF MEDICAL SERVICES BASED ON EXPERT OPINION, SURVEY AND ACTUAL MEASUREMENTS TO DETERMINE HUMAN RESOURCES

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INTRODUCTION. The number of human resources required at intensive care units can be determined through a performance analysis that methodically measures or estimates the quantity and duration of specific medical tasks.

METHODS. We have compared expert opinions (10 heads of ICUs), survey at 200 intensive care units in Germany and real time measurements at 3 different ICUs. The medical tasks done by the physicians were looked at individually and in classified groups. All tasks were categorized into basic and supplementary tasks.

RESULTS. For only 20% of all parameters the expert opinions closely match the results of the survey and of the actual measurements.

TABLE 1 BASIC TASKS

	Expert Opinion	Operative ICU	Internal ICU	Interdis. ICU	Survey
Patient Registration	52	38	45	42	52
Routine Examinations	44	31	36	59	25
Release/Transfer	37	25	31	32	30

Median total time in minutes

TABLE 2 SUPPLEMENTARY TASKS

	Expert Opinion	Operative ICU	Internal ICU	Interdis. ICU	Survey
CT Examination	25	45	61	42	30–60
Catheterplacement	40	36	30	33	
Blood Transfusion	5	6	6	4	
Reports (multiple pages)	30	21	31	25	30

Median total time in minutes

CONCLUSION. The process-variety at different wards may explain singular dissimilarities, such as the significantly higher measurements for routine procedures at the general hospital. A methodical process analysis by quantity and duration and/or the process-standardization at all ICUs would be necessary to enable exact comparisons.

In order to use collected data as a basis for determination of ICU-staff requirements one has to take into consideration the basic comparability of the underlying premises, most importantly processes by which the institutions organize their workflow.

0271

EVALUATION OF STAFF-PERCEIVED PATIENT OUTCOME AFTER ICU STAY - DO WE KNOW WHAT WE ARE DOING?

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INTRODUCTION. Patient outcome data are considered as cornerstones in the corporate planning of health care systems. In contrast, perception and attitudes of ICU staff towards these important issues have been poorly documented. The objective of the present investigation was to measure and compare critical care physicians' and nurses' perception of ICU-patient outcome within the year 2007.

METHODS. Cross-sectional surveys. SETTING: A nine bed medical intensive care unit in a tertiary teaching hospital in Graz, Austria SUBJECTS: Physicians and nurses who worked in the intensive care unit in the year 2007.

RESULTS. 55 subjects (10 consultants, 18 residents and 27 nurses) responded to the survey. For the year 2007 the documented ICU mortality, in-hospital mortality and average length of ICU-stay for patients were 24%, 32% and 6 days, respectively. Whereas consultants accurately appraised ICU-mortality [%, mean ± sd (min-max) p-value)] 28 ± 12(6–50) $p = 0.36$, nurses 35 ± 20(7–74) $p < 0.01$ and residents 41 ± 19(12–80) $p < 0.001$ significantly overestimated it. In a uniform manner in-hospital mortality (consultants: 42 ± 14(8–58) $p = 0.61$), nurses: 52 ± 22(11–96) $p < 0.001$), residents: 54 ± 21(20–92) $p < 0.001$) and average length of stay (days/patient) (consultants: 8 ± 2(5–12) $p = 0.06$, nurses: 11 ± 4(2–18) $p < 0.001$, residents 10 ± 5(4–17) $p < 0.05$) were rated by the different staff members.

CONCLUSION. Residents and nurses have a pessimistic estimate of patient outcome, whilst consultants seem to have a more realistic appreciation. The dominant perception of patients, who require long time ICU care and have worse outcome, can possibly explain this finding among nurses and residents. Feedback regarding outcome data could help to overcome this pessimistic perception.

0272

FIRENZE-ASMARA KM 0: A COLLABORATION PROJECT IN A NATIONAL REFERRAL HOSPITAL IN ERITREA

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INTRODUCTION. International Cooperation projects in developing countries can be entrusted to non-governative organizations or based on an agreement between the local and the cooperating board. Our project is of the second type and was endorsed by the Tuscany Region and the Eritrean Health Ministry. Aim of the project was to improve the quality of nurse and medical care in the Area of Critical Care of the Orotta Hospital, in Asmara. The intervention was addressed to: 1)develop an effective triage system in the Emergency Department. 2) improve the safety in anesthetic procedures in the Operating Room. 3) improve the level of care and the management of an open model ICU. Aim of this study is to evaluate the effects of the intervention in the ICU.

METHODS. The Orotta ICU is a 9 bed facility, staffed with 15 nurses and 1 consulting physician. It is an open model ICU and patients are admitted depending on the caring physician.

From July 2006 to December 2007 nurses and physicians from the ICU of Careggi Hospital (Florence, Italy) stayed in Asmara for periods of 1 to 6 months. The ICU intervention consisted mainly in counseling and teaching activities. Improving the materials storage, revising medical equipment and teaching basics on how to operate were part of the intervention. Protocols of nurse care and updated medical treatment were introduced. A course for nurses was organized based on local detected educational requirements. It consisted of classes and practical training sessions. Data about ICU admissions, LOS, mortality and 28-days mortality were analyzed.

RESULTS. 501 patients admitted to Orotta ICU from August 2006 to December 2007 were included (Group 1). The comparison group (Group2) included 294 patients from June 2005 to July 2006. Results of our intervention are reported in Table 1.

TABLE 1 RESULTS OF INTERVENTION

	Group 1	Group 2	p
MEWS at ICU admission	5 ± 3	4 ± 1	0,000037
Beds rotation rate (bed*days/patients)	9	13	0,2
ICU mortality	36%	33%	0,42
ICU LOS (days)	8,3 ± 7	6,5 ± 5	0,0001
28 days mortality	6%	26%	0,0000002

CONCLUSION. Regardless the already existing intensive care facilities the delivered quality of care we have encountered was poor in comparison to the modern standards. Accordingly to our experience a cooperation project addressed to promote expertise in critical care and to optimize the available resources seems to improve the standards of care and affects outcome and resources utilization. A learning programme with bed-side training can increase motivation and knowledge in the ICU personnel. The major limitation to our project could be maintaining the achieved results over the time. A further collaboration aimed to educate local teachers could be a possible solution.

0273

AUDIT TO DETERMINE ALLIED HEALTH PROFESSIONALS UNMET NEED IN A CRITICAL CARE UNIT IN A CITY CENTRE TEACHING HOSPITAL

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INTRODUCTION. Allied Health Professionals (AHP's) play a varied and important role in the management of critically ill patients, both in the acute phase of illness and the rehabilitation phase (1,2). However, representation for each profession within critical care units in the UK varies greatly, with many only able to offer an ad hoc service due to lack of funding. Following an audit of AHP unmet need in critical care carried out by the Lancashire and South Cumbria Critical Care Network in 2006 (3), it was decided to perform a similar audit within a large city centre university teaching hospital to provide evidence to support bids for extra staffing within critical care.

METHODS. The initial audit by Lancashire and South Cumbria Critical Care Network (3) looked at the unmet need for 4 professions - dieticians, occupational therapy (OT), physiotherapy (PT) and speech and language therapy (SALT). It was decided not to include dieticians in this audit as their current role within critical care was funded.
At the time of audit PT was able to review every patient on a daily basis to assess their respiratory needs but rehabilitation depended upon on staffing levels and the day of the week as there was no rehabilitation service at weekends or bank holidays. OT was only able to assess patients with neurological conditions and SALT those patients most at risk of aspiration.
The audit was carried out over a 4 week period in October - November 2007. Senior staff members from the 3 professional groups decided upon criteria for patients they would treat within critical care if funding was available. Each patient was then assessed daily for their OT, PT and SALT needs.

RESULTS. Over the 4 week period there was a total of 326 possible patient contacts which equates to 90% of the total ICU capacity.
OT - Patient awake (70%), cognitive problems (18%), muscle weakness/decreased ROM (61%), difficulty with ADL's (68%)
PT - Suitable for active rehab (43%), rehab occured (31%), lack of PT staff (52%), patient refused/away from bed (17%)
SALT - Communication difficulties (60%), needs communication assessment (9%), problems with eating/cuff up (26%), patients with neurological conditions (25%)

CONCLUSION. This audit demonstrated a large unmet need for AHP's within critical care. The results obtained were similar to those by the Lancashire and South Cumbria Critical Care Network.

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0274

COMPETENCIES OF COBATRICE VERSUS SPANISH INTENSIVE CARE SOCIETY COMPETENCIES PROJECT

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INTRODUCTION. The European Society of Intensive Medicine (ESICM/COBATRICE), and Spanish Society of Intensive Care and Coronary Unit (SEMICYUC), are recommending a set of competencies needed for the care of critical patients. Our aim was to verify the similarities, differences and uncover areas between both societies recommendations.

METHODS. Qualitative study carried on by four experts in intensive care medicine and one in emergency medicine. Data sources were articles and competencies guides published by both societies. It was needed the positive vote of at least three experts to accept that a competency was similar in both projects.

RESULTS. The Spanish project is covering only this country, and it's expert group where from ICU and emergency services; the competencies propose have to levels, the first one is for emergency physicians and the second one for intensivists. The European project has been realized by a wider group of experts including citizens; 57 countries have participated and its target group was intensivits.

The Spanish project has 146 competencies divided in six categories, while the COBATRICE, has 102 competencies belonging to 12 categories; 64 competencies do not mach among both projects. (53 c. from SEMICYUC versus 11 c. from COBATRICE).

The SEMICYUC emphasyses competencies more than COBATRICE in coronary and neuro patients as well as in organ transplant and quality assurance, and less in safety patients and palliative care.

Neither European nor Spanish Societies of Intensive Medicine have developed competencies for geriatric patients, ICT, or self learning.

CONCLUSION. The competencies of SEMIUC, cover a wider and different range of competencies despite some weak points. The Spanish project search to assure the best treatment of critical patients inside or outside ICU.

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0275

OPERATION LIFE-SAVE 3000 LIVES CAMPAIGN IN DENMARK: RESULTS FROM A COMMUNITY HOSPITAL

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INTRODUCTION. In April 2007 Operation LIFE was launched as a nationwide campaign for quality and patient safety in Danish Hospitals (1). The goal is to save 3000 lives during an18 months' period, by implementing 6 initiatives: Medical Emergency Teams (MET), Medicine Balancing, Myocardial Infarction (MI) Bundle, Central Venous Line (CVL) Bundle, Ventilator Care (VC) Bundle and Sepsis Bundle. Our department implemented the following three bundles: MET, CVL and VC.

METHODS. The primary outcome is the Hospital Standardized Mortality Rate (HSMR). HSMR = 100 means that the expected deaths per observed deaths are 1. The baseline measurement of 105 took its point of departure in 2006 measurements/results. The second outcome measurement is the number of cardiac arrest per 1000 days of admission in hospital. For our department, the adherence to the different elements of each bundle was calculated every month.

RESULTS. During 2007 the HSMR decreased every trimester from 104, to 101 and finally reached 92.

Cardiac arrest per 1000 days of admission in hospital varied every month from 0.0, to 0.65, 0.65, and 0.65.

The number of MET calls per month was 6.

The adherence to the different elements of the CVL bundle began at 77% and peaked at 93% during the first 4 months, then decreased to 61%. For the VC bundle, it started at 30%, increased to 54% during the first month before decreasing to 27% during the second month. Afterwards a slow increase to 61% was observed. The adherence to the three bundles did not differ between our department and the other Danish departments.

CONCLUSION. The observed period of the HSMR changes was very short; its confidential intervals were large. Therefore the observed fall in HSMR was not conclusive. However, HSMR is a very powerful pedagogical tool in quality improvement. For the different bundles, the adherence to all the elements varied with time. It reminds us that all new initiatives are difficult to implement.

REFERENCE(S). 1. http://www.operationlife.dk.

0276

INTRAHOSPITAL TRANSFER OF CRITICAL PATIENTS

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INTRODUCTION. For different reasons, most critical patients need intrahospital transfer during their admission. Doctors and Hospital Staff involved, are responsible of assure the level of care and the appropriate way of transport according to the patient's condition. The technology available makes possible that the physician in charge continues with the treatment even when the patient is being transferred. But transport itself may deteriorate patient's condition, as much as interrupt the treatment the patient is receiving. This is one of the greatest risks when a patient is transferred, especially if doctors are not well trained. In Argentina, there's no regulation for this type of transfer.

METHODS. Observational study. There have been included all patients transferred by the Transfer Unit (TU) from 01-01-2007 to 31-01-2007. Patients came from: Emergency Room, Intermediate Care Unit (IMCU) -only when the doctor in charge request it- and Intensive Care Unit (ICU) to Computerized Tomography Scanner. Data is obtained from a database designed only for that purpose. There is a form to be filled by the doctor in charge of the transfer. It contains the following variables: name, age, origin, APACHE II score, TISS 28, procedure, diagnosis, reason for request, vital signs, complications, duration, drugs in use and respiratory support. The TU has a 24/7 availability, with a time of arrival to hospital no larger than 20 min. The algorithm is fulfilled according to the type of patient and the test to be done. Doctors are specialized in intensive care and trained in critical patient's transfer (by land, air and intrahospital) and they work as a team with orderlies, nurses and CT Scan Staff. Physicians evaluate the patient before transfer and make changes to prevent any risk.

RESULTS. During that period, 977 patients were transfer. Mean age 64 (± 19). From ER 505 (51,69%), from IMCU 56 (5,73%) and from ICU 416 (42,58%). APACHE II 15 (± 7) points. TISS 28 was 22 (± 8). Procedures: Brain 71,77% (5,9% TEC), abdominal 2,41%, chest 12,92%, chest and abdominal 1,7%, others 4,83%, multiple CT scan 6,87% (50% TEC). Diagnosis 75,94%, control 24,06%. Drugs: Sedatives and Opioids 61,5%, Central Nervous System Depressant 12,5%, others 10,3%, Sedatives 8%, Analgesics 5%, none 2,7%. Duration: < 30' 43,65%, 30–60' 49,60%, > 60' 6,75%. Complications: bronchial secretions 1,64%, agitation 0,82%, hemodynamic instability 0,72%, seizures 0,3%, rush 0,2%, tubes disconnection 0,2%, emesis 0,2%, desaturation 0,1%, hematemesis 0,1%, glottis edema 0,1%. Mask 56,04, Mechanical ventilator 20,45, Ambu Bag 18,4%, Ttube 5,11%.

CONCLUSION. The incidence of complications was very low. This is probably related with: highly trained staff, guidelines of treatment and prevention of risks. This fact allows a safe transport with continuity of treatment and care. Critical Care Transport is in our opinion a very important tool, which according to pragmatism, logistics and foresight of needs, fulfilles a significant role on critical patients care.

0277

IMPACT OF ICU MODEL ON OUTCOME OF SEVERE ACUTE PANCREATITIS

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INTRODUCTION. We present our experience on outcome of patients of severe acute pancreatitis (SAP) in a tertiary care centre based on open and closed model ICU care.

METHODS. Case records of consecutive patients with SAP admitted to Closed ICU from July 2002 to Nov 2007 were retrospectively reviewed and compared to SAP admitted in an Open ICU in the same hospital from 1999 to 2002. The patients were distributed into survivor(S) and non-survivor(NS) groups and the factors determining outcome were analyzed.

RESULTS. Age, sex, co morbid illnesses, elective or emergency admission, etiology of pancreatitis did not affect the outcome in both models of ICU. There was significant mortality reduction in closed unit ICU (60% vs 80%). The SOFA scores on admission were higher for both S and NS in the closed unit and yet the mortality was significantly less from the open unit. In the Open ICU nearly all patients who needed mechanical ventilation for > 7 days died as against closed ICU where survivors were ventilated for a median of 9 days (0–25). The LOS in the closed unit is not significant between S and NS as against being significant in the open unit.

TABLE 1 COMPARITIVE BETWEN TWO ICU MODELS

	Open ICU 1991–2000	Closed ICU 2002–2007	Significance
No of patients	44	50	
Survivors(S)	09 (20.45%)	20(40%)	$P < 0.05$
Nonsurvivors(NS)	35 (79.54%)	30(60%)	$P < 0.05$
SOFA- S	2- 5	4- 10	$P < 0.05$
SOFA- NS	2- 10	5- 17	$P < 0.05$
Length of Stay- S	2- 14 days	4- 112 days	$P < 0.05$
Length of Stay- NS	2- 47 days	1- 85 days	$P < 0.05$

CONCLUSION. Care in a closed model ICU is associated with a significant reduction in in-hospital mortality. This effect was also seen at our centre with cases of SAP. Intensivist led ICU leads to timely utilization of resources with increased and timely usage of standardized protocols for critically ill patients.

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0278

INTENSIVE CARE AIR TRANSFERS IN SCOTLAND

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INTRODUCTION. Intensive care transfers are usually done for higher specialist care or repatriation. In addition to risks of transfer, specific risks involved in air transfer of critically ill patients are addressed.

METHODS. Retrospective study of all the critical care air transfers by the Shock Team in Scotland over a period of 1 year.

RESULTS. Data of all the inter-ICU patient transfers by the Shock Team in western Scotland for 1 year (between 1/4/2007 to 31/3/2008) was studied. Out of a total 504 transfers, 26 were done by air, either by fixed wing aircraft or by helicopters.

TABLE 1

Mean age 54.5 years	Systems involved	Duration of transfer
Sex, **male**.18, **female**. 8	**Cardiac**. 7%	Mean duration of transfer including preparation. 405 min
Time of transfer	**Respiratory** 30%	
8am to 1800 hrs. 55%	**Nervous system.** 15%	Mean air transit. 74 min.
1800 hrs to 8am. 45%	**Multiple**. 48%	

TABLE 2

Ventilator	Support	Cardiac Support (inotropes)
IPPV. 85%	FiO2 required	Nor. Adrenaline. 46%
NIV. 7.5%	< 0.5. 15%	Combined Nor.ad with dobutamine or adrenaline. 12%
Nil. 7.5%	0.5 – 0.8. 70%	Nil. 42%
	> 0.8. 15%	

CONCLUSION. Complications requiring intervension were, arrythmias, low BP, desaturations, high airway pressures and equipment malfunction.

Outcome:
Grade of doctor involved. Trainee registrar.
Deterioration due to transfer. Nil.
Number refused transfer. Nil
Survival (discharged alive out of ITU). 100%.
Air transfer of critically ill patients is a high risk undertaking. In the 35 years history of the Shock Team of western Scotland, it has constantly audited and reviewed its performance not only, strictly adhering to national guidelines in monitoring and management but also showing initiative and adaptability to rapidly changing situations be it clinical or non clinical in the difficult weather systems and terrain of North west Scotland. Air transfer, when done by specially trained and experienced staff is safe and no major untoward incidents occurred during the audit year.
Crew: Anaesthetist (grade, Registrar), ITU Nurse with a minimum of 4 years experience in intensive care. A dedicated ambulance equipped to provide level 1 intensive care.

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0279

ADMISSIONS TO INTENSIVE CARE UNIT FROM LONDON GATWICK AIRPORT

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INTRODUCTION. Globally over one billion people fly each year1. London Gatwick Airport is the second busiest airport in the UK handling over 35 million passengers per year and it is increasing. East Surrey Hospital (ESH) is the nearest receiving hospital with ICU facilities. Though the risk of air travel is low, increasingly high risk patients are travelling especially long haul flights which increases the risk of complications2. Aim: To look into the epidemiology of admissions to the ICU from London Gatwick Airport (LGW).

METHODS. Data extracted from Ward Watcher at ESH ICU. All admissions from Gatwick airport from 1993 to 2007 were included in the analysis. These patients may have been returning passengers, travellers or visitors to the airport.

RESULTS. 1.3% of all admissions in our ICU were from LGW. There were total of 72 admissions over 15 year period. Majority of them were medical patients (88%) and there was only one pediatric patient with status epilepticus. The mean ICU mortality was 29% and hospital mortality was 37%. 5 patients had clinical presentation consistent with pulmonary embolism leading to cardiac arrest. 28% of the patients were over 70 years of age. Discussion: There is gradual increase in the trend of admissions to ICU due to expansion of Gatwick airport and merger of Crawley and ESH ICU. Myocardial infarction followed by respiratory problems leading to cardiac arrest is the most common reason for ICU admission. The mean ICU mortality of 29% is higher than our mean ICU mortality for all patients (22%), possibly because of large number of post cardiac arrest admissions.Post cardiac arrest patients admitted from airport had better survival rate than similar admissions from non airport areas. Contrary to common belief, pulmonary embolism does not seem to be a very common problem (7%) Many of these patients were outside our catchment area which results in difficulties in repatriation.

In a recent study3, 0.12% of travelers attended travel clinic at Bahrain airport. 2.1% of these patients needed referral to secondary care and there were two deaths.

TABLE 1 RESULTS

Total number of patients	72
Males	49(67%)
Females	23(33%)
Post cardiac arrest	25
IHD leading to cardiac arrest	13/25
Pulmonary embolism	5/25
Sepsis, Pneumothorax, Unsure	4/25, 1/25, 2/25

CONCLUSION. The number of ICU admissions from LGW is increasing, majority of them with acute medical problems especially cardio respiratory events. 35% of those ICU admissions were following cardiac arrest.Higher (29%) mortality than our mean ICU mortality (22%) due to high proportion of admissions due to cardiac arrest.

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0280

MONITORING OF CONSUMPTION AND EXPENSES IN AN ICU ACCORDING TO A LOCAL GUIDELINES POLICY

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INTRODUCTION. Clinical practitioners have a double challenge: to give the best quality of care and to reduce costs. Accordingly, a strong element is the rationalization of medical prescription of drugs and for 6 years, the medical team of an ICU has payed attention to it. The aim of the study is double: to evaluate the impact of 2 methods (use of protocols and team sensitising) on medical prescription and to appreciate the link between quality of prescription and costs trend.

METHODS. continuous evaluation, 2001–2007, 2001 as reference, regarding 1/quinolon: included in a written guideline, whose effectiveness is equal for oral (OR) and parenteral (PR) routes, parenteral form being much more expensive. The recommendation is oral administration if possible 2/gastric bleeding prevention: a written protocol recommends sucralfate at first, oral proton pomp inhibitor (PPI) in 2nd line, intravenous PPI in third line. Since 2002, a new PPI is available for gastric tube administration and free for the hospital 3/paracetamol: sensitization during daily team meetings to management of pain by using paracetamol, to oral administration efficacy and costs, and a line was added on the monitoring and prescription sign, without written protocol.

RESULTS. Many factors may influence prescriptions. A consensual written protocol makes medical prescriptions evolve (1). Impact of oral sensitizing and use of a graphic inciting tool are as strong (3). Introduction of news drugs by the industry has a significant effect on practitionners' behaviour (2).Pharmaceutical industry prices policy is the overriding factor for costs evolution. A virtuous behaviour can generate financial savings (1) or extra costs (3). A diverting behaviour does not imply obligatorily a cost increase(2).

TABLE 1 QUINOLON CONSUMPTION (UNITS)/COSTS (EUROS)

years	2001	2002	2003	2004	2005	2006	2007
Global dose unit (GDU)	1173/ 12587	1321/ 12211	1435/ 13330	1321/ 16539	625/ 5753	1147/ 9041	1383/ 11849
OR	156/181	517/599	694/806	497/682	309/354	650/850	684/711
PR	1017/ 12406	804/ 11612	741/ 12524	824/ 15857	316/ 5399	497/ 8191	699/ 11138

TABLE 2 GBP CONSUMPTION (DOSE UNIT)/COSTS (EUROS)

years	2001	2002	2003	2004	2005	2006	2007
GDU	3310/ 3519	3039/ 2107	3210/ 1959	3197/ 1707	1221/ 784	2395/ 1756	2966/ 490
Sucrafalte	2407/169	1724/171	1160/203	1650/65	170/11	19/1	90/6
PPI OR	389/0	980/0	1745/0	1078/0	780/0	1661/0	1983/0
PPI PR	514/3350	335/1936	305/1756	469/1642	271/773	715/1754	893/484

CONCLUSION. Prescription quality should be evaluated by measuring both consumptions and costs, associated to professional practices evaluation regarding to medical guidelines.

