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NO FATE BUT WHAT WE MAKE: A CASE OF FULL RECOVERY FROM SUDDEN CARDIAC ARREST

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INTRODUCTION. Cardiac Arrest (CA) is an important cause of death, 50 percent occurring outside hospitals. One-half of these patients are found in Ventricular Fibrillation (VF) or pulseless ventricular taquicardia. Within this group, better survival is achieved with early defibrillation (less than four to eight minutes). Early BLS is also associated with better survival, by delaying the deterioration of the cardiac rhythm to asystole.

METHODS. Case report.

RESULTS. We describe the case of a 80 years old man, who suffered CA shortly after arrival to his local health department, for an appointment with his GP. Several weeks before he began to suffer from typical effort angina and that day he was feeling unwell. Basic Life Support (BLS) was started promptly and an Advance Life Support (ALS) team was requested through the national emergency number. Nine minutes after, ALS team arrived and confirmed CA, with VF. The victim was defibrillated with a 200 J shock and BLS resumed. When orotracheal intubation was attempted, masseter muscle contraction was noticed, so BLS was discontinued for reevaluation. The rhythm had become a wide QRS tachycardia with pulse and the victim recovered spontaneous breathing. Partial consciousness was recovered (Glasgow Coma Score: 11). On physical examination blood pressure was 133/62 mmHg, heart rate 130 bpm and pulse oximetry 97%. The patient was transferred to an emergency department. Half an hour later, as he recovered consciousness fully, he complained of chest pain. The ECG showed a sinus rhythm with a heart rate of 75, right bundle branch block and ST segment depression in in leads V4 to V6. Laboratorial tests showed cardiac troponine I 0.78 ng/ml. A coronary angiography performed urgently, disclosed significant left main plus three vessel – coronary artery disease. Left anterior descending artery (LAD) was occluded, with late retrograde flow. Eighteen hours after the CA, a quadruple coronary artery bypass grafting operation was undertaken. During surgery, a fresh thrombus was removed from the proximal LAD.
Post-operative course was uneventful and the patient was discharged on day 7 after the procedure. Sixteen months later, he remains asymptomatic.

CONCLUSION. This case illustrates the possibility of a happy end after an episode of sudden CA, in an old patient with undiagnosed severe coronary artery disease and presumable acute coronary syndrome.
Although ALS was started nine minutes after the witnessed collapse, return of spontaneous circulation after the first defibrillation and prompt breathing recovery contributed to the success of the resuscitation maneuvers. The fact that CA occurred in a health care facility allowed prompt BLS, which contributed to the recovery. Furthermore, the speed in the detection and treatment of the acute reversible cause (myocardial ischemia in this case) was crucial for long-term prognosis.

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GLYCEMIA AT ADMITTANCE AND OUTCOME IN SEVERELY INJURED ICU PATIENTS

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INTRODUCTION. Hyperglycemia has suppressive effects on immune function and an associated increased risk of infection, endothelial damage and development of tissue ischemia due to acidosis or inflammation. (1) We aimed to study the possible association between hyperglycemia and outcome in a population of critically ill trauma patients.

METHODS. Analysis of a cohort of trauma admitted in the emergency room in a 6 years period, using the prospective registry that uses TRISS methodology for severity analysis. Percentage, mean, standard deviation, 25th – 75th, Chi-square and Fisher's exact test were used for the statistical analysis ($p < 0.05$ was consider significant). Hyperglycemia was considered when glycemia at admittance was $\geq$ 106 mg/d. Patients with hypoglycemia (< 80 mg/dL) were excluded from the analysis.

RESULTS. 883 patients (85.3 % of 1035 patients) had hyperglycemia. In this group 703 were men (79.6%) with a mean age of 44.49 $\pm$ 20.71 ($p < 0.01$). Road traffic accidents (56.3%), falls (29.7%), and penetrating injuries (5.8 %) account for most of the injury mechanisms.
Patients with hyperglycemia were more severely injured resulting in significant differences concerning Revised Trauma Score (RTS) (5.95 $\pm$ 1.42), Injury Severity Score (ISS) (25.15 $\pm$ 11.41, $p < 0.001$) and probability of survival (69.8 $\pm$ 28.59, $p < 0.001$).
Mortality was 30.1% for the hyperglycemia group and 16.4% for the normoglycemic group ($p = 0.001$). The logistic regression model showed glycemia at admittance as an independent prognostic factor (OR: 1.003; 95%CI: 1.001–1.004) after controlling for age, gender type of trauma and severity of trauma.

CONCLUSION. Increases in 10 points in the glycemia implies an increase of more than 10 times in mortality showing that the simple glycemia admittance determination is of farthest value.

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Multi-resistant infections: 0705–0718

0705

"COLONIZATION PRESSURE" AND AIRBORNE TRANSMISSION: TWO IMPORTANT PARAMETERS OF A UNIQUE EPIDEMIOLOGICAL BEHAVIOUR OF A. BAUMANNII IN ICU

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INTRODUCTION. Despite contact-isolation precautions routinely applied against carriers of multi-drug resistant bacteria in our ICU, A. baumannii remains highly endemic. This study aimed to record the incidence of A. baumannii-carriage and to explore the presence of an endemic or an epidemic situation.

METHODS. For 13 months (screening-period) we performed a prospective cohort study by screening for A. baumannii-carriage with pharyngeal, cutaneous and rectal swabs, at admission and then once-weekly. We also performed environmental sampling of inanimate surfaces. Despite the initial schedule, we continued our study for the next 12 months (post-screening period) because of an outbreak of A. baumannii revealed by the molecular analysis of the first period. Clinical samples and additional specimens from the environment were taken during the post-screening period (surfaces, air, filters of the acclimatization system). Molecular analysis (rep-PCR) of the strains of the two periods was performed to identify possible horizontal transmission and exogenous A. baumannii-reservoirs. Correlation was calculated between weekly "colonisation pressure" of A. baumannii-carriers and acquisition of A. baumannii-carriage in the screening-period.

RESULTS. 301 patients were admitted in the ICU, 284 were eligible for analysis. In the screening-period, 6% admitted- and 16% acquired-carriage was recorded. One clone (among six) of A. baumannii "circulated" in the unit in both periods of the study (one epidemic clone). A sustained survival of A. baumannii on the surfaces and in the air was detected. Correlation was found between the weekly "colonization pressure" of A. baumannii and the acquisition of A. baumannii-carriage ($p = 0.004$). For a weekly "colonization pressure" above 20%, the possibility for acquisition of A. baumannii-carriage increased 23 times (RR = 23.42, 95% CI: 3.127–175, $P = 0.0001$).

CONCLUSION. Admitted-carriers were the sources for both endemic and epidemic situations in the unit. Secondary inanimate reservoirs and airborne transmission of A. baumannii played an important role in the evolution and duration of the outbreak. Screening for admitted-carriage and contact-isolation precautions for A. baumannii carriers are not always effective measures for the control of an outbreak. High levels of a weekly "colonisation pressure" could be considered a preliminary sign of an A. baumannii-outbreak and help clinicians apply adequate control measures.

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EPIDEMIOLOGY OF COMMUNITY-ACQUIRED SEPSIS IN PORTUGUESE ICUS: DATA FROM SACIUCI STUDY

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INTRODUCTION. Sepsis is an important cause of admission in intensive care units (ICUs) and is associated with high morbidity and mortality. The goal of our study was to better define the epidemiology of community-acquired sepsis (CAS) in Portuguese ICUs.

METHODS. Prospective observational study of all patients admitted to 17 Portuguese ICU (41% of all Portuguese ICU beds) from 1st December 2004 to 30th November 2005. Washington consensus conference sepsis definitions were used. Co-morbidities considered were: chemotherapy, radiotherapy, malignancy, corticotherapy, HIV infection, AIDS and chronic diseases such as: cardiovascular, respiratory, liver, renal and haematological. Chi-square test and logistic regression were used in statistical analysis.

RESULTS. 22% of the 4202 patients admitted to the ICUs during the study period had CAS (Severe sepsis 40%; Septic shock 50%). CAS patients were mostly male (64%) and a median age of 63 (18–100). Although a shorter hospital length of stay (LOS) was observed in CAS patients (18 vs. 19 d; $p = 0{,}001$), they had a higher SAPS II score on admission (47 vs. 41) and stayed longer in the ICU LOS (9 vs. 5 days; $p < 0{,}001$). Median time between hospital and ICU admission was 2 days (1–16) and SOFA score on ICU admission was 7.14 $\pm$ 3.75. The most common site of infection was respiratory (61%) followed by intra-abdominal 18% and urinary 7%. Septic shock patients were older, had higher SAPS II and SOFA scores on ICU admission and the abdomen was more often the source of sepsis. Health care associated infections represented 23% of all cases. Infections were microbiologically documented (MD) in 39% of the cases and blood cultures were positive in 20%. There was a small predominance of Gram + organism (41%). The most common pathogens were St. pneumoniae (21%), *E. coli* (18%) and *Staph. aureus* (17%, including 3,4% methicilin-resistant). Half of the patients had at least 1 co-morbidity and 23% $\geq$ 2 co-morbidities, mainly cardiovascular (19%) and respiratory disease (19%). Number of co-morbidities ($p = 0{,}031$), malignancy ($p = 0.001$), chronic liver disease ($p < 0.001$) and chronic renal failure ($p = 0.028$) were associated with ICU mortality. Globally, ICU (30% vs. 23%) and hospital (38% vs. 32%) mortality of CAS patients were significantly higher than non-CAS patients. Variables associated with mortality were: age (OR 1.014), male (OR 1.608), SAPS II (OR 1.050), SOFA on hospital admission (OR 1.174), $\geq$ 1 co-morbidity (OR 1.430), MD (OR 1.402), bacteremia (OR 1.807) and septic shock (OR 4.272).

CONCLUSION. CAS is a frequent cause of ICU admission. CAS patients usually have co-morbidities, a higher SAPS II score, a significantly longer ICU LOS and a significantly higher ICU and hospital mortality. Most of episodes were not MD. The presence of septic shock, MD, namely bacteremia, and at least 1 co-morbidity were the variables more strongly associated with mortality.

0707

POLYCLONAL *P. AERUGINOSA* IN ICU: NO NEED FOR ISOLATION PRECAUTIONS IN ENDEMIC SITUATIONS

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INTRODUCTION. In our ICU, *P. aeruginosa* is the third cause of nosocomial infections. This study aimed to identify the epidemiology of this pathogen in order to assess the possibility of an unrecognized outbreak and the usefulleness of screening cultures and contact isolation precautions.

METHODS. We performed a prospective cohort study for 13 months. *P. aeruginosa*-carriage was recorded by pharyngeal, cutaneous and rectal swabs at admission and then once-weekly. A patient was considered as admitted-carrier if he had the first screening sample positive for *P. aeruginosa* and as acquired-carrier if he had the first sample negative and at least one positive sample during his ICU stay. Environmental sampling was performed before and after routine daily disinfection. Demographical data, severity scores, duration of invasive procedures and antibiotics administered in the ICU were recorded. Preventive contact-isolation and contact-isolation precautions were applied only for carriers of other multi-drug resistant microorganisms. All first P. aeruginosa-isolates as well as environmental strains were typed by repetitive extragenic palindromic sequence-based PCR (rep-PCR). Multivariate analysis identified risk factors for admitted and acquired P. aeruginosa-carriage.

RESULTS. 284 among 301 admitted patients were eligible for analysis. 6% admitted and 13% acquired *P. aeruginosa*-carriage was revealed, pharynx was the principal site of carriage (50%). *P. aeruginosa* was found in tap water and sinks. The molecular typing identified 43 different rep-PCR profiles, no similarity was found between carriage- and water-isolates. The conditional probability for acquisition of *P. aeruginosa*-carriage was: 4% for days 0–9, 13% for days 10–19, 20% for days 20–29, 23% for days 30–39 and 29% for days 40–50. In multivariate analysis, risk factors for admitted-carriage were: transfer from another ICU (OR: 7.22; CI: 1.75–29.82, P = 0.006) and administration of antibiotics before the ICU admission (OR: 4.71, CI: 1.12–19.78, P = 0.034). For acquisition of P. aeruginosa-carriage, age (OR = 1.038; CI: 1.013–1.06, P = 0.002) and the transfer from another ICU were independent risk factors in the multivariate analysis.

CONCLUSION. *P. aeruginosa* in our ICU showed a polyclonal endemicity and a low capacity for horizontal transmission despite the non application of contact-isolation precautions for carriers. Transfer from another ICU and exposure to antibiotics identified admitted-carriers of *P.aeruginosa*. Screening and isolation of *P. aeruginosa*-carriers are not necessary for endemic situations with non-multiresistant strains of *P. aeruginosa*.

0708

EVOLUTION OF MULTIRESISTANCE MARKERS IN THE ICU SPANISH. 2007 DATA

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INTRODUCTION. To present the evolution of multiresistance markers (MMR) in ICU-acquired infections according to the site of infection.

METHODS. Prospective, multicenter, cohort study. Patients admitted to the participating ICUs during the year 2007 were included. Patients were followed until ICU discharge or up to a maximum of 30 days. The following infections were assessed: mechanical ventilation-related pneumonia (VAP), urinary tract infection related to the urinary catheter (C-UTI), and catheter-related bacteremias/primary bacteremias (PB(VCB). MMR identified were defined according to the CDC (1). Data were collected using a program developed with Acces 97 database. Resistance rates are expressed as % of isolations resistant to the antibiotics selected in respect to each pathogen evaluated. Multiresistance rates for each infection analyzed are presented. Rates of previous years are compared.

RESULTS. A total of 12,453 patients admitted to the participating ICUs were included, 1367 of which (11.0%) developed 1577 infections (12.7%) during their ICU stay. A total of 1625 microorganisms were recovered, 926 (57%) of which were Gram-negative pathogens, 506 (31.4%) Gram-positive, 179 (11%) fungi, and 14 (0.9%) of other bacteriologic families. MMR according to the infection focus are shown in table.

TABLE 1

	GLOBAL	VAP	C-UTI	CV-B/PB
Staphylococcus aureus methicillin-resistant	24.2	24.6	ND	25.0
Staphylococcus epider methicillin-resistant	80.9	ND	ND	82.5
Escherichia coli ciprofloxacin-resista	34.4	32.1	35.4	ND
Escherichia coli cefotaxime-resistant	16.9	17.0	12.4	ND
Acinetobacter spp imipenem-resistant	76.4	72.2	93.3	93.3
P. aeruginosa amikacin-resistant	12.9	14.0	13.5	5.0
P. aeruginosa ceftazidime-resistant	27.2	27.8	28.0	20.8
P. aeruginosa ciprofloxacin-resista	37.1	35.3	43.6	20.8
P. aeruginosa imipenem-resistant	32.0	36.8	25.8	14.3
P. aeruginosa pipe/tazo-resistant	18.9	18.7	23.7	12.5

CONCLUSION. Differences in the resistance markers in *P. aeruginosa* according to the infection focus.

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0709

EMERGENCE OF PANRESISTANT STRAINS OF NON-FERMENTATIVE GRAM-NEGATIVE PATHOGENS IN A TRAUMA HOSPITAL

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INTRODUCTION. Panresistant Pseudomonas aeruginosa(Pa)has emerged in Rio de Janeiro in 1999;Panresistant Acinetobacter sp.(Acn) has emerged in 2003,both has become a public health problem.Pu blic Hospital of Macae(MPH)is localized 190 km far from Rio de Janeiro city;it is a 127-bed trauma hospital.

METHODS. 35 patients(pts) colonized or infected by panresistant Pa or Acn were analyzed(JUL-DEC/2007).Panresistant strains were defined as those susceptible only to amikacin or polymyxin and resistant to all antimicrobials tested.Nosocomial infections were defined by the CDC.The cumulative incidence of infections was calculated.Antimicrobial susceptibility was performed using Vitek-1.Genotyping of was performed by RAPD-PCR.APACHE II score (24 h)and Charlson score was calculated(2,3).

RESULTS. The cumulative incidences of panresistant Pa and Acn were 0.9/1,000 pts-day (0.24–1.63)and 0.96 pts-day (0- 1.77),respectively.The majority of pts were admitted at intensive care units(77%).Ventilator-associated pneumonia(12 pts)and primary bloodstream infection (10 pts)were the most commom infections diagnosed.The days between hospitalization and isolation,for Acn is median 13,and for the Pa is 30,with p = 0,02.Infections were caused by Acn sp.in 14 pts and by Pa in 9 pts.The mortality rate by Pa or Acn was 47%.9 pts(26%)had their isolates typed.The Acn strains had unique DNA pattern,but analysis of Pa strains showed a polyclonal pattern.

CONCLUSION. The emergence of panresistant Pa may have occurred by the acquisition of mechanisms of resistance of the previously susceptible strains. Cross-transmission was probably responsible for the emergence of panresistant Acn.These two mechanisms of acquisition of resistance may explain the difference in time from hospitalization to the first isolation of the resistant strain observed in our study. Measures involving antimicrobial use and to contain cross-transmission of strains are important in the control of resistance in the hospital.

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0710

TO DETERMINE THE RISK FACTORS AND OUTCOME OF THE MULTI-DRUG RESISTANT ACINETOBACTER BAUMANNI INFECTION IN INTENSIVE CARE UNIT OF A DEVELOPING COUNTRY

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INTRODUCTION. *Acinetobacter Baumanni* is an important cause of nosocomial infection in critically ill patients. Many isolates exhibit multi-drug resistance, raising concerns over our ability to treat serious infections with these organisms. The risk factors and clinical outcome for resistance are poorly defined.

METHODS. A descriptive retrospective observational study was undertaken of all episodes of *Acinetobacter baumanni* bacteremia occurring in 40-beded tertiary level multidisciplinary intensive care unit (ICU) of a teaching hospital. Over a period of one year, patients with *Acinetobacter baumanni* infection in their first blood stream sample were considered. The profile of patients with multi-drug resistant (MDR) *A. baumanni* blood stream infection (BSI) was compared to the patients with susceptible *Acinetobacter baumanni* BSI.

RESULTS. Of the 104(72 males,32 females) patients with *Acinetobacter baumanni* BSI,43(41.3%)had MDR *A. baumanni* infection while 61(58.7%) had susceptible *A. baumanni* infection. Mean age of patients with MDR *A. baumanni* BSI was 43 ± 34 years while the mean age of susceptible group was 47 ± 39 years. MDR *A. baumanni* infection occurred significantly higher in males as compared to females (30/43 vs. 13/43,P = 0.03).Patients with MDR *A. baumanni* BSI had significantly higher number of patients with history of previous hospitalization(38/43 vs. 25/61,P = 0.01)and had significantly received Carbepenem(29/43vs17/61,P = 0.01) as compared to the patients with susceptible *A. baumanni* BSI. There was no significant difference in the mean duration of the hospital stay before being shifted to ICU (15 ± 12.4 vs. 12 ± 10.9,P = 0.2) however, patients with MDR *A. baumanni* had prolonged ICU stay (33.5 ± 25 vs. 20.4 ± 16.2,P = 0.04) as compared to the patients with susceptible *A. baumanni* BSI. The odds of having a MDR *A baumanni* BSI was significantly higher in post-operative patients (19/43 vs. 12/61, OR = 2.2,95% CI = 0.98–5.1, P = 0.05, patients with grade IV pancreatitis (24/43 vs. 16/61, OR = 2.1, 95%CI = 1–4.4,P = 0.04, with solid malignancy(18/43 vs. 9/43,OR = 2.8,95%CI = 1.1–6.9,P = 0.01) and in diabetics (28/43 vs. 18/61, OR = 2.2,95% CI = 1–4.4, P = 0.02. However, susceptible *A. baumanni* BSI occurred significantly in patients with lower respiratory tract infections as compared to MDR *A. baumanni* BSI(38/61 vs. 12/43,P = 0.03). BSI with MDR *A. baumanni* was an independent risk factor for mechanical ventilation (32/43 vs. 23/61,P = 0.04) and mortality (28/43 vs. 19/61,P = 0.03) as compared to the susceptible *A.baumanni* BSI. The mean SAPS II(simplified acute physiology score) predicted death rate was significantly higher in patients with MDR *A. baumanni* BSI as compared with those having susceptible *A. baumanni* (63% vs. 41%,P = 0.04).

CONCLUSION. MDR *Acinetobacter* is more likely to be found in patients with solid malignancy, diabetics and grade IV pancreatitis. It was an independent risk factor for mechanical ventilation, mortality and SAPS predicted death rate in patients.

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ACINETOBACTER BAUMANII INFECTIONS IN THE INTENSIVE CARE UNIT: EPIDEMIOLOGY, PATTERNS OF RESISTANCE AND CLINICAL OUTCOME

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INTRODUCTION. Among critically ill patients, *Acinetobacter* spp. cause serious infections, the management of which is complicated by antimicrobial resistance, including carbapenem resistance. The data from various studies regarding the impact of these infections on mortality are conflicting.

METHODS. Prospective, epidemiological study of infections due to *A. baumanii* in an ICU of a tertiary care hospital. The data collected included demographic and clinical characteristics of all patients admitted to the ICU from August 2004 to January 2007. A patient was considered to have an infection due to *A. baumanii* when the bacterium was isolated from a blood culture and he also had clinical signs of infection. Positive bronchial cultures were considered to represent colonization. Only the first episode of infection for each patient was included. Statistical analysis was done with SPSS v.16.

RESULTS. During the study period 447 patients were admitted to the ICU, of whom 63% were surgical. Their mean age was 66 years and 61% of them were male. Their mean APACHE II score was 18. Thirty-five cases of bloodstream infections due to *A.baumanii* (BSI) were identified (8% of patients). Of these, 13 were due to ventilator-associated pneumonia, 2 to abdominal infections, 11 were catheter-related and 9 were primary. Prior bronchial colonization with *A.baumanii* was found to be a significant risk factor for BSI ($p = 0.000$). The isolated strains of *A.baumanii* were highly resistant: 79% to carbapenems, 73% to ampicillin/sulbactam, 97% to quinolones and 97% to maxipime. 66% were susceptible only to colistin (tigecycline excluded), while in the last year of the study, when tigecycline was included in the testing, resistance to tigecycline was found to be 15%.
Patients with BSI due to *A.baumanii* had a 28 days mortality of 47% and an in-hospital mortality of 70%. BSI was significantly related to increased in-hospital mortality ($p = 0.000$).

CONCLUSION. Multi-drug resistant *A.baumanii* is an important cause of infection in our ICU leading to increased in-hospital mortality. Bronchial colonization seems to be a predisposing factor and hygiene measures must be implemented, in order to minimize the risk.

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0712

IMPACT OF HOSPITAL SIZE IN THE NOSOCOMIAL INFECTION RATE IN ICU

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INTRODUCTION. Surveillance of device related infection is one of the mean objectives in Spain. Infection rates (IR) are influenced by both the intrinsic and extrinsic risk factors (RF); the latest vary according to the hospital. Objective: To compare IR in ICU according to the hospital size

METHODS. Prospective study performed through out 3 months per year during 2 consecutive years (2006 and 2007), using the methodology and database of the ENVIN-HELICS. Characteristics of the patients, use of devices and IR per 100 patients and per 1,000 days of ICU' stay/ device were analysed. Hospitals were classified as small (SH) <200 beds, medium (MH) 200–500 beds and big (BH) > 500 beds. udy.