0281

DETERMINING HUMAN RESOURCES FOR INTENSIVE CARE UNITS

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INTRODUCTION. This paper aims at developing a method to determine the required number of human resources to run intensive care units based on service minutes. The idea for the project came about from the complex staffing situation of today. Managing a clinic must do justice to economics while at the same time keeping and improving the quality of medical care.

METHODS. The analytical approach of the study brought with it significant documentation efforts by measuring and recording specific previously defined medical tasks with a stopwatch. The focus was entirely restricted to essential tasks and did not cover every task done by the physicians. To determine the net amount of work time, only actual time physicians spent on a given task was recorded; interruptions such as phone calls or emergency calls were ignored. The data were collected at several intensive care units at a university clinic and at a general hospital offering non-specialized health care. Only tasks falling into the category of basic tasks that could be measured by time were recorded. A basic task per definition is a standard medical procedure given to every patient at an intensive care unit, e.g. daily routine examinations or patient registration. Supplementary tasks are more elaborate tasks that not every patient at an intensive care unit receives. They vary with patient condition, severity of illness and diagnostic method used.

RESULTS. Looking at the frequency with which these medical tasks are done one can extrapolate the annual net amount of work time.

Our results of measuring 22 basic standard tasks such as patient registration (e.g. university hospital: 38,43 min, general hospital: 42,36 min) and 16 supplementary tasks, like CT-examinations (e.g. university hospital: 44,56 min, general hospital: 42,15 min), catheter placement or blood transfusions showed partially similar results and partially different results in the university hospital and the general hospital.

CONCLUSION. This is mainly due to different workflows and procedures and due to the grade of teaching in different units.
For each unit, the measured times and frequencies of medicals tasks can be used to develop a model for calculating necessary human resources in intensive care units.

0283

RETROSPECTIVE EVALUATION OF A DECISION SUPPORT SYSTEM FOR ADVISING ON VENTILATOR SETTINGS IN PATIENTS WITH ARDS/ALI

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INTRODUCTION. For intensive care patients with acute lung injury (ALI) or acute respiratory distress syndrome (ARDS) mechanical ventilation provides life support but may potentially aggravate lung injury. During the last decade studies have shown that protective ventilation with low tidal volumes reduces mortality in these patients [1]. Recently, a decision support system (DSS) [2] has been built to provide advice on three mechanical ventilator settings (FiO2, Vt, and f). The DSS is based on physiological models, and as such can be tuned to the individual patient's gas exchange, lung mechanics, circulatory and metabolic status. This study presents evaluation of this DSS, comparing the advice provided by the DSS with ARDSNET guidelines [1].

METHODS. 18 ALI/ARDS patient cases with measurement of ventilation, arterial and mixed venous blood gases, and cardiac output were included in this retrospective evaluation. These data were used to tune the physiological models [2] of the DSS which then generated suggestions for FiO2, Vt and f, the values of which being compared to the ARDSNET guidelines for mechanical ventilation.

RESULTS. The system suggested values of FiO2 within the range 0.33 – 0.61, giving simulated arterial SaO2 in the ARDSNET range 88–95% in 13 of the 18 cases. The five remaining had simulated SaO2 > 95% which was possible with FiO2 levels no higher than 0.45. Suggested frequency was in the range 15–30/min, within the maximum of 35/min of the ARDSNET. In 16 of the 18 cases suggested Vt was lower than 8 ml/kg, with 9 of these in the range 6–8 ml/kg. One of the remaining patients had a suggested Vt of 8.4 ml/kg. The remaining had a suggested Vt of 9.6 ml/kg, however this patient had a lung compliance of 62 ml/cmH_2O, giving a simulated PIP of only 24 cmH_2O. These suggestions resulted in: pH values within the ARDSNET range 7.30-7.45, with the highest simulated pH being 7.41; and PIP values $\leq$ 30 cmH_2O in 14 of the 18 cases, the remaining 4 ($\leq$ 36 cmH_2O) being explained either by high PEEP ($\geq$ 14 cmH20, 3 cases), or very low compliance (= 19 ml/cmH_2O, 1 case).

CONCLUSION. The computer system suggested ventilator settings which in the vast majority of cases were consistent with ARDSNET guidelines. Where different, these differences could be explained by the individual patient state.

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0282

INFLUENCE OF BIS®-MONITORED TITRATION OF SEDATIVES IN SEDATED AND PARALYZED CRITICALLY ILL VENTILATED PATIENTS

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INTRODUCTION. In sedated and ventilated patients continuously treated with neuromuscular blockers (NMB) it is recommended to use objective sedation monitoring methods to avoid under- and oversedation. To this end, since the year 2003, we employ bispectral index (BIS®) monitoring. The aim of this study is to analyze the influence of this monitorization in the sedative doses administered.

METHODS. Descriptive, observational, and comparative study between two consecutive series of sedated and paralyzed ventilated patients for acute respiratory insufficiency. One, 44 patients, ongoing where we employ BIS-monitored titration of sedatives and the other one, 36 patients, is a historical series without this kind of monitoring. In both, we administered analgesics and sedatives to obtain a deep level of sedation (5 to 6 Ramsay scale); furthermore in BIS-monitored patients, we titrated sedative doses to obtain BIS values between 40 and 60. We analyze: demographic, clinical and outcome data; daily sedative doses administered on the first day and the average daily dose during neuromuscular blockade treatment. Statistical method: Data are means $\pm$ standard deviations and were compared by unpaired t-test or X2 as appropriate; significance assumed for $P < 0.05$.

RESULTS. The monitored patients were older (48 $\pm$ 17 vs 37 $\pm$ 18 years of age, $p < 0.05$), more were male (88% vs 58%, $p < 0.05$), more seriously injured (Apache II 27 $\pm$ 8 vs 23 $\pm$ 6, $p < 0.05$) and had less sedative tolerance phenomenon before NMB treatment (5% vs 36%, $p < 0.05$). There were no differences between ventilation cause (88% for ARDS, 15% for pulmonary fibrosis and 5% for asthma), sedatives used (midazolam in 95% of the cases), length of NMB treatment (109 $\pm$ 96 vs 133 $\pm$ 133 hours) and incidence of hepatic or renal insufficiency (31% and 59% vs 39% and 33%, respectively). The monitorized patients received significantly lower midazolam doses either on the first day (166 $\pm$ 114 vs 435 $\pm$ 295 mg, $p < 0.0001$) or as the average daily dose during NMB treatment (159 $\pm$ 126 vs 455 $\pm$ 286 mg, $p < 0.0001$). Excluding patients with previous tolerance phenomenon, this statistical difference persists, on the first day (151 $\pm$ 95 vs 253 $\pm$ 80 mg, $p < 0.0001$) and in the average dose (144 $\pm$ 111 vs 287 $\pm$ 112 mg, $p < 0.0001$). In 27% of the monitored patients sedatives were suspended at some time during the NMB period (12% for the entire period, and 10% during more than 50% of the period). We detected tolerance to midazolam in 12.5% of the monitored patients.

CONCLUSION. BIS monitoring permits us to reduce the required sedative doses by nearly 50% and to detect and correct over-sedation (27% of the paralyzed patients) or under-sedation (12.5% of the patients).

0284

INFLUENCE OF PRONE POSITIONING ON MEASUREMENT OF EXTRAVASCULAR LUNG WATER BY TRANSPULMONARY THERMODILUTION

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INTRODUCTION. The transpulmonary thermodilution technique enables measurement of extravascular lung water index (EVLWI), which has been found in experimental and clinical studies to agree well with the reference method (transpulmonary double indicator technique) [1,2]. In this study, we analyzed the influence of prone positioning on the reliability of measurement of EVLWI by the transpulmonary thermodilution technique.

METHODS. 10 mechanically ventilated patients (7♂, 3♀, age 20–64 years) with chest trauma or ARDS undergoing prone positioning and hemodynamic monitoring with the transpulmonary thermodilution technique (PiCCO®, Pulsion Medical Systems AG). All patients received a thermistor catheter (A. femoralis) which was connected to a monitor (PiCCO®plus, Version 7.0 nonUS). Measurement of cardiac output, intrathoracic blood volume (ITBV) and EVLWI were obtained by bolus injections of 15 ml NaCl (< 8°C) before and 10 min after modified prone positioning (135°). No changes in ventilator settings or fluid management were made.

RESULTS. EVLWI was 5.0–16.0 and 5.0–17.0 ml/kg ($r = 0.92$, mean difference 0.17 $\pm$ 1.2 ml/kg). Regression analysis for ITBV between both time points revealed $r = 0.97$.

CONCLUSION. Measurement of extravascular lung water by the transpulmonary thermodilution technique is not influenced by prone positioning.

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0285

ICU ALARMS - HOW MANY DO WE NEED?

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INTRODUCTION. Monitoring of physiological parameters in critically ill patients is currently performed by threshold alarm systems with high sensitivity, but low specificity. As a consequence, a multitude of alarms with potential negative impact on the quality of care are generated. We have previously established an experimental setting for generating a database of physiological data and clinical alarm annotations, and report the current rate of alarms and their clinical validity in a 12 bed medical ICU.

METHODS. Data were collected between January 2006 and May 2007. Patients with invasive cardiovascular monitoring were included in the study, and physiologic data at one-second intervals, monitor alarms and -settings were extracted from the surveillance network. Video recordings were clinically annotated with respect of alarm relevance and technical validity by an experienced physician.

RESULTS. During 982 hours of observation 5934 alarms were annotated, corresponding to 6 alarms per hour. About 40% of all alarms did not correctly describe the patient condition and were classified as technically false, 68% of those were caused by manipulation. Only 885 (15%) of all alarms were considered alarm relevant. Most of the generated alarms were related to arterial blood pressure (2601;44%), followed by oxygen saturation (1517;26%) and heart rate alarms (789;13%). Most of these alarms were threshold alarms, but 826 (14%) were graded as technical requiring user interaction to solve signal problems.

CONCLUSION. This study used a new approach of off-line, video-based physician annotations, showing that even with modern monitoring systems most alarms are not clinically relevant. As the majority of alarms are simple threshold alarms, statistical methods may be suitable to help reduce the number of false positive alarms. Our study is also intended to develop a reference database of annotated monitoring alarms for further application to alarm algorithm research.

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0286

PERCUTANEOUS OXYGEN SATUROMETRY MEASUREMENT OF PERFUSION INDEX (PI) AND HIS VARIABILITY(VPI) AS PREDICTIVE FACTORS OF HAEMODYNAMIC INSTABILITY IN PAEDIATRIC CRITICAL CARE PATIENTS

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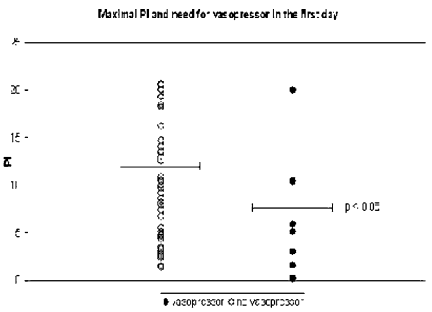
INTRODUCTION. Hemoglobin percutaneous oxygen saturometry measurement can be coupled with evaluation of local perfusion (Perfusion index = PI) and his respiratory variation (Variability of Perfusion index = VPI). The interest of these parameters is to be established.

METHODS. We study prospectively during 90 days, the PI (minimal, maximal and mild) and VPI (minimal, maximal and mild) values during the first hour after admission in a level 3 paediatric critical care unit. These values are given by RADICAL 7® monitor (Massimo) coupled with LNCS sensor (Massimo) applied on the hand or the foot.Demographic and clinical data (age, weight, sex, pathology, therapeutics, cardiac frequency, arterial blood pressure, SpO2) and therapeutics during the first 24 hours are noted. Means are expressed +/− 1SD. Student t test is used for statistics and p value is 0.05.

RESULTS. 74 subjects are included in the study. The mean age is 4.9 +/−17.8 years. 59% are male and 45% are mechanically ventiled. 30% need fluid therapy and 12% need vasopressor within the first 24 hours.
The mean values are 0.39, 11.35, 1.63 for PI (min, max and mean) and 15.8, 38.3, 25.1 for VPI (min, max, mean).
The PI max is significantly lower for subjects who need vasopressor (7.7 +/−7.7 vs 11.9 +/− 7.2; p = 0.048).
PI and/or VPI are not predictive for need of fluid therapy or mechanical ventilation.



CONCLUSION. Patient PI max value at admission in paediatric critical care unit may be an haemodynamic instability witness. Others studies are needed to determine the place of these parameters in hemodynamic evaluation.

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0287

HEMODYNAMIC MONITORING OF PATIENTS IN SHOCK: COMPARISON BETWEEN TRANSTHORACIC ECHOCARDIOGRAPHY AND THE TRANSPULMONARY THERMODILUTION TECHNIQUE

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INTRODUCTION. Various methods for hemodynamic monitoring of patients in shock are used today. There is, however, insuficient data on head to head comparison between these methods and their relative advantages/disadvantages have been the subject of ongoing controversy.

METHODS. Prospective study, comparing hemodynamic monitoring with transthoracic echocardiography and with transpulmonary thermodilution technique. All patients with shock admitted on our intensive care unit (ICU) were included. Patients were evaluated less than 30 minutes appart by both methods. A qualitative evaluation was made by each method on the cardiogenic, hypovolemic and vasogenic component of shock. A quantitative evaluation was also made by each method, on the stroke volume (SV). Operators of each method were blinded to the results of the evaluation made by the other method.

RESULTS. From June 2007 to March 2008, 145 patients were admitted to our ICU. In 45 (31%) a diagnosis of shock was made. Invasive hemodynamic monitoring was performed on 30 patients (67% of the shock patients), and 25 were included in the study (56% of the shock patients). These 25 patients had a mean age of 68 years (43 to 85) and 60% were male.

The two methods agreed on the evaluation of the cardiogenic component of shock in 72%, on the hypovolemic component in 92% and on the vasogenic component in 68%. The two methods agreed on all the components of shock in 48% of patients. On the evaluation of SV, the mean difference between the two methods was of 21.4 ml (0 to 119 ml).

CONCLUSION. In this study, the two methods agreed on the evaluation of the hypovolemic component of shock in 92% of patients, but with much less impressive results on the cardiogenic and vasogenic components of shock. There was a significant difference on the SV measured by the two methods. Transthoracic echocardiography, although useful in the monitoring of hypovolemia and the initial evaluation of shocked patients, needs more studies to better define its reliability on the global evaluation of these patients.

0288

ACTIVE CIRCULATION BLOOD VOLUME (ACV) AS AN INDICATOR OF CARDIAC AFTERLOAD IN HEMATOLOGY PATIENTS

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INTRODUCTION. ACV is defined as the volume of blood in which the isotonic saline is mixed during the first minute after its intravenous injection. This volume consists of two parts: the cardiopulmonary part (CBV, central blood volume) and the peripheral systemic part (ASV, active systemic volume). Using the novel ultrasound dilution (UD) method (COstatus, Transonic Systems Inc. Ithaca, NY, USA) that measures the change in blood concentration upon injecting isotonic saline [1], these volumes can be routinely measured in the critically ill patients (pts). The aim of this study is to evaluate the clinical utility of ACV and ASV.

METHODS. Eight pts with hematological malignancies (age 34–64 years) were included in this study. Indications for invasive monitoring were: sepsis and acute lung injury -3, ARDS - 1, septic shock -2, acute congestive heart failure -1 and intracranial hemorrhage -1. Three 30 ml injections of 0.9% saline were performed to obtain the UD measurements [1]: cardiac index (CI); central blood volume index (CBVI: CBV normalized to body weight); total end diastolic volume index (TEDVI); ACVI (ACV normalized to body weight) and active systemic volume index (ASVI = ACVI-CBVI). Systemic vascular resistance index (SVRI), stroke volume index (SVI) and mean arterial pressure (MAP) were also recorded for the study.

RESULTS. A total of 53 pairs of averaged data were used for comparison. There was a significant correlation between ACVI and ASVI with CI (positive) and with SVRI (negative), while no correlation was observed with the preload parameters CBVI, TEDVI and contractility parameter SVI. This suggests that ACVI and ASVI could be used as indicators of afterload. The slightly higher correlation of ASVI with SVRI, MAP and CI reflects the influence of the peripheral systemic part of ACV on afterload. The pts with hematological malignancies had very low values of hemoglobin (4.6 – 8.5 g/dl) thus these pts had high CI (mean 5.52 L/min/m2; range 3.1 – 9.2 L/min/m2). This hyperdynamic status associated with low absolute SVR values (mean 694 dynes/sec/cm5; range 350–1695 dynes/sec/cm5) was observed in these pts. This in turn could explain the relatively high ACVI (mean 56 ml/kg; range 39–79 ml/kg) which is almost close to the expected total blood volume of 75 ml/kg in adults.

TABLE 1 CORRELATION (R) BETWEEN ACVI & ASVI WITH HEMODYNAMIC PARAMETERS

Parameter	CI	CBVI	SVI	TEDVI	SVRI	MAP
ACVI	0.588	0.152	0.210	0.054	−0.52	−0.25
ASVI	0.686	0.361	0.01	0.045	−0.663	−0.45

CONCLUSION. Preliminary data shows that ACVI and especially ASVI that represents the peripheral systemic part of ACVI, correlate with systemic vascular resistance - suggesting that these parameters may be valuable indicators of afterload. Further studies that include volume loading and drug titrations to alter peripheral circulation will be necessary to establish clinic utility of these volumes.

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0289

PULMONARY ARTERY CATHETER IS ASSOCIATED TO HIGH MORTALITY INDEPENDENT TO SEVERYTY AT ADMITTION

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INTRODUCTION. Since their introduction into clinical practice in 1970, balloon tipped, flow directed pulmonary artery (PA) catheter (PAC) have found widespread use in the clinical management of critically ill patients. Both the safety and efficacy of these catheters have been brought into question, despite these, PA still on clinical practice every day (1). Aim: Just to evaluate mortality in critically ill patients under PAC measurements during ICU management.

METHODS. We did a Prospective observational research study from March 2007 to March 2008. Eight hundred and twenty one patients admitted to the ICU with variety of diseases were selected to be analyzed with or without PAC. Sstatistical analysis: Data (mean and standard deviation, ± 2) were performed and chi2 were used to compare mortality vs PAC, and t student between assessments were used to compare differences between groups with or without PAC. The statistical analysis was carried out with the SPSS 10 package, and $p < 0.05$ was significant.

RESULTS. Differences between patients with or without PAC vs mortality were the variable that was studied. Of 821 patients, 69 (8,5%) were with PAC and 752 (91,5%) without PAC. Their average age between the two groups was 63.2 ± 16 y and 63.8 ± 18 y with or without PAC respectively. Also, APACHE II score between the two groups was 15.1 ± 6.6 and 20.7 ± 15,3 with or without PAC respectively ($p = 0.011$). ARDS was significantly more common among the patients without PAC. The common diagnosis at admission was septic shock, hypovolemic shock, trauma and postoperative patients. Statistics analysis showed significant differences between mortality and PAC, taking into account that patients without PAC were APACHE score higher than the others.

TABLE 1

Variable	Death Yes	Death Not	p = 0.0005 Total
With PAC.	42	27	69
Without PAC	206	546	752
total	248	573	821

CONCLUSION. These data suggest that independent to the APACHE II score severity and ARDS, patients under measurements with PAC during the hospitalization at the ICU are associated to ore mortality that the patients without PAC. We recommend take into account literature recommendation from developed countries about indications to use PAC at the ICUs.

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0290

PULMONARY CAPILLARY WEDGE PRESSURE (PCWP) VALUE IS AFFECTED BY BODY POSITION CHANGES ON PULMONARY CATHETER MEASUREMENTS

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INTRODUCTION. Since their introduction into clinical practice in 1970, balloon tipped, flow directed pulmonary artery (PA) catheter have found widespread use in the clinical management of critically ill patients. Both the safety and efficacy of these catheters have been brought into question, despite these, PA still on clinical practice every day. Pcwp measurements according to body position changes between fowler position and recumbent position have not been completely studied (1). Aim: Pcwp measurement on different kind of positions after standardization of the procedure.

METHODS. We did a Prospective observational research study from 2006 to 2008. Seventy one measurements of pcwp on thirty five critically ill patients with variety of diseases were selected to be monitorized with PA. Research sequence of measurements were as follows: First assay at fowler position (always at 30 degree), second assay after changing the bed position to recumbent and third assay after 30 minutes at recumbent position. Transducers were always at right atrium level in order to reduce mistakes. Statistical analysis: Data (mean and standard deviation, ± 2) were performed and pared t student between assessments were used to compare differences of pcwp affected by position changes. The statistical analysis was carried out with the SPSS 10 package, and $p < 0.05$ was significant.

RESULTS. Differences between pcwp assessments were the variable that was studied. Of 35 patients, 18 (51.4%) were male and 17 (48.57%) were female. Their average age was 56.8 ± 16 y, APACHE II score 16,3 ± 7.94 and SOFA score at the moment of measurements was 8,62 ± 3,94. The common diagnosis at admission was septic shock, hypovolemic shock, trauma and postoperative patients. Data between fowler and at once change position was not affected by mechanical ventilation pressure value. Statistics analysis showed significant differences between pcwp assay at fowler position and others two positions, but not between pcwp measured at recumbent position (Table 1).

TABLE 1

Variable	Pcwp Before	Pcwp After	p
Fowler vs Recumbent	16,1 ± 5	17,8 ± 5	0.001
Fowler vs Recumbent 30 min	15,9 ± 5,1	18,1 ± 4,9	0,005
Recumbent vs Recumbent 30 mins	17,7 ± 5,1	18,1 ± 4,9	0,58

CONCLUSION. Pcwp measurements at fowler position could show wrong data at the critically ill patients. We recommend every assay of pcwp for patients at the ICU should be at recumbent position and therapeutic orders should be based on that information and not at fowler position. Beside of, nurse should not hold 30 mints to get information.

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0291

REPRODUCIBILITY OF REGIONAL VENTILATION DETERMINED BY ELECTRICAL IMPEDANCE TOMOGRAPHY DURING SPONTANEOUS TIDAL BREATHING AND A VENTILATORY MANEUVER

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INTRODUCTION. The aim of our study was to determine the reproducibility of electrical impedance tomography (EIT) measurements in assessing regional lung ventilation during spontaneous tidal breathing and a deep expiratory maneuver in healthy adult human subjects. Good reproducibility of EIT data is the prerequisite for the future application of this imaging modality in a clinical setting.

METHODS. Ten subjects, eight male and two female (30.1 ± 2.6 years, mean age ± SD) were studied in three body positions: sitting, supine and right lateral on two separate days, at least 48 hours apart. EIT measurements were performed using the Goe-MF II EIT device (Cardinal Health, Höchberg, Germany) in two transverse chest planes. EIT and spirometric data were acquired during spontaneous tidal breathing and deep expiratory, i.e. vital capacity maneuvers. The EIT scan rate was 13 scans/s, the scan period 60 s. The distribution of regional tidal volumes and vital capacities was determined from the EIT data in four quadrants of the studied chest cross-sections in each transverse plane and posture. Bland-Altman method was applied for statistical analysis.

RESULTS. The fractional ventilation and vital capacity determined by EIT in the four chest quadrants were highly reproducible. No significant differences between the measurements were found in either posture or transverse chest plane studied. The global tidal volumes and vital capacities determined by spirometry also did not reveal any differences between the measurements. Body position influenced significantly the distribution of regional tidal volumes and vital capacities among the regions. The effect of posture was most pronounced in the upper chest plane during spontaneous tidal breathing.

CONCLUSION. Our study showed a good reproducibility of regional ventilation distribution during spontaneous tidal breathing and a deep expiratory maneuver determined by EIT in healthy subjects. The posture-dependent redistribution of regional tidal volumes and vital capacities was discernible and corresponded to the known physiological effects of gravity on regional lung volumes and ventilation.

0292

COMPLICATIONS ASSOCIATED WITH CENTRAL VENOUS CATHETER INSERTION AND MANAGEMENT

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INTRODUCTION. Central Venous Catheterisation is a frequently performed in Theatre and Intensive Care and is associated with serious complications. The aim of this project was to ascertain the prevalence of complications associated with the insertion and management of Central Venous Catheters in our department and highlight areas where changes in practice are necessary.

METHODS. Data was collected over a four month period, for all CVCs inserted in Theatre and Intensive Care. For each CVC inserted the following data was collected at insertion: operator, site, type of line, aseptic measures, difficulty of insertion, use of ultrasound and immediate complications. Each CVC placed underwent daily surveillance looking for Catheter insertion site infection and signs of Catheter Related Bloodstream Infection (CR-BSI). Upon removal all CVC tips were cultured and blood culture data from patients suspected of having CR-BSI was correlated.

RESULTS. A total of 174 CVC's were inserted, 83 in theatre and 91 in ICU. 113 (65%) of CVC's were inserted solely a trainee, 52 (30%) were inserted solely by a consultant and 9 (5%) were the result of a combined effort by consultant and trainee. 115 (66%) of CVC's were inserted via the subclavian route, 47 (27%) by the internal jugular and 12 (7%) by the femoral route. Ultrasound guidance was used in only 13 cases (7%) and most commonly by consultant staff (77%) for internal jugular and femoral CVC insertion. Full barrier precautions were used in only 76 (44%) of the total cases, with a lower rate in ICU (11%). The most commonly occurring complication of CVC insertion was the need for repeated attempts (defined as more than 2 attempts). This occurred in 15 (9%) of cases. Carotid artery puncture occurred 3 times (6% of IJ insertions) and subclavian artery puncture occurred twice (2% of SC insertions). Aberrant line position requiring line re-insertion occurred in 4 (2%) cases, all associated with the subclavian route. Pneumothorax occurred in 4 cases (2%, which were all by the subclavian route. Three of these followed CVC insertion by trainee's and one by a consultant.In total there were found to be 13 infections related to CVC, of which 4 were local infections and 9 were confirmed as cases of CR-BSI, with 68% positive bacterial culture. Overall rates of CR-BSI were higher for CVC's inserted in theatre (9.9 per 1000 line days) than in ICU (2.6 per 1000 line days).

CONCLUSION. 1. Increased use of US guidance and necessary training in this technique is required.
2. Strict adherence to infection reducing measures such as use of full barrier precaution and use of 2% Chlorhexidine is being enforced.
3. Ongoing surveillance of CVC's inserted and education for staff involved in handling these lines is required.

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0293

DECISION SUPPORT TO INCREASE ADHERENCE TO A MECHANICAL VENTILATION GUIDELINE: A STUDY PROTOCOL AND FIRST RESULTS

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INTRODUCTION. Lung–protective (LP)–mechanical ventilation (MV) using lower tidal volumes (VT) is advised for patients with ALI/ARDS. However, VT may become too large when lung compliance improves, in particular with pressure controlled modes of MV. We studied the effects of a clinical decision support system (CDSS), integrated in a patient data management system, on adherence to LP–MV in a mixed medical–surgical intensive care unit (ICU).

METHODS. Overall the study is a time series experiment with five 3-month period: (1) a control period without any decision support, (2) a period with an active but non–critiquing CDSS, (3) the same but with asking for indication whether clinicians follows the guideline, (4) a period with an active critiquing CDSS and finally (5) an active feedback critiquing CDSS. In periods 1 and 2, consecutive mechanically ventilated patients admitted to our 30–beds hospital were included. In period 2 for each individual patient, CDSS presents the recommended VT (i.e., 6 ml/kg predicted body weight [PBW]) in a pop–up window. Outcome measures: average volume in excess of the recommended VT over time ("excess volume"), and percentage of ventilation time in which the applied VT was larger than the recommended VT ("%–excess volume time") Statistics: Mann–Whitney U.

RESULTS. MV–data of 696 patients were analyzed. Table 1 shows "excess volume" and "%–excess volume time". Although "excess volume" and "%–excess volume time" did not change significantly for all patients, in patients who were ventilated > 24 hours it did: 1.9 ± 1.3 ml/kg PBW before intervention and 1.8 ± 1.3 ml/kg PBW after intervention (6% reduction, P = 0.23). Table 1 shows the outcome measures separately for patients ventilated for > 1 hour and > 24 hours. With longer ventilation times the intervention seemed to result in lower tidal volumes.

TABLE 1 OUTCOME MEASURES (3,663,674 VT–RECORDS)

MV Duration	Parameter	Period 1	Period 2	p value
Patients on MV > 1 hour (n = 696)	excess volume (ml)	1.9 ± 1.3	1.8 ± 1.3	0.23
	%–excess volume time	67 ± 27	64 ± 28	0.37
Patients on MV > 24 hour (n = 368)	excess volume (ml)	1.9 ± 1.3	1.5 ± 1.0	0.01
	%–excess volume time	65 ± 26	59 ± 26	0.01

CONCLUSION. CDSS, integrated in a patient data management system, improves implementation of a LP–MV in patients on MV > 24 hours.

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0294

MODEL-BASED DIAGNOSIS OF ACUTE PULMONARY EMBOLISM – RESULTS FROM A PORCINE MODEL

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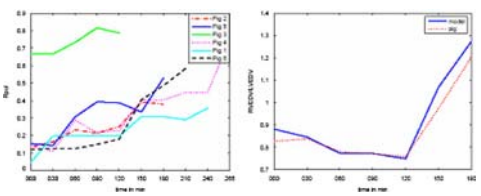
INTRODUCTION. Accurate computational models in conjunction with clinical data can be used to create patient-specific models that match the clinical measurements. If these models are physiological, then the patient-specific parameters, or changes in them over time, can be used to diagnose disease states, the affect of drug therapy, or the acute onset of dysfunction. This model-based diagnostic approach is applied with an existing minimal computational model to a porcine simulate of acute pulmonary embolism.

METHODS. The model consists of 6 elastic chambers including the right and left ventricles, as well as the pulmonary and systemic circulation systems. It accounts for ventricular interaction and valve dynamics. Under the control of the Ethics committee of the Medical Faculty of the University of Liege, pulmonary embolization was made in (N = 6) healthy pigs with autologous blood clots to provide the clinical data. Right ventricular pressure-volume loops were recorded using a conductance catheter while end-systolic ventricular elastance was periodically assessed by varying right ventricular preload.

RESULTS. Errors between the identified model and clinical data are within 10% in all cases. Pulmonary resistance increased significantly with the onset of embolism in all cases, as expected, ranging from 89.98% to 261.44% of the initial state (Fig. 1). The model also predicted increases in right ventricle expansion index of ~ 33% (Fig. 1), and a decrease in septum volume. Each is consistent with known physiological response.



CONCLUSION. A minimal closed-loop model of the cardiovascular system is able to detect, and thus monitor and diagnose the onset of acute pulmonary embolism. These results are a first clinical result in this arena and illustrate the potential of model-based monitoring and diagnostic systems to create a single, clear physiological picture from a series of individual clinical measurements.

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0295

ELECTRICAL DIAPHRAGM ACTIVITY (EDI) IS A RELEVANT FACTOR AFFECTING WEANING OUTCOME

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INTRODUCTION. Sinderby et al (1998) showed that the relative Edi (percentage of voluntary maximal Edi) during quiet breathing was 8% in normal subjects, 43% in stable COPD, and 45% in restrictive patients. We aimed to assess Edi behavior during the process of patients' discontinuation from mechanical ventilation.

METHODS. Breathing pattern, transdiaphragmatic (Pdi), esophageal (Pes) pressures, and Edi were measured in 10 patients during weaning from mechanical ventilation and assisted with neurally adjusted ventilatory assist (NAVA) mode. Measurements were performed during a spontaneous breathing trial at rest, during a maximal inspiratory pressure manoeuvre (Pdimax, Pesmax) and at total lung capacity (Edimax). The tension-Time index for the diaphragm (TTdi) was computed. Unpaired t test (successful vs. unsuccessful weaning) and linear regression (Edi/Edimax ratio vs respiratory variables) were set with a significance $P < 0.05$.

RESULTS. We found that, on the overall, Edi/Edimax ratio was lower during weaning success than during weaning failure, the former being comparable to Edi measured in stable, spontaneously breathing chronic patients (Synderby et al. J. Appl. Physiol. 85(6), 1998). Moreover, a significant linear relationship was found between Edi/Edimax compared to both Pdi/Pdimax ($p < 0.001$, $R2 = 0.79$) and TTdi ($p < 0.001$; $R2 = 0.77$). A similar but weaker linear relationship was found between Edi/Edimax and both the occlusion pressure (P0.1) and the frequency to tidal volume (f/VT) ratio ($p < 0.05$; $R2 = 0.56$, and $p = 0.03$; $R2 = 0.55$, respectively). Finally, no relationship was found between Edi/Edimax and Pdi or Pes raw data not normalized for maximum values.

TABLE 1

Respiratory variables	Weaning Success	Weaning Failure	P value
Edi/Edimax	34% ± 11%	64% ± 9%	<0.001
TTdi	0.10 ± 0.03	0.15 ± 0.02	<0.01
Pdi/Pdimax	0.31 ± 0.09	0.59 ± 0.10	<0.001
P0.1	5.3 ± 3.5	9.6 ± 2.7	<0.05
f/VT	62.3 ± 19.4	88.2 ± 29.2	0.06

CONCLUSION. We conclude that in mechanically ventilated patients during weaning from mechanical ventilation: 1) weaning failure is associated with a higher diaphragm electrical activity (> 50% of maximum Edi); 2) Edi/Edimax ratio data are consistent to other predictive outcome indexes; and 3) Edi/Edimax might be useful to assess NAVA efficiency in unloading the respiratory system.

0296

INTEREST OF AN OBJECTIVE EVALUATION OF COUGH DURING WEANING FROM MECHANICAL VENTILATION

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INTRODUCTION. In the case of success of spontaneous breathing trial, the search of risk factors for extubation failure, especially a poor cough strength, is recommended. This prospective study aimed to evaluate the interest of an objective evaluation of cough strength as a predictive criterion of success or failure of extubation.

METHODS. The patients under mechanical ventilation for more than 24 hours and having successfully passed the spontaneous breathing T-tube trial were included if a respiratory therapist was present in the intensive care unit (ICU). The measure of the peak cough expiratory flow (PCEF) was then achieved by the respiratory therapist with an electronic flowmeter, the Piko-1 (Ferraris Respiratory Europe) blindly from medical staff; the patients were then extubated. The extubation failure was defined by the need for reintubation within 48 hours following extubation. The following factors were analyzed to evaluate their predictive value for extubation failure: age, sex, SAPS II at admission, previous duration of mechanical ventilation, underlying COPD, persistent neurologic failure – central or peripheral, number of tracheal aspirates during the 24 hours before extubation, diameter of tracheal tube, impossibility to achieve the measure of PCEF because of lack of understanding from the patient, and value of PCEF.

RESULTS. 130 patients were included for 15 months, cumulating 141 extubations (35% of all extubations in the ICU during this period). The median duration of mechanical ventilation before extubation was 9 days (1–95). The measure of PCEF was impossible to achieve because of lack of understanding from the patient for 21 extubations (14.8%). 16 patients (11.3%) exhibited an extubation failure. The sole factor significantly associated with extubation failure was the PCEF: the mean PCEF of patients who failed (33.9 ± 14.6 l/min) was significantly lower than the one of patients who succeeded (61.7 ± 32 l/min) ($p < 0.0001$). In multivariate analysis, PCEF was the sole factor independently predictive of extubation failure (OR 1.06 [95% CI: 1.01–1.12]). The optimal cut-off value of PCEF was 35 l/min: a PCEF lower or equal to 35 l/min predicted extubation failure with a sensitivity of 72% and a specificity of 76%. The risk of extubation failure was 23.5% for the patients with a PCEF lower or equal to 35 l/min and 3.4% for those with a PCEF over 35 l/min (RR = 6.75 [95% CI: 1.9–23.9], $p = 0.003$).

CONCLUSION. This study shows that an objective measure of cough strength is helpful to predict the issue of extubation in patients having successfully passed the spontaneous breathing trial.

0297

CHARACTERISTICS OF VENTILATED PATIENTS ACCORDING TO THE DIFFICULTY OF THE WEANING PROCESS

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INTRODUCTION. In the recent consensus conference about weaning from mechanical ventilation (Eur Respir J 2007; 29:1033-56) it has been proposed a new classification for patients who initiate weaning: simple weaning (SW), difficult weaning (DW) and prolonged weaning (PW), although no studies are available comparing the differences among these groups. The aim of the study is to compare population characteristics and prognosis outcomes among the 3 groups.

METHODS. We prospectively analyzed 178 ventilated patients during weaning from mechanical ventilation. We divided them into three groups according to the weaning process: (1) SW in patients who proceeded from initiation of weaning to successful extubation on the first attempt without difficulty; (2) DW in patients who failed initial weaning and required up to three spontaneous breathing trials (SBT) or as long as 7 days from the first SBT to achieve successful weaning; (3) PW in patients who failed at least three weaning attempts or required more than 7 days of weaning after the first SBT.

RESULTS. We analyzed 78 patients with SW, 67 with DW and 33 with PW. No differences were observed in age and sex in the analyzed groups. COPD was more frequent in PW (67%) than in SW or DW (49% and 35% respectively, $p = 0.03$). Exacerbation of chronic respiratory disorder was the main cause of initiating mechanical ventilation in the three groups. At admission, there were no differences in APACHE-II score; however, at the beginning of the weaning process, APACHE-II score was significantly higher in PW group compared to SW and DW (15 ± 5 vs 11 ± 3 and 12 ± 4, respectively). At the end of the SBT, PaCO2 was higher in PW than in SW and DW (53 ± 13 vs 45 ± 9 and 46 ± 9 mmHg, respectively). ICU and hospital stay was longer in PW. The 90 days-mortality rate was significantly higher in PW than in the other weaning groups.

CONCLUSION. Although all three weaning groups had similar APACHE-II scores at the admission, PW patients had longer hospital and ICU stay and lower survival than SW and DW patients. By contrast, no significant differences were observed between SW and DW.

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0298

CLINICAL WEANING SCORE:SOMETHING TO BE EXPLORED

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INTRODUCTION. Liberation from mechanical ventilation still consumes substantial medical effort, demonstrated on publication focused on predictor indexes, spontaneous breathing trial, and clinical protocols of weaning. Only the rapid shallow breathing (RSB) index is generally accepted (1), and maybe clinical decision should be explored deeper. Clinical "Weaning Score (WS)" should be included on the spontaneous breathing ability protocol (SBAP). Aim: To predict success extubation or return to mechanical ventilation based on WS.

METHODS. We did a prospective observational research study on one hundred and forty seven critical ill patients admitted between October 2005 to December 2007. When the patient was enrolled in the study, SBAP was checked by switching the ventilator (Galileo, Hamilton Medical AG.) from full ventilatory support to CPAP 5 cmH_2O, Pressure trigger was set at 0.5 cmH_2O, and pressure support on 7 cmH_2O. Automatic tube compensation was not used. Patients were evaluated according to WS on the first 10 min.: agitation: 1, diaphoresis: 1, retractions: 1, somnolence: 1, breathing pattern: 1, secretions: 1, cough capacity: 1, patient acceptance of extubation: 1, nasal flaring: 1, and head up capacity: 1 point. Final aim was reintubation, return to mechanical ventilation and mortality. Before the decision of extubation patient was evaluated by the intensivist and according to his criteria taking into account numeric indexes, patient was extubated. Patients who showed sings of poor tolerance at the end of the trial were returned to controlled mechanical ventilation and the trial was tried following day. A validation of the data was used to assess the ability to the new WS to predict weaning outcomes such us re-intubation or return to mechanical ventilation, based receiver operating characteristic (ROC) analysis. The statistical analysis was carried out with the SPSS 10, and $p < 0,05$ was considered statistically significant.

RESULTS. One hundred and forty seven patients were studied, 73(49.6%) were male and 74(50.3%) were female. Their average age was 51 ± 20.7 years. APACHE II score 16 ± 14, the overall mortality rate was 7.9%, and death of re-intubated patients was 11.1%. Statistics significant dates are showed on Table 1.

TABLE 1

Statistics	Return to Ventilation	Re-Intubation	Death
%	17%	12.2%	7.9%
WS	>3	>1	>3
AUC (CI 95%)	0.89 (0.83–0.94)	0.54 (0.46–0.62)	0.69 (0.61–0.76)
p	0.0005	0.52	0.051
Se/Sp	76/91	77.8/41.9	45.5/85.2
+LR/− LR	8.43/0.26	1.34/0.53	3/0.64
+PV/− PV	63.3/94.9	15.7/93.1	20.8/94.8

CONCLUSION. Clinical decision has not been explored on the set of weaning from mechanical ventilation. According to our findings, weaning is still depending on clinical assessments and the "art" of weaning is related with clinical score. Besides of mathematical indexes a WS should be included on the first 10 mins of SBAP. Definitively, patients should not be extubated with score more than 3 due to risk to mortality and WS must be added to another parameters to detect risk of re-intubation.

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0299

DELAYS TO APPRIOPRIATE NON INVASIVE VENTILATION

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INTRODUCTION. Non –Invasive Ventilation (NIV) is an important intervention for patients in respiratory failure admitted to hospital. Current guidelines state that NIV should be considered in patients who do not respond to maximal medical therapy with one hour or earlier if the need so arose. We noted large fluctuations in initiating NIV noting significant mortality associated with their need. The primary aim is to assess the length of time needed to get patients to appropriate NIV (CPAP or BIPAP). The secondary aim is to help draw up guidelines for setting up NIV in the acute admission setting.

METHODS. Retrospective study reviewing the case notes of 49 patients needing. NIV on a high dependency unit. 24 excluded as the need developed as an in patient, 6 as the timing of events was unclear and 1 due to extreme nature of delay. The time needed was divided into triage, to arterial blood gas (ABG), interpretation and implementation. The delay was split into four parts -door to doctor, doctor to ABG, ABG to decision, decision to NIV.

RESULTS. Average time from admission to commencing CPAP or BIPAP was 5 hours and 25 minutes. Majority of delay was due to interpretation and implementing ventilatory support. 12 out of 19 started within 4 hours. 192 minute average time from admission to support in the 9 patients that died (average pH – 7.221), 453 minutes in those that died (average pH – 7.228)

CONCLUSION. Current threshold for getting an ABG is too high. Need to establish whether delay is statistically associated with mortality and formal guidelines on time to ventilatory support. Recommendations including simplified protocols and clear timing of events have been suggested to the acute medical team to decrease the door to NIV time where appropriate. Educating junior medical and nursing staff and developing a simple algorithm (Fig. 1) will play an important part in reducing delays.

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0300

WEANING WITH SMART CARE: OUR EXPERIENCE

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INTRODUCTION. Ventilator weaning is an important step in a patient's recovery, which can be long and difficult. The goal of the ventilator weaning program is to reduce and, if possible, eliminate a patient's dependence on a ventilator for breathing. Thus often guidelines application may be very difficult in clinical practice. Several studies demonstrated that the duration of weaning process can be shortened by using a closed-loop knowledge based weaning system. This computer driven weaning protocol is present in Drager ventilator Evita XL and provides to automatically and gradually reduce the ventilatory assistance. Aim of this study was the comparation enter computer-driving weaning protocol and conventional weaning protocol employed in our ICU. Our primary end-points were mechanical ventilation total duration and successful extubation time.

METHODS. We enrolled 30 patients mechanical ventilated for at least 24 hours and eligibles for mechanical ventilation discontinuation using usual criteria for weaning readiness. After a successful pre-inclusion test with PSV ($PS > 15$ cmH_2O) patients were randomised to computer-driven weaning or conventional weaning.

RESULTS. Table 1 shows our results. Weaning duration resulted reduced in the group weaned with computer-driven protocol with an extubation time of 3.5 ± 1.4 days. Extubation time in the group of control was 5.4 ± 1.8 days. Total duration of mechanical ventilation was 14 ± 3.0 days in treatment group and 16.8 ± 4.6 days in control group.

TABLE 1

SMART CARE	SAPS II	Weaning (days)	VAM (days)	USUAL CARE	SAPS II	Weaning (days)	VAM (days)
media	44.2	3.5	14	media	43.4	5.5	16.8
DS	6.2	1.4	3.0	DS	6.9	1.8	4.6

CONCLUSION. In accordance with several studies, computer-driven weaning produced encouraging data. Automation of the weaning protocol may explain our results. The advantages of computer-driven weaning protocol are the independence from the willingness or availability of the staff. Moreover the system has the ability to determine more easily and rapidly than usual care the time for a possible separation from the ventilator, which could lead to a greater number of successful weaning processes.

0301

THE HUMIDIFICATION OF MEDICAL GASES DURING HELMET CPAP ?

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INTRODUCTION. The helmet may be an effective interface to deliver noninvasive positive pressure ventilation (NPPV). The high internal gas volume of the helmet can act as a "mixing chamber" where the humidity of the dry medical gases can be increased by mixing with the expired humidity from the alveolar gases, avoiding the need of an active humidification. We evaluated the temperature and humidity of medical gases with and without a heated humidifier during NPPV with helmet.

METHODS. Nine patients with acute respiratory failure (PaO2/FiO2 209 ± 52) and ten healthy subjects during CPAP. CPAP was delivered through a mechanical ventilator or by a continuous low (40 L/min) and high flow (80 L/min).

The humidity was measured inside the helmet by a capacitive hygrometer. The level of patients' comfort was evaluated using a continuous scale.

RESULTS. In patients with acute respiratory failure the heated humidifier significantly increased the absolute humidity from 18.4 ± 5.5 to 34.1 ± 2.8 mgH_2O/L during ventilator CPAP, from 11.4 ± 4.8 to 33.9 ± 1.9 mH_2O/L during continuous low flow and from 6.4 ± 1.8 to 24.2 ± 5.4 mgH_2O/L during continuous high flow CPAP. Without the heated humidifier the absolute humidity was significantly higher with ventilator CPAP compared to the continuous low and high flow CPAP. The level of comfort was similar for all the three modes of ventilation and with or without the heated humidifier. The findings in healthy subjects were similar to the patients with acute respiratory failure.

CONCLUSION. The fresh gas flowing through the helmet during the continuous flow CPAP systems limited the possibility to increase the humidity. When using the continuous flow CPAP systems a heated humidifier is suggested.

0302

PREDICTING SUCCESSFUL WEANING IN A COHORT OF ELDERLY PATIENTS

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INTRODUCTION. Aging causes structural and functional modifications in the respiratory system. The evidence that these changes could impair weaning in elderly patient, till now, is not clear. We design a protocol to study possible differences between an adult group (AG-up to 65 yrs) and an elderly group (EG > 65 yrs) in a daily screening trial.

METHODS. 288 patients (116 EG and 132 AG) were studied. Parameters studied were: respiratory rate (RR), tidal volume (VT), frequency-tidal volume ratio (f/VT). The weaning method was spontaneous breathing trial. Measurements were done twice: just before the spontaneous breathing trial just at the beginning of spontaneous breathing trial (T0) and 30 minutes after (T30). Chi square test, ANOVA and t-test were used in the analysis.

RESULTS. Weaning success was 72,4% in EG and 76,5%in AG (p = 0.552). Values from weaning criteria are shown in Tables 1 and 2.