RESULTS. 112 ICU were evaluated. Their location was: 14 (12,5%) belonged to SH, 45 (40,1%) to MH, and 53 (47,3%) to BH. 24137 patients were studied, distributed as follow: 1191 (4,9%)/10686 (44,2%)/12260 (50,7%). Mean age: 62,9/62,8/60,3 years. APACHE II score: 13,5 (8,1)/ 13 (8,5)/15 (8,2). Immune system alterations: 6,3/7,3/10,5%. Mechanical ventilation (MV): 32,2/35,5/47,4%. Central venous catheter (CVC): 61,3/ 1,9???? /89,9%. Urinary tract infection (UTI): 66/66,4/78%. Extra renal depuration: 0,2/ 1,1/2,4%. Length of stay: 6,4/ 7,1/ 8,4 days. Mortality: 8,2/9,2/12,8%. Colonization-infection by MRSA: 0,67/ 1,31/1,8%; Acinetobacter: 0,1/1,1/2,7%; multiresistant P aeruginosa: 0,4/0,6/1,3%, and by BLEE: 0,4/0,6/1%.

TABLE 1

	SH	MH	BH
INF x100 pts	7,8	11,6	16,7
INF x 1000 days	12,2	16,2	19,7
VAP x 100 pts	3,4	5,7	6,8
VAP x 100 pts with MV	10,6	16,2	14,4
VAP x 1000 days MV	0,84	12,6	17,1
UTI x 100 pts	1,5	2,5	4,1
UTI x 100 pts with UC	2,2	3,9	5,6
UTI x 1000 days UC	0,2	3,6	6,2
PB + CRB x 100 pts	2,3	2,3	4,1
PB + CRB x 100 pts with CVC	3,8	3,7	5,1
PB + CRB x 1000 days CVC	0,3	3,1	6,5

CONCLUSION. Major participation of MH and BH. The severity, length of stay and exposition to risk factors are directly proportional to the hospital size, as well as the multiresistant bacterial infection and IR due to more prolonged stay and devices. Stratification is mandatory in the evaluation of IR according to the ICU size.

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SPECTRUM OF ACINETOBACTER INFECTIONS IN PATIENTS ADMITTED TO THE ICU OF A TERTIARY CARE CENTER

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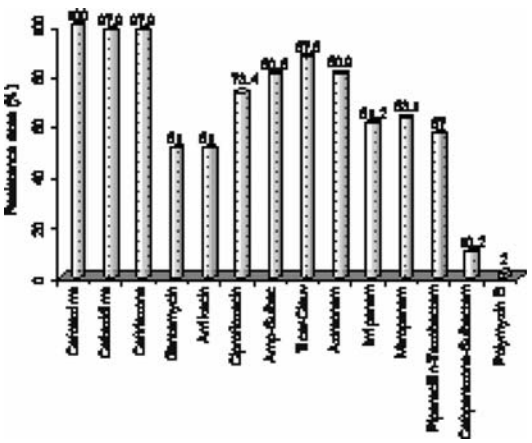
INTRODUCTION. Acinetobacter has emerged as the major pathogen responsible for infections in ICU patients. It is commonly ESBL positive and resistant to vast majority of drugs. However, there is lack of data from Indian patients

METHODS. To elucidate the characteristics of patients, co-morbidities, site of isolation, sensitivity patterns and outcome of ICU patients with Acinetobacter infections

RESULTS. Forty nine critically ill patients (56.4 ± 15.5 years, 20–79 years; M:F 33:16; Apache II score 20.6 ± 7.9, 4–35) with Acinetobacter infection from different sites were included over a six month period. Majority had hospital acquired infections (n = 29, 59.2%) with the commonest site of isolation being the respiratory secretions (n = 28, 57.1%). Pneumonia (n = 10, 20.4) was the commonest diagnostic group followed by sepsis (n = 7, 14.3%). Co-morbidities were commonly present (n = 23, 46.9%) with diabetes being the commonest (n = 9, 18.4%). Majority of the patients were on mechanical ventilation (n = 28, 57.1%). History of prior broad spectrum antibiotic use was present in 19 patients (38.8%). Third generation cephalosporins alone were largely ineffective (sensitivity rates < 5% of all the isolates). Isolates demonstrated high rates of resistance to Meropenem (n = 31, 63.1%), Imipenem (n = 30, 61.2%) and Piperacillin-Tazobactam combination (n = 28, 57%). Only two antibiotics, namely, Polymyxin B (only one isolate found to be resistant) and Cefoperazone-Sulbactam (only 5 isolates were resistant) demonstrated good efficacy against the isolates (see figure). Hospital mortality was 20.4% (n = 10).



CONCLUSION. Acinetobacter is frequently isolated from ICU patients with lung being the commonest focus. History of broad spectrum antibiotic use is common. A vast majority of the antibiotics including the carbapenems seem to be largely ineffective. Polymyxin B and Cefoperazone-Sulbactam are useful antimicrobial agents against Acinetobacter infections.

0714

REDUCTION OF BLOODSTREAM *S. AUREUS*/METHICILLIN RESISTANT *S. AUREUS* INFECTION WITH REGULAR ANTISEPTIC BODY WASH-RETROSPECTIVE ANALYSIS

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INTRODUCTION. The aim of this study was to analyze the efficacy of the antiseptic Stellisept® body lotion, containing Undecylenamide Propyl Trimonium Methosulphate (2.5 g/100 g) and Phenoxyethanol (2.5 g/100 g), for the eradication of bloodstream *Staphylococcus aureus* (*S. aureus*) especially methicillin resistant *S. aureus* (MRSA) infection in patients admitted to mixed medical-surgical ICU.

METHODS. Between October 2006 and June 2007, all patients admitted to ICU were given regular body wash with antiseptic Stellisept® body lotion irrespective of their infection/ colonization status. The number of central venous catheters placed and all blood cultures positive for *S. aureus* including MRSA were retrospectively collected and compared with the patients admitted to the ICU in the preceding nine months between January 2006 and September 2006 where Stellisept® body wash was not used. For the purpose of this study only central venous catheters placed in the ICU and blood cultures that were positive after 48 h of ICU admission were used.

RESULTS. Between January 2006 and September 2006, 694 patients were admitted to the ICU, 113 central venous catheters were placed and 55 patients developed S. aureus bacteremia out of which 21 were MRSA. Between October 2006 and June 2007, 648 patients were admitted to the ICU, 105 central venous catheters were placed and 14 patients developed S. aureus bacteremia out of which 9 were MRSA. After the regular body wash with antiseptic Stellisept® body lotion of all ICU patients there was a significant reduction in the incidence of bloodstream S. aureus ($p < 0.05$) and MRSA ($p = 0.019$) infection.

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0715

EPIDEMIC BLOODSTREAM INFECTION CAUSED BY CARBAPENEM-RESISTANT KLEBSIELLA PNEUMONIAE IN A GREEK ICU. ONE YEAR PROSPECTIVE STUDY

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INTRODUCTION. Carbapenem resistance of Klebsiella pneumoniae has increased in our hospital from 1,75% in 2005 to 22% in 2006.The aim of our study was the evaluation of treatment, infection outcome and mortality rate of patients with Bloodstream Infections (BSI) caused by Carbapenem-Resistant Klebsiella Pneumoniae (CRKP) in the ICU of a 1200-bed tertiary greek hospital.

METHODS. We prospectively studied all patients with BSI due to CRKP in our ICU, during 1-year period (from 1/1/2007 to 1/1/2008). 40 blood isolates from 25 patients carried metallo-beta-lactamases and were resistant to carbapenems. The isolates were susceptible to aminoglycosides (100%) and colimycine (100%). Treatment, infection outcome and patient mortality were assessed.

RESULTS. 25 patients (15 male, 10 female, age 54 $\pm$ 21,8 years) had BSI due to CRKP. Admission APACHE II score was 15,1 $\pm$ 6 and SOFA score on the first day of infection was 7,1 $\pm$ 2,6. BSI occurred 15,2 $\pm$ 8,7 days after admission. The patients' length of stay in the ICU was 27,3 $\pm$ 15 days. All patients received aminoglycosides (100%) and among them 17 patients with septic shock received combination therapy with colimycine. 80% of patients recovered from BSI while 36% of included patients died; in 55% of them BSI due to CRKP was considered responsible for their death.

CONCLUSION. The emergence of CRKP has important implications to the future ability to treat these infections. In our study, the most consistently in vitro active agents were aminoglycosides and colimycine. Combination therapy may affect outcome in septic shock patients with BSI due to CRKP.

0716

GOALS TO DECREASE THE INCIDENCE OF MULTI-RESISTANT *ACINETOBACTER* SP. IN A CRITICAL CARE UNIT

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INTRODUCTION. The presence of multi-resistant *Acinetobacter* sp. is a current challenge in critical care units all over the world. This gram negative bacteria is characterized by survival in the environment for long periods of time, requiring few conditions for its growth. In this study we are monitoring the impact of the incidence of *Acinetobacter* sp. MDR (resistance to ampicillin/sulbactam and carbapenems) in an ICU, after intensification of measures for prevention and control of hospital infection, with involvement of the multidisciplinary team.

METHODS. Prospective study, with pre and post-intervention, in a general private ICU, with 23 beds. We classified a multidrug resistant when the bacteria were resistant to carbapenems and ampicilina/sulbactam. We calculated the incidence rate monthly (absolute number of new cases after 48 h of the admission in the hospital, over the number of patients/day). The intervention measures to be implemented were discussed at meetings with the "brainstorm" technique with the whole ICU team. Measures selected were: intensification of hand washing, use of alcohol gel, adherence to the contact measurements advices and withdrawal of rings and bracelets; review the process of cleaning the environment and care of ventilation material. It was established as our goal to maintain the rates under the maximum limit expected of the previous year.

RESULTS. The measures were implemented in December 2006. There was a good participation and adherence of all staff. The goal established was the incidence below of the maximum limit expected of 2006 (13,6 new cases per 1000 patients/day). It has been observed already in the first half of the following year a reduction of the rates, to even better than to the lasts two years (5,6 new cases per 1000 patients/day). In July 2007 there was another outbreak of the multiresistant bacteria (18,9 new cases per 1000 patient/day). After that, we reintroduced all the training measurements and for the next months our rates showed reduction to the previous level (4,9 new cases per 1000 patients/day).

CONCLUSION. The implementation of an appropriate program involving all staff members can reduce the presence of multi-resistant Acinetobacter sp in an ICU. But the vigilance and adherence to the recommendations must be maintained and monitored continuously so that such results can be sustainable.

0717

INCIDENCE AND ANTIBIOTIC RESISTANCE PATTERN OF EXTENDED SPECTRUM BETA LACTAMASE PRODUCING ORGANISMS FROM INPATIENT SAMPLES FROM A TERTIARY CARE HOSPITAL IN INDIA

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INTRODUCTION. Infections due to extended spectrum beta lactamase (ESBL) producing multi drug resistant Enterobacteriaceae is increasingly seen world wide. The threat of ESBL's is higher in India than in the western world.

METHODS. This retrospective review of the Microbiology database was done to find out the prevalence of ESBL's at Manipal Hospital, Bangalore, India (a 650 bed tertiary care centre) in 2007. The laboratory received 16392 requests for culture from January to December 2007. 1228 *E.coli* and 514 *Klebsiella pneumonia* isolates were analysed. Antibiotic susceptibility testing was done by the CLSI guidelines. Cefotaxime and cefotaxime plus clavulanic acid discs and ceftazidime and ceftazidime plus clavulanic acid discs were used for the confirmation of ESBL's.

RESULTS. The prevalence of ESBL's was 40.8% (710/1742)-ESBL *E. coli* was 39.3% (483/1228) and ESBL *Klebsiella pneumonia* was 43.6% (224/514). Resistance to antibiotics among ESBL's was as follows: Amikacin 9.3% (66/710), Netilmycin 7.0%, ofloxacin 78%. Among the beta lactam/beta lactam inhibitor combinations—increased resistance to piperacillin- tazobactum was seen (67.9%) as compared to Cefaperazone/sulbactum (36.8%). Resitance to carbapenem–Imipenem 0.8% and Meropenem 0.5% was low. Four isolates were resistant to both carbapenems and two to all the above antibiotics.

CONCLUSION. The ESBL prevalence from inpatient samples at our hospital was 40.8%. Most of the ESBL's were multidrug resistant. Cefaperazone/sulbactum showed a higher sensitivity compared to Piperacillin/tazobactum. Low level of resistance to Carbapenems was prevalent.

0718

REDUCTION OF ICU ACQUIRED MRSA, ACINETOBACTER AND VRE WITH INTRODUCTION OF SDD

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INTRODUCTION. Selective digestive decontamination (SDD) may reduce colonization with multiresistant bacteria, e.g. acinetobacter, in intubated critically ill patients. With addition of vancomycin to SDD a reduction of methicillin resistant staphyloccocus aureus (MRSA) has been demonstrated. SDD with topical tobramycin, colistin, vancomycin and nystatin has been administered to patients intubated >48 h at our ICU since January 2007, together with expanded microbiological screening for resistant bacteria (MRSA screeing only before).

METHODS. Retrospective observational study of patients intubated >48 h in the same ICU in the first six months of 2006 (no SDD)and 2007(with SDD). Data were obtained from ICU and microbiology databases. ICU acquired colonization was defined as $\geq$1 positive sample for MRSA, multiresistant acinetobacter (MRA), other cephalosporin resistant gram-negative bacteria (RGNB) and VRE > 48 after ICU admission and up to 48 h after ICU discharge.

RESULTS. A total of 304 and 253 patients were admitted to our ICU in the first six months of 2006 and 2007, respectively. The table shows results for patients intubated > 48 h only. RGNB includes cephalosporin resistant *E.coli*, *Enterobacter* and *Klebsiella*.

TABLE 1

	1 January–30 June 2006	1 January–30 June 2007
Patients intubated > 48 h	114	125
Mean APACHE II	21	21
ICU deaths (%)	27 (24%)	30 (24%
Total ventilator days	1076	1210
Mean ventilator days/patient	9.4	9.7
Patients with acq. MRSA (%)	6 (5.3%)	1 (0.8%)
Patients with acq MRA (%)	25 (21.9%)	5 (4%)
Patients with acq. RGNB	9 (7.9%)	9 (7.2%)
Patients with acq. VRE	10 (8.8%)	5 (4.0%)

CONCLUSION. In the first six months after intoduction of SDD acquisition of MRSA, MRA and VRE decreased compared to the same time period the year before, RGNB acquisition remained the same. 3 of 9 acquired RGNB in 2007 were only detected on new expanded screening. This seems to confirm that SDD with vancomycin can decrease MRSA and acinetobacter without a rise in other resistance. Longer term observation of ICU ecology with on-going SDD remains necessary.

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0719

BUFFERED HYPERCAPNIA ATTENUATES THE DEVELOPMENT OF SEPTIC SHOCK IN SYSTEMIC POLYMICROBIAL SEPSIS

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INTRODUCTION. Lung protective mechanical ventilation is integral component of the management of acute lung injury (ALI), however such strategies are often associated with elevated $PaCO_2$. Whereas current concepts presuppose that improved outcome is due to limitation of lung stretch, increasing evidence exists to support an independent protective effect of elevated CO_2 tension. Hypercapnic acidosis protects against lung injury in several contexts, including pulmonary and mesenteric ischaemia-reperfusion (1) and sepsis induced lung injury (2). In contrast, buffered hypercapnia, i.e. hypercapnia with normal pH, worsens ischaemia-reperfusion induced lung injury (3). However, the effect of buffered hypercapnia on the evolution of shock due to systemic sepsis has not been investigated.

METHODS. Adult male Sprague-Dawley rats (330–450 g) were randomised to be exposed to environmental hypercapnia (8% CO_2) or normocapnia for 72 h, at which stage the animals had a buffered hypercapnia. On day four, following induction of anaesthesia, mechanical ventilaiton and placement of lines, animals were subjected to caecal ligation and puncture (CLP) and received normocapnia ($FiCO_2$ 0.0, n = 12) or hypercapnia ($FiCO_2$ 0.05, n = 12). Animals were ventilated for 6 h and haemodynamic parameters, indices of anaerobic metabolism (blood lactate, base deficit), lung mechanics were assessed. Broncho-alveolar lavage specimens, blood and peritoneal fluid were analysed post-mortem.

RESULTS. Buffered hypercapnia attenuated the development of septic shock. The time to reduction of arterial blood pressure to 50% of baseline level was significantly longer in the hypercapnia group ($p = 0.0023$). This was associated with better survival at 6 h and significantly lower blood lactate levels in the buffered hypercapnia group ($p < 0.05$). Total urine output was significantly higher in the buffered hypercapnia group ($p = 0.0022$). Static lung compliance, arterial oxygenation did not differ between the two group, however there was a trend of reduced broncho-alveolar IL-6 levels in the hypercapnia group.

CONCLUSION. Buffered hypercapnia proved to be protective in evolving septic shock, with better presevation of arterial blood pressure and lesser increases in blood lactate levels, compared to controls. These protective effects were persistent during the experiment.

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0720

CHANGES IN EEG, BRAIN SPECIFIC PROTEINS AND COGNITIVE FUNCTIONAL TESTS DURING EXPERIMENTAL HUMAN ENDOTOXEMIA

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INTRODUCTION. Septic encephalopathy as example of organ dysfunction in septic patients is associated with EEG changes and increased levels of brain specific proteins (BSP). The pathophysiological mechanism is unclear, but possibly mediated by a direct neurocytotoxic effect of circulating cytokines. We determined the correlation between EEG changes, BSP, and cognitive functions (CF) in volunteers exposed to endotoxin (LPS).

METHODS. Healthy male volunteers (n = 15) received 2 ng/kg E. coli LPS. Cytokines, temperature, heart rate and BSP were determined at 0–1–2–4–8 hrs after LPS infusion. CF-tests were performed at 0–2–8 hrs, and EEG changes were monitored continuously.

RESULTS. Volunteers experienced the expected flu-like symptoms, illustrated by an increase in temperature of 1.4 ± 0.5oC and an increase in heart rate of 27 ± 9 bpm. Circulating cytokines increased to 814 ± 516, 1111 ± 548 and 108 ± 106 pg/ml) for respectively TNF-α, IL-6, and IL-10. Endotoxemia induced no clinical relevant EEG changes by both visual and quantitative analysis. NSE and S100-β (BSP's) decreased from 11.5 ± 2.0 to 7.7 ± 1.4 µg/l ($p < 0.0001$) and 51 ± 8 to40 ± 9 ng/l ($p = 0.076$) respectively, whereas GFAP did not change. All domains of the CF showed a significant improvement after the administration of LPS. Peak concentrations of circulating TNF-α and IL-6 were negatively correlated with S100β ($r = -0.63$ and $r = -0.65$, $p = 0.012$ and $p = 0.009$, respectively). No correlations were found between cytokines, EEG parameters and CF.

CONCLUSION. Experimental human endotoxemia results in high levels of circulating cytokines, no significant changes in EEG background activity and is associated with lower BSP, and improved CF. We found no indications of direct neurocytotoxic effects of cytokines on the brain.

0721

HUMAN NEUTROPHIL PEPTIDES INDUCE INFLAMMATION IN HEMORRHAGIC SHOCK HEMODILUTION RESUSCITATION

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INTRODUCTION. Fluid resuscitation in the perioperative care of hypotensive trauma patients can exacerbate the injury sustained during hemorrhagic shock. Polymorphonuclear leukocytes (PMN) release human neutrophil peptides (HNP) upon activation and are known to play a pivotal role in reperfusion associated organ injury. We hypothesize that HNP play an important role in mediating proinflammatory and prothrombotic responses during ischemia and reperfusion following hemorrhagic shock.

METHODS. Male Sprague-Dawley rats were subjected to hemorrhagic shock initiated by blood withdrawal to reduce MAP to 40 mm Hg within 15 min. After a 60 min hypotensive period, rats underwent isovolumetric resuscitation using either whole blood (B) or an equal mix of whole blood and lactated Ringer's solution (B/R) to restore values of MAP to 80 – 90 mm Hg for 1 hr. Blood was drawn for cytokine analysis. PMN-induced inflammation was assessed in a co-culture of human primary pulmonary artery endothelial cells (HPAEC) with primary human PMN stimulated with HNP. Platelet aggregation and expression of CD62P was examined following stimulation with HNP.

RESULTS. MIP-2 and TNF-\alpha levels at baseline were similar between B and B/R rats but following HSR were significantly increased in the B/R group (Table 1). Direct stimulation of HPAEC with HNP increased PMN adhesion, which was associated with IL-6 and IL-8 production from HPAEC and an increased surface expression of CD11b in PMN (Table 2). HNP increased P-selectin expression, induced aggregation, and prolonged the transient aggregation mediated by ADP in both human and murine platelets.

TABLE 1 HEMODILUTION-INDUCED INFLAMMATION IN RATS

	Whole blood pre	(B) Post	Whole blood/ lactated Ringer's	(B/R)
TNF-\alpha	20.12 ± 2.18	35.14 ± 4.51	18.07 ± 2.87	667.50 ± 84.86*
MIP-2	134.00 ± 8.32	198.70 ± 19.43	165.90 ± 17.80	324.20 ± 61.57*

*Cytokine concentrations are pg/mL. *P < 0.001*

TABLE 2 PMN-INDUCED INFLAMMATION IN HPAEC AND PMN

	Control	HNP (1 ug/mL)	HNP (10 ug/mL)
Adhesion (PMN)	1.00 ± 0.00	0.73 ± 0.16	8.00 ± 3.10*
CD11b (PMN)	1.00 ± 0.00	1.17 ± 0.14	2.03 ± 0.03*
IL-6 (HPAEC)	0.49 ± 0.14	0.68 ± 0.09	11.80 ± 0.69*
IL-8 (HPAEC)	13.98 ± 3.45	12.65 ± 1.75	114.2 ± 7.29*

*Fold-increase in Adhesion and CD11b. Cytokine concentrations are pg/mL. *P < 0.05*

CONCLUSION. Resuscitation using the hemodilution method caused significant inflammation associated with PMN infiltration. HNP released from neutrophils play a crucial role in mediating inflammation through activation of the endothelium, leukocytes and platelets.

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0722

HIGH VS. MODERATE FLUID MANAGEMENT INCREASES MORTALITY IN TWO DIFFERENT EXPERIMENTAL SEPSIS MODELS

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INTRODUCTION. Aggressive fluid resuscitation may improve outcome in septic patients [1]. For selected patient groups, however, this approach can be detrimental by increasing the risk of lung edema and abdominal compartment syndrome [2,3]. The aim of this study was to test the effects of a high vs. moderate volume fluid administration strategy on hemodynamics, organ function and survival in two relevant experimental sepsis models.

METHODS. 48 anesthetized pigs were invasively monitored (systemic and regional flows and pressures). They were randomized (full factorial design) to 3 groups (controls, endotoxin infusion and fecal peritonitis) and 2 treatments (high and moderate volume resuscitation), respectively, for 24 hrs or until death occurred. High volume administration consisted of 20 ml/kg/h, including 5 ml/kg/h HES 6%; moderate volume administration consisted of 10 ml/kg/h). Ventilation was adjusted to keep the animals normoxic and normocapnic, and plateau pressures were kept at <35 mmHg. Differences between groups were assessed by MANOVA using two between-subject factors (model and volume approach) and time as within-subject factor. Preliminary data on control and peritonitis pigs have been presented previously.

RESULTS. Mortality was highest in peritonitis high volume (87%) and endotoxin high volume (75%) groups (peritonitis moderate volume: 50%; endotoxin moderate volume: 13%; $p < 0.01$). One animal in the control high volume group died, while all control moderate volume pigs survived 24 hrs. Filling pressures (CVP, PAOP) increased in all groups, with highest pressures in peritonitis high volume ($p < 0.01$), while mixed venous saturation was lowest in both peritonitis groups ($p < 0.02$). The arterial lactate concentration increased in both peritonitis groups ($p < 0.05$), while the oxygenation index decreased in all groups, with lowest values in the peritonitis high volume group ($p < 0.05$).