TABLE 1

WENING CRITERIA	UP TO 60 YRS	61 –70 YRS	71–80 YRS	>80 YRS	P*
VT (mL) T0	523 ± 201	490 ± 178	436 ± 147	422 ± 157	0.013
VT (mL)T30	509 ± 202	496 ± 168	466 ± 135	473 ± 250	0.551
RR (bpm)T0	23.2 ± 6.7	23.4 ± 5	24.3 ± 4.1	28.3 ± 7	0.004
RR (bpm)T30	24.5 ± 7.6	23.6 ± 5.7	24.5 ± 4.8	28.3 ± 7	0.412
f/VT T0	55.3 ± 36.7	56.1 ± 29.7	63.1 ± 26.1	79.8 ± 43.1	0.022
f/VT T30	64.4 ± 61	56.7 ± 36.1	60.9 ± 36.9	73.9 ± 41.7	0.558

** t-test for independent samples*

TABLE 2

WENING CRITERIA	EG	AG	p time	p interaction	p group
VT (mL) T0	446 ± 143*	528 ± 219*	0.449	0.015	0.006
VT (mL) T30	472 ± 169*	514 ± 200*			
RR (bpm)T0	24.8 ± 5.2	23 ± 6.6	0.069	0.115	0.092
RR (bpm)T30	24.9 ± 6.1	24.1 ± 7.3			
f/VT T0	63.8 ± 31.7	54.8 ± 35.9	0.121	0.076	0.333
f/VT T30	63.1 ± 38.7	62.1 ± 58.1			

**p < 0.05 t-test for independent samples*

CONCLUSION. Weaning success in our study is lower, but similar to the described. Older patients showed differences in f, VT and f/VT. The same differences where observed comparing by age group. There were no differences in weaning success.

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0303

PROLONGED WEANING FROM MECHANICAL VENTILATION: IMPACT OF A SPECIALISED WEANING UNIT

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INTRODUCTION. The aim of this study, performed in a 20 beds medical intensive care unit, was to describe the distribution of patients ventilated more than 15 days, according to the three categories of weaning as proposed in the last consensus conference. The impact of the creation of a 6 beds specialised weaning unit (SWU) on the group III weaning process was also accessed.

METHODS. We performed a single center retrospective analysis of 334 patients intubated for mechanical ventilation (MV) for more than 15 days. After excluding post anoxic arrest and patients with care limitation, 257 patients meet inclusion criteria. We report here preliminary results of 225 patients: 104 before (2001–2003, period 1) and 121 after (2004–2006, period 2) the creation of a SWU. Group I (simple weaning) was defined as extubation success after first spontaneous breathing trial (SBT), group III (prolonged) as extubation success after more than three SBT and/or more than 7 days after first attempt of SBT. Other patients was classified in group II (difficult). Group III patients characteristics were compared between period 1 and period 2 (Table 1). In the second period, patients admitted in SWU were compared to those were not (Table 1).

RESULTS. Patients were distributed among weaning groups as follows: group I, n = 10 and 9; group II, n = 12 and 21; group III, n = 82 and 91 respectively in period 1 and 2.

TABLE 1

	Period 1	Period 2	p	Period 2 SWU -	Period 2 SWU +	p
n classe III	82/104 (79%)	91/121 (75%)		41	50	
SAPS II	52	50	NS	57	44	0,0034
ICU + SWU los	39 +/−36	59 +/−47	0,0016	32 +/−20	86 +/−49	0,0001
ICU + SWU length of MV	34 +/−24	39 +/−28	NS	31 +/−20	49 +/−33	0,005
Tracheotomy (T) n	48	58	NS	10	48	<0,0001
Weaning of MV n	41	48	NS	10/41	30/42	<0,0001
Decanulation n	9	27	0,0051	0	27/48	<0,0001
Dead n	32	39	NS	32	7	<0,0001

CONCLUSION. We observed that group III patients concern the majority of patients ventilated more than 15 days. Percentage of this patients as well as tracheotomies rate remained constant over the time, suggesting that SWU creation do not had significantly affect our weaning process. The greater rate of decanulation in period 2 suggest a beneficial effect of SWU creation. As expected, patients transferred to the SWU exhibited a lower hospital mortality rate compared to those who remain in the ICU (Table 2). Aside the weaning classification, admission criteria are required to render a SWU efficient in terms of weaning process. Further studies are warranted to evaluate the benefit of a SWU as regards hospital discharge and 1 year mortality.

0304

FEASIBILITY AND SAFETY OF FIBEROPTIC BRONCHOSCOPY WITH BRONCHO-ALVEOLAR LAVAGE UNDER NONINVASIVE VENTILATION WITH PROPOFOL TARGET CONTROLED INFUSION IN PATIENT WITH ACUTE HYPOXEMIC RESPIRATORY FAILURE

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INTRODUCTION. Fiberoptic bronchoscopy (FOB) is an important tool for the diagnosis of pulmonary diseases. The French Consensus on non invasive ventilation (NIV) recommends performing FOB under NIV in patients with acute hypoxemic respiratory failure (AHRF). Nevertheless this procedure remains uncomfortable, and patients agitation may lead to desaturation. Using Target Control Infusion (TCI) sedation with propofol during FOB under NIV could prevent desaturation and help tolerance of FOB. TCI sedation with propofol maintain a constant concentration in the target cerebral compartment, preserves spontaneous ventilation, and does not alter hemodynamic parameters.

METHODS. Inclusion criteria were patient with AHRF, PaO2/FiO2 ratio (P/F) < 250, and requirement of FOB with broncho-alveolar lavage (BAL). Exclusion criteria was thrombopenia < 30.000, P/F < 80 or pH < 7,32 under NIV. Patient was placed under NIV before FOB for adaptation to the ventilator. Sedation was start prior to the FOB, the objective was to obtain an OAA/S level at 4 (response to verbal stimulation). The effect site concentration of propofol (Cpt) was initially set at 0,6 μg/ml, and was increased by 0,2 μg/ml steps until the sedation goal was achieved. Then, FOB was performed.

RESULTS. 23 patients, IGS II mean 56 +/−14 [30–85], were included and 24 FOB were performed. Immunosuppression was noted in 19 patients (79%) due to AIDS (4), neutropenia (9), bone marrow transplantation (3), renal transplantation (1), and long-term corticosteroid treatment (2). The mean duration of the procedure was 13,5 +/−5,5 min [5–30]. Loss of consciousness was obtained with a Cpt of 1,49 +/−0,46 μg/mL [2,6-0,6]. All patients well tolerated FOB-BAL. No significant adverse event, including vomiting or apnea were recorded. SpO2 never dropped below 90% for longer than 1 min. Cough was preserved for all patients. During the procedure hemodynamic changes were modest and transient. The P/F increase from 181 +/−50 [85–286] at baseline to 211 +/−103 [82–502] one hour after the procedure (p = 0.95). Intubation was required for only one patient during the 6 h after FOB and was attributed to FOB. 3 patients were intubated during the 24 h, but this was probably not imputable to FOB. The procedure yielded diagnostic for 18 patients (75%). FO-BAL led to diagnosis of bacterial infection (6), Pneumocystis (5), Aspergillosis (1), Candida (1), CMV (1), HHV6 infection (3), malignant pneumonia (1), alveolar hemorrhage (5), drug induced hypersensitivity pneumonia (1).

TABLE 1 PHYSIOLOGICAL PARAMETERS

	Before sedation & before FOB	Under sedation & under NIV, before FOB	H + 1 after FOB
pH	7.44 +/−0,5		7.44 +/−0.06
PaO2/FiO2	181 +/−50		211 +/−103
MAP (mmHg)	91.8 +/−17.8	84.35 +/−15.5 *	81.95 +/−14.7
SaO2 (%)	95.25 +/−3.45	98.41 +/−1.41	96.37 +/−3.65
Respiratory rate	25.5 +/−6.7	23.4 +/− 7.2	24.6 +/−6.7
Heart rate	93 +/−16	88.9 +/−17 *	93.62 +/−19

*mean +/− SD; * = p<0.05 (under sedation vs before)*

CONCLUSION. The present study shows that FOB-BAL under NIV and TCI sedation with Propofol is feasible and safe in patient with severe hypoxemia. A randomised controlled study is necessary to assess if this technique could substantially reduce early failures, oxygen desaturation and increase tolerance of FOB in patients with AHRF.

0305

PREDICTING SUCCESS IN WEANING FROM MECHANICAL VENTILATION

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INTRODUCTION. Weaning failure occurs in about 25–30%. Indexes predicting success can be helpful clinically but their predictive capacity can be low. The purpose of this study is to evaluate weaning predictor indexes in patients ho tolerated SBT.

METHODS. We included patients under MV for at least 48 h, submitted to SBT for 30 min, extubated according to clinical tolerance and followed for 48 h. They were evaluated concerning age, sex, clinical characteristics, length of hospital and ICU stay and of MV. At first and 30th minutes during SBT there were analyzed: arterial blood gases, hemodynamic and respiratory parameters as respiratory rate (f), tidal volume (VT), respiratory rate to tidal volume ratio (f/VT), maximal inspiratory and expiratory pressures. Comparisons were done between two groups of patients: success x failure, defining failure as reintubation in the first 48 h.

RESULTS. 458 patients were studied. Reintubation occurred in 21%. The most important differences comparing success with failure groups were: lower age, lower mortality rate, shorter length of ICU stay, higher oxygenation (Table 1) and lower increase in f/VT (delta f/VT) (6 +/− 26 x 17 +/− 40, p = 0.02) during the test (Fig. 1).

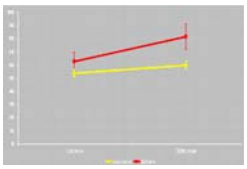

TABLE 1

	Weaning Success n = 360	Weaning Failure n = 98	p
Age (yr)	56 +/− 19	62 +/− 18	0.008
APACHE II Score	19 +/− 7	19 +/− 6	0.88
MV days	7 +/− 6	7 +/− 5	0.95
Respir Sepsis	96 (27)	36 (36)	
Post Operative	43 (12)	11 (11)	
COPD	39 (11)	7 (7)	
PaO2/FiO2	342 +/− 128	299 +/− 104	0.002
ICU days	15 +/− 12	19 +/− 13	0.002
Mortality (%)	36 (10)	30 (31)	<0.001

CONCLUSION. In this group of patients a great number failed in the extubation process showing, as expected, a higher mortality rate in this group. Parameters related to failure were higher age, longer length of ICU stay, lower level of oxygenation, higher f and f/VT and higher increase in f/VT (delta f/VT) during the SBT.

0306

THE INVOLVEMENT OF INSPIRATORY MUSCLES IN CRITICALLY ILLNESS POLYNEUROMYOPTATHY

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INTRODUCTION. Critical illness polyneuromyopathy (CIPNM) has been increasingly recognized in patients with severe critical illness in the intensive care unit (ICU). The respiratory neuromuscular component of CIPNM has been less studied. The respiratory neuromuscular involvement might contribute to difficulty in weaning from the ventilator and prolonged ICU stay. The involvement of respiratory muscles in patients with CINM has not been adequately quantified to date. We attempted to evaluate the involvement of respiratory muscles by assessing the maximum inspiratory pressure (MIP).

METHODS. Our prospective study included 19 patients (mean age 59 ± 19 years, 14Male/5Female)(Apache II scoreon admission 18 ± 4) with mean duration of ICU stay 33 ± 16 days. Patients with pre-existing neurological or muscular disease, age < 18, pregnancy, BMI > 35, connective tissue disorders, peripheral vascular disease and limb fractures were excluded. The MRC (Medical Research Council) scale for clinical assessment of muscle strength was used for the diagnosis of CIPNM with a score of 48 being the cut off for the diagnosis of CIPNM. MIP was measured with a unidirectional expiratory valve where low resistance was used to selectively permit exhalation while inspiration was blocked. This caused patients to initiate successive efforts from respiratory volumes progressively closer to RV, a known factor that helps to generate a more negative pressure. The differences between groups were assessed with independent samples t-test.

RESULTS. MIP mean value (± SD) in all patients was: 28 ± 13. Eight patients were diagnosed with CIPNM., 5 patients had an MRC score > 48 and 6 patients could not be evaluated for CIPNM. MIP mean value was 23 ± 8 in patients with CIPNM and 40 ± 14 in patients that did not have CIPNM (p = 0.017). MIP mean value in patients that could not be evaluated for the diagnosis of CIPNM was 25 ± 11. Furthermore a correlation was found with the MRC scale and the MIP value (r:0.75, p < 0.05).

CONCLUSION. CIPNM is characterized by limb weakness and has been recognized as a risk factor for prolonged ICU stay and difficult weaning from mechanical ventilation. Our results imply that MIP could possibly evaluate the degree of involvement of respiratory muscles in CIPNM and thus could be a useful clinical tool for the assessment of CIPNM.

0307

ECHOCARDIOGRAPHIC ASSESSMENT DURING WEANING FROM

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INTRODUCTION. Physiologic changes occurring during transition from mechanical (MV) to spontaneous ventilation can overload cardiorespiratory system (1)with increase of oxygen demand and cardiac overload resulting in difficulties in weaning (2). Left ventricular dysfunction induced by acute weaning can be detected by bedside echocardiography. A careful analysis of acute changes in Dopper profile of mitral flow permits reliable avaluation of acute changes in left ventricular dyastolic function (3).

METHODS. Patients under MV for more than 48 hours and prone to weaning were observed during 30 minutes of pressure support ventilation (PSV) and T-tube, in a random order, and with a rest period of at least 30 minutes between methods. Variables analyzed were: age, APACHE, underlying disease, period of MV, cardiorespiratory parameters, ECG, echocardiogram and blood gas analysis in thirtieth minute in both methods.Echocardiographic parameters included: measurements of heart cavities; ejection fraction; acceleration of the E wave of mitral inflow (MI); deceleration of the E wave of MI; duration of the A wave of MI;isovolumetric relaxation time, E/A ratio and myocardial performance index. Statistical analysis were done comparing PSV versus T-tube, success versus failure and cardiac versus non-cardiac patients using t-test and ANOVA.

RESULTS. Twenty four patients (mean age 53 ± 20 years and APACHE 18 ± 6.) have been analyzed till now. The majority of patients had neurologic diseases. The period of MV was 21 ± 21 days. 17 patients were extubated and 7 failed during T-tube trial. Comparisons between PSV and T-tube showed similar results concerning cardiorespiratory parameters as well as echocardiographic measurements.

However, patients in the failure weaning group, Dopplerechoparameters in basal conditions showed significant differences mainly considering parameters related to structural size and diastolic function, and comparing cardiac and non-cardiac patients assessment showed no differences.

CONCLUSION. In our preliminary results in this group of patients under weaning from mechanical ventilation, echocardiographic assessment of cardiac function showed diastolic function and structural size could be considered predictors of weaning failure.

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0308

PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) AND HOME OXYGEN THERAPY: TOO SICK TO BE ADMITTED IN ICU?

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INTRODUCTION. The high costs and the economic constraints have changed the practice of critical care medicine. Decisions when to initiate or terminate therapy can sometimes be difficult(1).ICU mortality and morbidity, even following discharge from ICU is higher than from the general medical ward. Acute exacerbation of COPD is the most common cause for admission in ICU(2). The purpose of this study was to analyse hospital morbidity and mortality and length of ICU stay in patients with COPD and home oxygen therapy who were admitted to the ICU at CHVNG/E, Vila Nova de Gaia, Portugal.

METHODS. We retrospectively reviewed charts of Patients with COPD on home oxygen therapy (COPD-O2) during the period from January 2005 to December 2007. Data were collected for age, sex, severity scores (APACHE and SAPS II), cause of admission, ICU stay time, presence of co-morbidities, duration of invasive ventilation, infectious complications, weaning attempts, ICU and hospital mortality.

RESULTS. Of the 906 patients admitted in our ICU during this period, 31 were COPD-O2 (3.4%). Of these patients, 66% were male; the mean age was 68 yr; 84% had co-morbidities, the APACHE and SAPS II scores were 16 and 34.7 respectively; 90% had COPD exacerbation after a respiratory infection, the mean time for ICU stay was 10 days (mean time for other ICU patients 7.2 days); mean time for invasive ventilation was 8 days. During the stay in ICU 20% had developed Ventilator Associated Pneumonia. During the weaning process, 30% needed Non-Invasive Ventilation (NIV) and 20% had a tracheostomy. The ICU mortality was 30% (mean 15.7%), 31% patients died after discharge from ICU in the ward (mean 4.1%). 83% of the tracheotomised patients died in the hospital.

CONCLUSION. The COPD patients on home oxygen therapy represent a small number of the total ICU admissions. In our study, the mean time for ICU stay in these patients was above the average, even with strategies for faster weaning (NIV and tracheostomy). These strategies did not modify the prognosis for hospital discharge. The total mortality (ICU and hospital) in these patients was very high, 61%. We conclude that it is crucial to have guidelines for ICU admission for these patients.

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0309

RELATIONSHIP BETWEEN BODY TEMPERATURE LEVEL AND CEREBRAL TISSUE METABOLISM IN PATIENTS WITH SEVERE BRAIN INJURY

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INTRODUCTION. Elevations of body temperature (BT) > 1degree Celsius (C) above normal are associatedwith secondary cerebral damage and worse outcome in brain-injured patients. Temperature control therefore is recommended, but its effect on cerebral tissuemetabolism is not fully elucidated.

METHODS. Patients with severe braininjury (GCS below 9) admitted to our Neuro-ICU, monitored with cerebral microdialysis (CMD) andbrain tissue oxygen (PbtO2) and treated for temperature control (rectal BT > 38C) with therapeutic cooling (icepacks + external cooling device, BT target 36 ± 1C)were retrospectively identified from a prospective observational cohort. BT wascategorized into 5 separate levels: 35–36, 36.1-37, 37.1-38, 38.1-39, and > 39C. The relationship between BT levelsand CMD lactate/pyruvate ratio (LPR) and PbtO2 was analyzed using ANOVA, and Pvalues calculated after post hoc Bonferroni corrections for multiplecomparisons. Data from patients treated with mild hypothermia (BT < 35C) and pentobarbital infusion were excluded.

RESULTS. A total of 2209 samples from 23 consecutive patients (19 SAH, 4 TBI) were analyzed (Table 1). Significant elevations of LPR were observed at high BT levels (38 ± 48 at BT 38.1-39C vs. 31 ± 15 at BT 36.1–37C, $P < 0.05$; and 50 ± 50 at BT > 39C vs. 31 ± 15, $P < 0.01$). Compared to a BT of 36–37C, PbtO2 was lower when BT was > 39C (31.6 ± 13.4 vs. 28.3 ± 10.7 mm Hg, $P < 0.05$) and at 35–36C (31.6 ± 13.4 vs. 27.7 ± 9.6 mm Hg, $P < 0.05$). Cooling-induced shivering (n = 29 episodes) was also associated with reduced PbtO2 levels (30.5 ± 6.3 vs. 26.6 ± 5.9 mm Hg, $P < 0.01$).

TABLE 1

BT level	LP ratio	P value	PbtO2 (mm Hg)	P value
35–36C (n = 120)	32 ± 10	NS	27.7 ± 9.6	0.015
36.1–37C (n = 452)	31 ± 15		31.6 ± 13.4	
37.1–38C (n = 794)	33 ± 28	NS	30.8 ± 11.6	NS
38.1–39C (n = 591)	38 ± 48	0.024	30.0 ± 11.8	NS
> 39C (n = 144)	50 ± 50	<0.001	28.3 ± 10.7	0.04

CONCLUSION. In patients with severe brain injury, maintenance of BT at 36–37C is associated with reduced cerebral metabolic distress and improved cerebral oxygenation compared to hyperthermia. Temperature control to BT < 36C and cooling-induced shivering may reduce brain oxygen.

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0310

HEMORRHAGIC SHOCK RESUSCITATION: THE LATE SYNERGISTIC EFFECTS OF PENTOXIFYLLINE AND HYPERTONIC SALINE SOLUTION IN OXIDATIVE BURST

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INTRODUCTION. The relationship between hemorrhagic shock, duration of ischemia and reperfusion, and the development of sepsis and MODS has been well studied. The inflammatory response is triggered either during the shock period or after fluid resuscitation. Conventional fluid resuscitation with lactated Ringer's (LR) may activate neutrophils and induce end-organ damage. Small-volume resuscitation with hypertonic saline (HSD) may modulate the inflammatory response to hemorrhage and trauma. We have investigated the anti-inflammatory and immune effects of small volume hypertonic saline resuscitation (HSD) and pentoxifylline (PTX) following hemorrhagic shock, with downregulates in vitro neutrophil activation. We hypothesized that HSD + PTX decreases neutrophil activation and end-organ injury when compared with LR in an animal model of controlled hemorrhagic shock.

METHODS. A controlled hemorrhagic shock was induced in 20 Landrace Pigs, under general anesthesia (Isoflurane), by blood withdrawal through the left femoral artery cannula at a fixed rate of 20 mL/min, using an electronic pump to a target mean arterial pressure (MAP) of 40 mm Hg (THS). Additional blood was withdrawn or injected whenever required to maintain MAP at these levels for 30 additional minutes (T0). The animals were randomly assigned to Sham Group (no fluids) LR (32 ml/Kg), HSD (4 ml/Kg) or 4 mL/kg of HSD + PTX (25 mg/Kg). After 30 min (T30) blood was reinfused. The animals were monitored with pulmonary artery catheter, ultrasonic flowprobes in renal and portal veins, lactate and blood gases. Oxidative burst was measured by flow cytometry, and was conducted before the experiment and after 4 hours after resuscitation was started. Statistical analyses were performed using Analysis of variance with repeated measures (ANOVA). A p value of 0.05 was considered statistically significant.

RESULTS. There was no difference between the three treated groups in arterial pressure or any other hemodynamic variables during experiment. Animals return to initial pressure (MAP ~ 79 mmHg) after blood reinfusion, and remained stable until the end of the protocol. After shock, the animals presented similar systemic and regional perfusion variables, with no difference after 4 hours, including lactate. Oxidative burst presented with different evolution on Sham and LR, with increase in these groups after 240 min (~ 1.40), from HSD and HSD + PTX, with decrease after 4 hours (~ 0.60) (Fig. 1).

CONCLUSION. Hypertonic saline solution, with or without pentoxifylline inhibits neutrophil activation and oxidative burst in experimental hemorrhagic shock.

0311

DYSBALANCES OF EFFECTIVE OSMOLALITY IN ACUTE BRAIN DISEASES

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INTRODUCTION. Dysbalances of effective osmolality are some of the most frequent and serious complications in neurointensive care. Hyponatraemia is more common than hypernatraemia, which is however prognostically worse. The purpose of this study was to evaluate sodium dysbalances in patients with acute brain diseases admitted to our neurologic-neurosurgical care unit (NNICU) over a period of five years.

METHODS. Collections of patients and laboratory data were made from the Laboratory Information System database in the clinical biochemistry department. The criteria for patients' inclusion in the study was acute brain disease and serum sodium below 135 mmol/l (hyponatraemia) or above 150 mmol/l (hypernatraemia).

RESULTS. In the five-year observation period there were 326 (100%) patients (pts) with 928 (100%) days of serum sodium dysbalances. Hyponatraemia was predominant (251, 77% pts; 736, 79% days), while hypernatraemia was less frequent (75, 23% pts; 192, 21% days). Between these groups there were no diferences in age ($p = 0.268$), stay in NNICU ($p = 0.221$), length of dysnatraemia ($p = 0.713$), onset from brain damage ($p = 0.359$) and operation ($p = 0.153$). Hyponatraemia was however more frequent upon entry to NNICU ($p = 0.030$) and arose later after operation ($p = 0.002$). Hypernatraemia occurred more often in stroke pts ($p = 0.009$), no difference were found in tumour ($p = 0.387$) and trauma pts ($p = 0.364$). Antioedematic therapy more often preceded hypernatraemia ($p = 0.001$). No significant difference was observed in the administration of diuretic therapy ($p = 0.099$), fluid intake ($p = 0.240$, ml/day), or infusion ($p = 0.097$, ml/day), but fluid output ($p = 0.018$, ml/day) and diuresis ($p = 0.016$, ml/day) were higher in hyponatraemia. Hypernatraemia was connected with more cerebral complications ($p = 0.001$), worse Glasgow Outcome Scale upon discharge from NNICU ($p = 0.002$) and higher mortality in the NNICU ($p = 0.001$), but it arose with significantly lower Glasgow Coma Scale ($p = 0.001$).