CONCLUSION. High volume resuscitation reduced oxygenation and survival, with the most detrimental effects in animals with peritonitis. This study suggests that a prolonged aggressive fluid strategy may not generally be beneficial in sepsis.

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0723

IMMUNE AND BIOENERGETIC FUNCTION IN NEUTROPHILS IN AN IN VITRO MODEL OF SEPSIS

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INTRODUCTION. Mitochondrial bioenergetic dysfunction is described in many cell types during prolonged sepsis, including monocytes [1, 2]. The resulting lack of energy supply may be responsible for the decreased functioning of these cells. Neutrophils, on the other hand, rely predominantly on glycolysis for their ATP supply. We therefore studied neutrophil phagocytic function and cell surface receptor expression plus glycolytic respiration (measured by ATP levels and lactate production) in an in vitro model of sepsis.

METHODS. Neutrophils were isolated from 20 ml blood samples taken from 10 healthy volunteers. These were incubated for 24 h in plasma pooled from either 6 separate healthy controls or 6 patients on Day 1 of septic shock. At 24 h, cell viability (apoptosis/necrosis) was assessed by Annexin-V-FLUOS; surface CD16 expression (marker of activation) by FACS; oxidative burst following PMA stimulation by Phagoburst™; ATP levels by ATP-Lite and lactate production by lactate-Trinity. Data were analysed by paired Student's *t* test and Mann Whitney *U*, as appropriate.

RESULTS. Compared to their healthy plasma counterparts, neutrophils incubated in septic plasma for 24 h showed deceased cell death, a higher state of activation (higher CD16 expression) and increased oxidative burst activity (Table 1). ATP content and supernatant lactate levels were also significantly higher in these cells.

TABLE 1

	Necrosis*	Apoptosis*	CD16*	Oxidative burst*†	ATP content *†	Lactate *†
control	0.07(0–0.4)	24% (14–28)	47% (12–60)	1	1	1
septic	0.03(0–0.07)	11% (8–16)	90% (73–94)	2.5(1.5–6.8)	2 (1.1–3)	1.8(1.3–4.2)

** $p < 0.05$ compared to controls;† ratio to control;data shown as median(range)*

CONCLUSION. Neutrophils incubated in septic plasma showed a higher level of functional capacity and glycolytic activity, and greater longevity. Whether this is related to increased activation by septic mediators or, potentially, loss of inhibitory factors present in healthy plasma requires further elucidation. This in vitro model offers a useful means of assessing leukocyte function and bioenergetic status, and for comparing different cell populations.

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0724

HAEMODYNAMIC AND METABOLIC EFFECTS OF VASOPRESSIN AND TERLIPRESSIN IN OVINE SEPTIC SHOCK

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INTRODUCTION. Arginine vasopressin (AVP) and terlipressin (TP) are regularly used in the support of patients with septic shock. Recently, AVP has been shown to improve survival in less-severe septic shock patients[1]. Nevertheless, there is still concern regarding negative effects on cardiac output and global oxygen transport[2]. The present study was conducted as a prospective, randomized, controlled laboratory experiment to compare the haemodynamic and metabolic effects of a continuous infusion of AVP and TP using an established ovine model of septic shock.

METHODS. Twenty-four ewes were anaesthetized and instrumented for chronic haemodynamic monitoring. A laparotomy was performed and faeces were taken from the caecum under sterile conditions. After baseline measurements (BL1) had been performed, the faeces were injected into the peritoneal cavity. A second set of measurements (BL2) was taken after the onset of septic shock (defined as mean arterial pressure (MAP) inferior to 60 mmHg). The animals were then randomly assigned to receive either AVP (0.5 mU/kg/min; n = 8) or TP (1 \mug/kg/h; n = 8). The control group (n = 8) received only the vehicle (normal saline). If necessary, norepinephrine was titrated to maintain MAP at 70 ± 5 mmHg in all groups.

RESULTS. Baseline characteristics did not differ between groups. Compared to BL2, both AVP and TP significantly increased MAP (p inferior to 0.05). Ten hours after the onset of septic shock, heart rate (HR) was significantly decreased in the treatment groups as compared to the control group (p inferior to 0.05). Cardiac index (CI), cardiac troponin and arterial lactate levels were similar between groups. In addition, there were no between group differences in serum creatinine and urinary output. Following 12 h of septic shock, mixed venous oxygen saturation (SvO_2) and base excess tended to be higher in animals treated with AVP or TP as compared to the control group.

CONCLUSION. Our data suggest that early low-dose infusion of AVP or TP is a safe and efficacious treatment option in ovine septic shock. Both agents increased MAP without impairing CI and without inducing myocardial ischaemia or renal dysfunction. Whether or not the decrease in heart rate seen in the treatment groups represents a therapeutic advantage remains to be elucidated in future trials.

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Oral Presentations
Functional approach of cardiovascular failure: 0725–0730

0725

USEFULLNESS OF STROKE VOLUME VARIATION (SVV) AND PULSE PRESSURE VARIATION (PPV) IN AN INTERNAL ICU: A PROSPECTIVE STUDY ON THE PREVALENCE OF CONTROLLED VENTILATION AND SINUS RHYTHM DURING 632 HEMODYNAMIC MEASUREMENTS

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INTRODUCTION. Appropriate assessment of preload and volume responsiveness are cornerstones of ICU therapy. In several recent trials comparing pressure-based (CVP, PAWP), volume-based (ITBI, GEDI) and variability-based (SVV, PPV) preload parameters, CVP and PAWP had the lowest predictive values, and the variability parameters were slightly more predictive than the volume-based. However, the use of variability parameters is restricted to patients with sinus rhythm (SR) and controlled (CV) mechanical ventilation. Little is known about the prevalence of SR and CV in long term treatment of ICU patients.

METHODS. From February 1 to July 31 2007, the prevalence of SR and CV was documented immediately before 632 thermodilution measurements in 42 consecutive patients with newly inserted PiCCO catheters (Pulsion, Munich, Germany). The average frequency of haemodynamic measurements was three per day.

RESULTS. PiCCO device in 42 patients out of 214 admissions (19.6%). Mean age 61.1 ± 17.4 years, 16 female, 26 male, APACHE-II 21.7 ± 7.8. Underlying diseases 21/42 sepsis/SIRS, 9/42 liver cirrhosis, 5/42 pancreatitis, 5/42 pneumonia/ARDS; 2 cardiogenic shock; mortality 15/42 (36%). Patients were under catecholamines in 259/632 measurements (41%). The prevalence of both SR and CV was 60/632 (9.5%). In 422/632 (66.8%) of the measurements, the patients had SR, but were not on CV. In 19/632 (3%), the patients were on CV, but they were arrhythmic. In 131/632 (20.7%), the patients were neither on CV nor they had SR.

TABLE 1 PEVALENCE OF SR AND CV

	SR + CV+	SR + CV-	SR- CV+	SR- CV-
All measurements	60/632 (9.5%)	422/632 (66.8%)	19/632 (3%)	131/632 (20.7%)
Measurements within first day	16/122 (13%)	73/122 (60%)	7/122 (6%)	26/122 (21%)

Evaluating only the first three measurements within the first 24 h after the insertion of the PiCCO catheter, the prevalence of SR and CV was 16/122 (13%; in two patients only one measurement was performed). In 73/122 (60%) measurements, the patients had SR, but they were not under CV. In 7/122 (6%) measurements, the patients were under CV, but they suffered from arrhythmia. In 26/122 (21%), the patients were neither on CV nor they had SR.

CONCLUSION. Despite several studies demonstrating superior prediction of volume responsiveness as compared to volumetric and pressure parameters, the variability parameters SVV and PPV cannot be used in a significant percentage of patients in an internal ICU. Therefore, in high risk patients, monitoring of volumetric parameters such as GEDI, ITBI and ELWI and echocardiography should be available.

0726

FLUID RESPONSIVENESS PREDICTION BY PASSIVE LEG RAISING AND BREATH RELATED INDICES IN THE NON ARRHYTHMIC SHOCKED PATIENT WITHOUT SPONTANEOUS BREATHING ACTIVITY

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INTRODUCTION. The aim of the study was to compare the performance of respiratory changes in pulse pressure $\Delta^{RESP\ PP}$, and passive leg raising (PLR) induced changes in cardiac output $\Delta^{PLR\ CO}$ and pulse pressure $\Delta^{PLR\ PP}$ in a wide population of medical ICU patients to predict an increase in CO > 15% after 500 ml fluid loading (FL).

METHODS. Prospective, multicentre study with ethical approval. Deeply sedated patients under mechanical ventilation with shock were enrolled. Study phases: patient supine, PLR (patient supine, legs at 45°), after FL . Measurements: invasive and noninvasive arterial pressure and cardiac output (thermodilution) at each phase. Discriminative power was assessed by the area under the ROC curve (AUC) and likelihood ratios (LHR).

RESULTS. Among the 97 patients included (age 57 ± 16 yrs, SAPSII 57 ± 18, 7% with acute cor pulmonale on ultrasonography), 78 were receiving norepinephrine (0.7 ± 0.8 µg/kg/min) and 21 epinephrine (0.4 ± 0.4 µg/kg/min). Respiratory rate was 24 ± 6/min, heart/respiratory rate ratio 4.5 ± 1.6, mean plateau and end expiratory pressure difference 13 ± 4 cmH2O, tidal volume (Vt) 6.9 ± 1 ml/kg (>8 ml/kg in only 15 patients). 31 (33%) patients were responders (CO increase > 15%). The mean \DeltaResp PP was 5.4 ± 4.6%.
The AUC of \DeltaResp PP to predict fluid responsiveness was 0.76 [0.65–0.87]. With a 5% cut-off, positive and negative LHR were 3.2 [2.0–5.2] and 0.3 [0.2–0.6], respectively. For \DeltaPRL PP, the AUC was 0.78 [0.68–0.88]. Positive and negative LHR were 2.6 [1.7–4.1] and 0.4 [0.2–0.7] with a 9% cut-off. For both \DeltaResp PP and \DeltaPLR PP, these LHR led to similar changes in post-test probabilities of fluid responsiveness (about only 20–25%) in the whole population. For \DeltaPLR CO, the AUC was 0.89 [0.81–0.97] with positive and negative LHR of 6.2 [3.3–11.5] and 0.1 [0.1–0.4] with a 7% cut-off (changes in fluid responsiveness probability of 35–45%). PLR induced changes in non-invasive blood pressure measurements were associated with poor AUC, below 0.69. Among the 48 patients who increased central venous pressure (CVP) of at least 2 mmHg during PLR, \DeltaPLR PP was associated with an AUC of 0.88 [0.77–1], positive and negative LHR of 5.8 [1.7–4.1] and 0.2 [0.2–0.7] with a 9% cut-off (changes in probability of 30–35%). In this subpopulation, the AUC of \DeltaPLR CO was 0.92 [0.80–1] and a 7% cut-off was associated with positive and negative LHR of 11 [3.7–32.9] and 0.1[0.0–0.6], respectively (45% change in probability).

CONCLUSION. In our study, the respiratory changes in arterial waveform were small and did not alow \DeltaResp PP to predict fluid responsiveness, probably because of the current ventilator settings in the participating ICUs. On the other hand, ΔPLRCO was performing well. ΔPLRPP may be a simple and readily surrogate in the subgroup of patients increasing CVP of at least 2 mmHg.

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0727

PASSIVE LEG RAISING FOR PREDICTING FLUID RESPONSIVENESS: IMPORTANCE OF THE POSTURAL CHANGE

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INTRODUCTION. For predicting fluid responsiveness by passive leg raising (PLR), the lower limbs can be elevated at 45° either from the 45° semi-recumbent position (PLRSEMIREC) or from the supine position (PLRSUPINE). PLRSUPINE could have a lower hemodynamic impact than PLRSEMIREC since it should not recruit the splanchnic venous reservoir.

METHODS. Thirty-five patients with circulatory failure who responded to an initial PLRSEMIREC by an increase in cardiac index $\geq$ 10%. In these patients, PLRSEMIREC, a transfer from the semi-recumbent to the supine position and PLRSUPINE were performed in all patients in a random order before fluid expansion (500 mL saline).

RESULTS. PLRSEMIREC, supine transfer and PLRSUPINE significantly increased the pulse-contour derived cardiac index (PiCCOplus) by 22[17–28]%, 9[5–15]% and 10[7–14]% ($p < 0.05$ vs. PLRSEMIREC for the latter two), respectively. These maneuvers significantly increased the right ventricular end-diastolic area (echocardiography) by 20[14–29]%, 9[5–16]% and 10[5–16]% ($p < 0.05$ vs. PLRSEMIREC for the latter two) and the central venous pressure by 33[22–50]%, 15[10–20]% and 20[15–29]% ($p < 0.05$ vs. PLRSEMIREC for the latter two), respectively. Volume expansion significantly increased cardiac index by 27[14–38]% and all patients were responders to volume expansion. If an increase in cardiac index ^{3}10% had considered as a positive response to PLRSUPINE, 15(43%) patients would have been unduly predicted as non-responders to fluid administration by PLRSUPINE.

CONCLUSION. PLRSEMIREC indices larger increase in cardiac preload than PLRSUPINE and may be preferred for predicting fluid responsiveness.

0728

SUBLINGUAL FUNCTIONAL CAPILLARY DENSITY IS ASSOCIATED WITH LACTATE LEVEL IN PATIENTS WITH ACUTE HEART FAILURE

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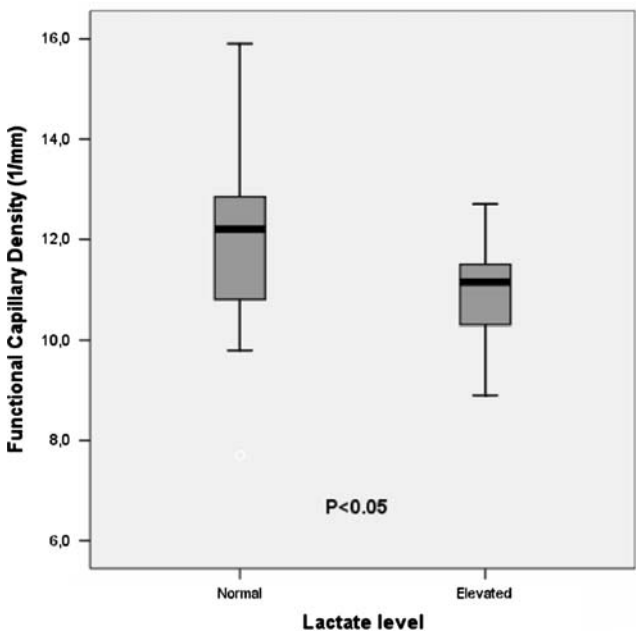
INTRODUCTION. We tested whether functional capillary density (FCD) is impaired in patients with acute heart failure (AHF) who have an elevated lactate level.

METHODS. We investigated 33 AHF patients < 24 h after admission. SDF imaging was used to image the sublingual microcirculation. MAS software was used to measure FCD. Values are shown as medians [IQR].

RESULTS. Patients with an elevated lactate level (> 1.7 mmol/L, n = 14) were compared to those with a normal lactate level (<=1.7 mmol/L, n = 19). FCD was lower in patients who had an elevated lactate level compared to patients with a normal lactate level (11.2 [10.3–11.6] mm^{-1} vs. 12.2 [10.4–13.1 mm^{-1}, respectively). Between both groups, there were no differences in HR, MAP, CVP, mean PAP, PCWP, CI, and SVR.



CONCLUSION. Elevated lactate levels are related to alterations in microcirculatory perfusion in patients with AHF.

0729

ENDOTHELIN RECEPTOR ANTAGONISTS IN SECONDARY PULMONARY HYPERTENSION

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INTRODUCTION. The effect of endothelin receptor antagonist Bosentan with its selective activity upon the pulmonary capillaries favors the hemodynamic and clinical profile of patients with idiopathic pulmonary hypertension, whereas its use in cases of secondary pulmonary hypertension has not been established yet.

METHODS. 44 patients (53.4 $\pm$ 9.7 years old, 20 male) with secondary pulmonary hypertension in functional stage III-IV according to WHO classification were studied for a time period of 40 $\pm$ 7 months. The patients were divided in two groups: group A (n = 24) who received conventional treatment with anticoagulants, calcium-channel blockers and diuretics, and group B (n = 20) who received Bosentan. Between the groups there was no significant difference concerning their WHO functional class, the etiology of pulmonary hypertension and test of vasoreactivity.

RESULTS. The pulmonary artery systolic pressure (PASP) was reduced to 48 $\pm$ 27.6 from 94.8 $\pm$ 26.6 mmHg in group B, versus 92.8 $\pm$ 21.5 from 95.2 $\pm$ 22.7 mmHg in group A ($p < 0.05$). The mean pulmonary artery pressure decreased to 42.7 $\pm$ 12.8 from 55.8 $\pm$ 13.7 mmHg in group B, versus 52.6 $\pm$ 13.1 from 54.4 $\pm$ 12.6 mmHg in group A ($p = 0.05$). The pulmonary vascular resistance (PVR) decreased to 8.2 $\pm$ 3.5 from 10.7 $\pm$ 3.8 IU Wood in group B, versus 9.9 $\pm$ 3.5 from 10.6 $\pm$ 3.2 IU Wood in group A ($p < 0.05$). Concerning the increase in the cardiac index, there were no significant differences between the groups. Mortality was 41.2% (10/24) in group A and 15% (3/20) in group B ($p = 0.001$).

CONCLUSION. Bosentan demonstrates a beneficial hemodynamic and clinical effect and represents a most promising factor with an extension in its use to treat secondary pulmonary hypertension.

0730

MECHANISMS OF UNSUCCESSFUL SPONTANEOUS BREATHING TRIAL IN HIGH-RISK PATIENTS: AN ECHOCARDIOGRAPHY DOPPLER STUDY

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INTRODUCTION. Congestive heart failure has been reported as a common source of unsuccessful extubation, especially in patients with cardiac disease or chronic obstructive pulmonary disease (COPD). Spontaneous breathing trial (SBT) is recommended prior to a planned extubation. We sought to evaluate the ability of transthoracic echocardiography (TTE) to identify a cardiac source of unsuccessful SBT in high-risk patients.

METHODS. During a 2-month period, all patients with a congestive heart failure (ejection fraction [EF] $\leq$ 40%) and/or a COPD who were mechanically ventilated > 24 h were prospectively studied. TTE was performed prior to (T0) and at the end of (T1) the SBT (30 min, unless unsuccessful). The following measurements were performed in triplicate at end-expiration and averaged: left ventricular end-diastolic (LVEDV) and end-systolic (LVESV) volumes with EF using the modified Simpson's rule, maximal Doppler velocity of mitral E and A waves, E/A and E/E' ratios (tissue Doppler at the lateral mitral ring), stroke volume (SV) using the Doppler method at the level of the aortic ring, and the surface of the color Doppler jet normalized by the left atrial surface in the presence of a mitral regurgitation (MR). In each patients, parameters were compared between T0 and T1 using the matched-pairs Wilcoxon test. Results are expressed in median and 95% confidence intervals. Our local Ethics Committee agreed with the protocol.

RESULTS. 16 patients (heart failure, 14; COPD, 3) were studied (SAPS 2: 43 [34–51]; duration of mechanical ventilation: 75 h [70–234]). SBT was unsuccessful in 4 patients and another patient who passed the SBT was reintubated within 24 h for progressive accumulation of tracheal secretion due to inefficient cough. The remaining 11 patients underwent both a successful SBT and extubation. Overall, LVEF remained stable between T0 and T1 whereas LV filling pressures significantly increased, as reflected by the higher E, E/A and E/E' values (table; *$p < 0.05$). In patients with unsuccessful SBT, E, E/A and E/E' values increased of 19.6 cm/s, 0.67 and 1.97 when compared to 7.9 cm/s, 0.08 and 0.32 in patients who passed the SBT, respectively. When MR was present at T0 (n = 8), its normalized surface increased of 2.1 cm^2 in patient with unsuccessful SBT, and was comparable (+0.14 cm^2) in the remaining patients.

TABLE 1

	LVEDV mL	LVESV mL	EF %	SV mL	E cm/s	E/A	E/E'
T0	120/104–170	83/64–124	35/28–40	43/37–47	73/58–88	1.2/0.7–1.7	6.7/5.8–11.7
T1	126/110–174*	89/67–127	34/27–41	49/42–59	92/70–114*	1.6/0.9–2.2*	9.5/7.0–13.5

CONCLUSION. In this study, SBT significantly increased LV filling pressures and the surface of MR, when present. These variations were more pronounced in the subset of patients with unsuccessful SBT. Even in patients with severe congestive heart failure, the absence of documented variation of LV filling pressure and MR during the SBT appeared as a good predictor of successful extubation.

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0731

COMPLICATIONS OF HYPOTHERMIA APPLIED FOR PREVENTING CEREBRAL EDEMA AFTER LARGE HEMISPHERIC INFARCTION

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INTRODUCTION. Large hemispheric infarction carries a mortality rate of 40–80%. Management of brain swelling includes mild to moderate hypothermia, osmotherapy, and decompressive hemicraniectomy.

METHODS. We treated 34 patients with large hemispheric infarctions between August 2006 and December 2007 with the combination of insulin infusion (target glucose 4.6–6.1 mmol/L), mild hypothermia (33–35°C) using a surface cooling or intravascular heat exchange device, and hypertonic saline (3% sodium chloride acetate) at a rate 1 ml/kg (goal sodium 150–155 mmol/L) within 72 h of symptom onset. We predefined and collected all complications and procedures that could potentially occur during the hospital course in the Columbia University Large Hemispheric Infarctions Outcomes Project database, evaluated their frequency and the patient's neurological outcome at 3 months.

RESULTS. Of the 34 patients 15 had right-sided infarctions and median age was 65.5 (range 38–83) years. Baseline NIHSS was 18.6 ± 5.3. At 3 months, 17 patients had died; support had been actively withdrawn in 13 cases. The mRS was 1 in 1 patient, 3 in 3 patients, 4 in 2 patients and 5 in 11 patients.

The most frequent complications included pulmonary edema (n = 25), tracheobronchitis (n = 17), hypotension (n = 17), thrombocytopenia (n = 16), atrial fibrillation with rapid ventricular response (n = 11), sepsis and septic shock (n = 9), acute renal failure (n = 9), anemia requiring transfusion (n = 9), aspiration and ventilator-acquired pneumonia (n = 8), urinary tract infection (n = 6), coagulopathy (n = 6), leucopenia (n = 4), rhabdomyolysis (n = 5), myocardial ischemia (n = 2), and paralytic ileus (n = 2).

CONCLUSION. Mild hypothermia (33–35°C) offers a feasible alternative strategy to decrease massive cerebral edema after large hemispheric infarction as part of intensive care treatment protocol. Several complications may counteract the therapeutic effect of hypothermia, therefore detailed attention should be given to their prevention and management.

0732

COLD-INDUCED CHANGES IN PLASMA VOLUME (PV) AND MICROVASCULAR PERMEABILITY: THE EFFECT OF INSULIN ADMINISTRATION

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INTRODUCTION. Induced hypothermia by surface- or endovascular-cooling increases microvascular permeability for water and macromolecules. An inflammatory reaction may be responsible. We hypothesized that an increase in capillary permeability can be counteracted by an anti-inflammatory effect of insulin (1,2).

METHODS. 21 anesthetized piglets were randomized to normothermia (NT-group), hypothermia (HT-group) and hypothermia with insulin (HTI-group). (n = 7, in all groups). All animals had an endovascular cooling catheter (Alsius, USA). The HT- and HTI-groups were cooled to 28°C for 4 h. The NT-group was kept normothermic. All animals received 4 ml/kg/h of Ringer's solution. The NT-and HT-groups were given 1 ml/kg/h of 5%- Glucose solution. The HTI-group received Insulin 1 IE/h and an infusion of 20%-Glucose, 1 ml/kg/h, with Potassium 0,08 mmol/ml. The glucose-infusion-rate was adjusted to keep blood glucose level in the range of 4–7 mmol/l. Hematocrit (Hct), plasma-cytokines (TNF-α, IL-1β, IL-10) and PV were measured and net fluid balance (NFB) and fluid- and protein extravasation calculated. Statistics: by SPSS v.15.Normalized Values as mean (SEM). Significance level: $p < 0.05$.

RESULTS. NFB was similar in all groups. PV remained unchanged in the NT-group and decreased 16.6 (2.3)% and 8.4 (3.5)% in the HT-and HTI-groups. The reduction was higher in the HT-group compared with the NT-group ($P = 0.016$) while the reduction found in the HTI-group was in between and did not differ significantly from the other groups. Hct increased in the HT-group, the change tending to be higher as compared with the change of the NT-group ($P = 0.07$). The results of the HTI-group were found in between the others. Fluid extravasation rate tended to increase slightly in the HT-group, while the values remained stable in the two other groups. The albumin mass was reduced by 22.4 (3.3) % in the HT-group, 15.4 (2.7) % in the HTI-group and 6.5 (2.7) % in the NT-group. Compared with the NT-group, the decrease of the HP-group was significantly higher ($P = 0.006$) while the decrease of the HTI-group tended to be higher ($P = 0.076$). TNF-α tended to increase in the HT-group, whereas the values of the HTI-group remained stable. We did not find any differences for IL-1β, IL-10.

CONCLUSION. The results confirmed our previous studies regarding the effect of hypothermia on capillary permeability (3). Even though the results of the HTI-group did not differ significantly from the others, the pattern of trends found, suggest a modulating effect of insulin on the cold-induced increase in capillary permeability

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0733

FAVORABLE NEUROLOGICAL OUTCOME AT INTENSIVE CARE UNIT DISCHARGE AND 6 MONTHS AFTER CARDIOPULMONARY RESUSCITATION OF ASYSTOLE PATIENTS TREATED WITH INDUCED MILD HYPOTHERMIA

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INTRODUCTION. Induced mild hypothermia therapy (MHyT) improves neurological outcome in post resuscitation cardiac arrest (CA) patients with ventricular fibrillation/tachykardia (VF/VT). Patients with asystole as initial rhythm were excluded from earlier studies due to poor neurological outcome. The present study enrolled both patients with asystole or VF/VT; one of the objectives was to assess neurological function at ICU discharge and six months after CPR.

METHODS. Prospective multi-center single arm registry in 49 patients with witnessed cardiac arrest and succesful CPR who were selected for MHyT. Patients had to be > 18 years old and unconscious at ICU/ER admission (GCS < 8), with a time interval between cardiac arrest and initiation of MHyT treatment of < 6 hrs. Treatment was performed for 24 hrs with a target temperature of 32,5°C. Neurological status was documented upon ICU/ER arrival, during MHyT treatment, at ICU discharge and 6 months after the event as measured by the Glasgow Outcome Scale (GOS). Temperature measurements were continuously taken throughout the cooling period via bladder catheter. For MHyT treatment the Deltatherm device (KCI, USA) was used.

RESULTS. Of the 49 patients included in the registry 31 (63%) had VF/VT and 18 (36,7%) had asystole/PEA as first rhythm. Good neurological recovery at ICU discharge (GOS 5/4) was seen in 22 (45%) of the patients, 9 (18,4%) were neurologically impaired (GOS 3/2) and 16 (33%) died. In the follow up investigation after 6 months 19 patients (38,7%) showed favorable neurological outcome (GOS 5/4), 2 (4%) were severly neurological impaired (GOS 3/2), 26 (53%) died. 2 patients with GOS 5 at ICU discharge were lost to the follow up, one (GOS 5) died due to another event. Good neurological recovery was seen in 45,16 %(n = 14) of patients with VF/VT and in 27,7 % (n = 5) patients with asystole 6 months after CPR

CONCLUSION. MHyT improves neurological outcome in patients with witnessed CA regardless of the initial rhythm. Favorable results in VF/VT patients were similar to preceding studies. Hypothermia also appears to provide neurological protection in patients presenting with asystole at ICU discharge as well as 6 months after the event.

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0734

SURFACE COOLING VERSUS CORE COOLING: COMPARATIVE STUDIES OF MICROVASCULAR FLUID - AND PROTEINSHIFTS IN A PORCINE MODEL

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INTRODUCTION. Cooling to 28°C by immersion in ice sludge, results in increased microvascular permeability for water and macromolecules (1,2). This is in contrast to core-cooling during cardiopulmonary bypass. Here the permeability is increased for water only, whereas the intravascular protein masses remains stable (3). In the present study we hypothesized that core cooling by an endovascular catheter would represent a gentler cooling method than surface cooling with respect to water- and macromolecule permeability.

METHODS. 14 anesthetized piglets were, following 60 min normothermia, randomly cooled by surface cooling (SC-group, n = 7) or core cooling (CC-group, n = 7) to about 28 °C. Fluid balance, hemodynamic variables, colloid osmotic pressures (plasma/ interstitial fluid), hematocrit, serum concentrations of albumin and protein, intracranial pressure (ICP) and cerebral metabolic markers of ischemia, were measured. Fluid shifts and changes in albumin and protein masses were calculated. At the end of the experiments total tissue water content was assessed in different tissues and compared with a normothermic control-group.

RESULTS. Hypothermia induced an increase in the fluid extravasation rate from 33.9 (31.9) to 109.0 (16.5) and 27.8 (28.0) to 95.6 (29.1) ml/ kg/ min × 10–3, in the SC-group and CC-group, respectively. Albumin extravasation was reflected by a significant drop in the albumin mass from 148.8 (11.7) to 111.4 (10.3) ($P < 0.001$) in the SC-group and from 163.4 (27.8) to 136.8 (19.0) g/kg × 10-2 ($p < 0.01$) in the CC-group during the experiments. Similar decreases were obtained in the protein masses as well.
The total tissue water content increased in most organs including brain in both study-groups compared with a control. ICP and cerebral metabolic markers remained normal in both groups

CONCLUSION. Rapid lowering of body core temperature to 28 °C results in extravasation of water and proteins to the same extent either hypothermia is a result of surface- or core cooling. Cold-induced fluid extravasation is associated with edema in most tissue including brain.

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0735

PULSE PRESSURE VARIATION IN HEMORRHAGIC SHOCK: THE EFFECTIVENESS OF HYPERTONIC SOLUTION DURING RESUSCITATION

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INTRODUCTION. Hemorrhage remains a primary cause of death in civilian and military trauma. Volume replacement and surgical bleeding control are the most important issues in the treatment of hemorrhagic shock. Bedside indicators of ventricular preload have been proposed as predictors of fluid responsiveness. This goal could be achieved reducing arterial pulse pressure (ΔPP) variation induced by mechanical ventilation. The systolic pressure variation (SPV) has been shown to be a predictor of fluid responsiveness. This prospective study was undertaken to determine the ΔPP, SPV and cardiac output (CO) in a swine model of controlled hemorrhagic shock and volume replacement with lactated Ringers' solution and hypertonic saline + 6% with hydroxyethyl starch.

METHODS. Fifteen pigs were anesthetized, instrumented and randomized into three groups: Sham (S), lactated Ringer solution (LR) and hypertonic saline in 6% with hydroxyethyl starch 130/0,4 (HHES). Hemorrhage was induced by blood withdrawal by a catheter placed through the femoral artery until a mean arterial pressure (MAP) of 40 mmHg was achieved. This pressure was maintained for 30 minutes. At this point, the animals received 32 ml/Kg/ for 20 minutes (LR) or a bolus dose of HHES,4 ml/Kg for 5 minutes. Thirty minutes after the resuscitation, total shed blood was reinfused to the animals. Sham animals were not bled. ΔPP, SPV and CO were monitored at the following time points: before hemorrhage (Baseline), when a pressure of 40 mmHg was achieved (Tshock), 30 minutes of MAP of 40 mmHg (T0), 30 min, 60 min,120 min and 240 min after treatment (T30, T60, T120,T240). Statistical analyses were performed using one-way analysis of variance followed by Tukey-Kramer test. A p value of 0.05 was considered statistically significant.

RESULTS. During shock, ΔPP was significant higher in groups LR (51.00 ± 17.59; $p < 0.05$) and HHES (53.00 ± 17.32; $p < 0.05$) when compared to Sham (16.20 ± 10.96), but no significant differences between them. At time T0, only HHES (49.67 ± 20.21; $p < 0.05$) was significantly different from Sham (22.58 ± 11.84). At time T30, HHES (29.67 ± 17.16; $p < 0.05$) differed when compared to Sham (19.18 ± 9.01), but after T60 no significant differences were detected in the three groups. When SPV and CO were analyzed, there were no significant differences at time points.

CONCLUSION. Small volume hypertonic saline + 6% with hydroxyethyl starch promotes similar volume expansion as large volume LR, reducing the large dPP induced by hemorrhage.

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TISSUE OXYGEN SATURATION DURING CARDIAC SURGERY IS ASSOCIATED WITH POST-OPERATIVE RECOVERY

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INTRODUCTION. Near Infra-Red Spectroscopy is a novel method for rapid and non-invasive assessment of tissue oxygen saturation (StO2). An association between StO2 (%) and oxygen delivery has been demonstrated during shock, trauma and resuscitation. We sought to explore StO2 during cardiac surgery and its association with post-operative outcome.

METHODS. 74 adult patients undergoing first-time, elective, single procedure cardiac surgery requiring cardiopulmonary bypass (CPB) were studied. StO2 was measured from the thenar eminence (Inspectra Tissue Spectrometer Model 325, Hutchinson Technology Inc, USA) through anaesthesia and surgery, and arrival on the Intensive Care Unit (ICU). Outcome was defined as length of ventilation and ICU stay, post-operative length of stay and morbidity outcome (POMS) on post-operative days 1, 3, 5, 8 and 15 (the presence or absence of a infectious, pulmonary, cardiovascular, wound, haematological, pain, renal or gastrointestinal complication). All clinical information was prospectively collected.

RESULTS. StO2 rose from baseline during induction of anaesthesia (81.7 to 88.5, $p < 0.001$) then fell during surgery (mean 78.9) with a significant change in minimum StO2 during CPB (75.9 to 68.2 $p < 0.0001$). The mean StO2 during the 1st 5 minutes of anaesthesia was lower in those patients with than without POMS on D15 (81.1 ± 7.0 v 87.6 ± 7.7, $p = 0.04$) with the mean StO2 during those first 5 minutes being predictive of the presence of D15 POMS (ROC 0.762, $p = 0.01$). Lower mean StO2 during the first 20 minutes of ICU monitoring was observed in those with than without POMS on D3 (72.9 ± 12.9 v 85.5 ± 8.4, $p = 0.009$) and was predictive of the presence of D3 POMS (ROC 0.793, $p < 0.0001$).

CONCLUSION. StO2 during anaesthesia and ICU is predictive of post-operative complications on D15 and D3 respectively, with lower StO2 being associated with poorer outcome. Such data suggest that reduced tissue oxygen delivery, as measured by StO2, may be associated with poorer outcome - an association which may in theory be causal. Were this the case, interventions targeted at maintaining StO2 may beneficially impact on such outcome. This hypothesis seems worthy of further exploration.

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Perioperative monitoring: 0736–0741

0736

PLATELET DYSFUNCTION IN OUT-PATIENTS WITH LEFT VENTRICULAR ASSIST DEVICES (LVAD)

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INTRODUCTION. Nowadays, left ventricular assist devices (LVAD) are increasingly used as a bridge to transplant in heart failure patients. These patients are generally anticoagulated with phenprocoumon and aspirin. During heart transplant severe bleeding frequently poses a serious problem. Despite lack of evidence, desmopressin is often administered successfully when other means fail. We hypothesised that apart from aspirin-induced cyclooxygenase inhibition an additional platelet dysfunction is present in these patients. In order to evaluate this aspect we employed multiple monitoring devices for platelet function.

METHODS. Blood from 12 out-patients after elective LVAD implantation and 12 healthy matched volunteers was screened with the help of thrombelastography (TEG®), platelet function analyzer (PFA-100®) and a new whole blood aggregometer (Multiplate®) [1]. Additionally, we measured von Willebrand Factor (vWF) antigen levels and vWF:RCo activity (vWF ristocetin co-factor). The anticoagulation regimen for LVAD patients consisted of 100 mg of aspirin PO daily combined with phenprocoumon (INR: 2.5–3.5) [2].

RESULTS. Oral anticoagulation produced an average INR of 3.5. Aspirin reduced MA-AA (Maximum Amplitude Arachidonic Acid; TEG®) by > 60% in patients ($p = 0.001$ vs. controls). The effectiveness of aspirin to suppress arachidonic acid-induced aggregation was also reflected by an almost 75% decrease in the ASPItest (Aspirin Test; Multiplate®) ($p < 0.001$ vs. controls) while ADP-induced aggregation was not altered in patients ($p = 0.805$). Platelet function under high shear was invariably and severely compromised: CADP-CT (collagen adenosine diphosphate closure times; PFA-100®) were 2.5-fold longer in patients than in controls ($p < 0.001$), and 50% of patients had maximal CADP-CT values of 300 s. While vWF antigen levels were 80% higher in patients ($p < 0.001$), vWF:RiCO was subnormal (<60%) in 5/12 patients. Ristocetin-induced aggregation was also 3-fold higher in controls than in patients ($p < 0.001$).

CONCLUSION. This indicates that LVAD out-patients have an additional functional platelet defect, which affects the glycoprotein Ib/vWF axis. Therefore, desmopressin use in the management of bleeding in these patients seems justified.

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0738

ARTERIAL LACTATE LEVELS IN PATIENTS UNDERGOING CARDIOPULMONARY BYPASS OPERATION– RISK FACTORS FOR POSTOPERATIVE INCREASE

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INTRODUCTION. Increased arterial blood lactate levels have been identified as a good predictor of postoperative morbidity and mortality. However, little is known about factors that might influence this increase. Therefore we examined the changes in blood lactate levels during and after cardiopulmonary bypass (CPB) as well as blood gas levels, pressure and flow parameters, metabolic values, body temperatures and substitution of catecholamines.

METHODS. We conducted a retrospective clinical study with consecutive patients ($n = 403$) undergoing cardiopulmonary bypass for cardiac surgery at a university hospital. The difference between pre- and postoperative lactate levels was obtained and its relationship to the perioperative factors was analysed. Patients were assigned to three groups: slight increase in lactate levels (SIL, $n = 154$, increase < 0.8 mmol/L), medium increase in lactate levels (MIL, $n = 105$, 0.8 mmol/L ≤ increase < 1.4 mmol/L) and high increase in lactate levels (HIL, $n = 144$, 1.4 mmol/L ≤ increase). Differences between the three groups in the potential risk factors were identified by one-way ANOVA and Bonferroni correction. Correlations were assessed with either Spearmans rank correlation test or Pearsons correlation test, as appropriate.

RESULTS. Analysis of variance indicated that the three groups differed significantly in maximum glucose concentration during CPB ($p < 0.001$) and during ICU stay ($p < 0.001$), application of insulin during CPB ($p = 0.001$) and during ICU stay ($p < 0.001$), total perfusion duration ($p < 0.001$) and aortic clamp duration ($p = 0.002$). Correlation analysis identified all of these potential risk factors to be positively correlated to the increase of arterial blood lactate levels ($p < 0.001$). Correlation of increase in lactate to the administration of catecholamines was not verified.

CONCLUSION. Hyperglycemia and long CPB duration are associated with increased lactate levels. Attempts to reduce glucose concentration and CPB duration may result in lower lactate concentrations after cardiac surgery.

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0739

ELECTROCARDIOGRAPHIC ST-T ABNORMALITIES FOLLOWING CARDIAC VALVE SURGERY WITH NORMAL CORONARY VESSELS. PERIOPERATIVE MYOCARDIAL INFARCTION?

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INTRODUCTION. ECG abnormalities after cardiac valve surgery may be similar to those seen during spontaneous myocardial infarction, and few reports describe them. In patients who have undergone valve surgery, new ST-T abnormalities are common but not necessarily diagnostic of myocardial ischemia. However, when new Q waves appear in territories other than those identified before surgery, myocardial infarction should be considered, particularly if associated with elevated biomarkers, new wall motion abnormalities or haemodynamic instability (1–2). The purpose of this study is to asses the incidence of ST-T abnormalities and perioperative myocardial infarction, clinical manifestations (electrocardiographic, echocardiographic, biomarkers elevation) and prognosis, in patients with cardiac valve surgery without coronary artery disease.

METHODS. Retrospective analysis of patients who underwent cardiac valve replacement in a Tertiary University Hospital over a ten year period. After surgery, the patients were routinely admitted to the Intensive Care Unit (ICU). We excluded patients with angiographically significant coronary lesions before surgery and those with aortic dissection. Statistical analysis was performed with SPSS 12.0.

RESULTS. Between 1997 and 2007, 3700 patients underwent cardiac surgery in our hospital. Of them, 1600 (43.24%) were operated for valve replacement. 30 (1.8%) patients had, in the first 24 h of ICU stay ST-T abnormalities. 18 (60%) showed new Q waves and at least one of the following: echocardiographic findings consistent with Myocardial infarction (MI), elevated biomarkers (Troponin T) five fold the upper reference limit (0.1 ng/ml) or haemodynamic instability. Baseline characteristics were as follows: Age(yr) 57.6 ± 14.6; LVEF %:57.8 ± 6; Sex(%female) 47; ExtracCirc.(min.): 134 ± 60; Aortic clamp (min.): 68.4 ± 29.4; Hypertension 37%; Diabetes 13.6%; Euroscore 4.6 ± 2.3. Clinical outcome and complications: ICU stay (days) 5.8 ± 3.8 (1–20); Mechanical ventilation (hours) 40 ± 13 (0–360); Intraaortic balloon pump 23.3% (n = 7); Low cardiac output 37%;(n = 11); ST changes Inferior leads:46% (n = 14); Inferior + right:20 % (n = 6); Anterior:16.7 % (n = 5); New onset Q waves 60 %;n = 18; Cardiogenic shock 13.3%;n = 4; Emergency coronary artery bypass 10 %;n = 3; Mortality causes: Cardiogenic shock n = 4; Multiple organ failure n = 2; Mortality: 20%; n = 6.

CONCLUSION. perioperative myocardial infarction following valve surgery is a fairly uncommon complication, that must be suspected in patients with ST abnormalities; in our patients, it is associated with increased mortality. Inferior leads were the most frequently affected, with high proportion of right ventricular dysfunction. Strategies must be directed towards early diagnosis, including angiography in patients hemodynamically unstable.

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0740

SCVO2 FAILS TO PREDICT LOW OUTPUT STATE FOLLOWING CARDIAC SURGERY

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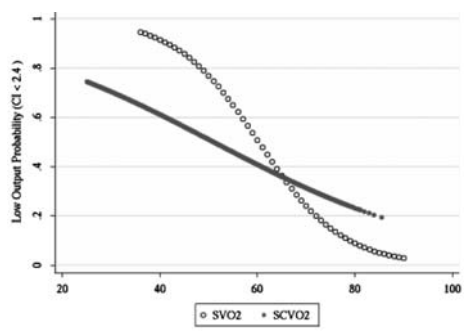
INTRODUCTION. The monitoring of mixed venous saturation(SVO2) necessitates the use of a Pulmonary Artery Catheter. SVO2 measurement is now frequently replaced by the measure of venous saturation in the superior vena cava (ScVO2). The aim of our study is to analyze the correlation between ScVO2 and SVO2 and their predictive value of low output state following cardiac surgery.

METHODS. SVO2, ScVO2 and cardiac output were monitored in 15 patients during 24 h following cardiac surgery. SVO2 and continuous cardiac output were monitored using optical pulmonary Swan Ganz catheter and Vigileo monitoring from Edwards LifeScience. ScVO2 was monitored using optical central venous catheter and monitoring from Pulsion. Data were collected every two seconds. Paired data for ScVo2 and SVO2 were analyzed with T test and linear regression. Logistic regression was used to predict low output state from ScvO2 and SVO2. The statistical analysis was performed using Stata 8 for UNIX.

RESULTS. ScVO2 underestimates SVO2 (SVO2 = 62.88 +- 6.20, ScVO2 = 57.35 +- 9.20, $p < 0.0001$ at paired T test) and poorly correlates with SVO2 at linear regression ($R^2 = 0.57$, ScVO2 coefficient = 0.446, const = 37.45). Predictive value of ScVO2 for low output state as defined by a CI < 2.4 l/min was poor (*LROC = 0.6) at logistic regression as compared with SVO2 (LROC = 0.69).



CONCLUSION. ScVO2, on the average, underestimates SVO2 and is only of low value to detect low output state following cardiac surgery.

0741

ADAPTIVE SUPPORT VENTILATION (ASV) DOES NOT AFFECT SEDATION REQUIREMENTS IN PATIENTS AFTER CORONARY ARTERY BYPASS GRAFTING (CABG)

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INTRODUCTION. ASV maintains an operator preset alveolar minute ventilation by providing automatic selection of ventilatory settings and continuous breath by breath adaptation (1). We studied the influence of ASV on need for sedatives (propofol) and tes (morphine) in patients after CABG.

METHODS. Randomized controlled trial comparing ASV with pressure control/pressure support (PC/PS)–mechanical ventilation (MV) in 128 patients after Coronary Artery Bypass Grafting (CABG). Data on prescribed propofol and morphine were retrieved from the patient data management system (in the ICU) and from the patient's charts (in the OR). Data are means ± SD, or medians [IQR] where appropriate. Statistics: T-tests were used to analyze differences between groups; non parametric tests were used when applicable

RESULTS. There were no differences between ASV– and PC/PS–MV patients regarding demographics, length of stay in ICU/hospital, and creatinine levels. Sedation use in the OR was similar. Duration of intubation and mechanical ventilation was 16.7 ± 6.1 h versus 17.9 ± 1.0 h with ASV and PC/PS–MV, respectively (P = 0.35). There were no differences in prescribed propofol and morphine (Table 1).

TABLE 1 SEDATIVES AND ANALGESICS CHARACTERISTICS

	ASV N = 64	PC/PS–MV N = 64	P–value
Propofol – total dose (mg/kg)	9.44 [4.12 – 15.66]	8.38 [4.90 – 12.44]	0.83
Propofol – duration (minutes)	308 [168 – 455]	318 [200 – 780]	0.93
Propofol – duration after reaching core temp 36°	144 [67 – 217]	135 [60 – 238]	0.41
Morphine – total dose (mg/kg)	0.05 [0.03 – 0.12]	0.05 [0.03 – 0.07]	0.41

CONCLUSION. ASV does not affect the use of propofol and morphine in patients after CABG.

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Oral Presentations
Long term outcome: 0742–0747

0742

LONG-TERM OUTCOME AND QUALITY-ADJUSTED LIFE YEARS AFTER SEVERE SEPSIS

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INTRODUCTION. Severe sepsis usually leads to a life-threatening acute critical illness and short-term mortality has been used to measure the outcome. Severe sepsis often causes several organ dysfunctions, from which surviving patients may recover slowly. An important long-term outcome is the assessment of quality of life (QOL) after critical illness.The aim of the study was to assess the long-term mortality, quality of life (QOL), quality-adjusted life years (QALY) and costs per one QALY in an unselected ICU patient population with severe sepsis.