CONCLUSION. In accordance with literature the results of our study showed that the majority of patients with acute brain diseasess had hyponatraemia, but hypernatraemia was prognostically more serious.

0312

THE APPLICATION OF OPTIC NERVE SONOGRAPHY IN THE EVALUATION OF ADULT BRAIN INJURY

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INTRODUCTION. An increase of the optic nerve sheath diameter (ONSD) may be noted in brain-injured patients with elevated intracranial pressure (ICP). We evaluated whether ONSD measurements were correlated with simultaneous non-invasive and invasive measurements of the ICP in brain-injured adults.

METHODS. From the 68 intensive care patients (51 males, 48 ± 19 years old) who participated in the study, 46 suffered from brain injury, while 22 had no intracranial pathology and served as controls. All brain-injured patients were evaluated clinically (Glasgow Coma Scale, GCS) and by a semi-quantitative (I to VI) neuroimaging scale (Marshall Scale, MS), and they were further divided into subjects with moderate (MS = I and GCS > 8, n = 17) and severe (MS = II to VI and GCS ≤ 8, n = 29) brain injury. All patients underwent non-invasive measurements of the ICP (eICP) by transcranial Doppler sonography, and synchronous ONSD measurements by optic nerve sonography. Additionally, invasive ICP measurements by an intraparenchymal catheter were performed in patients with severe brain injury.

RESULTS. ONSD and eICP were both significantly increased (6.2 ± 0.7 mm and 26.0 ± 8.4 mmHg, respectively, $P < 0.0001$) in patients with severe brain injury as compared to patients with moderate brain injury (4.3 ± 1.2 mm and 12.1 ± 3.7 mmHg, respectively) and to controls (3.6 ± 0.6 mm and 10.4 ± 3.1 mmHg, respectively). Furthermore, in patients with severe brain injury the ONSD measurements were strongly correlated to the eICP values ($r = 0.80$, $P < 0.0001$), as well as to the neuroimaging scale results ($r = 0.83$, $P < 0.001$). In the patients with severe brain injury the ONSD measurements correlated to the invasive ICP values ($r = 0.67$, $P = 0.004$). The best cut-off value of ONSD for the prediction of elevated ICP was 5.7 mm (sensitivity 78.3%, specificity 100%).

CONCLUSION. In adult brain injury the ONSD measurements correlate with non-invasive and invasive measurements of the ICP. Optic nerve sonography may alert clinicians for the presence of elevated ICP, whenever invasive ICP evaluation is contraindicated and/or is not available.

0313

SPECIFIC PATTERN OF NEUROHUMORAL DISORDERS AND HEMODYNAMIC CHANGES AFTER HYPOTHALAMIC AND BRAIN STEM SURGERY

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INTRODUCTION. Some researchers (1) believe that haemodynamics disorders at focal lesions of hypothalamic and brain stem structures are initiated by specific neurohumoral disturbances. We hope, that the understanding of these mechanisms will help with optimisation of postoperative management of patients after hypotalamic and brain stem surgery.

METHODS. Cardiac output by means of echocardiographic method, and humoral parameters was investigated by fluorometric and radioimmunologic methods in 1–7 day after operation in 139 patients after hypothalamo-pituitary and 148 patients after brain stem surgery.

RESULTS. We consider that unfavorable hemodynamics changes may be used as prognostic criteria of severe damage of regulatory centers in hypothalamus or brain stem. The main character of unfavorable type of hemodynamic was decrease of cardiac output (CO). However, the causes of this decrease are quite different. In case of severe damage of hypothalamus the decrease of CO is connected with decreased of blood volume and the last is connected with decrease of vasopressin secretion. As have shown our researches at lesions of dif-ferent structures of a hypothalamus and a brainstem observed specific changes of various neurohumoral systems. In case of severe damage of dorsomedial part of medulla oblongata the reason of decease of CO is a primary neurogenic cardiac insufficiency. In cause of severe damage of hypothalamic structures we see increasing the amplitude power spectral density (PSD) of respiratory periodic of heard rate variability (HRV), decreasing the amplitude of low frequency peak and very high degree of coherence between HRV and respiratory variability. In cause of severe damage of brain stem structures on the PSD of HRV we can see low frequency components only (Fig. 1). We postulate that these differences of HRV showed that in all causes the hemodynamics disturbance a new inadequate type of cerebral regulation of hemodynamic forms.

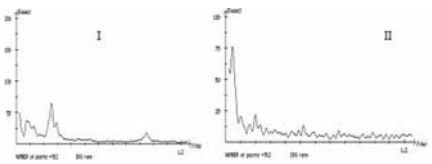

Fig. 1. PSD of HRV after hypothalmic (I) and brain stem (II) surgery.

CONCLUSION. Our investigation showed that disorders of a neurohumoral regulation at focal lesions of a hypothalamus and a brain stem have specific character. Therefore the intensive care should be carried out with the count of feature of these changes should be directed on regeneration of a normal humoral pattern.

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0314

THE RENAL EFFECT OF REPLASMAN FLUIDS IN CONTROLLED SEVERE HEMORRHAGIC SHOCK: AN EXPERIMENTAL STUDY

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INTRODUCTION. Allogeneic blood resuscitation is the major treatment modality in hemorrhagic shock. Plasma expanders are used when blood can not be obtained. The type and quantity of fluid to administer for resuscitation after hemorrhagic shock is controversial. The aim of this study was to examine the effects of resuscitation with lactated Ringer's (LR), hydroxyethyl starch 6% (130/0.4) (HES) and LR + HES on renal function in rabbit model of hemorrhagic shock.

METHODS. Twenty-four New Zealand rabbits were included in the study. Controlled hemorrhagic shock (CHS) was constituted by keeping mean arterial blood pressure 35 mmHg and blood lactate > 4 mM/L. The CHS was permitted to last 30 minutes; then group-1 rabbits (control, $n = 6$) were not resuscitated, but the study rabbits' resuscitation was initiated with LR (three times of lost blood volume) (group-2, $n = 6$), HES (equivalent to blood lost) (group-3, $n = 6$) or LR (1.5 times of lost blood volume) + HES (half of the lost blood volume) (group-4, $n = 6$). Blood samples were collected from all rabbits before and 30 minutes after CHS. In the study rabbits, blood samples were also collected at the end of the resuscitation and two hours later. Histopathologic evaluation was performed by light microscope. Glomerular function was determined by serum BUN, creatinin and cyctatin-C, tubular functions by alpha (1)-microglobulin and urine N-acetyl-beta-glucosaminidase (NAG), cellular damage by lactate dehydrogenase (LDH). IL-6 and TNF-alpha; were measured to determine whether treatment fluids for resuscitation had any pro-inflammatory effect.

RESULTS. In all groups, while creatinin levels were constant, BUN, LDH and alpha (1)-microglobulin levels were increased as statistically comparing to the beginning and time points ($p < 0.05$). Cyctatin-C levels were increased after the CHS ($p < 0.05$) but, returned to normal two hours after the resuscitation. Urine NAG levels were statistically insignificant increased in the study groups ($p > 0.05$). IL-6 and TNF-alpha; levels were increased in all rabbits after the CHS. There were not any significant differences among the study groups after the resuscitation ($p > 0.05$). In the histopathological evaluation of the kidneys, there were no statistically significant differences for histological imaging, leukocyte infiltration in interstitial tissue and glomerular congestion among the four groups ($p > 0.05$).

CONCLUSION. The characteristic ultrastructural features of hemorrhagic shock appear to be severe tubular degeneration and mild to moderate changes in glomeruli. We did not observe any additional harmful effect of resuscitation of hemorrhagic shock with LR, HES or LR + HES on renal function in rabbits. The high levels of IL-6 and TNF-alpha; observed after the shock might indicate that hemorrhagic shock caused systemic inflammatory response. Resuscitation of CHS with LR, HES or LR + HES did not any additional effect on these levels of IL–6 and TNF-alpha. HES 6% (130/0.4) did not have a harmful effect on kidney, when it used alone or combination with crystalloid for resuscitation of CHS in rabbits.

0315

SEVERITY OF NEUROENDOCRINE DYSFUNCTION AFTER HEAD TRAUMA

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INTRODUCTION. Neuroendocrine dysfunction (ND) is a major side effect of head trauma. Endocrine disturbances may be caused by compression of the hypothalamic–pituitary complex by hemorrhagic local tissue pressure changes, toxic effects of the extravasated blood, ischemia caused by vasospasm, high intracranial pressure, and local destruction (1). This study examines the severity of neuroendocrine abnormalities in patients after traumatic brain injury.

METHODS. 25 men (mean age 38 ± 15) admitted at intensive care unit (ICU) were studied in the immediate post-trauma period. All patients included in the study had a Glasgow Coma Scale (GCS) < 7. Hormonal assessment included measurement of cortisol, corticotropin, free tiroxin (fT4), thyrotropin (TSH), and testosterone (T). Women were exluded because prolactin and estradiol could not be evaluated by laboratory at that time. Data were collected two times: 1) after 3 days from ICU admission at basal time (T1); 2) subsequently, 100 microgramms human corticotropin releasing hormone (hCRH) was intravenously administered and, 30 min later, a second blood sample was used for titrations of hormones. PRAM (Pressure Recording Analytical Method) (2) was used to calculate the cardiac index (CI) and the systemic vascular resistances (SVR).

RESULTS. 18 patients showed a ND (i.e. nonresponders patients): 8 had cortisol hyporesponsiveness (peak cortisol concentration less than 20 mcg/dl following hCRH), 7 had hypothyroidism (low fT4 values with normal or low TSH), and 3 had hypogonadism (low T values). Age and GCS were similar for responders and nonresponders. Nonresponders showed higher CI values ($3{,}2 \pm 0{,}8$ vs $2{,}8 \pm 1.0$ l/min/m2, $p = 0.3$) and significant lower SVR (700 ± 150 vs 1100 ± 220 dyne*sec/cm5, $p < 0.01$). Nonresponders also needed a higher vasopressor support (14/18 vs 1/7, $p < 0.05$). Mortality was similar for both groups.

CONCLUSION. Our findings suggests that a certain degree of ND occurs with high frquency in critically ill patients with head trauma during the early recovery period. In addition, hormonal secretion following dynamic stimulation is insufficient in most brain injured patients whose hemodynamic state is associated with vasopressors dependency to increase SVR. Further studies should determine whether ND may have implications for clinical outcome.

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0316

OBSERVATIONAL STUDY FOR EVALUATION OF RISK FACTORES TO DELIRIUM IN AN INTENSIVE CARE UNIT IN BRAZIL

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INTRODUCTION. Delirium is a neurobehavioral syndrome caused by a reversible break in the cerebral homeostasis. In recent studies, Delirium has been related to worse prognosis, including greater mortality. Several risk factors have been reported, most of which in medical-surgical intensive care units. The goal of this study was to evaluate the prevalence of delirium in this unit and to identify risk factors associated with its development.

METHODS. One prospective coort including data colected during 16 consecutive days. The explanatory variables searched were: age, sex, Apache II, UCI stay, presence of previous cognitive disorder, neuromuscular disease, sensorial disorder (visual and hearing), use of sedative or analgesic drugs, Diabetes Mellitus, Hypertensive Vascular Disease, Chronic Renal Disease, Chronic Pulmonary Obstrutive Disease, Immobility, alcoholism, smoking, use of mechanical ventilation, illicit drug abuse, fluid and eletrolyte disorders, acid-base disorders, pain, evidence of brain injury in image exams, eletroencefalogram alterations and Glasgow Coma Scale (GCS). The continuous variable was presented as average and confidence interval of 95% (CI), with normal distribution (Test of Kolmogorov-Smirnov), while the categorical variable, as ratio and its respective CI. The univariavel analysis was lead through the t-independent test and qui-square, as appropriate and the multichangeable analysis was carried out through multiple logistic regression models of the step-wise type.

RESULTS. 676 consecutive observations of 45 patients, in a 16 day period, were carried out. 18 of these patients presented Delirium during the study window, a 40% incidence (CI = 25- 35%). The average age in the control group was 59 years, (CI = 50 - 67 years). In the delirium group, the average age was 78 years, (CI = 78- 84 years). Apache II average in the control group was 13 (CI = 10–17). In the delirium group the average was 16 (CI = 13–20). 29% of the control group was Male, as 16% of the patients with delirium. None of the evaluated variables was demonstrated significant differences between the control group and the dellirium group. Among the diagnosis, the most frequent (31%) was of surgical patients, followed by pneumonia (18%) and sepsis (4%). Among the risk factors studied, only age was an independent risk factor with an odds ratio (OR) of 1.07% for each year (CI = 1,029 – 1,13; p = 0,083).

CONCLUSION. During the 16 days of observation in our intensive care unit, there was a high prevalence (40%) of Delirium, and age was the greatest independent risk factor. We therefore suggest that elderly patients should constitute the target popularion for adoption of prevention strategies.

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0317

BRAIN NATRIURETIC PEPTIDE VALUE IN CEREBRAL SPINAL FLUID IN ACUTE SUBARACHNOID HEMORRHAGE. RESULTS OF PRELIMINARY STUDY

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INTRODUCTION. The elevation of brain natriuretic peptide, NT-proBNP fraction, and troponin I (TnI) is frequent amongst patients with severe degrees of acute spontaneous subarachnoid hemorrhage (ASSH). Elevation of these parameters is related with myocardial damage and it may point towards a cardiac and/or cerebral origin (1). The objetive is to analyze if levels of NT-proBNP in cerebral spinal fluid (NT-proBNPcSF) in patients with ASSH correlate with serum NT-proBNP and TnI.

METHODS. Prospective study. Preliminary results. Data recorded during the last 13 months. NT-proBNPcSF, serum NT-proBNP and TnI were determined at least once in the first 48 hours after their admittance in ICU. Hunt-Hess, Fisher modified, Hijdra and Graeb scales were estimated after admission. All patients needed placement of an intraventricular catheter once in the ICU.

RESULTS. Eight patients were included. Five women. Mean age 57 years. Hunt-Hess $\geq$ III, Fisher modified IV and Graeb $\geq$ 9 were present in all cases. Five had a Hijdra $\geq$ 15. Mean concentrations of serum NT-proBNP and NT-proBNPcSF were 1540,37 pg/ml y 108,01 pg/ml respectively. Mean concentration of TnI 2,03 µg/L. Highest levels of NT-proBNPcSF did not correlate with the highest levels of serum NT-proBNP and TnI. We observed that high levels of TnI correlated with high levels of NT-proBNPcSF. Scores in the Hijdra scale $\geq$ 15 were not associated with high levels of NT-proBNPcSF.

CONCLUSION. In our serie, values of NT-proBNPcSF did not correlate with the concentration of serum NT-proBNP and TnI, neither with the amount of blood in the subarachnoid space (Hijdra scale). This finding could suggest again, a cardiac origin of this peptide.

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0318

BRAIN CATHETERIZATION FOR NEUROMONITORING - BEDSIDE PROCEDURE INSIDE INTENSIVE CARE WARD

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INTRODUCTION. This is a review of our experience regarding the bedside insertion of neuromonitoring catheters and the respective data registration.

METHODS. During the past three years, 36 traumatic brain injury (TBI) patients and 6 patients with spontaneous intracerebral hemorrhage were monitored by intracranial intraparenchymal neuromonitoring catheters (intracranial pressure – ICP, brain tissue oxygen – PtiO2 and biochemical brain monitoring – microdialysis). The catheters were placed at the bedside in the ICU, via a 5.3 mm burr hole using a three – lumen cranial bolt.

RESULTS. The method has been proven easy to perform and safe. In one case the catheter was contaminated with Staphylococcus Epidermidis. Anyway, there was no clinical infection noticed that could be attributed to the procedure or to the catheters. In two cases, there were marked traumatic contusions attributed to the catheter insertion. The contusions were located in the left frontal lobe, measuring less than 2 cm. None of the patients presented focal neurological deficits attributed to these contusions. Material failure was present in three cases, one involving the ICP probe and two concerning the microdialysis catheter. Problems are related to the quantity of the registered data because of insufficient number of ICU nursing personnel. The microdialysis measurements are carried out by the duty doctors.

CONCLUSION. Our experience proves that the bedside insertion of neuromonitoring catheters in ICU patients is simple and safe, providing at the same time valuable information for the prognosis and management of these patients. However, the method's optimal usefulness requires either specialized nursing personnel dedicated to the data registration or the on-line data registration.

0319

CLINICAL DECISIONS BASED ON MICRODIALYSIS IN BRAIN TRAUMA

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INTRODUCTION. The purpose of treatment in acute head injury patients is to prevent secondary brain damage. Surgical and intensive care treatment based on multimodal neuromonitoring are essential for outcome. We present our recent experience in 29 patients with severe traumatic brain injury (TBI) monitored by three intracranial catheters (intracranial pressure- ICP, brain tissue oxygen- PtO2 and microdialysis). Various clinical decisions were taken during treatment of these patients, based on data provided by microdialysis, in association with the other monitoring parameters, the clinical and radiological evaluation.

METHODS. 29 (25 male and 4 female, 36 yrs average) ICU patients with severe TBI were submitted to multimodal neuromonitoring (ICP, PtO2 and microdialysis) using intraparenchymal brain catheters. Catheters were inserted via a 5.3 mm burr hole using a three – lumen cranial bolt. The procedure took place inside ICU board. Tips of catheters were guided 12–35 mm inside the white matter of the non – dominant frontal lobe or near the penumbra of the largest contusion.

RESULTS. After emergency measures, patients underwent various treatments (sedation only, barbiturate coma, or decompressive craniectomy) according to the neuromonitoring data. We particularly focus on cases that microdialysis determined the kind of treatment: e.g prolongation of barbiturate coma based on lactate/pyruvate (L/P) ratio improvement prior to ICP reduce, early detection of CNS infection and choise of conservative versus surgical treatment in cases of traumaic intracerebral hematomas.

CONCLUSION. Multimodal neuromonitoring with microdialysis seem to be safe, reliable and useful tool in the treatment of TBI patients. In particular, data provided by microdialysis seem to be helpful taking appropriate clinical decisions.

0320

DYNAMICS OF MATRIX METALLOPROTEINASE-9 AFTER BRAIN TRAUMA, ITS RELATION TO S100-B LEVELS. PRELIMINARY RESULTS

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INTRODUCTION. Blood-brain barrier dysruption contributes to brain oedema develpoment and therefore to increased intracranial pressure that negatively affected brain tissue perfusion. Mediators acting in the blood-brain barrier disruption are, among others, matrix metalloproteinases, degrading components of extracellular matrix. Experiments in animal models demonstrated the importance of matrix metalloproteinase-9 for brain injury development in various pathologic conditions.

There is a limited number of human studies monitoring the levels of MMP-9. A study in ICU patients showed increased MMP-9 levels in the first day following the brain trauma. On the other hand, correlation of S100-b to the severity of brain injury and outcome quality is well proven and therefore it is a useful marker of severity of injury and outcome prognosis.

METHODS. Study included patients who sustained either an isolated head injury or a head injury as a part of major trauma, and required intensive care (GCS $\leq$ 8 at the time of admission). All patients were treated according to Brain Trauma Foundation guidelines. Catheter into the dominant jugular bulb was inserted instantly after admission to the department.

Blood samples were taken from jugular bulb and radial or femoral artery immediately after insertion of jugular catheter, 18 hours after trauma and then each 24 hours till the 9th posttraumatic day. Levels of matrix metalloproteinase 9 in jugular blood and S100-b in arterial blood were assessed by ELISA.

RESULTS. Twelve patients (10 men) with a brain trauma were enrolled into the study. Two patients died before the end of the monitored period.

Obtained data show highly elevated MMP-9 levels in jugular blood immediately after the trauma, followed by a gradual decrease till the 3rd day. In 4 patients, subsequent increase of MMP-9 levels between 3. – 5. day was observed. Highest S100-b levels were observed during first 24 hours with maximum 18 hours after the trauma, the elevated levels then decreased during the following period. Among patients with secondary increase of MMP-9, no significant increase of S100-b levels was observed.

CONCLUSION. Elevated levels of MMP-9 in early posttraumatic period, with a subsequent decrease were observed in critical care patients sustaining a severe brain trauma. The increase of MMP-9 levels in the 3rd to 5th day observed in 4 patients can be related to a secondary brain injury and thus matrix metalloproteinase 9 can contribute to the development of a secondary brain injury by increasing the blood-brain barrier permeability. On the other hand, discrepancy between levels of MMP-9 and S100-b was observed, when increase of MMP-9 levels did not correlate with S100-b levels. Further research is now going on to evaluate significance of these findings.

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0321

INFLUENCE OF INTRACRANIAL PRESSURE MEASUREMENT ON THE OUTCOME IN PATIENTS WITH INTRACRANIAL HEMORRHAGE

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INTRODUCTION. Intracranial hypertension is one of the most relevant factors of secondary ischemic brain injury. Intracranial pressure measurement helps to distinguish the intracranial hypertension and is widely used in patients with GCS 3-8. But in spite of that fact the necessity of ICP monitoring and its influence on the outcome is still under discussion. We compared the outcome in patients with and without ICP monitoring.

METHODS. During 2005 – 2007 years we investigated 94 patients with intracranial hemorrhage and GCS 3-8 on admission to ICU. 38 had severe traumatic brain injury, 56 - arterial aneurism ruptures. All patients were operated and treated in neurosurgical ICU. ICP monitoring was used in 43 cases ("ICP" group). 51 patients were treated without ICP monitoring ("Control" group). Outcome was assessed by Glasgo Outcome Scale (1- good outcome, 5 – death).

RESULTS. GOS 1-2 was noticed in 14 patients (33%), 3–4 in 3 patients (7%) and 5 in 26 patients (60%) in "ICP" group. Frequency of good outcomes in "Control" group was lower than in "ICP", but number of bad outcomes was the same in both groups. GOS 1–2 was in 11 patients (22%), 3–4 in 9 patients (18%) and 5 in 31 patients (60%) in "Control" group.

CONCLUSION. Intracranial pressure monitoring increases the number of good outcomes and decreases the frequency of severe disability in patients with intracranial hemorrhage.

0322

DECOMPRESSIVE CRANIECTOMY - 5 YEAR EXPERIENCE IN A PAEDIATRIC INTENSIVE CARE UNIT

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INTRODUCTION. Raised intracranial pressure (ICP), following traumatic or non-traumatic brain injury, is a serious complication that requires urgent therapeutic measures. Some studies have shown the benefit of decompressive craniectomy (DC), and the role of early timing as been emphasized, but the subject continues to be discussed.

METHODS. Retrospective study, through revision of clinical records of patients submitted to DC between January 2003 and January 2008.

RESULTS. We report 8 patients, aged between 13 months and 14 years (median: 9 years), admitted with severe traumatic brain injury (3), non-traumatic intracranial haemorrhage (3), embolic stroke (1) and acute ischemic event in the setting of pneumococcal meningitis (1). Mean GCS on admission was 7 (range: 3–15). Computed tomography scan on admission showed unilateral lesion in 4 cases, unilateral lesion plus oedema in 2 and bilateral lesion plus oedema in 2. Medical treatment was optimised and an ICP monitoring catheter was placed in all patients (4 pre-DC and 4 during DC).
Early DC (< 12 h) was performed in 5 patients (Group A) and late DC (> 12 h) in three (Group B). All patients had a reduction in ICP (average 18,3 mmHg). At discharge, 5 patients presented a GCS > = 12, (Group A - 4; Group B - 1) and 2 presented a GCS < 12 (Group A - 1; Group B - 1). Median in-hospital stay was 26 days (range: 6–33 days).