METHODS. A total of 470 adult patients with severe sepsis were treated in 24 mixed ICUs between November 1, 2004 and February 28, 2005. The QOL before critical illness was assessed in 252 patients and QOL after severe sepsis in 156 patients (58% of the patients surviving in April 30, 2006). Ninety-eight patients responded to both questionnaires. QOL was assessed by a generic EuroQol (EQ-5D) measurement with summary index (EQsum) and visual analogue scale (VAS).

RESULTS. The two-year mortality after severe sepsis was 44.9% (211/470). The median response time for QOL assessment after severe sepsis was 17 months (IQR 16–18). The median EQsum index (63, IQR 48–79) and EQ VAS (66, IQR 50–80) were lower after severe sepsis than age- and gender-adjusted reference values ($p < 0.001$ and $p < 0.001$). The decrease between the mean EQsum reference value and that of severe sepsis patients was 23 (95% CI, 20–26). The difference between the mean EQ VAS reference values and the mean EQ VAS was 8 (95% CI, 5–11). The mean calculated QALYs after severe sepsis were 9.2 (95% CI, 8.2–10.2) and the calculated cost for one QALY was only 2533 € for all survivors and non-survivors.

CONCLUSION. Two-year mortality after severe sepsis was high (44.9%) and the QOL was lower after severe sepsis than before critical illness as assessed by EQ-5D. However, the mean QALYs for the surviving patients were reasonable and the cost for one QALY was reasonably low, which makes intensive care in patients with severe sepsis cost-effective.

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INTEGRATING MORTALITY AND MORBIDITY OUTCOMES: QUALITY-ADJUSTED LIFE YEARS IN CRITICAL CARE TRIALS

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INTRODUCTION. Measures that integrate mortality and morbidity, such as quality-adjusted life years (QALYs), have been proposed as outcomes for critical care clinical trials. We sought to describe the statistical distribution of QALYs in a cohort of ARDS patients, and to estimate sample size requirements for a hypothetical interventional trial using QALYs as the primary outcome.

METHODS. We used SF-36 data collected during a multicentre prospective observational study of ARDS patients(1) to generate utility values for patients at 3, 6, and 12 months using the SF-6D. While patients remained in the ICU we assigned a utility of 0, and patients who died were assigned a utility of 0 from that point forward. QALY values for each patient were calculated from the area under the utility-time curve. We used the distribution of these QALYs to estimate the sample size needed to detect a combined mortality reduction and increase in QALYs among survivors, and considered additional permutations where these outcomes were affected differentially. We estimated sample size requirements using multiple simulations and compared results to what a standard chi-squared comparison of mortality proportions would require.

RESULTS. From 195 enrolled patients we could generate QALY outcomes for 168 (86.2%) at 6 months and 159 (81.5%) at 1-year follow-up. The median (IQR) patient age was 48 (37–61) years, and APACHE II score 25 (20–30). The median ICU length of stay was 21 (11–37) days, the ICU mortality rate was 78/195 (40.0%), and the 6-month mortality was 87/177 (49.2%). The required sample size (80% power; 2-sided alpha = 0.05)for an intervention that reduced mortality from 48% to 44% and improved QALY by 0.025 in survivors at 6 months was 580 per group, compared with 2436 patients per group for a hi-squared comparison of these same mortality proportions. When only mortality or only QALY in survivors improved by these amounts, 3364 and 1856 patients per group would be needed, respectively. When QALY in survivors and mortality moved in opposite directions meaningful estimates could not be generated.

CONCLUSION. QALYs may be a more patient-centred, feasible outcome in ICU trials yielding a major gain in statistical power under certain conditions. However, like all composite endpoints, the individual components of this outcome must be examined separately to ensure they are not differentially affected by the trial intervention.

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GRANT ACKNOWLEDGEMENT. OTS Block-Term Grant; for the Canadian Critical Care Trials Group.

0744

SHORT AND LONG TERM OUTCOME OF PATIENTS RECIEVING HAEMOFILTRATION DURING CRITICAL ILLNESS

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INTRODUCTION. Acute renal failure requiring renal replacement therapy (RRT) is common in critically ill patients. Mortality in this group of patients is high, ranging from 28 to 90%. The purpose of the study was to define the outcome of patients requiring haemofiltration (HF) during critical illness and outcome following discharge from our adult general ICU, over a 3 year period, of patients still requiring RRT at time of hospital discharge.

METHODS. Between January 2004 and December 2006, 436 patients (total admission were 3890) received RRT in our ICU as noted by our database. We looked into the ICU and hospital mortality and their relation to renal plus respiratory or renal plus cardiovascular or both. All patients requiring long term renal support were available from our computer based registry.

RESULTS. Of the 436 patients, 47% of patients were admitted with a respiratory cause and 35% with cardiovascular cause. The average number of ventilator days was 9.3 and average haemofiltration 5.49 days. Our ICU mortality was 37%. 11.9% subsequently died in hospital. 17% were transferred to other hospitals in the region following critical care discharge. 54 patients were identified as having pre-existing renal impairment and hospital mortality in this group was 46.29%. Of the 382 patients admitted to ICU with normal renal function pre critical illness, 10 still required RRT at time of hospital discharge. At the end of 1 year of follow up, 4 had died, 3 were still on haemodialysis (Abdominal aortic aneurysm repair, perforated duodenal ulcer and diabetic ketoacidosis) and 2 patients were being monitored. By 2 years post follow up no patients required RRT. The monitored patient's diagnoses were TTP and SLE. The mortality of patients admitted with specific organ failures were

TABLE 1

Organ Failure	Hospital Mortality (%)	Average Age
Renal + Respiratory	33.6	56.2
Renal + Cardiovascular	35.2	59.9
Renal + Respiratory + Cardiovascular	28.6	60.92

CONCLUSION. Of the survivors of critical illness requiring RRT, 2.61% required RRT for up to one year following ICU discharge. 2 years after discharge no patients with normal renal function preadmission required RRT. The mortality of patients discharged from hospital still requiring RRT was 40%. These results have implications for what patients, or the patient's relatives, are told when RRT is deemed necessary during critical illness. It also has implications for those commissioning RRT services in survivors of critical illness. Our mortality for patients requiring RRT is low. The lower mortality for 3 organ failure versus 2 probably represents non escalation treatment limitations and needs further investigation.

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0745

PREVALENCE AND RISK FACTORS FOR POST-TRAUMATIC STRESS DISORDER SYMPTOMS ONE YEAR AFTER MECHANICAL VENTILATION

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INTRODUCTION. Patients suffering critical illnes are at risk of developing post-traumatic stress disorder (PTSD). We assessed prevalence and risk factors for PTSD symptoms in patients who required mechanical ventilation one year after ICU stay.

METHODS. Two-hundred and eighty-seven patients who required mechanical ventilation > 48 h were enrolled in a prospective, nonrandomized, multicenter study in Chile (ClinicalTrials.gov NCT00403208). Main exclusion criteria were neurologic impairment and end-stage organ disease. One-year mortality was 48%, and survivors were screened telephonically for memories of traumatic experiences during ICU stay (nightmares, panic, pain, and suffocation) and PTSD symptoms by means of the post-traumatic stress syndrome-10 (PTSS-10) scale. PTSS-10 score > 35 was defined as PTSD. Statistical analysis included MannWhitney and Fisher's exact tests for univariate analysis, and multiple logistic regression to test risk factors for PTSD.

RESULTS. Fifty percent (75/149) of patients answered the questionnaire (52 could not be reached, 14 refused consent, and 8 were not able to respond). Average PTSS-10 score was 29 ± 14, and 20 (37%) patients had a score > 35. Gender (M:24 ± 11 vs. F:35 ± 14, $p < 0.001$), medical condition ($p < 0.015$) and oxygenation index at 24 h ($p < 0.009$) were correlated to PTSS-10 score. No relationship was found between hypnotics, analgesic and neuromuscular blockade use and doses, or level of sedation during mechanical ventilation and PTSD symptoms. Patients with traumatic memories had a greater prevalence of PTSS-10 > 35 ($p < 0.005$). Multivariate analysis showed only gender to be predictive of PTSD symptoms.

CONCLUSION. Prevalence of PTSD symptoms in patients surviving critical illnes and mechanical ventilation was more frequent in women, and similar to other studies. None of sedation variables studied was related to PTSD symptoms.

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0746

ESTABLISHING AN ICU FOLLOW-UP CLINIC: FEASIBLE AND OF VALUE

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INTRODUCTION. Intensive Care Unit (ICU) survivors are at risk for physical or psychological sequelae after critical illness. Medical practioners outside the ICU may not recognize or understand these sequelae. While there are no consensus recommendations of how to organize ICU follow-up, experiences of others suggest that repeated follow-up may be valuable for evaluation after intensive care.

METHODS. In 2007 a multidisciplinary follow-up team was formed, consisting of three physicians, two nurses and a physiotherapist from the General ICU. Hospital psychiatrists were involved to dsicuss consensus for patient referrals, as well as the Pain Clinic.

Patients treated for 4 days or longer in the General ICU are seen in the ward by a nurse from the follow-up team 2–5 days after ICU discharge. Patients are briefed about their ICU stay, and the ICU follow-up is described shortly. Visits to the ICU Follow-up Clinic are 3, 6 and 12 months after ICU discharge. Prior to each visit patients fill in ICU Memory Tool, Short Form-36, Hospital Anxiety and Depression Scale (HAD) and Impact of Event Scale (IES). At each visit the patient meets a nurse, a physician and a physiotherapist from the ICU. Memories from the ICU are ventilated and the course of illness and treatments during the ICU stay are described. Patients with >25 points in IES or >10 in any of the two subscales of HAD are referred to a collaborating psychiatrist. Patients with mean daily pain score above 3 on the Visual Analog Scale or with untreated neuropathic pain are referred to the Pain Clinic. Questionnaire results and potential further referral are discussed with the patient. Muscle strength, mobility and restrictions in physical functioning are evaluated and the patient performs a 6 minute walking test. If necessary patients are referred to their local out-clinic physiotherapist.

RESULTS. During the first year of follow-up, 95 patients who spent >96 h in the ICU and survived to follow-up were invited and 57 came for follow-up. Eight patients were referred for more extensive psychiatric evaluation, of which four were found to be in need for specific treatment (cognitive behavioural therapy, antidepressive treatment) or repeated assessment. Two patients were referred to the Pain Clinic. Thirty-eight patients were found to be in need of physiotherapy recommendations or referral. Evaluation of the follow-up indicates a high degree of patient satisfaction.

CONCLUSION. Follow-up of ICU survivors by an ICU-based multidisciplinary team is feasible and can help identify unmet physical and psychological needs of ICU survivors during the first year after intensive care. A liaison between ICU clinicians and other specialists for referral of patients with psychological, somatic or pain sequelae is essential.

0747

TWO YEARS ROUTINE BASED FOLLOW-UP AFTER INTENSIVE CARE

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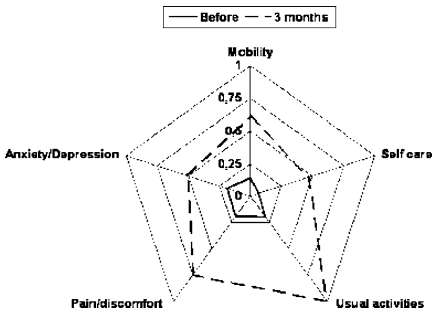
INTRODUCTION. Morbidity after intensive care spans from impaired physical function to mental problems. However, few ICUs have regular follow-up routines. In rural areas it is inconvenient for patients to visit an out-patient clinic. From January 2006 we implemented a two-step follow-up in our ICU, and the experiences from the first two years are presented

METHODS. The study was conducted in a 10 bed general ICU. All survivors (> 16 years) with a LOS > 48 h were eligible. 3 months after ICU discharge they were contacted by telephone, two questionnaires (EQ 5D and Karnofsky score) were applied, and a semi-structured interview performed. This part was performed by one of six trained ICU nurses. If the patient expressed a wish for a follow-up, or the interviewer deemed this necessary, patients were invited to the out-patient clinic at the hospital.

RESULTS. During the first two years, 738 adult patients were treated in the ICU, mean SAPS II score was 41.9, hospital mortality 24%. 214 (75%) of 285 eligible patients were followed up, and 57 patients wanted a second follow-up at the hospital. The figure shows results from EQ-5D (mean sum before 0.78 and after 3.25). The mean Karnofsky score was 66. An unpleasant memory was reported by 57%, most often hallucinations (24%) or anxiety (11%). In 6% pain was remembered as a problem.



CONCLUSION. Three months after the ICU stay the daily life of a large part of our patients were still reduced, with perceived QOL worse than pre-ICU. However, most patients seem to cope with such problems without the need for a second consultation in our ICU, making this model cost-effective.

Oral Presentations
Ventilator-associated pneumonia: Treatment: 0748–0753

0748

EFFICACY OF TIGECYCLIN VERSUS HIGH DOSE OF AMPICILLIN-SULBACTAM IN VENTILATOR ASSOCIATED PNEUMONIA CAUSED BY ACINETOBACTER BAUMANII

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INTRODUCTION. Acinetobacter baumanii is an important cause of infections in patients in intensive care units. Sulbactam combinations are bactericidal against A.baumanii in in vivo models. Tigecycline, the first clinically available semisynthetic glycylcycline approved for clinical use, has been shown to have potent activity against a wide variety of gram–positive and gram-negative pathogens, including multidrug resistant (MDR) strains. We prospectively studied the efficacy of tigecyclin versus a high dose regimen of ampicillin-sulbactam (A/S) in patients with Ventilator Associated Pneumonia (VAP) caused by A.baumanii.

METHODS. Twenty-three mechanical ventilated patients > 72 h (mean age: 70 ± 7) that developed VAP and had positive A. baumannii tracheal aspirates were enrolled in the study. The case was considered to be aetiologically confirmed if A. baumannii was isolated and quantitative culture of broncho-alveolar lavage (> 104 cfu/mL) was achieved. The antimicrobial susceptibility of the isolates was determined using the disk-diffusion (Kirby-Bauer) method, the VITEK II system and the E-test method (AB Biodisk, Solna-Sweden). All isolates exhibited resistance to almost all antibiotics routinely tested, excluding colistin. Susceptibility to tigecyclin was intermediate. Ten of the patients received tigecyclin intravenously (Group A), as monotherapy (50 mg twice daily) while thirteen of them received 9 g A/S (Group B) three times daily (cumulative dose of 9 g sulbactam daily, adjusted for creatinine clearance). Follow up cultures and clinical evaluation of all patients was performed five days after the initiation of therapy. Clinical success was defined by a lessening of the signs and symptoms of VAP, while microbiologic success was defined as eradication of the pathogen in BAL cultures.

RESULTS. Follow up BAL revealed microbiologic success in 8 patients of Group A (80%) and 10 patients of Group B (77%) (p = 0.86). Clinical success was observed in 7 patients of Group A (70%) and 10 patients of Group B (77%) (p = 0.7). There was no significant difference in 14 days and 30 days mortality between the two groups. Adverse reactions occurred in 2 patients (15.3%) of Group B (reversible nephrotoxicity and diarrhea), which did not lead to discontinuation of treatment. Toxicity was not observed with tigecyclin use.

CONCLUSION. In this study tigecyclin and high-dose ampicillin/sulbactam were comparably effective treatment options for MDR A.baumanii VAP, while tigecycline therapy seems safer. The administration of these regimens could prevent the excessive use of polymixins in intensive care units and the subsequent development of pandrug resistant strains.

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0749

VENTILATOR ASSOCIATED PNEUMONIA FROM MULTI-RESISTANT, COLISTIN SENSITIVE, *ACINETOBACTER BAUMANNII*

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INTRODUCTION. Retrospective studies have reported good clinical and microbiological success rates using intravenous colistin as monotherapy to treat multiresistant A. baumannii ventilator associated pneumonia (VAP), comparable to that obtained with imipenem at the time to treat VAP due to imipenem-susceptible strains. However, colistin as monotherapy led to poor results in mouse pneumonia by multiresistant A baumannii, due to inadequate penetration into the pulmonary parenchyma.

METHODS. Between November 2003 to December 2006, 74 consecutive patients developed microbiologically documented VAP due to A. baumannii susceptible only to colistin. Twenty four from these patients were excluded from the study as they were requiring antibiotics against Gram negative bacteria for infections other than VAP, or they were considered to suffer from multimicrobial VAP. The rest were prospectively, randomized to administer colistin only (3 MU three times daily, adjusted for creatinine clearance) (Group A) or combination therapy with colistin (dose as group A) and ampicillin/sulbactam 24 (16 + 8) gr IV (Group B). Eleven more patients were also excluded in the course of the study due to development of confirmed infections from microorganisms other than A. baumannii. Finally, Group A consisted from 19 patients (age 56.6 ± 14.3) Group B consisted from 20 patients (age 56.9 ± 18.7). The clinical response of VAP (improvement of symptoms, clear decrease of purulent bronchial secretions, constant decrease of vasopressors) was assessed on day 5th of treatment.

RESULTS. Group A did not differ to Group B in APACHE II on admission to ICU (14.5 ± 3.1 vs. 16.5 ± 4.7), SOFA score on diagnosis of VAP (7.6 ± 2 vs. 7.9 ± 3.1), the clinical presentation with septic shock (52.9 vs. 47.1%), or the existence of bacteremia. In univariate logistic regression analysis only the combination treatment (70% vs. 15.8, p = 0.001, OR = 12.44(2.6–59.3)) and SOFA ≤ 8 (58.3 vs. 20%, p = 0.024, OR = 0.179 (0.04–0.8)) were associated with clinical response of VAP.

CONCLUSION. Combination therapy with colistin and high dose of ampicillin/sulbactam seem to be more effective in VAP due to multiresistant—only colistin sensitive—*A. baumannii* VAP.

0750

COLISTIN VERSUS TIGECYCLINE IN VENTILATOR ASSOCIATED PNEUMONIA CAUSED BY *ACINETOBACTER BAUMANII*

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INTRODUCTION. The emergence of multidrug resistant (MDR) gram-negative bacteria necessitated the revival of older antibiotic drug classes such as polymyxins (colistin) and tetracyclines. Tigecycline, the first clinically available semisynthetic glycylcycline approved for clinical use, has been shown to have potent activity against a wide variety of gram–positive and gram-negative pathogens, including MDR strains. We retrospectively evaluated the efficacy of tigecyclin versus colistin in patients with Ventilator Associated Pneumonia (VAP) caused by A.baumanii.

METHODS. Twenty-five mechanical ventilated patients > 72 h (mean age: 70 ± 7) that developed VAP and had positive A. baumannii tracheal aspirates were enrolled in the study. The case was considered to be aetiologically confirmed if *A. baumannii* was isolated and quantitative culture of broncho-alveolar lavage (> 104 cfu/mL) was achieved. The antimicrobial susceptibility of the isolates was determined using the disk-diffusion (Kirby–Bauer) method, the VITEK II system and the E-test method (AB Biodisk, Solna-Sweden).Interpretation of the susceptibility results was in accordance to the Clinical and Laboratory Standards Institute (CLSI). All isolates exhibited resistance to almost all antibiotics routinely tested, excluding colistin. Susceptibility to tigecyclin was intermediate. Ten of the patients received tigecyclin intravenously (Group A), as monotherapy (50 mg twice daily) while fifteen of them received colistin intravenously, as monotherapy or in combination with cefepime (3*106 IU three times daily, adjusted for creatinine clearance) (Group B). Follow up cultures and clinical evaluation of all patients was performed five days after the initiation of therapy. Clinical success was defined by a lessening of the signs and symptoms of VAP, while microbiologic success was defined as eradication of the pathogen in BAL cultures.

RESULTS. Follow up BAL revealed microbiologic success in 8 patients of Group A (80%) and 10 patients of Group B (66,6%) (p = 0.86). Clinical success was observed in 7 patients of Group A (70%) and 9 patients of Group B (60%) (p = 0.7). There was no significant difference in 14 days and 30 days mortality between the two groups. Adverse reactions occurred in 5 patients (33%) of Group B (reversible nephrotoxicity), which did not lead to discontinuation of treatment. Toxicity was not observed with tigecyclin use.

CONCLUSION. Colistin and tigecycline seem equally effective in eradication of multidrug resistant A. baumanii in BAL cultures of patients with VAP. However, tigecycline administration seems to be safer than colistin in the clinical treatment of these patients. More data are needed, in order to clarify the role of these regiments in the treatment of A.baumanii infections.

0751

NEBULIZED COLISTINE IN THE TREATMENT OF MULTIRESISTANT *PSEUDOMONAS AERUGINOSA* NOSOCOMIAL PNEUMONIA

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INTRODUCTION. The multi resistant *Pseudomonas aeruginosa* (MRPA) nosocomial pneumonias are responsible for an important mortality and morbidity in ICU. We report our experience in the use of the nebulized colistine in the treatment of the MRPA nosocomial pneumonias (NP).

METHODS. It is a prospective observational study performed during 2 years (2006–2007) concerning all patients having developed MRPA nosocomial pneumonias, treated by nebulized colistine. The criterions of success treatment were extubation and ICU mortality.

RESULTS. We count 32 patients (12 women and 20 men) which the mean age was 48 ± 19 years. All patient have been mechanical ventilation which the mean length was 29 ± 5,5 days. The bronchial sampling technique was broncho-alveolar lavage (BAL). The mean delay of infection was 7 ± 2 days. The isolated MRPA was sensitive only to the colistine. The treatment was nebulized colistine for all patient (4 MUI/day) and intravenous way (4 MUI/day) if the bloodculture was positive (n = 5) for the same germ. No one has been developed sign of toxicity to the colistine. The mean delay of extubation after starting treatment was 10 days. The sterilization of the sampling has been gotten on average on the eighth day. No case of mortality has been noted.

CONCLUSION. It seems that nebulized colistine is an important alternative to treat MRPA nosocomial pneumonia in ICU. Our result needs confirmation by others multicentric studies.

0753

LIMITING THE DURATION OF ANTIBIOTIC THERAPY IMPROVES OUTCOMES IN PATIENTS ADMITTED TO THE INTENSIVE CARE UNIT WITH PNEUMONIA

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INTRODUCTION. Whilst antibiotics have reduced mortality from sepsis, their use is associated with increased healthcare associated infections, emergence of drug-resistant organisms, increased hospital length of stay, morbidity and mortality and increased cost. There is now evidence that strict control over antibiotic prescription, with appropriately shortened durations of regimes reduces cost, does not compromise outcome, and may be beneficial in critically ill patients [1, 2].

METHODS. We performed a retrospective analysis of 56 patients admitted consecutively to our ICU with severe pneumonia over the past 12 months and evaluated the suitability of antibiotic chemotherapy based on choice of agent, duration of therapy, modification following assessment of the clinical state of the patient and microbiological data. We excluded patients with chronic immunodeficiency states or those who died within 24 h of admission to the ICU. Data analysis was performed using the InStat v.3 statistical package (GraphPad Software Inc, USA).

RESULTS. Of the 56 patients, 31 (55.4%) received appropriate antibiotic chemotherapy, 8 (14.2%) received an incorrect antibiotic, and 17 (30.4%) received an inappropriately long duration of therapy based on microbiological data, clinical response and current hospital guidelines. Sputum cultures/tracehal aspirates taken on admission were positive in 13 (23.6%) patients despite clinical evidence of pneumonia. The incidence of hospital acquired infection (HAI) was significantly higher in those patients receiving incorrect antibiotic choice or prolonged duration of therapy (12 vs. 6 infections, p = 0.023). When stratified by duration of therapy, those patients receiving ≤ 5 days of antibiotics had significantly reduced ventilator days (5.8 vs. 10.2 days; p = 0.027), duration of ICU stay (6.9 vs. 12.4 days; p = 0.02), and reduced HAI (3 vs. 14 episodes; p = 0.0093) despite being comparable for age, relevant comorbidities, and severity of illness (APACHE II score 19.6 vs. 19.4; p = 0.9).

CONCLUSION. 1. Shortened antibiotic regimes based on clinical assessment, response to empiric therapy and microbiological data are associated with reduced incidence of hospital acquired infections, ventilator days, and duration of intensive care length of stay.
2. Accurate diagnosis of infection may be improved using biochemical markers such as procalcitonin assay or clinical infection scores such as CPIS (Clinical Pulmonary Infection Score) given the low yield from sputum culture/tracheal aspirate.

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Oral Presentations
Technology assessment organ support II: 0754–0759

0754

REGIONAL COOLING OF EXTRACORPOREAL BLOOD CIRCUIT: A NOVEL ANTICOAGULATION APPROACH FOR CONTINUOUS RENAL REPLACEMENT THERAPY

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INTRODUCTION. An optimal anticoagulation strategy during CRRT in critically ill still remains unresolved issue. It is well known that cooling of blood decreases its ability to clot. Therefore, we developed and experimentally tested a device designed for regional blood cooling in CRRT extracorporeal circuit as a non-anticoagulant measure to prevent circuit clotting.

METHODS. We developed the device for selective cooling of extracorporeal circuit (20 centigrade) allowing blood rewarming (38 centigrade) just before returning into the body. 12 anesthetized and ventilated pigs were randomized to receive either 6 hrs of continuous hemofiltration with application of this device (COOL; N = 6) or without it (CONTR; N = 6). In neither of these groups any anticoagulant was used. In 15, 60, 180, 360 min after starting hemofiltration variables related to circuit patency (time to clotting [TC], number of alarm-triggered pump stopping, venous circuit pressure [VP]) were assessed. In addition, thrombin-antithrombin complexes [TAT circ], a marker of coagulation activation in circuit were measured.

RESULTS. Data are median and interquartile range. While the patency of all circuits treated with selective cooling was well maintained within the observation period, 5 of 6 sessions were prematurely clotted in untreated group (TC 197 min (180;240)). Similarly, the number of alarm-triggered pump stopping was significantly higher in nonintervened group (COOL 1.5 (0;2) vs. CONTR 6 (5;7)).

TABLE 1

Variable	Group	15	Time 60	180	360
VP *(mmHg)*	**COOL**	110 (88;122)	100 (78;158)	80 (80;125)	80 (80;205)
	CONTR	140 (110;180)	265[a b] (200;360)	360[a b] (315;418)	—
TAT circ *(μg/L)*	**COOL**	13.7 (9.4;23)	44.4[b] (37;48.6)	70.2[b] (46.8;141)	103.6[b] (47.4;110)
	CONTR	30.2[a] (20.7;36.6)	78[b] (56.6;91,9)	173.5[b] (121;192)	—

a = p < 0,05 vs. COOL; b = p < 0,05 vs. 15

CONCLUSION. In this experimental setting, our novel device for regional extracorporeal blood cooling completely prevented circuit clotting. The efficacy and safety of this emerging strategy will further be validated.

GRANT ACKNOWLEDGEMENT. MSM 0021620819 Replacement of and support to some vital organs.

0755

COMPLIANCE WITH LOW VT VENTILATION STRATEGY AND USE OF A NEW SCALES ON THE ICU

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INTRODUCTION. It has been shown[1] that patients with Acute Lung Injury (ALI), and Acute Respiratory Distress Syndrome (ARDS) gain morbidity and mortality benefit from use of low tidal volumes (Vt) and low (< 30 cm H_2O) peak inspiratory pressure (Pinsp) with invasive ventilation.
Vt's of 6–8 ml.kg^{-1} of ideal weight have been recommended; this weight is calculated using a formula based on patients' height. Our unit advocates use of this guidance in determining ventilator settings for patients with ARDS and ALI (based on oxygenation criteria), but our compliance with this guidance was not known. The Soehnle Professional 3020 system is an industrial use electronic scale which allows patients to be weighed without being moved; its use has not previously been described in a critical care setting.

METHODS. Prospective audit of tidal volumes achieved per kg of actual and ideal weight in fully ventilated patients with ARDS or ALI.
During October and November 2007, 20 patients were assessed. Vt's were recorded for each of the first 24 h of ventilation. Values were excluded if an assisted breathing mode was in use. Notes and x-rays were reviewed to confirm diagnoses of ARDS/ALI. Patients without X-ray changes were included in the analysis. Patients were measured to calculate ideal weight, and weighed using a Soehnle Professional 3020 system. This uses chocks placed under bed wheels to weigh bed and patient together, allowing deduction of the weight of the bed and equipment to derive patient weight. The weight of all equipment on our ICU was measured prior to introduction of the scales.
PaO_2 at the time of highest FiO_2 requirement was recorded, and highest Pinsp used during the first 24 h.

RESULTS. 17 patients met oxygenation criteria for ALI, 12 of these met criteria for ARDS. Actual weight was greater than ideal weight in 12 patients. Average actual weight was 149.9% of ideal weight. Only 5 patients received low Vt ventilation (6–8 ml kg^{-1} ideal weight). A further 5 had median Vt between 8.0 and 8.5 ml kg^{-1} ideal weight. 1 patient required peak inspiratory pressure over 30 cm H_2O. Median Vt was 9.2 ml kg^{-1} of ideal weight and 6.7 ml kg^{-1} of actual weight. There were no adverse incidents related to use of the Soehnle scales, and staff required only 10 minutes training in their use.

CONCLUSION. Compliance with low Vt was good in terms of actual weight but relatively poor in terms of ideal weight. Patients were being ventilated with excessive Vt. Compliance with low Pinsp was very good. Ideal weight was lower than actual weight and this seems likely to be a factor in the tendency to excessive Vt. The Soehnle 3020 system is a safe way of weighing unstable critically ill patients.

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0756

ARE TIDAL VOLUMES DELIVERED BY THE VENTILATOR AND RECEIVED BY THE PATIENT SIMILAR?

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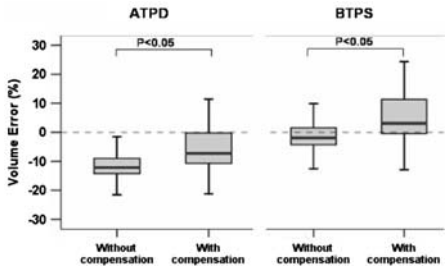
INTRODUCTION. During volume controlled ventilation (VCV), several factors can modify the volume (VT) really delivered to the patient's lung, such as ambient pressure and temperature, water content, and the amount of compressed gas in the tubings. Consequently, the preset VT can differ from the VT delivered to patient's lungs. This bench study aimed at assessing the ability of ICU ventilators to accurately deliver a pre-set VT, by compensating compressed gas and accurately predicting final VT in body temperature and pressure, saturated with water vapour (BTPS) conditions, from initial ambient temperature and pressure dry gas conditions (ATPD).

METHODS. Ten ICU ventilators with compensation of compressed gas (Avea, Elisée350, Engström, Esprit, Evita XL, Extend, PB7200, PB840, Servo I) and three ventilators without compensation (Bird 8400, Avea compensation off, Servo I compensation off) were evaluated using a Michigan lung test model. We compared three pre-set VT (300, 500 and 800 ml), with three simulations of the respiratory system (obstructive, restrictive, normal), with and without an inspiratory pause. With two pneumotachographs, we measured the VT delivered by the ventilator in ATPD conditions and the VT received by the test lung, and used appropriate corrections for simulating BTPS conditions.

RESULTS. Overall, the compensation algorithms for compressed gas allowed to reduce errors on delivered VT in ATPD condition ($P < 0.05$). Errors persisted, however, from at ATPD to BTPS condition with frequent overestimations (the figure averages values for all ventilators without versus with compensation). Large errors persisted frequently for all respiratory system conditions, from −10% to +24 % of the preset VT.



CONCLUSION. Errors in delivered volumes were significantly different between both groups of ventilators. Despite technological improvements, performances of ventilators remain heterogeneous regarding the accurate delivery of VT.

0757

REGIONAL DEPENDENCY OF RESPIRATORY TIME CONSTANTS ON DIFFERENT LEVELS OF PEEP IN PATIENTS WITH ACUTE LUNG INJURY

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INTRODUCTION. Injured lungs consist of fast and slow compartments characterized by fast and slow inhomogeneously respiratory time constants (au). So far, regional au has only been determined in animal models of acute lung injury (ALI) by dynamic computed tomography. The aim of our study was to determine regional au and the dependency of au on different positive end-expiratory pressure (PEEP) levels in patients with acute ALI using electrical impedance tomography (EIT).

METHODS. Five adult patients with ALI caused by pneumonia were included. To determine the inspiratory au, sustained step increase in airway pressure was performed from 0, 8 and 15 cm H_2O of PEEP to 35 cm H_2O. EIT scans were obtained at a rate of 25 cycles/s using the Goe-MF II device (Cardinal Health, Hoechberg, Germany). Regional au and the percentage of the corresponding lung tissue were calculated by a bi-exponential fit of the data from the global, ventral and dorsal lung regions in the chest cross-section.

RESULTS. The results of the global regions are shown in Table 1. Higher au values and percentages of lung tissue with slow au were found in dorsal than in ventral regions. Higher PEEP levels decreased the fast and slow au in global and dorsal regions without significant changes in compartment size.

TABLE 1

PEEP	global au1	global au 2	global A1 (%)	global A2 (%)	vent. au 1	vent. au 2	vent. A1 (%)	vent. A2 (%)	dorsal au1	dorsal au2	dorsal A1 (%)	dorsal A2 (%)
0	1.4	62.8	71.4	28.6	1.3	68.6	73.7	26.3	1.6	96.3	59.2	40.8
8	1.1	43.8	73	27	1	48.8	73.3	26.7	1.4	91.3	63	37
15	0.8	24.8	67.5	32.5	0.9	51.4	73.4	26.6	1	72.2	50.9	49.1

Mean fast and slow time constants and the percentages of corresponding lung tissue

CONCLUSION. EIT is a sensitive method for monitoring regional au. The results indicate overdistension in ventral and lack of recruitment in dorsal lung regions in our patient group.

GRANT ACKNOWLEDGEMENT. This work is funded by the DFG (German Research Foundation)

0758

SPATIAL DISTRIBUTION OF VENTILATION DURING LUNG PROTECTIVE MECHANICAL VENTILATION IN EXPERIMENTAL LUNG INJURY

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INTRODUCTION. Lung protective ventilation strategies for acute respiratory distress syndrome (ARDS) consider the use of a reduced tidal volume ($V_T = 6$ ml/kg) (1). Extracorporeal CO_2 removal with the aim of further reducing V_T may additionally limit injurious effects of ventilation in severe ARDS. However, ventilation with $V_T < 6$ ml/kg may cause pulmonary de-recruitment. The aim of this prospective experimental animal study was to evaluate the distribution of regional lung ventilation during ventilation with 5 ml/kg V_T combined with extracorporeal CO_2 removal compared to 10 ml/kg V_T without extracorporeal CO_2 removal by using electrical impedance tomography (EIT).

METHODS. 10 anesthetized supine pigs (50 ± 5 kg, mean ± sd) were ventilated in a pressure-regulated volume-controlled mode. A pumpless arteriovenous extracorporeal membrane oxygenator (interventional lung assist (ILA), Novalung, Hechingen, Germany) was connected to one femoral artery and vein before acute lung injury was induced by repeated saline lavage. Inspiratory oxygen concentration was increased to 100% and positive end-expiratory pressure (PEEP) was set 2 cmH_2O above the lower inflection point determined by a constant low flow inflation maneuver. Subsequently, 5 animals were ventilated with 10 ml/kg V_T and clamped ILA for 30 min followed by a 30 min period of ventilation with 5 ml/kg V_T and open ILA. The other 5 animals were ventilated in reversed order. Regional lung ventilation was determined from EIT measurements (EIT system Goe MF II, Cardinal Health, Höchberg, Germany) during baseline conditions at ventilation with 5 and 10 ml/kg V_T in the normal lung, after induction of lung injury as well as 5 and 30 min after ventilation with low V_T and open ILA or high V_T and clamped ILA, respectively. Changes in ventilation distribution were calculated as anterior-to-posterior shifts in ventilation evaluated from ventilation profiles and so-called centers of ventilation (2).

RESULTS. A significant shift in ventilation towards the dependent lung regions was observed in injured lungs after having set PEEP using pressure-volume curve. This shift in ventilation was not influenced by the lower V_T ventilation combined with ILA and maintained over the whole time period independent of the chronological order. The center of ventilation was located at 50.5 ± 2.5 % of the anterior-to-posterior chest diameter during low V_T and open ILA and 50.1 ± 2.2 % during high V_T and clamped ILA, respectively.

CONCLUSION. Spatial distribution of ventilation in the lavaged lung is not impaired by the use of lower V_T ventilation strategy in combination with ILA under the prerequisite that PEEP is adequately set.

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0759

PRONE POSITION DECREASES REGIONAL LUNG INFLAMMATION DURING EXPERIMENTAL ALI. A PET STUDY

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INTRODUCTION. Ventilation with high tidal volumes may harm the lung in acute lung injury (ALI) by increasing both lung inflammation and permeability of the alveolar-capillary membrane, resulting in increased mortality. Whether high or low PEEP or prone positioning (PP) improves patient outcome remains controversial. Mathematical analysis of the expiratory pressure-volume (P-V) curve allows determination of specific points (inflection point (c) and point of maximal compliance decrease (Pmcd)) which might help tailoring PEEP level from individual characteristics of respiratory mechanics. The aim of this study is to evaluate regional lung inflammation, perfusion, ventilation and aerated volume assessed with Positron Emission Tomography (PET) in supine position (SP) at 2 PEEP levels, and in PP during experimental ALI.

METHODS. ALI was performed in 21 piglets by tracheal instillation of hydrochloric acid. Animals were then randomly assigned to 3 experimental groups, based on the characteristics of their expiratory P-V curve. 14 animals were studied in SP with PEEP = c + 2 cm H2O (c + 2 group, n = 7), or = Pmcd + 2 cm H2O (Pmcd + 2 group, n = 7). The 7 remaining animals were studied in PP with PEEP = c + 2 cm H2O (PP group). Tidal volume was then adjusted in all groups to keep plateau pressure below 30 cm H_2O. 2 hours after randomization, ventilation and aerated volume, tissue fraction (FT) and perfusion were assessed with PET using inhaled ^{13} N, density analysis and ^{15}O labelled water, respectively. Lung inflammation was assessed with PET as lung uptake of ^{18}F-FDG (Ki) normalized by tissue fraction (Ki/FT).

RESULTS. PEEP was significantly higher in the Pmcd + 2 group (13 ± 3) than in c + 2 (5 ± 3) and PP (4 ± 2 cm H2O) groups. Tidal volumes were significantly reduced in the Pmcd + 2 group (6.2 ± 1.6 ml/kg) as compared to c + 2 (9.4 ± 0.7 ml/kg) and PP (9.4 ± 1.4 ml/kg) groups.
In SP, increasing PEEP level did not significantly modify anterior-to-posterior distribution of both ventilation and perfusion. PP significantly redistributed perfusion and ventilation towards ventral regions. The values of Ki/FT were significantly lower in the PP group, as compared to both SP groups.

CONCLUSION. In this model of ALI, high or low PEEP level did not reduce lung inflammation. PP decreases lung inflammation, as compared to SP. This effect might be related to a protective effect of PP on ventilator-induced lung injury.

GRANT ACKNOWLEDGEMENT. Hospices Civils de Lyon and IBA radio-isotopes France.

Oral Presentations
Acute kidney injury: 0760–0764

0760

PROPHYLAXIS OF CONTRAST INDUCED NEPHROPATHY – IS THERE AN ADDITIONAL EFFECT OF SODIUM BICARBONATE TO THEOPHYLLINE?

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INTRODUCTION. Contrast-induced nephropathy (CIN; increase in serum creatinine of >=0.5-mg/dl and/or >=25% within 48 h after contrast-medium) is the third leading cause of hospital-acquired acute renal failure. CIN is frequently found in ICU-patients, and it is associated with increased mortality and prolonged hospitalisation. Hydration as well as theophylline are among the most promising prophylactic approaches. Several studies suggest, that hydration with sodium bicarbonate might be superior to hydration by saline. Therefore, it was the aim of our double-blind study to compare the effects of a hydration with sodium bicarbonate (B) to hydration with saline (S) in addition to prophylaxis with theophylline.

METHODS. 87 patients with serum creatinine >=1.1 mg/dl and/or an otherwise increased risk of CIN (diabetes, nephrotoxic medication) were randomised to receive hydration with B (0.154 molar sodium bicarbonate) or S (0.9% saline) in adddition to 200 mg theophylline i.v. 30 min before contrast-medium (CM). The hydration solution was administered at 3 mL/kg for 1 h prior to CM and 1 mL/Kg for 6 h after CM. Primary end point: Incidence of CIN (increase in serum creatinine >=0.5mg/dl and/or >=25% within 48 h after CM). Secondary end points: time courses of serum-creatinine, glomerular filtration rate (GFR), and BUN. Multiple regression with regard to maximum increase in serum creatinine after CM. Statistics: Chi-square-test; Wilcoxon-test; multiple regression analysis; SPSS software version 16.0.

RESULTS. Patients of group S and group B were comparable with regard to baseline creatinine (1.27 ± 0.62 vs. 1.03 ± 0.47; p = 0.072), baseline BUN (33.7 ± 19.5 vs. 29.3 ± 19.5; p = 0.242), amount of CM (115 ± 63.5 vs. 103 ± 48.3; p = 0.290), baseline Mehran score (8.1 ± 3.5 vs. 8.2 ± 4.7; p = 0.633) and prevalence of other risk factors (RF) such as ICU, diabetes, hypertension and nephrotoxic medication. In patients with sodium bicarbonate prophylaxis in addition to theophylline, a significant lower incidence of CIN 0/43 (0%) was found as compared to patients of group S 4/44 (9.1%; p = 0.043). Compared to baseline, serum creatinine levels significantly decreased after 24 h (0.97 ± 0.43; p = 0.05) and 48 h (0.93 ± 0.42; p = 0.009) in group B. GFR increased (24 h: 97.2 ± 59.7; p = 0.054, 48 h: 103.3 ± 68.4; p = 0.046).
By contrast, in group S, serum creatinine and GFR did not change significantly after 24 h and 48 h. A comparison of the changes vs. baseline demonstrated significant differences between group S and group B 24 h (p = 0.014) and 48 h (p = 0.028) after CM. The mean maximum increase of serum creatinine within 48 h was 0.073 in group S, whereas it decreased by 0.028 in group B (p = 0.018). Multiple regression analysis revealed prophylaxis with S (p = 0.014), old age (p = 0.017), female gender (p = 0.001), decreased heart rate (p = 0.016) and nephrotoxic medication (p = 0.003) as independent risk factors for CIN.

CONCLUSION. 1. Hydration with 0.154 molar sodium bicarbonate provides significant reduction of the risk of CIN in addition to theophylline as compared to hydration with saline. 2. Old age, female gender, decreased heart rate and nephrotoxic medication are independent risk factors for CIN.

0761

RENAL PROTECTION AFTER TRAUMATIC RHABDOMYOLYSIS: IS ADDITIONAL ALKALINIZATION OF THE URINE BETTER THAN FORCED DIURESIS ALONE?

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INTRODUCTION. After major trauma to the muscles, myoglobin is released into the systemic circulation. Myoglobin can precipitate thereby impeding renal function. This can lead to myoglobinuric renal failure, with an incidence of 4–33%. A recommended therapeutic approach to prevent myoglobinuric renal failure is the alkalinization of the urine by administering sodium bicarbonate. Retrospective clinical studies and small trials advocate this therapy. However, two recent larger retrospective trials suggested that alkalinization of the urine does not offer any benefit over hydration and maintaining forced diuresis in these patients. We therefore tested the hypothesis, that forced diuresis with large-volume crystalloid infusion is equally effective in protecting renal function in patients with severe rhabdomyolysis than additional alkalinization of the urine.

METHODS. After institutional approval 30 consecutive trauma patients were enrolled in this study. To be eligible the patients had to have a serum myoglobin above 2000 mmol/l. Patients were excluded from the study if they had any preexisting renal disease. After enrollment the patients were randomly assigned to two treatments. In the Control Group patients received 5 ml/kg/h Ringer Lactate to achieve a diuresis of 3–4 ml/kg/h. If diuresis was not sufficient 100 ml of Mannitol 20% was administered three times daily. If diuresis still did not achieve targeted volumes a continuous infusion of 0,05 mg/kg/h furosemide was started, and titrated to achieve the targeted diuresis. In the second, the Alkaline Group, patients received the same volume and diuretics management as the Control Group. Additionally active alkalinization of the urine was performed by the administration of sodium bicarbonate. An initial bolus of 100 mmol Sodium Bicarbonate was given followed by a continuous infusion of 0,1 mmol/kg/h. The continuous infusion of Sodium Bicarbonate was then adjusted to keep the urinary pH > 7. Renal Injury was defined according to the RIFLE Criteria for Acute Kidney Injury. If diuresis decreased < 0,5 ml/kg/hr despite the above mentioned efforts to increase diuresis, or the patients blood urea nitrogen increased > 100 mg/ml, or serum creatinine increased ≥ 4 mg/dl, continuous veno-venous hemofiltration was started. The study was stopped after 72 h or when serum myoglobin decreased <250 mg/dl.

RESULTS. 30 patients were included in the study, 15 in each group. The APACHE scores were similar in both groups. The incidence of Risk, Injury and Failure were comparable in the two groups (table). One patient in the Alkaline Group and no patient in the Control Group had to undergo hemofiltration. Urinary ph in the Alkaline/Control Group after 24 h was 7,3 ± 0,4/6,8 ± 0,5 and after 48 h 7,5 ± 0,3/7,2 ± 0,3.

TABLE 1

Kidney injury group -RIFLE classification	Alkaline group	Control group
Normal	10	9
Risk/Creatinine x 1,5	1	2
Injury/Creatinine x 2	3	4
Failure/Creatinine x 3	1	

CONCLUSION. In this prospective randomized trial, large-volume crystalloid infusion is equally effective in protecting renal function in patients with severe rhabdomyolysis than additional active alkalinization of the urine. Interestingly the urinary pH was the same in both groups after 48 h of forced diuresis with lactated Ringers Solution.

0762

SELECTIVE INOS INHIBITOR PREVENTS RENAL MICROVASCULAR HYPOXIA IN EARLY STAGE OF ISCHEMIA-REPERFUSION

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INTRODUCTION. Growing interest surrounds the role of microvascular dysfunction and renal hypoxia in the initiation and development of acute renal failure. Regarding ischemia-reperfusion(I/R)-induced ARF, this role is poorly understood. In the kidney nitric oxide(NO) is important for adequate endothelial function and regulation of oxygen metabolism. Therefore the aim of this study was to investigate if early I/R-induced renal microvascular hypoxia can be prevented by nitric oxide synthase(NOS) inhibitors.

METHODS. Prospective animal study, where 28 rats were divided in 4 groups: (1) I/R group underwent a 30 minutes supra-renal aortic clamping (n = 7), (2) I/R treated with a non selective NOS inhibitor L-NAME (n = 7), (3) I/R treated with a selective iNOS inhibitor L-NIL(n = 7) and (4) time-control group(n = 7). Cortical ($C\muPO_2$), and medullary($M\muPO_2$) microvascular oxygen pressure, renal oxygen delivery(DO_{2ren}), renal oxygen consumption(VO2ren) and renal oxygen extraction(O_2ER) were measured using oxygen-quenched phosphorescent method throughout 2 h of reperfusion (1). Renal function was assessed with creatinine clearance and excretion fraction of Na^+.