We followed these patients to an average of 18 months, assessing the extent of long term disability through the KOSCHI scale. Two presented good recovery (group A), 3 moderate disability (Group A – 2; Group B - 1) and 2 severe disability (Group A - 1, Group B - 1). One patient died of acute leukaemia.

CONCLUSION. Our results suggest that DC should be considered as an early option in the management of refractory raised ICP. Close clinical and ICP monitoring, as well as prompt treatment are fundamental. Neurosurgical team experience is of the utmost importance.

Poster Sessions
Perioperative cardiac problems: 0323–0333

0323

RELEVANCE OF FACTOR XIII SHOULD BE RECONSIDERED - PREVALENCE OF FACTOR XIII DEFICIENCY AND PREDICTORS OF CLOT FIRMNESS AFTER CARDIAC SURGERY

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INTRODUCTION. Decreased clot firmness in thrombelastography may be associated with elevated blood loss. Platelets, fibrinogen and factor XIII are considered as main contributors to clot firmness. We investigated the incidence of decreased factor XIII, fibrinogen, factor II and platelets as well as the relative contribution of these factors to clot firmness after cardiac surgery.

METHODS. After IRB approval, 40 patients undergoing complex cardiac surgery procedures were prospectively enrolled in the study. Fibrinogen, factor XIII, factor II, platelet count and clot firmness using the Extem and Fibtem assay on a ROTEM thromboelastometer (Pentapharm) were determined after heparin removal. Prevalence of fibrinogen, factor XIII and factor II deficiency, thrombocytopenia and decreased clot firmness in thromboelastometry were analysed. Multiple linear regression with fibrinogen, factor XIII, factor II, platelet count, CPB duration and infused volume of colloids as independent variables was used to identify the significant contributors to clot firmness in extinsically activated, platelet inhibited thromboelastometry (Fibtem).

RESULTS. 78% of the patients showed mild (< 70%) and 38% severe FXIII-deficiency (< 50%). 50% had fibrinogen below 200 mg/dl and only one patient < 100 mg/dl. 55% had platelet count below 100/nl and 10% < 50/nl. Fibtem- clot firmness was pathologic (< 10 mm) in 88%, whereas only 45% showed decreased clot firmness in Extem (< 50 mm). Fibrinogen and FXIII significantly contributed to predicting clot firmness in Fibtem, however, analyzing only pathological results with maximum clot firmness < 10 mm, also the amount of infused colloids has been found as a significant predictor to clot firmness.

CONCLUSION. Thrombocytopenia (< 50 G/l) and hypofibrinogenaemia (< 1 g/l) were very rare findings. In contrast, we detected severe FXIII deficiency (< 50%) in 38% of the patients. The discrepancy between the low incidence of fibrinogen deficiency and the frequent occurrence of decreased clot firmness in Fibtem suggests that disturbance of in vitro fibrin generation occurs despite only mild decrease of plasma fibrinogen after complex cardiac surgery.

FXIII deficiency is obviously under-recognized as a reason for coagulopathy after high risk cardiac surgery. Furthermore, factor XIII is a significant predictor of clot firmness in both extrinsically and platelet inhibited thrombelastometry and should be considered in the therapy of severe coagulopathy after cardiopulmonary bypass. Finally, colloids influence Fibtem clot firmness and should be considered by interpreting pathological Fibtem results.

0324

POSTOPERATIVE COMPLICATIONS AFTER CORONARY ARTERY BYPASS GRAFT SURGERY IN ELDERLY PATIENTS

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INTRODUCTION. Elderly individuals are the fastest growing age group in Brazil, and heart disease is their leading cause of hospitalization and death. As a result, increasing numbers of elderly patients are undergoing coronary artery bypass graft surgery (CABG). The purpose of this study is to describe clinical features, length of stay (LOS), complications and short term outcomes after CABG in elderly patients.

METHODS. From February 2005 to October 2007, 269 patients underwent CABG surgery. Demographics, comorbidities, prognostic scores, CABG elective vs urgent indication, ICU length of stay (LOS), postoperative complications and ICU mortality were recorded. Intraoperative characteristics, such as total surgery time, use of bypass device, on-pump time, urine output, fluid balance, use of blood products and number of grafts, were analyzed. Patients were divided in 4 age groups: < 60 (n = 68), 60 to 69 (n = 86), 70 to 79 (n = 93) and older than 80 years (n = 22).

RESULTS. Octogenarian patients underwent more frequently CABG combined with valve replacement, urgent surgery, and stayed longer in the ICU ($p < 0.01$). The incidence of at least 1 postoperative complication was also higher among patients older than 80 ($p < 0.001$). The main present complications in the elderly were: atrial fibrilation, LV failure, thoracic bleeding, pneumonia, and elevation of serum creatinine. Multivariate analysis identified age and on-pump time as independent risk factors for development of complications. Mortality increased in patients older than 70 years ($p = 0.03$).

TABLE 1 COMPARISON OF POSTOPERATIVE CABG PATIENTS WITH OR WITHOUT COMPLICATIONS

	Without complications	At least one complication	p value
Age (years)	64.3 ± 10.1	70.2 ± 9.7	< 0.001
Older than 80 y (%)	6 (3.7)	16 (14.7)	0.002
Ejection fraction (%)	66.1 ± 10.8	61.3 ± 14.5	0.003
Urgent surgery (%)	51 (32)	52 (47.7)	0.01
On-pump time (min)	80.4 ± 22.7	100.7 ± 36.9	< 0.001
Perioperative transfusion (%) (Red cells)	44 (27.7)	56 (51.4)	< 0.001
APACHE II (points)	9.7 ± 4.2	13.4 ± 6.2	< 0.001
Euroscore (points)	3.3 ± 2.7	5.9 ± 3.6	< 0.001
ICU length of stay (days)	2.4 ± 1	5.3 ± 8.1	< 0.001
ICU mortality (%)	0	11 (10)	< 0.001

CONCLUSION. Octogenarian patients undergoing CABG have longer ICU LOS, incidence of complications and mortality. Age and on-pump time were independent risk factors associated with the incidence of postoperative complications.

0325

AFFECT OF REVASCULARIZATION TO DYSFUNCTIONAL BUT VIABLE MYOCARDIUM ON PERIOPERATIVE HEMODYNAMICS AND MORBIDITY; ASSOCIATION WITH MYOCARDIAL REPERFUSION INJURY

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INTRODUCTION. Myocardial viability is divided into three categories (viable, dysfunctional but viable, nonviable). Many thoracic surgeons undergo revascularization to nonviable myocardium with CABG on the belief that the dysfunctional but viable myocardium may show functional recovery after CABG. However, revascularization to dysfunctional but viable myocardium with percutaneous coronary intervention may induce arrhythmia which is thought to be the consequence of reperfusion injury. Myocardial reperfusion injury occurs after revascularization of ischemic myocardium and manifests as arrhythmia, functional impairment and accelerated progression of cell death.

We hypothesized that revascularization to dysfunctional but viable myocardium might affect the perioperative outcome of CABG, mainly reperfusion arrhythmia.

METHODS. Viability evaluation with preoperative single photon emission-computed tomography (SPECT) completed patients for 3 years were examined retrospectively. Dysfunctional but viable myocardium was determined when persistent perfusion defect was noted in delayed and 24 hr SPECT images. Viable group (n = 159) and dysfunctional but viable group (n = 24) were studied. The perioperative outcome during intensive care unit (ICU) stay was assessed by 1) occurrence of rhythm disturbance (atrial fibrillation/flutter or ventricular tachycardia), 2) use of continuous epinephrine infusion to maintain mean arterial pressure above 60 mmHg, 3) intra-aortic balloon pump (IABP) insertion with predetermined insertion criteria and 4) peak serum CK-MB and troponin-I to evaluate the accelerated progression of cell death. Intubation time and ICU stay were also documented.

RESULTS. During the period 183 patients were completed resting, delayed and 24 hr SPECT. Demographic data (gender, age, left ventricular ejection fraction, NYHA classification) showed no difference. Dysfunctional group showed higher incidence of rhythm disturbance. Although intubation time showed no difference, ICU stay of dysfunctional group was longer than viable group. There were no difference in terms of epinephrine and/or IABP use, peak serum CK-MB and troponin-I level between the groups.

CONCLUSION. Revascularization to dysfunctional but viable myocardium was associated with higher incidence of postoperative arrhythmia which may be due to the myocardial reperfusion injury and longer ICU stay.

0326

SUBLINGUAL LISINOPRIL IN AN ICU PATIENT WITH HEART FAILURE AFTER COMPLETE STOMACH AND INTESTINAL RESECTION

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INTRODUCTION. Sublingual administration of drugs is an alternative in patients unable to absorb orally administered drugs, in whom intravenous administration outside intensive care setting is not feasible(1). To our knowledge, neither data on the use of sublingual lisinopril are available, nor has the effect on the angiotensin-II (AT-II) levels been studied. We describe the effect of sublingual lisinopril administration on AT-II levels in a 44-year-old woman admitted to the in-tensive care unit with heart failure after complete resection of the stomach and intestines because of transmural ischemia.

METHODS. AT-II plasma levels were measured prior to, and 1 and 3 hours after, 20 mg lisinopril sublingually once daily (sid) and compared to AT-II plasma levels measured after a single 2 mg dose of intravenous enalaprilat and twice daily (bid) 25 mg sublingual captopril administration. Prior to the study informed consent was obtained from the patient.

RESULTS. AT-II plasma levels after sublingual administration of lisinopril were comparable to the levels found after sublingual captopril and intravenous enalaprilat administrations. Throughout the treatment period AT-II levels after lisinopril administration remained consistently low (Table 1). The tablets were well tolerated when administered sublingually. Side effects, such as headache, dizziness, itching cough or any negative effects on taste were not reported.

TABLE 1 TIME COURSE OF AT-II PLASMA LEVELS

Time after administration (h)	AT-II levels (pmol/l)					
	Enalaprilat 2 mg sid	Captopril 25 mg bid		Lisinopril 20 mg sid		
	Day 1	Day 1	Day 2	Day 1	Day 2	Day 5
T = 0	8.1	8.2	5.2	4.4	4.4	5.0
T = 1	6.4	7.9	3.8	5.2	4.2	3.1
T = 3	3.3	9.4	3.7	4.3	4.4	4.9

CONCLUSION. This case report is the first to demonstrate that sublingual administration of 20 mg lisinopril sid resulted in AT-II plasma levels comparable to the levels seen after a twice daily regimen of sublingual captopril and a single intravenous dose of enalaprilat. An advantage of lisinopril is that the drug can be administered once daily, thereby increasing compliance to the drug. As evidenced by the case presented sublingual administration of lisinopril can be of great benefit for selected patients who are not able to absorb orally administered ACE-inhibitors and in whom intravenous administration of the drug outside intensive care setting is not recommendable.

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0327

ULTRASOUND GUIDANCE IN CENTRAL VENOUS CATHETERIZATION: WHICH TECHNIQUE SHOULD WE USE?

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INTRODUCTION. According to many randomized trials and many meta-analyses, ultrasound (US) guided insertion of central venous catheters (CVC) reduces the % of failure, the average access time, the number of attempts before success, the % of accidental arterial puncture, the % of mechanical complications (haematoma, haemothorax, pneumothorax), as well as the overall cost of the procedure; its use is strongly recommended by guidelines and consensus statements of many clinical associations. Nonetheless, though many US guided approaches to cannulation of central veins have been described, it is still unclear which one is preferable.

METHODS. From Jan 2007 to Dec 2007, we adopted the following protocol for non-emergent central venous catheterization: the internal jugular vein (IJV), the innominate or brachiocephalic vein (BCV), the subclavian vein (SV) and the axillary vein (AV) were evaluated on both sides, to assess position, dimension, and other pathophysiologic features; on this basis, a decision was made whether to go on with any of the following US guided approaches: (1) low lateral 'Jernigan' approach to the IJV, (2) lateral approach to the BCV, (3) supraclavicular approach to the SV, (4) infraclavicular approach to the SV or AV. The 'axial' or 'central' approach to the IJV was excluded, since it is associated with a difficult management of the exit site and increased risk of infection. Correct position of the tip was controlled either by intraoperative EKG guidance or by post-operative chest X-ray.

RESULTS. 607 central venous lines were inserted in 625 adult patients; the chosen approach was the BCV in 360 cases, the IJV in 203 cases, the supraclavicular SV in 32 cases, the infraclavicular SV or AV in 12 cases.

In 2 cases of IJV puncture, in 4 cases of supraclavicular SV, and in 2 cases of infraclavicular SV/AV, after the first attempt the operator decided to shift to another approach (BCV in most cases, except one shift to the controlateral IJV). Overall complications were: complete failure 0%; pneumothorax 0%; hemothorax 0%; accidental arterial punture 1%(6 cases: 5 in the IJV approach, one with the supraclavicular SV approach); hematoma 0%; malposition 0.6% (4 cases, all from the left side, 2 with the IJV and 2 with the infraclavicular SV/AV).

CONCLUSION. (a) The ultrasound based approach to the central veins is characterized by an overall minimal incidence of complications; (b) preoperative US evaluation of the venous anatomy allows to choose the central venous approach most likely to be easy and successful; (c) the US guided cannulation of the BCV appears to be associated with the best chance of success and the least risk of insertion-related complications.

0328

IMPACT OF CPB AND CARDIOPLEGIA ON VENTRICULAR LATE POTENTIALS IN PATIENTS SUBMITTED TO VALVULAR SURGERY

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INTRODUCTION. Ventricular late potentials (LP) represent slow and inhomogeneous conduction within areas of damaged or ischemic myocardial tissue. Their recording with signal-averaged ECG (SAECG) allows identifying patients presenting a risk of sudden death and ventricular tachycardia. Cardiac surgery with cardiopulmonary bypass (CPB) has been incriminated in the development of an ischemic suffering probably related to imperfect cardioplegia. To our knowledge no study investigated the impact of the cardioplegia on the occurrence of LP in patients without coronary disease and undergoing valvular surgery involving CPB.

METHODS. We included 61 elective patients scheduled for cardiac surgery involving CPB and further admitted in our surgical intensive care unit. An SAECG was performed the day before and 24 to 48 hours after the surgery. The position of the electrodes was made according to Frank's orthogonal derivations. The root-mean square (RMS) voltage of the terminal 40 ms of the filtered QRS complex, the duration of the filtered QRS complex and the duration of the low-amplitude (< 40 μV) signals in the terminal portion of the QRS were recorded. All measurements were performed by the same investigator and were furthermore studied by another investigator not involved in the data collection. McNemar's tests were performed on the dichotomized values to investigate whether there were differences in pre-post scores.

RESULTS. 25 patients were excluded because of bad quality signals. Finally 36 patients (age, 64 ± 14) were analysed. The mean CPB duration was of 174 ± 60 minutes. An abnormal SAECG was considered when ≥ 2 of the recorded indexes were present. The results showed that patients scheduled for valvular surgery do not exhibited LP after CPB (no significant difference in pre-post CPB scores, NS). The probability of a patient with a negative score transitioning to a positive score was 0.23.

CONCLUSION. Our preliminary results tend to demonstrate that cardioplegia associated to CPB is safe and has no impact on the occurrence of LP after cardiac valvular surgery.

0329

INTERVENTIONS ON PREVENTION OF ATRIAL FIBRILLATION AFTER OPEN HEART SURGERY

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INTRODUCTION. Postoperative atrial fibrillation (pAF) is one of the most common complication of cardiac surgery. The incidence of this complication in our Postoperative Control Unit was higher than the one described in recent literature. An specific prophylactic protocol based on the last guidelines published was implemented.

METHODS. Prospective not randomized study of 166 consecutive patients undergoing cardiac surgery from January the 1st to June the 30 of 2007 (166 patients) after the new prophylaxis protocol was implemented. Collected date were compared with an historical cohort from 1/I/2006 to 30/VI/2006 (146 patients). The primary outcome was verify if the fulfillment of this protocol could reduce the incidence of pAF. As secondary outcomes we studied the existence of predicting factors of pAF development, ICU and Hospital length of stay and the appearance of postoperative complications related or not with the protocol implemented.

RESULTS. We found a significant reduction of pAF in the global of patients (36.3% vs 49.5%; $p = 0.004$) and also in the different surgery subgroups (26.8% in revascularization surgery group vs 41.8% in control group and 37.8% in valvular surgery group vs 62.9% in the control group).

TABLE 1 PFA INCIDENCE

	Control Group	Protocol Group	P	RR	CI (95%)
ICU pAF	30,5%	19,8%	0,059	0,565	0,311 - 1,027
Intrahospital pAF	36%	12%	0,00	0,242	0,123 - 0,477
Global Surgery pAF	49,5%	31,3%	0,004	0,46	0,27 - 0,79
Revascular. surgery pAF	41,8%	26,8%	0,04	0,511	0,25 - 1,01
Valvular Surgery pAF	62,9%	37,8%	0,026	0,356	0,144 - 0,899

The patients who didn't develop atrial fibrillation had a significant reduction in the incidence of postoperative complications and also Hospital and ICU length of stay, nevertheless there was no significant differences between the protocol and control groups. Secondarily we identified advanced age and valvular surgery as pAF risk factor in our Control Group.

CONCLUSION. Atrial fibrillation is a common but potentially preventable complication after cardiac surgery and the use of our specific prophylactic protocol significantly reduce the incidence of pAF globally and in both types of surgery without reducing neither postoperative complications nor Hospital and ICU length of Stay.

0330

A NEW TECHNIQUE FOR INTRACAVITARY EKG GUIDANCE DURING POSITIONING OF CLOSED-END PICCS IN ICU: PILOT STUDY

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INTRODUCTION. Peripherally inserted central catheters (PICCs) are increasingly used in ICU, as an alternative option to standard central venous catheters (CVCs), particularly in patients with severe coagulation disorders or at high risk for bloodstream infection. EKG guidance is a safe, simple, effective and inexpensive method to control the tip position during and after insertion of both CVCs and PICCs, avoiding primary malpositions, repeated attempts at repositioning the tip and/or multiple chest X-rays. Nonetheless, up to now, such method has been regarded as not feasible in closed-end catheters (e.g. Groshong PICCs), as the distal valve isolates the saline column which acts as intracavitary electrode. We propose a modified EKG guidance technique which allows this procedure also with closed-end catheters.

METHODS. Six consecutive ICU patients requiring a PICC line have been studied. Exclusion criteria were atrial fibrillation or other supra-ventricular arrhythmias, and/or presence of a pace-maker. We used the Vygocard® (Vygon) device as the electrical transducer between the catheter (filled with standard 0,9% saline solution) and the EKG cable. The Vygocard transducer is part of a 3-way stopcock connected with the catheter and with a cable going to lead II of a standard EKG monitor: the saline column within the catheter replaces the conventional metal guidewire as intracavitary electrode. After ultrasound guided insertion in the basilic (first choice) or brachial (second choice) vein at mid-arm, the catheter is connected to an infusion line and continuous saline infusion is started, so to keep the distal valve open. Then the catheter is slowly advanced in the venous system while observing the morphological changes of the P wave, until the P wave gets the desired amplitude (one-half of the QRS complex), corresponding to the atrio-caval junction. All patients underwent a post-operative chest X-Ray (postero-anterior and lateral views): the atrio-caval junction was radiologically identified as 2 cm below the carina.

RESULTS. All six PICCs were successfully inserted. The "atrio-caval junction p-wave" was observed in 5 patients. In one case, the cardiac signal was disturbed by electrical artefacts and the patient was excluded. No primary malpositions were observed on chest X-Ray and all five catheter tips appeared to be at the atrio-caval junction on X-Ray films.

CONCLUSION. Even considering the limits of the small sample size, EKG guidance during closed end PICC placement seems technically feasible using the saline column method with continuous saline infusion. Larger studies are required to confirm the reliability and the accuracy of the method.

0331

FACTORS PREDICTING ICU SURVIVAL FOLLOWING EMERGENCY RUPTURED ABDOMINAL AORTIC ANEURYSM REPAIR

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INTRODUCTION. Ruptured abdominal aortic anaeurysms (AAA) are a surgical emergency with a high mortality and use of intensive care (ICU) resources. We performed a retrospective analysis of all patients presenting to a major UK tertiary referral centre in 2006 with a ruptured AAA. The primary aim was to highlight predictors of outcome to guide creation of ICU guidelines.

METHODS. This study was registered with the local Clinical Effectiveness Unit and did not require ethical approval. We interrogated the critical care and vascular surgery audit databases for all relevant patients. Data was collected on premorbid condition, peri-operative course and post-operative care on a specially designed proforma. Data was divided into survivor (S) and non-survivor (NS) groups based on survival at ICU discharge and analyzed for differences using SPSS 15.0. The ages were analysed using an independent samples T-test, categorical data was analyzed using Chi-squared with Fisher's Exact Test.

RESULTS. We identified 31 patients who presented with ruptured AAA in 2006. Four of these died during the initial surgery, 27 survived to ICU. Overall mortality was 45%. This represented 22 males and 5 females with average age of 72.9 years (range 58–88). Thirteen (48%) were transferred from other hospitals preoperatively. Overall ICU mortality was 37%. Of those who died 50% occurred in the first 48hrs. Of the 17 patients who survived to leave ICU 88% survived to hospital discharge and 66% had a hospital stay of under 30 days.

There were no significant differences between the two groups in any pre-existing condition such as age (average age SG 71.2 vs NSG 75.8 years, $p = 0.123$) or comorbidity (heart, lung, neurological or renal disease, arrhythmia or diabetes mellitus, $p > 0.1$ for all).

There were numerous perioperative events in both groups, however massive transfusion was significantly associated with poor outcome ($p = 0.026$).

In the post-operative period requirement for triple inotropic support occurred significantly more frequently in the NS group ($p = 0.046$). Early unplanned return to theatre strongly predicted poor outcome ($p = 0.004$). When subdivided into respective causes this significance was maintained for patients who returned to theatre for bleeding ($p = 0.014$) or ischaemic bowel ($p = 0.046$), but not for those undergoing embolectomy ($p = 1$). None of the patients with secondary bleeding or ischaemic bowel survived and 71% had received massive transfusion. All the patients with ischaemic bowel had a preceding period with raised intra abdominal pressure (IAP) and physiological instability.

CONCLUSION. Intraoperative massive transfusion or post-operative requirement for triple inotropic support or unplanned return to theatre were predictive of poor outcome. Based on these results high risk groups can be identified and guidelines have been created including early use of IAP monitoring.

0332

PROPHYLACTIC PREOPERATIVE LEVOSIMENDAN ADMINISTRATION IN HEART FAILURE PATIENTS UNDERGOING ELECTIVE NONCARDIAC SURGERY

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INTRODUCTION. Heart failure (HF) is a major cause of perioperative morbidity and mortality in noncardiac surgery. Preoperative optimization of these patients is, thus, of utmost importance. Levosimendan seems promising for patients undergoing cardiac surgery; however, its safety and efficacy in HF patients undergoing noncardiac surgery have not been evaluated. The objective of this study was to evaluate the safety as well as the effects of prophylactic preoperative levosimendan administration on left ventricular function in HF patients undergoing elective noncardiac surgery.

METHODS. Patients with chronic cardiac failure with ejection fraction $< 30\%$ undergoing elective noncardiac surgery in 2005 were included in this prospective study. All patients were admitted to our Surgical Intensive Care Unit one day preoperatively for levosimendan treatment and close hemodynamic monitoring. Levosimendan treatment protocol consisted of an initial loading dose (24 microg/kg) for 10 min followed by a continuous 24-hour infusion (0.1 microg/kg/min). All patients remained under continuous hemodynamic monitoring in the SICU during the whole administration period and were operated immediately after the end of infusion under the same intraoperative hemodynamic monitoring. Monitoring was continued postoperatively in the SICU until 24 hours post-infusion. Echocardiography was performed before infusion (Day-0) and on the 7th post-infusion day (Day-7). Measurements included left ventricular ejection fraction (LVEF), velocity time integral (VTI), pre-ejection period (PEP), ejection time (ET), maximum (Pmax) and minimum (Pmin) transvalvular aortic pressure gradient, and maximum (Vmax) and minimum (Vmin) aortic velocity.