RESULTS. While renal arterial resistance increased (+192% vs. baseline, $p < 0.05$), renal blood flow, $C\muPO_2$ and $M\muPO_2$ dropped 2 h after the reperfusion (−70, − 42 and −42% respectively, $p < 0.05$), as well as DO_{2ren} and VO_{2ren} (−70%, $p < 0.0001$, and −28%, $p < 0.05$). Whereas L-NAME further decreased DO_{2ren}, VO_{2ren}, $C\muPO_2$ and $M\muPO_2$, and deteriorated renal function, L-NIL partially prevented the drop of DO_{2ren}, $C\muPO_2$ and $M\muPO_2$(53 ± 4 vs. 39 ± 3.5 and 41 ± 1.8 vs. 30 ± 2.8 mmHg respectively, $p < 0.05$)and increased VO_{2ren} (0.37 ± 0.04 vs. 0.13 ± 0.01 ml min g^{-1}, $p < 0.05$) in comparison with baseline value. L-NIL also prevented deterioration of renal function. Both L-NIL and L-NAME increased O_2ER.

CONCLUSION. This study showed that microvascular hypoxia occurs in early stage of renal I/R and demonstrates that microcirculation-targeted therapeutic strategies based on iNOS inhibition have beneficial effects on renal oxygenation and function. In contrast, inhibition of eNOS further decreased microvascular PO_2 highlighting its role in post-ischemic microvacular oxygenation regulation. Furthermore, inhibition function of NO on renal oxygen consumption during ischemia-reperfusion is described.

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0763

NGAL IN URINE AND PLASMA AS A PREDICTIVE BIOMARKER OF ACUTE KIDNEY INJURY (AKI) IN ADULT ICU PATIENTS

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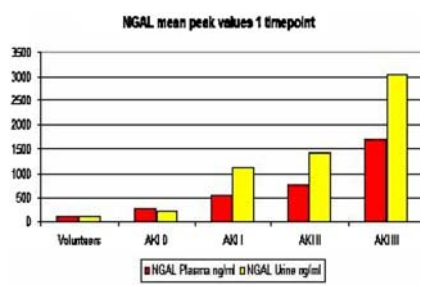
INTRODUCTION. Previous studies have shown that neutrophil gelatinase-associated lipocalin (NGAL) is an early predictive biomarker of ischemic and nephrotoxic AKI(1,2).The ability to use NGAL as a biomarker for early AKI has never been studied in critically ill adult patients with mixed etiologies. Therefore, we assessed the ability of urine (uNGAL) and plasma NGAL (pNGAL) to predict AKI development and characterize the degree of AKI in a heterogeneous adult ICU population.

METHODS. We conducted a prospective cohort study of critically ill adult patients from September 2007 until April 2008. Clinical data and serum creatinine were collected for up to 72 h from admission. Urine and plasma samples were collected at admission and at 4, 8, 24, 36, 48, 60 and 72 h. AKI was classified using the RIFLE criteria (Risk, Injury, Failure or AKI I, II and III). Healthy volunteers served as a control group. Non parametric tests were used to compare continuous variables between groups.

RESULTS. A total of 93 patients and 31 controls were included and analyzed. Mean age of patients and controls were 58 and 28 years respectively. The severity of illness score (APACHE II) was for patients without AKI 20.1 (8–33), for AKI-Risk 20.7 (10–34), for AKI-Injury 27.5 (17–44) and for AKI-Failure 25.4 (15–40). Overall mortality was 30%. Mean peak pNGAL and uNGAL levels were 98 ng/ml (42–98) and 108 ng/ml (1–108) in the healthy volunteers, 260 ng/ml (108–758) and 223 ng/ml (8–1080) in patients without AKI, 538 ng/ml (144–1475) and 1129 ng/ml (61–5000) in AKI-R, 759 ng/ml (288 – 1425) and 1433 ng/ml (127–5000) in AKI-I, and 1708 ng/ml (357- 3598) and 3062 ng/ml (565–5000) in AKI-F. A total number of 15 (16%) patients required renal replacement therapy (RRT), 2 of the AKI-I and 13 of the AKI-F.



CONCLUSION. 1. Both uNGAL and pNGAL levels are already elevated on admission in patients without AKI according to Rifle creatinine criteria compared to the levels of healthy volunteers 2.uNGAL and pNGAL levels predict the severity of AKI, uNGAL seems to be more sensitive than pNGAL 3.NGAL is a useful marker of AKI in a heterogeneous adult ICU population.

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0764

INCIDENCE OF RENAL REPLACEMENT THERAPY IN INTENSIVE CARE PATIENTS TREATED WITH DIFFERENT HYDROXYETHYL STARCH SOLUTIONS

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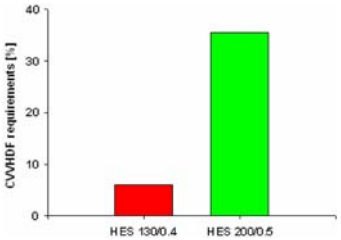
INTRODUCTION. The results of the currently published VISEP study [1] suggest that treatment with HES 200/0.5 preparations may impair renal function as compared to sole crystalloid infusion in critically ill patients. However, experimental and small scale clinical data demonstrate the safety of modern HES 130/0.4 solutions [2, 3]. Therefore, the purpose of the current retrospective study was to compare the impact of 6% HES 130/0.4 and 10% HES 200/0.5 on requirements of renal replacement therapy in critically ill patients.

METHODS. We analyzed 8408 surgical intensive patients treated with HES solutions in the University Hospital of Muenster, Germany, between 2000 and 2006. Among these patients, 7813 were treated with 6% HES 130/0.4 and 595 patients with 10% HES 200/0.5.

RESULTS. A total of 812 patients (10.4%) required continuous veno-venous hemodiafiltration (CVVHDF). However, the need for CVVHDF was more common in patients treated with 10% HES 200/0.5 as compared to 6% HES 130/0.4 (35.5% vs. 6.1%; OR 11.5; 95% CI 9.5–14.1; Fig. 1). In addition, mean creatinine plasma concentrations were higher in the 10% HES 200/0.5 group as compared to patients treated with 6% HES 130/0.4 (1.42 ± 0.84 vs. 1.19 ± 0.75 mg/dL; $p < 0.001$).



CONCLUSION. The results of the present study are in accordance with the VISEP study [1] and suggest that HES 200/0.5 may impair renal function in critically ill patients. However, the current data demonstrate that renal function was better maintained in patients treated with 6% HES 130/0.4 as compared to 10% HES 200/0.5. Clinical studies evaluating the safety of 6% HES 130/0.4 as compared to sole crystalloids in critically ill patients are now needed.

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Oral Presentations
Biomarkers in sepsis: 0765–0769

0765

THE "CYTOSCORE" PREDICTS SURVIVAL IN SEVERE SEPSIS

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INTRODUCTION. We have previously demonstrated that a distinct anti-inflammatory pattern of cytokine gene expression is associated with increased mortality in severe sepsis (1,2). Based on an integral biological measure of a patients' immunological response to an infective insult, we suggest that a novel scoring system, termed a "cytoscore", is predictive of ICU mortality.

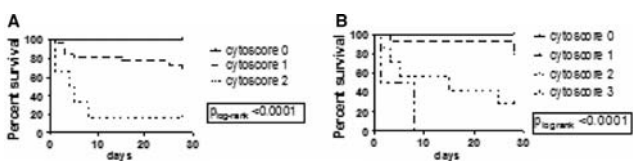
METHODS. Sixty two patients admitted to the ICU with a diagnosis of severe sepsis were recruited. IFNgamma, IL-10, IL-23 and IL-27 were assayed on ICU admission using QRT-PCR. IL-6 protein was assayed using ELISA. Recursive partitioning dichotomised each patients' ratio of IL-10:IFNgamma and IL-27:IL-23 into either a high and low category, with a score of 1 for high and 0 for low. A composite figure, termed a cytoscore and ranging from 0 to 2, is then calculated for each patient.

RESULTS. There is a direct relationship between the absolute ratio of both IL-10:IFNgamma and IL-27:IL-23 mRNA and increased mortality ($p < 0.05$). The robustness of the cytoscore is described in Table 1. The cytoscore accurately describes the temporal pattern of survival in patients with sepsis (p log rank < 0.0001,figure A). Addition of IL-6 protein data can add an extra layer of complexity to the score by describing a very high risk group (cytoscore 3) characterised by early ICU mortality (figure B).

TABLE 1 CONTINGENCY TABLE OF CYTOSCORE AND OUTCOME

	Death (%)	Discharge (%)
high risk (cytoscore 2)	5 (83)	1 (17)
intermediate risk (cytoscore 1)	7 (27)	22 (73)
low risk (cytoscore 0)	0 (0)	11 (100)

Chi squared statistic 15.2, p = 0.0005



CONCLUSION. The cytoscore predicts events remote from the time of assay. Consequently, this pattern of gene expression may represent a causal as opposed to a reactive phenomenon. The cytoscore may be of use both in risk stratification and in patient selection in the setting of novel inflammatory interventional therapies.

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0766

REPORTED PROCALCITONIN LEVELS IN SEVERE SEPSIS MAY BE INCONSISTENT

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INTRODUCTION. We measure procalcitonin (PCT) levels using the BRAHMS immunochromatographic technique. As small changes in the PCT value may be used to guide duration of antibiotic prescription and to inform prognosis (1) it is important to obtain accurate results. We have performed a study to investigate the reliability and interpretation of the PCT requests within Clinical Biochemistry at our institution.

METHODS. During a 10 month period (April 2007 to January 2008) 30 PCT results were reported by State Registered Biomedical Scientists (BMS). Each test band wes then interpreted by a further 10 BMS who were unaware of the original reported value.

RESULTS. The results are shown in the following table.

TABLE 1 PCT VALUES FOR 30 PCT ASSAYS

PCT value (ng/ml)	Number reported	Number of BMS in agreement	Number of BMS disagreed
<0.5	10	93 (93%)	7 (7%)
0.5–2	8	73 (91%)	7 (9%)
2–10	7	49 (70%)	21 (30%)
>10	5	42 (84%)	8 (6%)

CONCLUSION. For those patients with a reported PCT < 0.5 ng/ml or PCT > 10 ng/ml, we show a good correlation between reporters. Conversely, PCT of 0.5–2 ng/ml and 2–10 ng/ml show greater variation. This is a significant finding as we know that mortality increases when PCT rises above 1 ng/ml (1) and our study has shown that 30% of BMS would have reported such results in the range outside this value (implying a more severe illness and worse prognosis). This range where there was considerable error for reporting is probably the most important of the 4 values as the transition from 0.5–2 to 2–10 also represents a change from moderate systemic inflammatory response to severe response most likely due to infection. The difficulty experienced when interpreting those bands appears to be because the band colour is frequently non monochromatic making correlation with the reference card problematic. It is imperative to realise this is only semi-quantitative and therefore it is open to individual interpretation.

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0767

THE VASOPRESSIN AND COPEPTIN RESPONSE TO INFECTION, SEPSIS AND SEPTIC SHOCK

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INTRODUCTION. In septic shock, both adrenal insufficiency and inadequate plasma concentrations of arginine vasopressin (AVP) may contribute to the failure to restore vascular tone, respectively (1, 2). Infusion of a vasoconstrictor hormone like AVP increases arterial blood pressure in septic shock (3). Measurement of endogenous plasma concentrations of AVP could answer the question whether such an AVP therapy reverses an endogenous deficiency or simply constitutes a pharmacological intervention to increase peripheral vascular tone.

METHODS. In this prospective, controlled study, we measured AVP and copeptin plasma concentrations in 50 patients with sepsis or septic shock and in ten patients with infection but no systemic inflammation during the first seven days after intensive care unit (ICU) or hospital admission. Hemodynamic, laboratory and clinical data were recorded daily in all patients during the first seven days after ICU or hospital admission. At the same time points blood was withdrawn to determine plasma AVP (radioimmunoassay) and copeptin (immunoluminometric assay) concentrations. A mixed effects model was used for statistical analysis.

RESULTS. The AVP response was different between the three study groups ($p < 0.001$), but did not change over time ($p = 0.12$). While patients with sepsis and septic shock had significantly higher AVP levels than patients with infection (both $p < 0.001$), there was no difference in AVP concentrations between patients with sepsis and septic shock ($p = 0.98$). No difference in AVP concentrations was observed between survivors and non-survivors at day 28 ($p = 0.87$). In patients with sepsis, serum osmolarity ($p < 0.001$), arterial pH ($p = 0.001$) and PaO2 ($p = 0.04$) were indirectly associated with the course of AVP plasma levels, while it was serum osmolarity alone in patients with septic shock ($p = 0.03$). Plasma AVP concentrations were correlated with copeptin ($r = 0.476$, $p < 0.001$), but this correlation was influenced by continuous veno-venous hemofiltration ($p < 0.001$).

CONCLUSION. Sepsis induced a stronger AVP response than infection without systemic inflammation. However, a lacking difference in AVP plasma concentrations between patients with and without shock indicates comprehensive dysfunction of the AVP system in sepsis. Our data support the hypothesis that an impaired AVP response is at least partly responsible for the failure to restore vascular tone in septic shock.

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0768

MULTICENTRIC STUDY ON MONOCYTE HLA-DR EXPRESSION IN SEPTIC SHOCK : RELATION WITH PROGNOSIS AND SECONDARY INFECTION

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INTRODUCTION. Decrease in monocyte HLA-DR (mHLA-DR) in ICU patients has been proposed as a marker of immunity associated with poor prognosis but never evaluated in a large multicentric population. Objective: To test mHLA-DR as a marker of mortality and secondary infection risk in a large multicentric population of patients in septic shock with at least 2 organ dysfunction.

METHODS. Prospective multicentric study (4 ICU units). Evaluation of mHLA-DR (flow cytometry, normal values: 21955 ± 12088 AB/C), SAPSII, SOFA at D0, D1, D2, D7, D14, D21, D28; D7 and D28 mortality. Diagnosis of secondary infection according to CDC criteria. Predictive model for outcome and secondary infection: general clinical characteristics and mHLA-DR tested by univariate analysis (t-test) then multiple logistic regression.

RESULTS. 221 patients included with a delay of 12 h 19 min (± 7 h 12 min) after second organ failure occurence (91% in shock). Age 61 y.o. ± 17, 64% males, SAPSII 47 ± 14, SOFA D0 8 ± 3, 24% in surgical context. Mortality 25% at D7, 38% at D28. mHLA-DR at D0-D2 decreased in all patients but was not predictive of mortality rate, when SAPSII ($p < 0.0001$) and SOFA ($p = 0.0009$) were. First-week evolution of mHLA-DR (difference: D7 value- minimal value (D0-D2)) was predictive of mortality after D7 ($p = 0.03$). In survivors after D7 ($n = 175$), 138 presented at least one infection. Low initial mHLA-DR (D2) was associated with secondary infection occurrence ($p = 0.03$).

CONCLUSION. In our population of septic patients with at least 2 organ failures, mHLA-DR was not a marker for prognosis at admission, but a flat recovery of mHLA-DR during the first week was predictive of late death. Low mHLA-DR is associated with secondary infection risk during ICU stay. As a consequence, our results questioned the benefit of immunity stimulation (as with interferon gamma) to prevent secondary infections.

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0769

MARKERS OF COLLAGEN SYNTHESIS AND DEGRADATION ARE INCREASED IN SERUM IN SEVERE SEPSIS

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INTRODUCTION. Sepsis related inflammatory response syndrome and multiple organ dysfunctions are common causes of death in intensive care units. The effect of sepsis on markers of tissue repair is only partly understood.

METHODS. Blood samples were collected during a 10 day period following the first organ dysfunction and after 3 and 6 moths. Procollagen type I and III aminoterminal propeptides (PINP, PIIINP) as well as cross-linked telopeptides of type I collagen (ICTP) were measured. The median age of the 44 patients with severe sepsis was 63 years (25th–75th percentile 56–71). The median of APACHE II score on admission was 26 (22–30). The 30-day mortality was 25%. 15 volunteers were used as controls.

RESULTS. PIIINP concentration was elevated in septic patients (8.8[25th –75th 6.8–26.0]) compared to controls (3.0[25th –75th percentile, 2.7–3.3], $P < 0.001$) on the first day. The maximum serum PIIINP concentrations during sepsis were higher in non-survivors compared to survivors (26.1[18.7–84.3] vs. 15.1[9.6–25.5], $P = 0.033$) as well as in multiple organ failure compared to multiple organ dysfunction syndrome (24.2[13.4–48.2] vs. 8.9[7.4–19.4] $P = 0.002$). Although the PINP concentration of septic patients remained within the laboratory reference values during sepsis, the maximum values were higher in non-survivors than in survivors (118.5[52.4–195.5] vs. 64.0[41.7–109.7] $P < 0.001$) and in multiple organ failure than in multiple organ dysfunction syndrome (44.3[35.9–103.4] vs. 84.1[53.5–150.0], $P < 0.001$). ICTP levels were elevated in septic patients compared to controls (19.4[12.0–29.8] vs. 4.1[3.4–5.0] $P < 0.001$) on the first day.

CONCLUSION. Markers of collagen synthesis and degradation are increased in patients with severe sepsis and may be used as markers of disease severity and outcome. Fibrosis may be one mechanism in the pathogenesis of organ dysfunctions.

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CONSCIOUS-2: CLAZOSENTAN TO OVERCOME NEUROLOGICAL ISCHEMIA AND INFARCTION OCCURRING AFTER ANEURYSMAL SUBARACHNOID HEMORRHAGE (ASAH)

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INTRODUCTION. In CONSCIOUS-1, a dose-finding study, intravenous clazosentan (1, 5, and 15 mg/h vs. placebo) significantly and dose-dependently reduced angiographic vasospasm in patients with aSAH. A trend towards a decreased incidence of morbidity/mortality was also observed in a post-hoc analysis, using centrally-assessed computed tomography scans and a morbidity/mortality endpoint that included neurological deterioration, rescue therapy and hypodensities due to vasospasm on computed tomography. These findings support the notion that decreasing vasospasm may improve clinical outcome in aSAH patients and led us to design the CONSCIOUS-2 trial.

METHODS. CONSCIOUS-2 is a randomized, double blind, placebo controlled study to investigate the effect of intravenous clazosentan in reducing vasospasm-related morbidity and all-cause mortality after aSAH. Patients are randomized 2:1 to clazosentan (5 mg/hr) or placebo, to start within 56 h of aSAH and continuing until Day 14 post aneurysm rupture.

RESULTS. Main Inclusion criteria: (1) 18–75 years, (2) aSAH due to a ruptured saccular aneurysm, secured by surgical clipping, (3) "diffuse" clot (long axis, greater or equal to 20 mm), (4) WFNS grades I-IV.
Primary endpoint: Vasospasm-related morbidity/mortality (composed of: death from any cause; new cerebral infarcts due to vasospasm, delayed ischemic neurological deficit due to vasospasm; neurological signs or symptoms in the presence of angiographic vasospasm requiring administration of valid rescue therapy) within 6 weeks of aSAH; assessed by central reviewers. Based on the CONSCIOUS-1 results, the placebo rate for the primary endpoint has been estimated to be 40%.
Secondary endpoints: Clinical outcome (Glasgow Outcome Scale) at Week 12 and the total volume of new cerebral infarcts of all etiologies at Week 6.

CONCLUSION. CONSCIOUS-2 will recruit 765 patients from approximately 100 sites in N. America, Europe and Asia Pacific.

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0771

HYPOTERMI

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INTRODUCTION. Therapeutic hypothermia protects from neurological sequels and death after out-of-hospital cardiac arrest [1, 2] and it is recommended in the ERC Guidelines [3]. The Hypothermia Registry is a database on the Internet designed to enable evaluation of patients treated with intensive care after cardiac arrest.

METHODS. Data on patient and cardiac arrest characteristics, hypothermia treatment, adverse events, clinical investigations and general intensive care was registered. Outcome was documented as neurological score at ICU and hospital discharge and at six months using the Cerebral Performance Category (CPC) scale [4]: CPC 1–2 representing a good outcome and 3–5 a bad outcome. Only centres reporting all cardiac arrest patients were included.

RESULTS. Between October 2004 and March 2007 1109 patients from 37 centres in 7 countries were entered in the Registry of which 952 were treated with therapeutic hypothermia (TH) and 157 without. In this abstract the TH group is described. The median age was 63 years, 73 % were men and in 68% the initial rhythm was VT/VF. The time to initiation of TH was 90 minutes and the time to achieve core temperature less than 34°C was 240 minutes. Overall cooling rate was 0.6 degrees C/h. All patients, except 9, reached the target temperature. 38% developed pneumonia, 5% had a bleeding requiring transfusion and 29 % had a serious event of arrhythmia during the ICU stay. Data at 6 month was evaluated for 931 patients. 52 % were alive at follow up and 92 % of them had a good neurological outcome; in the groups with initial rhythm asystole/PEA and VT/VF good outcome was 26 % and 60 % respectively.

CONCLUSION. Our results indicate that half of the patients in an unselected cardiac arrest population admitted to intensive care for TH are alive at 6 months and they survive with a good neurological function. Patients with asystole and PEA have a better outcome than previously reported. The safety aspects compare well with previous studies on TH. Therapeutic hypothermia was feasible to use in all centres.

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0772

PEEP AND VOLUME RESPONSIVENESS IN SEVERE BRAIN TRAUMA

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INTRODUCTION. To avoid complications of the volume load, used for the cerebral perfusion support in brain trauma, we tried to determine volume responsiveness in these category of patients.

METHODS. We examined 30 patients with severe brain trauma. (GCS score < 8, sedation, artificial ventilation). The stroke volume (SV) and its variability (SVV) were determined by the bioimpedans method. Additionally we determined the variability of other haemodynamic parameters: BP, HR, CI, EF and peripheral pulse, which reflect the type of central autonomic regulation (were showed in our previews works) . Especial attention were paid to the P4 (0.2–0.5 Hz) bands of SVV, which predominantly connect with breathing, as a main marker of hypovolemia. All the comparisons were made before and after increasing of PEEP to 5 and then to 10 cm H2O. These were made before and after infusion of Stabisol (app. 10 ml\kg).

RESULTS. All patients were divided in two groups: A-18 patients (responders on volume load by the increasing SV) and B-12 patients (nonresponders: not only the absents of SV increasing, but in some cases - worsening the type of central regulation of haemodynamic). In group A the increasing PEEP to 5 and 10 cm H2O before volume load showed the decreasing of BP, rising HR and the grate increasing of P4 SVV. After volume load the same changes were only if PEEP was 10 cm H2O. It's probably related with no complete compensation of hypovolemia. In group B the same PEEP increasing before volume load did not revealed any changes in haemodynamic. After volume load PEEP increasing to 10 cm H2O induced some increasing of SV.

CONCLUSION. PEEP may be used in severe brain trauma for evaluation of the range of hypovolemia and volume responsiveness prediction. PEEP—the test that allows to estimate if addition volume expansion is needed and help to avoid the exertion of regulatory systems in other cases.

0774

IMPROVEMENT INTERVENTIONS TO REDUCE TUBE REMOVALS IN INTENSIVE CARE UNIT: THE F.R.A.T.E.R INTERVENTIONAL STUDY

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INTRODUCTION. Unintended tube removals (UTR) are frequently observed adverse events in ICUs and potentially involving serious complications. We monitored UTR in our ICU for a 2-year period to assess the incidence, the patient conditions at the time of event occurrence to analyze the system factors associated with UTR and to evaluate the effect of targeted interventions.