RESULTS. Twelve consecutive patients were enrolled. Levosimendan resulted in a significant increase in LVEF, VTI, Pmax, Pmin, Vmax, and Vmin ($p < 0.01$) and, moreover, a significant reduction of PEP, ET, and PEP/ET ($p = 0.04$) on Day-7 compared to Day-0 values. Levosimendan was well tolerated in all patients. Moreover, no adverse reactions, complications or mortality occurred during 30-days follow-up.

CONCLUSION. Prophylactic preoperative levosimendan treatment may be safe and efficient for perioperative optimization of heart failure patients undergoing noncardiac surgery.

0333

IATROGENIC HYDROTHORAX AFTER CENTRAL VENOUS CATHETERIZATION

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INTRODUCTION. Central venous catheterization may be associated with serious complications. The most severe complications are perforation of large vessel, bleeding (1), haemopneumothorax, infections, brachial plexus injury, pleural effusions (2), cardiac perforation or tamponade and even death.

METHODS. We describe a complication occurred in a 69-yr-old man admitted to intensive care unit for a cerebral haemorrhage. A triple lumen Multistar 3 catheter (7,5 Fr 20 cm) was inserted into the right subclavian vein. Post-procedural chest X-ray showed the catheter's tip approximately into the superior vena cava. Total parenteral nutrition (TPN) was started, to run at 83 ml/h (24 hours volume: 2000 ml). Five days after catheter insertion the patient developed a cardiogenic shock and bilateral pleural effusion. Arterial blood gas analysis while assisted-spontaneous ventilation was provided, breathing 100% oxygen, showed pH 7.28, (PaCO2) 44 mmHg, (PaO2) 362 mmHg, HCO3 17 BE -11 SpO2 100%. A thoracentesis was performed and over 1,2 litres of white, milky fluid was drained from the right-hand side and 1,7 from the chest left-hand side.

RESULTS. Biochemical analysis of the drained fluid from both sides suggested that the fluid was TPN. The drained fluid had glucose concentrations of 45 mmol litre–1 (806 mg/dl) and 49 mmol litre–1 (887 mg/dl). The patient's blood glucose was 16.15 mmol litre–1 (291 mg/dl) at that time. The glucose concentration of the TPN was 888 mmol litre–1 (16000 mg/dl). The drained fluid was presumably a mixture of TPN and pleural fluid and it contained no red blood cells. After the right thoracentesis and left chest drainage, an X chest ray showed full recovery of the lung parenchima.

CONCLUSION. Reports of ipsilateral pleural effusions following misplaced central venous catheters are not unusual; possible channels communicating between the peritoneal cavity and the pleural cavity have also been described, however no communications are known between the two pleural cavities.
This case is particular because the drained fluid, presumably a mixture of TPN and pleural fluid, didn' t contain red blood cells. The most likely explanation for the fluid passage into both pleural cavities and mediastinum, following a proximal misplacement of the central venous catheter, may be a continuous spillage of the TPN liquid before the subclavian entry hole.

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Poster Sessions
Non-invasive ventilation in the ICU: 0334–0344

0334

NONINVASIVE VENTILATION REDUCES INTUBATION RATE IN EARLY SEVERE POST-TRAUMATIC HYPOXIA: A RANDOMIZED CLINICAL TRIAL

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INTRODUCTION. Guidelines of NIMV in acute respiratory failure recommends CPAP in patients with chest wall trauma who remain hypoxic despite adequate regional anaesthesia with a level of evidence C (1), because randomized controlled trials in this specific population of acute respiratory failure are lacking.

METHODS. Randomized controlled trial in the general 26-bed ICU of a level-1 trauma hospital. Inclusion criteria: trauma patients with PaO2/FiO2 < 200, while breathing though a high flow oxygen mask, for > 8 consecutive hours within the first 48 hours after thoracic trauma. Exclusion criteria: specific tracheal intubation indication, facial trauma with pneumoencephalus, any cranial fracture, gastro-intestinal trauma, bronco-pleural fistula, cervical injury with specific treatment contraindicating a facial mask, or standard contraindication for NIMV. Study protocol included regional anaesthesia unless contraindicated. The interface was selected based on the associated injuries. NIMV was applied continuously for the first 24 hours. Primary end-point was need for intubation, and secondary end-points were ICU length of stay, complications, and ICU mortality. Statistical analysis: variables were compared with nonparametrics tests with significance at $p < 0.05$.

RESULTS. From 79 eligible patients, 50 were finally included and completed the trial. Main results are presented in the following table:

	NIMV Group (n = 25)	Control Group (n = 25)	p Value
Age (yr.)	44.5 ± 16.8	42.3 ± 19	0.7
APACHE II on admission	17.5 ± 4.7	14.1 ± 5	0.02
Thoracic AIS (points)	4.1 ± 0.7	3.8 ± 0.6	0.2
ISS (points)	33.8 ± 11.4	31.1 ± 12.2	0.4
Regional anaesthesia	10 (40%)	10 (40%)	1
PaO2/FiO2 at randomization	108.3 ± 34.5	110.2 ± 34.5	0.8
PaCO2 at randomization	36.2 ± 8.4	35.9 ± 6.7	0.8
Pneumothorax post-random	6 (24%)	3 (12%)	0.3
Pneumonia	2 (8%)	3 (12%)	0.6
Intubation rate	3 (12%)	10 (40%)	0.02
ICU mortality	1 (4%)	1 (4%)	1

CONCLUSION. The use of non-invasive ventilation avoided intubation when compared with standard therapy in this specific subset of patients. Clinicaltrials.gov identifier: NCT00557752.

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0335

IS THE FACE OF NON INVASIVE VENTILATION (NIV) CHANGING IN THE ICU?

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INTRODUCTION. Acute on chronic respiratory failure (AOC), cardiogenic pulmonary edema (CPE) and de novo respiratory failure are widespread indications of NIV. The rapid growth of NIV and the perception of benefits might continously influence practices. This prospective cohort study aimed at assessing the more recent trends in NIV use, in a 24 bedded-French ICU in which NIV is routinely applied and monitored since 1994(1).

METHODS. All patients admitted in 07 who received NIV > 2 h were included. Patients' characteristics, limitations regarding decision of endotracheal intubation (EI), severity scores, NIV indication, NIV failure, and nosocomial pneumonia were recorded.

RESULTS. 799 patients were admitted, 186 experienced 195 episodes of ARF managed with NIV:56 de novo respiratory failure, 63 CPE or AOC, 46 postextubation (9 for cure and 37 for prevention of postextubation respiratory failure), and 30 in context of intensive therapy limitation (21 do not intubate and 9 do not reintubate patients). More than 60% of patients had other organ failures and 25% of CPE-AOC had received NIV before admission. Overall, hospital mortality was 73/186 (39%), and was 34/165 (20%) in patients without treatment limitation.

TABLE 1 PATIENT'S CHARACTERISTICS AND OUTCOME ACCORDING TO NIV INDICATION (MEDIAN IQR 25-75)

	de novo n = 56	CPE-AOC n = 63	Postextubation n = 46	Do not intubate n = 30
Age, yrs	59 (47–75)	74 (61–79)	70 (58–77)	82 (77–86)
SAPS II, points	36 (26–44)	37 (32–46)	41 (32–49)	46 (39–57)
pH	7.39(7.31–7.44)	7.33 (7.27–7.38)	7.40 (7.37–7.46)	7.35 (7.28–7.43)
PaCO2, mm Hg	41 (34–51)	54 (41–70)	42 (38–50)	64 (41–77)
P/F ratio, mm Hg	139 (100–200)	170 (119–211)	210 (168–260)	194 (161–272)
Intubation rate	26 (46%)	18 (29%)	7 (15%)	–
Nosocomial pneumonia	16 (29%)*	6 (10%)*	5 (11%)*	1 (3%)
ICU mortality	11 (19%)	5 (8%)	4 (9%)	15 (50%)
Hospital mortality:	13 (23%)	13 (21%)	8 (17%)	22 (73%)
in case of EI	12/26 (46%)	8/18 (44%)	4/7 (57%)	–

** all VAP*

CONCLUSION. 1) de novo respiratory failure versus CPE and AOC represent an equivalent number of patients treated by NIV in our ICU 2) In the latter group, mean age is continously increasing compared to our previous surveys (1), but ICU mortality remains low 3) NIV is commonly used to prevent post extubation respiratory failure in at risk patients with a high success rate 4) By contrast, the indication for NIV in the context of limitation of intensive therapy might need to be better defined, considering the poor outcome in this group of patients.

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0336

HELMET FOR ARF IN THE ICU: CPAP VERSUS PERIODICAL APPLICATION OF TWO PRESSURE LEVELS

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INTRODUCTION. non invasive CPAP delivered by helmet has been effectively used to improve oxygenation in patients with acute respiratory failure (ARF) of various etiology. CPAP alone has some limitation. It does not provide ventilatory support and ventilation is totally dependent on patient own respiratory work. We tested the possibility to apply with helmet periodical high pressure breaths (SIGH) or biphasic positive pressure ventilation. We used a recently developed electromechanical expiratory valve (TwinPAP®, Starmed, Mirandola, Italy) which is time-cycled among two customizable PEEP levels.

METHODS. we studied 12 ARF patients (69.3 ± 10.7 years old, average iFO2 52 ± 17%), undergoing helmet CPAP. Continuous flow CPAP system was set at 60 L/min flow rate and clinical iFO2. Five steps, lasting 1 hour each, were applied: CPAP with PEEP 0 cmH20, CPAP with 8 cmH20 (CPAPb), CPAP with 8 cmH20 + 2 sighs/min at 25 cmH20 given for 5 seconds each (SIGH), BIPAP with low PEEP 8 cmH20 and high PEEP 20 cmH_2O given 10λ/min (BIPAP), CPAP with 8 cmH20 (CPAPf). We randomized sequence of SIGH and BIPAP. Respiratory rate and gas exchange were recorded at each step.

RESULTS. CPAP alone did not improve PaO2 compared to ZEEP. SIGH and BIPAP increased PaO2 compared to both ZEEP and CPAPb. Improvement in oxygenation was maintained during CPAPf. At ZEEP patients had respiratory alkalosis; PaCO2 increased slightly throughout the protocol and pH normalized meaning perhaps a reduction in ventilation caused by an improvement of the dispnea.

TABLE 1

	1 ZEEP	2 CPAPbaseline	3 SIGH	4 BIPAP	5 CPAPfinal
PaO2	101 ± 19§	108 ± 25§	129 ± 38†‡	119 ± 43†	124 ± 42†‡
PaCO2	41 ± 4	45 ± 8	47 ± 10	47 ± 9	48 ± 11
pHa	7.47 ± 0.04	7.45 ± 0.04	7.44 ± 0.04	7.44 ± 0.03	7.44 ± 0.05
RR	27 ± 10	25 ± 7	27 ± 9	27 ± 8	26 ± 8

p: < 0,05: † vs ZEEP, ‡ vs CPAPb, § vs SIGH

CONCLUSION. periodical administration of sighs in the helmet is feasible and could improve oxygenation more than with CPAP alone. This improvement is maintained at least 1 hour after cessation of sighs. Administration of more sighs for minute (BIPAP), even if as effective as SIGH, didn't show better results.

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0337

RISE OF PACO2 AND FALL IN PH IN THE INITIAL HOURS OF NIPPV (NON INVASIVE POSITIVE PRESSURE VENTILATION) MAY NOT INDICATE NIPPV FAILURE, A RETROSPECTIVE STUDY IN COHORT OF COPD PATIENTS WITH TYPE 2 RESPIRATORY FAILURE

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INTRODUCTION. It is now well established that AECOPD (Acute exacerbation of Chronic obstructive pulmonary disease) with respiratory failure should receive a trial of NIPPV. Rise in PaCO 2 and fall in pH is one of the predictors of NIPPV failure, and decision for invasive ventilation is recommended. To correlate the degree of encephalopathy, baseline values of PaCO2 and pH, and their early response to NIPPV with eventual in-hospital outcome in patients of acute on chronic hypercapnic respiratory failure in COPD.

METHODS. 20 episodes of AECOPD with Type II respiratory failure in 20 patients (16 male, 4 females) according to GOLD criteria with a mean age of 69.2 years (range 44 - 84) in 6 months (October 2007 to March 2008) had presented in medical intensive care unit (MICU) where NIPPV was initiated.

Data collected: encephalopathy score, serial arterial blood gas (ABG)(0.1,4 and every 24 hours), respiratory rate (RR), pattern of breathing, NIPPV settings (IPAP/EPAP), duration of NIPPV and MICU stay and hospital days.

RESULTS. 7 out of 20 patient had persistent severe hypercapnea; baseline PaCO2 80.5 ± 11.94 & mean peak PaCO2 91.24 mmHg ± 6.22: range 83 - 98.7 ($p = 0.037$), respiratory acidosis baseline pH 7.271 ± 0.83;range 7.187 –7.392 & mean nadir pH 7.229 ± 0.038: range 7.185 – 7.291($p = 0.00$) and tachypnea (mean RR 34.57 ± 2.22: range 32 – 38), encephalopathy score 2.14 ± 0.377, median 2). All these 7 patients improved clinically on NIPPV with adjustment in IPAP/EPAP settings. Mean time taken to acceptable PaCO2/pH (PaCO2: ≤ 60 mm of Hg with pH ≥ 7.350) was 96 ± 53.66 hours; range 48 – 192 hours of NIPPV. The hours of peak PaCO2 with NIPPV was 16.14 ± 6.74 with range 8–24.

TABLE 1 PATIENT CHARECTERSTICS (7 PATIENTS)

Patient Age/ Sex	Encephalo patthy score	PaCO2 Baseline	PaCO2 Peak (hours)	pH Baseline	pH Nadir	Acceptable pH/ PaCO2(hr)	NIPPV: max IPAP/ EPAP
81/M	2	78	83(8)	7.215	7.212	72	12/6
82/M	3	89.4	93.2(24)	7.187	7.187	192	18/6
59/M	2	98.7	98.7(12)	7.234	7.205	144	20/8
72/F	2	70.5	89.7(24)	7.28	7.229	72	20/8
44/M	2	88	98.2(16)	7.21	7.21	48	18/8
56/F	2	73.9	92(20)	7.379	7.291	96	24/12
65/M	2	65	83.9(9)	7.392	7.273	48	24/10

. *Abbreviations:RR:respiratory rate/IPAP:inspiratory positive airway pressure*

CONCLUSION. In selected patients of AECOPD with Type II respiratory failure on NIPPV worsening of PaCO2 and pH in the initial hours may not predict failure provided the level of consciousness and respiratory distress improves. A wider window of trial of NIPPV may be appropriate in case of AECOPD with type II respiratory failure.

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0338

AUDIT OF NIV PRACTICE

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INTRODUCTION. Current British Thoracic Society (BTS) guidelines recommend the use of Non Invasive Ventilation (NIV) in cases of acute hypercapnic respiratory failure, particularly in chronic obstructive pulmonary disease (COPD). They have also recommended regular audit of NIV practice.

METHODS. Audit of NIV practice in a big teaching hospital. Data of total 100 patients, who were treated with NIV from Sep 06 to Aug 07, was extracted from computerised departmental database. The data sheet was designed to answer the following questions:

- Who initiated the NIV support?
- What was the indication for the NIV?
- Are plans for escalating treatment in the event of failure being made?
- What was the outcome of NIV and outcome of admission?

The results were compared with BTS guideline.

RESULTS. • NIV initiated by outreach team in 82% of cases, by Physician in 43% of cases and by Intensivist in only 5% of cases.

- In 64% cases the patient was in type 2 respiratory failure in 36% case type 1 respiratory failure.
- In most of the cases (82%) the diagnosis was COPD.
- Out of 100 cases, 50% discharged home without any respiratory support, 46% died of respiratory cause, 3% died of non-respiratory cause and 1% discharged home with long term NIV support.
- In only 30% of cases there was plan for escalating treatment in the event of NIV failure.

CONCLUSION. In a fairly big teaching hospital, in spite of having protocol driven NIV practice, this audit showed that the practice is not compliant with BTS guideline. There was significant mortality (49%) and in only 30% of cases there was plan for escalating treatment in the event of NIV failure. Also in only 3% of cases there was involvement of Intensivist in the decision making process. We concluded that in future there should be senior doctor (Physician or Intensivist) involvement in decision making process and also there should be clear escalation plan in all the cases. We planned to re-audit our NIV practice in 6 months time.

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0339

VENTILATOR PERFORMANCE WITH DIFFERENT VENTILATORS DURING HELMET NIV

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INTRODUCTION. It has been already demonstrated that the physical characteristics of the helmet can influence patient-ventilator interaction and decrease the efficiency of Helmet-NIV (1–2).

The aim of this bench study was to compare the performance of a new ventilator specifically designed for helmet-NIV with two ICU ventilators provided with NIV mode, in terms of patient-ventilator synchrony during Helmet NIV.

METHODS. Helmet NIV (PS 12cmH_2O, PEEP 5cmH_2O) was applied to a mannequin, connected to a test lung (2) set at 2 different respiratory rates (20 and 30 breaths/min) (C = 60 ml/cmH_2O, R = 4 cmH_2O/L/sec, Pmus = 6 cmH_2O) and ventilated with 3 different ventilators (Puritan Bennett 840 Covidien, PB; Omega Datex GE, GE; and Zephyros, Medisize, ZM), set with 2 pressurization times and expiratory trigger delays: the default setting (DS) and a fast setting (FS).

The performance of the 3 ventilators was evaluated in terms of inspiratory and expiratory time, Vtact/Vt (% of Vt delivered during simulator inspiration), inspiratory and expiratory trigger delays, pressurization time, time of assistance, Wasted effort (WE) and Autocycling (AU) phenomena.

RESULTS. At both RR, ZM showed the longer Timecc and Ti/Ttot ($p < 0.001$). At 20 breaths/min PB had the higher Vtact/Vt ($P < 0.001$). At 30 breaths/min with DS ZM had the higher Vtact/Vt, while with FS ZM had the lower Vtact/Vt. At both RR and ventilator settings, PB showed a significantly lower Delaytrinsp, Timepress, Delaytrexp and the longer Timeass compared to ZM and GE ($p < 0.001$). At 20 breaths/min no significant differences were observed between ZM and GE in terms of Timeass, while at 30 breaths/min ZM had longer Timeass compared to GE ($p < 0.01$). At 30 breath/min and during DS, ZM had the higher rate of wasted efforts (WE) (63% ZM vs 0% PB and 0% GE, $p < 0.001$) and Autocycling phenomena (AC) (33% ZM vs 0% PB and 0% GE, respectively, $p < 0.001$).

CONCLUSION. This study suggests that at 20 breaths/min during Helmet-NIV with all ventilators but PB Timeass was lower than half of Tiact (simulator inspiratory time), while at 30 breaths/min Timeass falled with all ventilators below 30%. Further improvements, both in terms of ventilator software and helmet designed are required to optimize patient-ventilator interaction during Helmet-NIV.

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0340

WHY WEANING FROM MECHANICAL VENTILATION DOESN'T OCCUR

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INTRODUCTION. Optimal care for mechanically ventilated patients includes a structured and effective respiratory therapist driven weaning process.

METHODS. We created a custom online survey tool for prospective quality improvement self-reporting by respiratory therapists. A best practice ventilator weaning protocol for the Medical-Surgical ICU was established, based on published standards. Respiratory therapists were instructed to follow the weaning protocol and to submit a report daily, using the online survey tool (http://www.surveymonkey.com). The survey included instructions for weaning, and recorded for each ICU bed whether a ventilator was in use, and whether ventilator weaning was done by protocol or the reason for exclusion from protocol.

RESULTS. From Jan 08 - Mar 08, respiratory therapists reported on 1644 decisions to initiate ventilator weaning, 76% of possible decisions. On 497 occasions there was not a ventilator in use (30%). For ventilated patient encounters (n = 1147) weaning by protocol occurred 779 times (68%), and pre-specified criteria for exclusion from weaning occurred 368 times (32%) (see table).

	Number	% of eligible patients
Weaned according to protocol	779	68.0%
Requires FiO2 ≥ 0.5 and/or PEEP ≥ 8	98	8.4%
Physician decision not to wean	62	5.4%
Vasopressor	53	4.6%
Deep sedation	41	3.6%
Neuromuscular disease or blockade	21	1.8%
Metabolic acidosis	18	1.5%
Non standard mode of ventilation (HFO, PC-IRV)	6	0.5%
Other	71	6.2%

CONCLUSION. Online self-reporting of weaning protocol compliance served to prompt and to record therapist daily activity, and captured 76% of possible encounters. Data was generated on compliance with, and deviations from, weaning protocol. These data will be used to improve compliance by directing attention to "physician decision" and "other", as well as daily-wake up from sedation, which are the least easily justified exclusions.

0341

NON INVASIVE VENTILATION AS WEANING STRATEGY

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INTRODUCTION. The non-invasive ventilation (NIV) can be used as a tool for reduction of the days in invasive ventilation. In COPD exacerbations the NIV can be used with success after early extubations. The question remains in the patients submitted to invasive ventilation without COPD exacerbation. Can NIV be used with success in this patients?

METHODS. Patients with pneumonia admitted in a period of 12 months in an ICU. The pneumonia was defined based in clinical and radiological signs of pulmonary infection (fever, leucocytosis superior to 10000 cells/mm3 and pulmonary infiltrates on the chest radiography).

Patients admitted in the ICU with pneumonia but who had ICU stay inferior or equal to 24 hours were excluded from the study. Patients without invasive ventilation or ventilated for a time inferior to 24 hours were also excluded.

When patients presented weaning criteria (PaO2/FiO2 greater then 200 on less than or equal to 5 cm H20 PEEP, minute volume inferior to 20 L/min and hemodynamic stability), they were randomly selected to NIV after immediate extubation or to perform a T-piece trial.

RESULTS. From 62 patients 49 were included in the study, 22 were submitted to NIV after extubation and 27 patients preformed T-piece trial. The group submitted to NIV has demographic parameters similar to the T-piece trial. COPD was presented in 18% of the patients included in NIV group and in 14,8% of the patients included in the T-piece trial group.

The ICU stay was shorter in the NIV group 9,5 days compared to T-piece trial 16,2 days. The days of invasive ventilation and the mortality was similar (in NIV group, 7,2 days and 9%, and in T-piece trial 7 days and 11%).

CONCLUSION. The NIV strategy reduced de ICU stay in patients with pneumonia submitted to invasive ventilation.

0342

VAPOTHERM - SIMPLE DEVICE FOR CRITICALLY ILL PATIENTS

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INTRODUCTION. Vapotherm® (Vp) is a system that allows delivery of a high flow oxygen (up to 100%) via nasal cannula. It incorporates a humidification method that allows virtually 100% humidity to be achieved. In a neonates study, high flow caused PEEP 4–5 cm H_2O.

METHODS. We investigated of the use of the Vp system from Dec 2005 to Dec 2007 on the surgical HDU. We analysed type and reason for respiratory failure (RF) as well as RR, FiO2, flow, Arterial Blood Gases. Data were collected before (0) Vp was commenced, 1 hour after, and every day of treatment. Length and outcome of Vp therapy. Data were statistically analysed – Stat Software.

RESULTS. 72 pts (48% female, 52% male) aged 20–93 (67.73 ± 15.65) were treated for 1–16 (4.5 ± 3.13) days. 75.92% pts with type I RF and 24.07% with type II RF received Vp therapy. Reason of RF: Pneumonia 40.22%, Sepsis 23.61%, COPD 4.16%, Pulmonary Fibrosis 4.16%, Hypoxia 4.16%, PE 2.7%, Haemothorax 1.38%, Laryngospasm 1,38%. 83.3% of patients who received Vp therapy were discharged from hospital. We applied Vp to 34 pts with PaO2 < 8 kPa despite conventional O2 therapy (FiO2 0.63 ± 0.19). Ten patients (17.65% from selected 34Pts, 13.8% from whole group 72pts) required intubation and ventilation. 16.7% died (12 patients).

TABLE 1

	BEF	1 h after	Day 2	Day 3	Day 4	Day 5
FiO2 (kPa)	0.61 ± 0.17 ♥♬	0.81 ± 0.21 ♥◘®†	0.75 ± 0.22♬	0.70 ± 0.24◘	0.68 ± 0.23®	0.67 ± 0.21†
Flow (l/min)		30.07 ± 5.64	30.68 ± 5.64	29.90 ± 6.30	30.13 ± 6.42	30.33 ± 6.00
RR	26.27 ± 7.10 ♥♬®◘	22.57 ± 6.13♥	21.94 ± 6.29♬	21.90 ± 7.12®	22.72 ± 5.2	22.79 ± 7.29◘
PaO2 (kPa)	8.15 ± 1.75 ♥♬♀♂©	12.41 ± 5.85♥	12.94 ± 4.74♬	11.79 ± 3.55♀	11.04 ± 3.26♂	11.42 ± 2.78©
PaO2 < 8 (kPa)	6.94 ± 0.83 ♥♬♀♂©	11.52 ± 4.79♥	13.70 ± 5.64♬	11.57 ± 3.00♀	10.25 ± 2.13♂	10.70 ± 2.62©
PaCO2 (kPa)	4.97 ± 1.29	4.92 ± 1.14	4.88 ± 0.96	4.70 ± 0.96	4.79 ± 0.65	4.97 ± 0.91
pH	7.38 ± 0.08 ◘◆♠	7.40 ± 0.08	7.41 ± 0.07◘	7.43 ± 0.04◆	7.44 ± 0.05♠	7.44 ± 0.04

In table data are shown as an average and SD
◘◆♠ *@P < 0.05,* ®†© *p < 0.005,* ♥♬♀♂© *p < 0.0005*

CONCLUSION. Vp reduce the work of breathing and significantly decrease RR. Effective Vp therapy leads to a significant increase of blood oxygenation and can reduce the need for intubation and mechanical ventilation.

0343

DELIVERY OF HELIUM-OXYGEN MIXTURE DURING SPONTANEOUS BREATHING: EVALUATION OF THREE HIGH-CONCENTRATION FACE MASKS

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INTRODUCTION. The theoretical properties of helium-oxygen (He-O2) make it a very interesting gas mixture for the therapeutic management of obstructive respiratory diseases. To be beneficial, helium concentration must be at least 50% in the airways. Few studies have evaluated the efficacy of facemasks to deliver He-O2 during spontaneous breathing.

METHODS. This randomized crossover study tested three facemasks in 6 healthy volunteers breathing a 78:22 He-O2 mixture. The mean concentration of helium in the airways ([He]) was measured using a nasopharyngeal catheter and a helium sensor. The masks evaluated were: a standard high-concentration facemask (Unomedical, Italy), the Hi-Ox mask (Viasys, Netherlands), and the Heliox21 mask (Intersurgical, UK). The tests were performed under 2 breathing conditions (at rest and during hyperventilation) using 4 different He-O2 flow rates (7, 10, 12, and 15 L/min).

RESULTS. Of the 24 tests performed at rest (4 different flow rates and 6 volunteers), a [He] > 50% was achieved in 62% of the tests performed with the Hi-Ox mask compared to 33% for the Heliox21 mask and only 25% for the standard mask. During hyperventilation, a [He] > 50% was achieved in 29% of the 24 tests performed with the Hi-Ox mask compared to 4% for the others two masks. For all 3 masks, efficacy increased as He-O2 flow rates rose and decreased substantially during hyperventilation.

CONCLUSION. The efficacy of He-O2 delivery using commercial facemasks is poor. An efficient [He], e.g. > 50%, can be obtained with high delivered flow rates and only with validated facemasks.

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0344

NT-PROBNP LEVELS IN PATIENTS WITH ACUTE RESPIRATORY FAILURE REQUIRING NONINVASIVE VENTILATION

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INTRODUCTION. NT-proBNP is a cardiac hormone released by myocardial wall stress. NT-proBNP is a biomarker for heart failure;a threshold value < 450 pg/ml (and < 900 pg/ml for age > 50 years) may rule out heart failure. However elevated levels have been observed in critically ill patients, even in absence of left ventricular dysfunction (LVD). In this study is postulated that in patients with severe acute respiratory failure (ARF), requiring noninvasive ventilation (NIV), hypoxia and ventricular stress may increase NT-proBNP levels even in absence of LVD. The increase in intrathoracic pressure determined by NIV should decrease NT-proBNP levels, by reducing afterload and preload and ventricle stress trough direct decrease of transmural pressure. Aim of the study was to evaluate the discriminating power of plasmatic levels of NT-proBNP in patients with ARF necessitating NIV and to evaluate NT-proBNP variations during NIV.

METHODS. 40 patients (19 F and 21 M) with ARF requiring NIV were prospectively enrolled: 14 were admitted for an episode of acute cardiogenic pulmonary edema (ACPE) and 26 for an episode of ARF due to pneumonia or acute lung injury (Pn/ALI). A two dimensional echocardiogram was performed to assess ventricular function in all patients and to rule out systolic or diastolic dysfunction in Pn/ALI. Patients with septic shock were excluded from the study. NT-proBNP was determined at study entry, after 12 and 24 hours. Clinical-physiological parameters were also recordered.

RESULTS. The two groups were homogeneous for clinical-physiological parameters at study entry. Length of ventilation was significantly different in the two groups (61.6 ± 32.3 vs 9.82 ± 3.5 hours in Pn/ALI and ACPE respectively;p < 0.0001). A significant difference in NT-proBNP levels was observed between the two groups at study enrollment (8581.7 ± 12358.2 vs 16441.1 ± 18226.9 pg/ml in Pn/ALI and ACPE respectively;p = 0.015). In both groups, after 24 hours of ventilatory treatment, a significant reduction in NT-proBNP levels was observed (8581.7 ± 12358 vs 5701.3 ± 10024.4 pg/ml;p = 0.007 in Pn/ALI and 16441.1 ± 18226.9 vs 12530.6 ± 15714.2 pg/ml; p = 0.028 in ACPE). The diagnostic performance of NT-proBNP for discriminating ACPE from Pn/ALI in patients with ARF was assessed with a receiver operating characteristic (ROC) curve. The threshold value obtained was 4380 pg/ml (AUC: 0.738; 95%CI: 0.581–0.895) with a sensitivity of 71% and a specificity of 66%.

CONCLUSION. Conventional cut-off levels for NT-proBNP may not be adequate in the subgroup of patients with ARF necessitating NIV. A significant reduction of NT-proBNP was observed during the first 24 hours of NIV treatment in both groups, supporting the hypothesis that the increase in intrathoracic pressure may reduce ventricle wall stress and, hence, plasmatic levels of this hormone.

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0345

RENAL OUTCOMES FOLLOWING HYDROXYETHYL STARCH RESUSCITATION: A META-ANALYSIS OF RANDOMIZED TRIALS

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INTRODUCTION. Hydroxyethyl starch (HES) solutions are used widely for fluid resuscitation in critically ill patients. Although effective to restore intravascular volume, concerns are emerging that HES may increase the risk of renal dysfunction. The objective of this systematic review was to evaluate the impact of HES solutions on adverse renal outcomes and mortality in critically ill patients requiring acute volume resuscitation.

METHODS. We searched electronic databases from 1950 to 2007 (MEDLINE, EMBASE, the Cochrane Central Registry of Controlled Trials, and the SCOPUS database). Conference proceedings and grey literature sources were also searched from 2002–2007. We included all randomized controlled trials of patients requiring acute volume resuscitation who received HES compared to an alternative resuscitation fluid. No restrictions were considered regarding language or publication type. Data were independently extracted in duplicate.

RESULTS. Of 2381 citations reviewed, we included 22 trials (n = 1866) in the analysis. Patients receiving HES were more likely to receive renal replacement therapy [odds ratio [OR] 1.91 (95% confidence interval [CI] 1.22–2.99, I2 10.5%)]. This was also true for patients with severe sepsis or septic shock [OR 1.82 (95% CI 1.27–2.62, I2 0%)]. In high quality trials [OR 1.27 (95% CI 0.94–1.73, I2 = 0%)], multicenter trials [OR 1.31 (95% CI 0.98–1.77, I2 = 0%)], and in reports indicating adequate allocation concealment [OR 1.29 (95% CI 0.96–1.73, I2 = 0%)], there was a trend toward increased risk of death associated with HES. Adverse events such as allergic reactions and clinically significant bleeding were not systematically evaluated and were poorly reported.

CONCLUSION. The use of HES for volume resuscitation in critically ill patients is associated with increased use of renal replacement therapy. When used for acute resuscitation in patients with septic shock or in hemodynamically unstable patients, HES may be associated with increased mortality. Given these observations, the absence of demonstrable clinical superiority, and the costs associated with HES, we caution against the routine use of starches for acute volume resuscitation in critically ill patients.

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0346

THERAPEUTIC INFLUENCE OF 20% HUMAN ALBUMIN AND 6% HYDROXYETHYLSTARCH (VOLUVEN) ON EXTRAVASCULAR LUNG WATER IN SEPTIC PATIENTS

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INTRODUCTION. Recent studies demonstrated clearly that extravascular lung water (EVLW) as an indicator of lung functions is a reliable and independent marker for outcome of critically ill patients. Higher values of EVLW are connected with higher mortality. The primary therapeutical goal in critically ill patients is to resuscitate and retain adequate organ perfusion, which is dependend on adequate cardiac output. It is necessary to balance the intravascular filling – preload, in the way that prevent from initiation of pulmonary oedema, what is very difficult because of possible capillary leakage syndrome.

METHODS. In our randomized, controlled, single centre trial we investigated the efficacy of colloids versus albumin on EVLW. Patients with severe sepsis were randomly allocated to a group treated with 20% Albumin 100 ml every 12 hours (A; n = 30) or with 6% hydroxyethylstarch 130/0,4 (Voluven) 250 ml every 6 hours (HES; n = 26). The goal of the volumotherapy was to achieve normal values of intrathoracic blood volume (IBTV > 850) and cardiac index (CI > 3,5). Colloids doses were completed by crystalloids as necessary. In cases when the adequate preload did not conduct to sufficient mean arterial pressure (MAP), the norephinephrin was used. We analyzed amount of developed EVLW, relation of developed EVLW with mortality, PaO2/FiO2 and alveolo-arterial oxygen difference (AaDO2) at +6, +12, +24, +36, +48, +72 hours after start of study drug administration.

RESULTS. A total of 56 patients were studied. We observed significantly greater decrease of EVLW when compared the difference of initial value with the value after 6, 12, 36, 48 and 72 hours in Albumin group. In HES patients were no significant changes in observed periods. Despite no significant changes in amount of EVLW in HES group, we noted improving of PaO2/FiO2 and AaDO2 in both group. Statistical significant changes from initial values were observed after 6 and 12 hours (AaDO2) and after 6 hours (PaO2/FiO2) in HES group and after 48 and 72 hours (AaDO2) in Albumin patients. We did observe no difference in mortality in both groups.

CONCLUSION. According the results from our trial we can conclude that Albumin could reduce the amount of extravascular lung water for more and earlier than Voluven. Nevertheless we did observe significant changes in oxygenation functions in both groups.

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0347

LONG-TERM EFFECTS ON PROCESS-OF-CARE AND MORTALITY OF A NATIONAL EDUCATIONAL PROGRAM (EDUSEPSIS STUDY) BASED ON THE SURVIVING SEPSIS CAMPAIGN (SSC) GUIDELINES

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INTRODUCTION. A national educational effort based on the SSC guidelines in Spain to promote bundles of care for severe sepsis and septic shock in adults (Edusepsis study) resulted in improved guideline compliance and lower hospital mortality (1). The objective of the study was to determine the effects of the educational program at long term.

METHODS. Measurement of baseline compliance with the recommendations of the SSC guidelines in a pre-intervention cohort (2 month period: November-December 2005), re-measurement in a post-intervention cohort (4 month period: March-June 2006), and long-term follow-up one year later (2 month period: November-December 2006).Intervention: The educational program consisted of training physicians and nursing staff from the ED, medical and surgical wards, and ICU in the definitions of severe sepsis and sepsis shock, their early recognition, and the treatments included in the guidelines. Setting: 23 medical-surgical adult ICUs located throughout Spain.
Main Outcome Measure: Hospital mortality. Secondary outcome measures: Differences in adherence to process-of-care variables (sepsis care bundles).Patients: All admissions to the ICU from the emergency department (ED) or from wards and all ICU patients were actively screened daily for the presence of severe sepsis or septic shock. Statistic analysis: To compare continuous variables during study periods, we used Student's t test and to analyze categorical variables $\chi 2$ analysis was employed.

RESULTS. A total of 318 patients fulfilled the criteria for severe sepsis or septic shock during the pre-intervention period, 504 patients during the post-intervention period, and 247 during the long-term follow-up period. No differences in the epidemiological characteristics of patients were observed: APACHE II: Pre-intervention 20.5 ± 7.0, post-intervention 20.8 ± 7.4, long term 20.5 ± 7.0; p = 0.810. Process-of-care variables: Resuscitation bundle returned to baseline (pre-intervention 6.3%, post-intervention 12.9%, long term 7.3%; p = 0.003) and Management bundle was stable with respect to the post-intervention period (pre-intervention 9.4%, post-intervention 19.6%, long term 26.7%; p = < 0.001). Hospital mortality also remained stable (pre-intervention 42.5%, post-intervention 38.7%, long term 38.5%; p = 0.502).

CONCLUSION. At long-term follow-up, the resuscitation bundle returned to baseline but management bundle and mortality remained stable with respect to the post-intervention period. Applying the "Plan-Do-Study-Act" cycles could be the best approach to sustain the effect of the educational program.

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0348

HYDROCORTISONE AND HEMOSTASIS IN SEPTIC SHOCK – RESULTS FROM THE CORTICUS BERLIN STUDY GROUP

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INTRODUCTION. Coagulation and inflammation are cross-amplifying systems. Since hydrocortisone (HC) inhibits inflammation, we postulated that disseminated coagulation should be affected.

METHODS. Patients enrolled in the CORTICUS trial received 200 mg HC for 5 days (d), or placebo (PL). D-dimer (DD), prothrombin time (PT), protein C (PC), and factor VII (FVII) were analyzed at baseline (d0), d3, and d6. Platelets (PLT) were derived from charts. DIC-score was calculated. Data were analysed with general linear model. On d0, results are presented as median and range (DIC) or mean and SD (all others). On d3 and d6, percent changes from baseline are presented as mean and SD.

RESULTS. From Mar02 - Nov05, 84 patients (42 HC, 42 PL) were enrolled in 13 sites. Baseline values were not significantly different between groups. Percent changes on d3 and d6 were significantly different for PC (p = 0.014). No significant differences could be found in percent changes of all other parameters (see Tables 1 and 2).

TABLE 1 BASELINE VALUES AND PERCENT CHANGES FROM BASELINE

	PLT [1/nl] HC	PLT [1/nl] PL	DD [µg/ml] HC	DD [µg/ml] PL	.PT [sec] HC	.PT [sec] PL	DIC [pt] HC	DIC [pt] PL
baseline	196(116)	165(96)	5.4(5.7)	5.8(4.8)	19.5(3.0)	19.4(3.0)	4(2–7)	3(1–7)
day3 %	−7(41)	−17(25)	−4(54)	−3(57)	−13(11)	−8(14)	−15(23)	−8(30)
day6 %	+50(117)	+29(66)	+3(94)	+16(146)	−16(11)	−13(12)	−20(34)	−18(32)

pt: points

TABLE 2 BASELINE VALUES AND PERCENT CHANGES FROM BASELINE

	FVII [%] HC	FVII [%] PL	ProtC [%] HC	ProtC [%] PL
baseline	48(31)	44(17)	51.2(61)	50.3(23.5)
day3 %	+50(84)	+36(89)	+40(61)	+11(51)
day6 %	+46(64)	+36(61)	+121(102)	+53(81)

CONCLUSION. HC therapy in septic shock did not alter common parameters reflecting disseminated intravascular coagulation. The clinical relevance of the HC-induced increase of protein C remains to be determined.

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TREATMENT AND MORTALITY OF SEVERE SEPSIS: RESULTS OF A CANADIAN MULTICENTRE PROSPECTIVE OBSERVATIONAL STUDY

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INTRODUCTION. Management of severe sepsis based on recent international guidelines remains controversial. We used a prospective observational multicentre study to examine the relationship between treatment and outcome in a cohort of patients with protocol-defined severe sepsis.

METHODS. All patients admitted for > 24 h in 12 Canadian academic and community hospital intensive care units were prospectively monitored for criteria of severe sepsis. When severe sepsis was identified, data regarding organ dysfunction and treatments were recorded daily until day 28 or ICU discharge. Primary outcome for this analysis was hospital mortality analyzed with multivariable regression after candidate variables were selected with univariable analysis.

RESULTS. In addition to various baseline patient characteristics (age, location and timing of sepsis acquisition, comorbidity, organ failure, APACHE II risk; n = 1226), the multivariable analysis found an association with mortality and the variables listed in the table (OR interpreted for DVT prophylaxis for each percentage point of days with prophylaxis, glucose OR for each mmol/L increase). Hemodynamic resuscitation (day 1 CVP or MAP > 65 without vasopressors), use of vasopressors on day 2, antibiotic administration within 4 hours (with or without shock), drotrecogin alfa use, and nutrition support were not associated with mortality.

TABLE 1

	Odds Ratio for hospital mortality	p-value
Adrenal replacement vasopressors with >=5d steroid	reference	<0.001
vasopressors with < 5 d steroid	1.00 (0.70,1.44)	
no vasopressor or steroid	0.39 (0.23,0.60)	
DVT prophylaxis	0.99 (0.99,1.00)	<0.001
Ventilation	reference	<0.001
ARDS + protective lung ventilation		
ARDS + not protective lung ventilation (any day)	0.99 (0.61,1.60)	
No ARDS	0.53 (0.32,0.90)	
Glucose (mean, daily)	1.14 (1.05,1.23)	0.001

CONCLUSION. The effect of some treatments may be underestimated in our observational study since treatments were not randomized and constraints in the data collection. However, the presence of shock and ARDS appear to be more important to the risk of death from severe sepsis than the treatments recommended in current guidelines. Early intervention to prevent shock and ARDS may be the most effective approach to patient management.

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UNFRACTIONED HEPARIN FOR TREATMENT OF SEPSIS: A RANDOMIZED CLINICAL TRIAL (THE HETRASE STUDY)

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INTRODUCTION. Our primary aims were to determine the effects of heparin on length of stay (LOS) and change from baseline Multiple Organ Dysfunction (MOD) score. Secondary objectives were to estimate the effects of heparin on 28-day all-cause mortality, and to determine the possible effect modification on 28-day all-cause mortality, in subgroups defined by site of infection and baseline values of APACHE II score, MOD score and D-dimer.

METHODS. Design: Randomized, double-masked, placebo-controlled, single-center clinical trial, testing low dose continuous infusion of unfractioned heparin (UFH) as complementary treatment for sepsis. Setting: 550-bed University Hospital and referral center in Medellín, Colombia. Patients: 319 patients admitted at the emergency room with signs indicative of sepsis. Interventions: patients were randomly assigned to receive placebo or UFH (500 units/hour for 7 days).

RESULTS. The median LOS in patients discharged alive in the placebo group was 12.5 days (IQR = 8–20), and 12 days (IQR = 8–19.5) in the heparin group (p = 0.976). There MOD score improved equally in the two treatments arms, with an average decline of 0.13 and 0.11 per day for the placebo and heparin groups (p = 0.240), respectively. The overall 28-day mortality was 16% in the placebo group and 14% in the heparin group (p = 0.652). Subgroup analyses did not show any statistically significant reduction in 28-day mortality with UFH. There was only one serious adverse event on a patient who received heparin but it was fully resolved without complications.

CONCLUSION. Our findings demonstrated that UFH is a feasible and safe intervention. However, this study was not able to demonstrate a beneficial effect on the chosen primary outcomes or in the 28-day mortality rate. A further characterization of the potential efficacy of heparin would require a larger multicenter trial of prophylactic versus therapeutic doses of low molecular weight heparin.

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HEMOTRANSFUSION IMPACT ON CEREBRAL OXYGENATION AND METABOLISM

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INTRODUCTION. Anemia is considered to be the factor of secondary ischemic brain injury and must be corrected immediately. But hemotransfusion impact on cerebral oxygenation and metabolism is not completely investigated.

METHODS. Seven patients with intracranial hemorrhage and GCS 4 – 9 enrolled in the study. All patients had intracranial pressure monitoring (ICP), systemic hemodynamics evaluation (PICCO plus), brain tissue microdialysis (Iscus), temperature (Tbr) and oxygen pressure (PbrO2) (Licox) probes. Microdialysis, temperature, and oxygen probes were inserted in "injured" (inj) and "intact" (int) brain tissue. Serum hemoglobin level (Hb), arterial oxygen pressure (PaO2), Tbr, PbrO2, glucose (Glu), lactate (Lac), pyruvate (Pyr), glycerol levels and lactate/pyruvate ratio (L/P) in extracellular space of the brain tissue were measured before and after hemotransfusion (HT).

RESULTS. We analyzed 18 episodes of HT (volume of transfused blood was 300 ± 20 ml (M ± SD)). Hb level increased from 6,8 ± 1,0 to 8,7 ± 1,3 g/dl (p < 0,05). PaO2 and ICP didn't change during all investigations (PaO2 - 165,7 ± 39,4 mm Hg before HT and 166,5 ± 48,6 mm Hg after it; ICP - 13,1 ± 5,5 mm Hg before HT and 13,7 ± 6,6 mm Hg after it). Cardiac index didn't change as well (4,6 ± 0,6 l/min/m2 before and 4,6 ± 0,9 l/min/m2 after HT) but cerebral perfusion pressure increased from 82,5 ± 13 to 90,6 ± 11,4 mm Hg. Cerebral oxygenation improved slightly. PbrO2 increased from 32,2 ± 13,6 to 36,1 ± 14,6 mm Hg in "injured", and from 37,8 ± 16,6 to 40,1 ± 15,0 mm Hg in "intact" hemisphere. Hemotransfusion didn't change brain metabolism significantly. Glu (inj) was 1,1 ± 0,7 before and 1,0 ± 0,8 mmol/l after HT, Glu (int) 1,0 ± 0,8 before and 0,9 ± 0,7 mmol/l after HT; Lac (inj) 2,5 ± 1,5 before and 2,4 ± 1,5 mcmol/l after HT, Lac (int) 2,4 ± 1,7 before and 2,3 ± 1,5 mcmol/l after HT; Pyr (inj) 105,9 ± 41,9 mmol/l before and 105,2 ± 50,2 mmol/l after transfusion, Pyr (int) 88,3 ± 47,8 before and 88,9 ± 49,7 mmol/l after HT. Glycerol decreased from 133,8 ± 127,9 to 126,8 ± 132,1 mcmol/l in the "injured" and from 169,3 ± 157,1 to 146,2 ± 144,1 mcmol/l in the "intact" hemisphere. L/P ratio didn't change significantly in both hemispheres ("injured" - 24,2 ± 6,6 before and 23,0 ± 7,7 after HT; "intact" - 25,0 ± 7,3 before and 24,6 ± 8,5 after HT).

CONCLUSION. Hemotransfusion is not associated with significant changes of cerebral oxygenation and metabolism in neurosurgical patients with mild anemia.