METHODS. Demographic and clinical information was prospectively collected on all patients admitted in our ICU. Additional information was collected for patients who experienced an UTR. A dedicated staff analyzed the UTR bi-monthly using a system-factor approach to inform the ICU team on the rate and the potential cause of events and to propose, implement and improve care management protocols. A conditional logistic regression stratified on length of stay was used to identify risk factors of tube removals. Segmented linear regression analysis was conducted to test for the effect of the improvement interventions.

RESULTS. From a total of 2007 patients (12256 patient-days), 193 (9.6 %) patients experienced 270 UTR. Patients characteristics, including pain, psychiatric background, or ethylism was mentioned in 181 reports, inappropriate sedation in 55 reports. The team was involved in 118 events (lower surveillance 41, lack of surveillace during handover 40, lack of secure fixation 20). The management was mentioned in 136 adverse events, and for 90 of them the care staff considered there was an important workload at the time of the incident. Clinical or therapeutic consequences were observed in 46 (17%) of the events and concerned 38 (1.8%) of the patients. UTR was more frequent when coma was the cause of admission (OR = 2.4, 95% CI [1.7 – 3.4], P < 0.0001), and for the youngest patients (age less than 60 OR = 1/0.71, 95% CI [0.52 – 0.98], P = 0.04). Entering in the ward after the program start was found as a protective factor for suffering a tube removal (OR 0.82, 95% CI [0.73 – 0.93], P = 0.002). Segmented regression results confirmed a predicted drop of 15.8 percent (95% CI [–25.1; –6.5];p = 0.001) of UTR the weeks after improvement program introduction. The system factor analysis revealed its major implication in the occurrence of UTR.

CONCLUSION. UTR is a frequent complication. A continuous quality improvement program is able to reduce unintended tube removal in ICUs.

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Implementing quality indicators: 0773–0777

0773

NATIONAL IMPLEMENTATION OF THE VENTILATOR BUNDLE IN WALES: EFFECT ON MORTALITY AND LENGTH OF STAY

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INTRODUCTION. The Ventilator Bundle—elevation of the head of the bed, daily sedation vacations, peptic ulcer prophylaxis and DVT prophylaxis—has been promoted by the IHI as "a series of interventions that, when implemented together, will achieve significantly better outcomes than when implemented individually." However, rigorous evidence for the bundle approach is weak. In May 2006, the Welsh Critical Care Improvement Programme (WCCIP) launched implementation of care bundles at the national level. By August 2006, the Ventilator Bundle had not only been introduced in all 14 critical care sites in Wales, but WCCIP-monitored compliance rates indicated national compliance of over 95%. To date, no evaluation of patient outcomes has been attempted. Opportunistically, 13 critical care units from 12 of the 14 sites participate in the Case Mix Programme, the national comparative audit of critical care, enabling a comparison of outcomes before and after implementation and achieving high compliance.

METHODS. Data covering the implementation date were available from 10 of the 13 units. Data were extracted for all admissions, since 2002, who were ventilated during the first 24 h following admission. The effect of implementation of the Ventilator Bundle on hospital mortality (for all ventilated admissions) and on unit length of stay (for unit survivors) was assessed using multilevel models adjusted for time trends, seasonality and predicted risk of death (ICNARC model). Implementation of the Ventilator Bundle was modelled including a lag of two months following implementation, to allow for the observed delay in reaching maximal compliance.

RESULTS. 10,656 admissions were included in the analysis. Units had a median of 51 months data pre-implementation (range 2–54) and 19 months post-implementation (range 11–33). Most units implemented the Ventilator Bundle between March and August 2006, although two units had implemented it previously. Crude hospital mortality for ventilated admissions was 42.0% pre-implementation and 42.8% post-implementation. Mean unit length of stay for survivors was 7.1 days pre-implementation and 6.3 days post-implementation. Implementation of the Ventilator Bundle was not associated with any significant reduction in hospital mortality (odds ratio 0.96, 95% confidence interval 0.81–1.14) or in unit length of stay for survivors (ratio of geometric means 0.98, 0.88–1.10).

CONCLUSION. Despite widespread implementation and high levels of compliance across Wales, no significant impact on patient outcomes was identified. Possible reasons for lack of impact may include: that 1.5 years is too early to detect impact; that compliance does not necessarily equate to delivery of bundle elements (consideration and rejection of an individual element equates to compliance); or that the evidence base for bundles is weak – both for individual elements and collectively. While the failure to identify any demonstrable effect on patient outcomes in our study may disappoint those that support the bundle approach to quality improvement, it should not detract from the importance of following current best practice in the management of these patients.

0775

NORTHERN IRELAND CRITICAL CARE INCIDENT MONITORING STUDY (NICCIMS): DO EFFECTIVE LOCAL POLICIES EXIST TO HELP PREVENT ADVERSE INCIDENTS?

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INTRODUCTION. NICCIMS is a prospective regional audit study designed to analyse occurrence of adverse events in intensive care units (ICUs). An anonymous database has been installed in seven ICUs since September 2007 facilitating central analysis of all reported incidents in N.Ireland. The first NICCIMS report revealed that incidents relating to airway and central venous catheters were the events with highest potential impact as well as marked variability in frequency between the 7 units.

METHODS. Following collation of data related to these events we examined if effective local policies exist. Questionnaires were sent to the lead consultants, lead nurses and educational supervisors in the participating ICUs. The questions were related to the presence or absence of policies, and their content, regarding securing of airway devices and management of central venous catheters. Responses were compared between staff within units to assess agreement.

RESULTS. 100% response rate was achieved. 5 out of 7 units claimed to have a written policy regarding endotracheal tube (ETT) fixation. However there was disagreement as to the existence of a policy between the lead clinicians and lead nurses in 4 out of 5 units. In 5 out of the 7 units, percutaneous tracheostomies are performed in more than 80% of cases, but in 2 units surgical tracheostomies are performed in 70–98%. There appears to be more adverse events reported related to tracheostomies from the latter 2 units. All units claimed to have written policies related to central venous catheters, but in 2 units there was disagreement between staff as to the existence of a policy. 57% respondents stated the policy is only followed 'most of the time'. If staff were aware of a policy they said subclavian was the primary site of choice but staff unaware of a policy said they were using the internal jugular site.

CONCLUSION. A wealth of information regarding adverse events has been collected through NICCIMS. The presence of effective policies is likely to reduce the possibility of an incident as it provides staff with an agreed management approach. However, effective policies do not appear to be present in all ICUs. Discordance between clinicians and nursing staff regarding the existence of policies suggest an ineffective policy as staff are unaware of it, and therefore are highly unlikely to achieve the aim of the policy which may give rise to increased adverse events. There is an opportunity for regional policies to be agreed between units to simplify and unify our approach to enhancing safety.

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0776

AUDIT OF AUDITS: A RETROSPECTIVE REVIEW OF CLINICAL AUDIT IN A TEACHING HOSPITAL INTENSIVE CARE UNIT

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INTRODUCTION. Clincal audit is a core component of clinical governance. The National Institute for Clinical Excellence in the United Kingdom (NICE) has expressed concern that "Clinical audit has a mixed history in the NHS, and for every success story there are just as many projects that have run into the ground without demonstrating any significant contribution to quality of services." To improve this process, the Clinical Governance Support Team of the NHS has designed an Audit Project Assessment Tool (APAT) which assesses individual projects against national guidelines for good clinical audit. A maximum of 25 points are available and audit projects scoring more than 16 are regarded as good projects. This study examined whether the audit programme our institution was effective and associated with improved clinical governance.

METHODS. Presentations from clinical audit meetings from a 24 month period were retrospectively reviewed by two independent investigators and the following questions assessed. (1) How many of the projects were true audits? (2) Were the audit projects prospective or retrospective? (3) How many re-audits had been performed? (4) If re-audit showed improvements in performance? (5) What were the APAT scores of the projects?

RESULTS. Twenty-nine audit projects were presented during this period of which 25 were available for review. Of the projects reviewed, 22/25 (88%) were considered to be true audit projects of which 2/22 (9%) had a research overlap. 22/22 (100%) were retrospective and there were 4 (16%) re-audits during the period of investigation. Of the re-audits, 3 showed an improvement in performance and 1 showed deterioration. The APAT scores ranged from 9/25 to 21/25. Eleven projects (50%) scored greater than the 16 points required to be considered a good audit. It was noted that there was a paucity of multi-disciplinary audit projects in the cohort studied.

CONCLUSION. This study shows that a well-coordinated active audit programme was in place at the above institution. However, objective evidence of clinical governance benefit was lacking and 50% of the audits would have been rejected if the APAT tool had been used prospectively. We believe the results of this study are likely to be similar to other institutions experiences and to improve future performance, we suggest all new projects are prospectively assessed using the APAT tool at outset, and poorly scoring studies rejected. In addition, a database of past and proposed audit projects should be constructed to facilitate re-audit where performance improvement is indicated and to highlight deficits in areas (such as a lack of multidisciplinary audits). Clinical leads need to be identified to provide coherence to the process and to report to unit governance meetings.

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0777

HOW OFTEN TO MEASURE OUTCOME?

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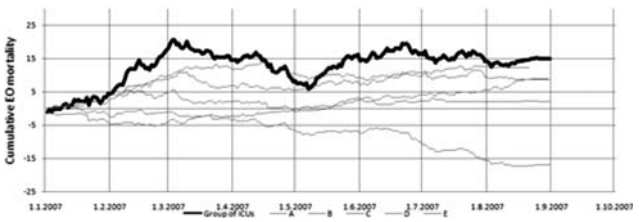
INTRODUCTION. Variable Life Adjusted Display (VLAD) is an easy-to-understand method to monitor outcomes (1) and a powerful tool to show developments in clinical practice (2). It has been seen as a promising tool for real-time outcome monitoring (3). Constant data delivery is a fundamental issue for the VLAD usability within a benchmarking project. A constant reporting cycle helps the units to routinely follow outcomes compared with those of similar units.

METHODS. Intensive Care Units (ICU) in Finland have measured their performance and quality of care since 1994. At present 24 Finnish ICUs compare continuously their performance within the Finnish Intensive Care Quality Consortium (FICQC). Data covering the ICU stay are delivered to the centralized benchmarking database both manually (4 units) and with an interfacing software (20 units), presenting 15 and 85% of IC period records respectively. The hospital discharge data and long-term status data are delivered with an internet application. Primary admissions from 2007 (N = 17,517) were included. Hospital discharge status was selected as a primary outcome parameter.The reconstructed figure (Fig 1) shows the data accumulation at 1st September 2007 and the actual data delivery differences between ICUs.

RESULTS. Sixty four percent (64%) of HDD was recorded within 30 days and 83% within 60 days. Average delay from hospital discharge to hospital discharge data (HDD) recording was 31.2 days (95% CI 30.6–31.8). Delays to register HDD were significantly shorter (24.5 days, SD 32.9) for dead patients than for survivors (32.5 days, SD 39.2). Mean HDD delivery after hospital discharge varied between units from 6.4 (SD 20.4) days to 63.7 days (SD 40.1).



CONCLUSION. Short and known reporting delays from ICU discharge and hospital discharge status recordings shorten the benchmarking reporting cycle and improve the report usability. Faster non-survivor data delivery is due to the data delivery protocol. Local possibilities to organize the data delivery cause variation between the ICUs. The recording delays and the variation between ICUs should be taken into account when benchmarking the ICU performance and outcome.

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INCIDENCE AND DURATION OF PATIENT INSTABILITY ON A STEP-DOWN UNIT BEFORE AND AFTER IMPLEMENTING AN ELECTRONIC INTEGRATED MONITORING SYSTEM–RAPID RESPONSE SYSTEM IMPACT

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INTRODUCTION. Early discharge from Intensive Care Units to Step-Down Units (SDUs) has increased, and patients are at increasing risk of developing instability that can be undetected and under-treated in this lower intensity monitoring environment. Failure to find and treat instability adversely affects outcome. Using an electronic integrated monitoring system (IMS) to continuously integrate individual minimally invasive monitoring parameters into a single index value with central station alarm capability may improve nurses' ability to detect, recognize, and attend to instability. We evaluated the ability of an IMS to improve nurses' ability to both detect cardiorespiratory instability according to Medical Emergency Team (MET) call criteria in patients on a SpO2 and ECG monitored SDU and shorten duration of instability.

METHODS. Prospective, longitudinal study of monitored patients (24 bed trauma SDU) in 3 phases. An IMS (Visensia™) received continuous input from bedside monitors and used 4 vital signs (VS) (HR, RR, BP, SpO2) to develop a single neural networked value, the Visensia Index (VSI). Phase 1 (P1; 8 wks) VSI was not displayed; patients received standard care; VSI and VS trends were background recorded. Phase 2 VSI was displayed on bedside and central station monitors; staff educated on use. Phase 3 (P3; 8 wks) staff used a clinical algorithm for response to alert of VSI $\geq$ 3.2. Detection of VS parameter changes meeting MET trigger values defined instability. P1 to P3 analyses: descriptive, Chi-square and Students t-test.

RESULTS. Admissions (326 in P1; 308 in P3) and continuous monitoring hours (18,258 in P1 and 18,314 in P3) were similar. 74.8% (n = 244) of P1 and 79.5% (n = 245) P3 patients were never unstable. Similar percentages of P1 and P3 patients achieved minimal MET call criteria (METmin) (25.2% P1 and 20.5% P3; p = .306). However, the mean duration of instability per METmin patient decreased from P1 to P3 (113.4 to 61.5 min/METmin patient, p = .046). The percentage of patients who developed serious and persistent instability which should have resulted in MET activation (METfull) decreased (17.8% P1 vs. 5.2% P3; $p < 0.0001$). There were fewer missed events where the MET should have been called as the ratio of patients with METfull who actually had a MET activation fell from 8.3:1 in P1 to only 1.7:1 in P3.

CONCLUSION. IMS improved detection of instability as compared to conventional four channel monitoring in a SDU and decreased both the total number of unstable patients and the instability duration. Use of the IMS also increased the probability that MET activation would be called for serious instability. Further study will determine the relationship between improved detection and treatment approaches for unstable patients.

0779

PATIENTS INFORMATION MANAGEMENT SYSTEMS MAY BRING TO A SIGNIFICANT REDUCTION IN MEDICATION ERRORS

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INTRODUCTION. Adverse events due to medication errors are significant and costly cause of injury during hospitalization. Patient Information Management System (PIMS) in Intensive Care Unit (ICU), although expensive, may contribute to a reduction in medication errors and lead to improvement in clinical practice1, 2. However, there are so far no cost-benefit analysis that can substantiate the need for PIMS in Intensive Care Units. This prospective study was designed to assess if PIMS may be effective in reducing error rate in a polyvalent ICU.

METHODS. In a 10-bed polyvalent ICU located in a 1400 bedded community and teaching hospital a PIMS (Centricity Critical Care Clinisoft; G.E. healthcare) was introduced on June 1st 2005. Before the implementation of the PIMS fluid and medication orders were written by hand by the physicians on a daily medication chart. After the implementation, drug prescriptions were entered via the keyboard. The system was developed to supply pre-defined fluids and medication protocols, as well as default medication dosages and drug interaction warnings.To compare the frequency of medication errors before and after the implementation of the PIMS, data of two periods of 15 days each (30 to 15 days before and 60 to 75 days after) were prospectively collected and analyzed. For each period, 150 patient/days were considered. No one of the staff members, but the ICU director, was made aware of the ongoing study. Patients charts were daily revised between 7.00 and 8.00 AM by two independent physicians, not directly involved in patients care. Fluids and medication orders were revised looking for medication errors. The ICU director was immediately notified about any identified error, to allow immediate correction during the ward round. Errors were classified as Type 1 (clinically relevant and potentially dangerous) or Type 2 (registration errors without clinical relevance).

RESULTS. 2912 medical prescriptions were analyzed: 1408 pre-PIMS and 1504 after PIMS implementation. Results are shown in Table 1. A highly significant ($p < 0.01$) reduction in medication errors (from 3.69% to 0.86%) was observed, mainly related to the Type 1 errors (2,34 vs. 0%)

TABLE 1 MEDICATION ERRORS PRE-PIMS AND AFTER PIMS

	Before PIMS Nr of errors	Before PIMS % of errors	With PIMS Nr of errors	With PIMS % of errors
Medical Prescriptions	1408		1504	
Tipe 1 (potentially harmful)	33	2,34%	0	0%
Type 2 (registration error)	19	1,35%	13	0,86%
Overall medication errors	52	3.69%	13	0,86%

CONCLUSION. the implementation of a PIMS in ICU was followed by a highly significant reduction in medication errors. Although PIMS are expensive, they may lead to a dramatic amelioration in the quality of care. The economic impact of the reduction in medication errors needs to be further investigated.

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0780

ONLINE HELP WITH THE USE OF ULTRASOUND IN ANESTHESIA, INTENSIVE CARE AND EMERGENCY: WWW.ECHOREA.ORG

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INTRODUCTION. While echography has become an essential tool in anesthesiology and intensive care, its learning remains in France dependant of personnal volunteering: degrees, seminars ou rare IMF courses. Learning imaging technicals can easily be made through informatic communication, and it has been shown that elearning allows enrichment (1) and improved quality of teaching (2). In this context, it seemed relevant to create a website about echography in the ICU, accessible 24/24, recalling the fundamentals (main measures, normal and pathological values), illustrated by images and videos. This work reports the initial conditions of use.

METHODS. Echorea.org is a free website, with intuitive ergonomy. It consists of files organized into three categories allowing three possible approaches: by diagnoses, by ultrasound signs, or by clinical signs. Practical clinical cases complement theory. Most assertions are justified by bibliographic references at the bottom of sheet with pubmed link.
The dates, times and origins of visits has been collected day by day by an online software.

RESULTS. Echorea.org is available online since October 2006. Echorea.org now receives an average of 750 visits per month, 24 connections per day. 73% are new visitors and 27% previously known visitors. 7.2 pages are viewed on average per connection. There are 2 attendance peaks in the day: 16–18 and 21–22 h (and 37.5% of the connections at night). The week/weekend ratio is 77%/23%. Visitors come from all over France, university hospitals, general hospitals or otherwise. Foreign visitors (29.1%) come from 48 countries on 5 continents. 61% connect via search engines, 27% directly and 11% through links from referrals.

CONCLUSION. The pace of consultation to echorea.org is continuing but presents 2 particular peaks which appear to correspond to the search for timely information out of senior coaching (afternoon, custody). The number of connections reported to the medical presence is higher at night and on weekends. The chosen support seems therefore to satisfy two conditions:

- A virtual companionship (3) by a modern and easily accessible support dealing with the complexity and magnitude of knowledge to be retained, particularly when people lack accompaniment, especially in custody (37.5% of connections at night and 23% at WE). Thus, 27% of visitors have already visited at least once.
- Ease of access to dense but illustrated information. Internet allows a wide, fast and free diffusion (1), maintaining a rate of newcomers to the site of 73%. Connections was initiated by the hospital, the faculty, and the home. Echorea.org is visited throughout France but also abroad. The translation into English is one of the main projects in the short term.

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0781

USE OF MAXIMAL END-TIDAL CO2 VALUES TO IMPROVE ITS MONITORING ACCURACY

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INTRODUCTION. PaCO2 is often grossly estimated from end tidal CO2 (EtCO2), which substantially underestimate its value. EvitaXL (Dräger Medical) proposes a continuous monitoring of expired CO2, and this value is used as a safety limit in an automated ventilation system (SmartCare®). Long expirations allow EtCO2 to reach values closer to PaCO2. We wondered whether taking the maximal value instead of the mean EtCO2 value over fixed intervals would result in a more reliable estimate of PaCO2. This study, approved by the Erasme Hospital ethical committee, compared etCO2 values averaged over 2 or 5 min versus the maximal value only and compared to PaCO2 at different times.

METHODS. Breath by breath EtCO2 was continuously recorded during SmartCare (SC) sessions in 34 mechanically ventilated patients (median duration 70 min, interquartiles: 59–97 min). Data were collected simultaneously from SmartCare recordings on a ventilator (every 2 or 5 min) and stored in a computer through the VentView software (Dräger) to compare maximum and averaged values. PaCO2 was measured from 107 blood samples performed for clinical purposes (3.7 ± 1.1 blood samples per patient) in 29 patients: Mean PaCO2 per pt was 43.3 ± 10.6 mmHg. The maximum EtCO2 were determined over 5 or 10 minutes around the PaCO2 sampling.

RESULTS. We first compared, for 1158 sequences of SC recordings, the mean EtCO2 with the corresponding Max EtCO2; 10 aberrant values needed to be discarded. We then calculated the differences between mean EtCO2 or maximum EtCO2 and PaCO2 over different periods. Comparisons were performed only when mean and/or maximum EtCO2 were available shortly before and after the blood gas sampling.

TABLE 1

EtCO2 difference (mmHg)	Mean ± sd	Median (1st; 3rd quartile)
Mean* EtCO2-Max* EtCO2 (N = 1158)	−3 ± 6	−2 (−4; −1)
Mean* EtCO2-PaCO2 (N = 74)	−11 ± 13	−9 (−13; −6)
Max EtCO2 (5 min)°-PaCO2 (N = 68)	−7 ± 12	−6 (−10; −4)
Max EtCO2 (10 min)°°-PaCO2 (N = 94)	−6 ± 11	−5 (−8; −3)

(*) Over 2 min or 5 min/(°) Max determined within an interval of 2 min 30 before to 2 min 30 after gas measurement/(°°) Max determined within an interval of 5 min before to 5 min after gas measurement

CONCLUSION. Use of maximal EtCO2 over 5 or 10 min can reduce the difference between EtCO2 and PaCO2. Few aberrant values (0.9%) must be discarded.

GRANT ACKNOWLEDGEMENT. Dräger Medical (Lübeck, Germany).

0782

COMPARISON OF CARDIAC OUTPUT (CO) AND BLOOD VOLUME MEASUREMENTS BY ULTRASOUND DILUTION AND TRANSPULMONARY THERMODILUTION METHODS

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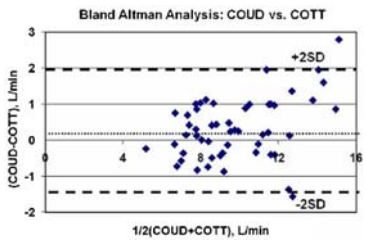
INTRODUCTION. Recently a new ultrasound dilution (UD) method was introduced that uses insitu arterial and venous catheters to measure COUD and Central Blood Volume (CBV). The method is based on measurement of decrease in blood ultrasound velocity caused by injecting isotonic saline. The purpose of the study was to compare UD measurements with transpulmonary thermodilution (TT) measurements (COTT & Intrathorathic Blood Volume ITBV, parameter analogous to CBV).

METHODS. Eight adult patients (age 34–64) with hematological malignancies were included in the study. Indications for invasive monitoring were: sepsis and acute lung injury (3); ARDS (1); septic shock (2); acute congestive heart failure (1); intracranial hemorrhage (1). For TT measurements 3 injections of 20 ml cold 5% dextrose were performed into 5Fr PiCCO femoral arterial catheter. For UD measurements, an extracorporeal AV loop was connected between insitu A-V catheters. Reusable UD sensors were clamped on the arterial and venous limbs of the loop. Pump circulated blood from the artery to the vein at 8–12 ml/min for 5–7 min. Three UD readings (COstatus, Transonic Systems Inc., USA) were obtained by injecting 20–30 ml of body temperature isotonic saline. At the end of the session, the system was flushed with heparinized saline until the next measurement session.

RESULTS. 51 pairs of averaged data were obtained for comparison. For CO, correlation was R = 0.94; COUD = 1.07*COTT–0.40 L/min; bias was 0.32 L/min and the error (2SD/Mean of TT) was 18%. For volumes, correlation was R = 0.90; CBV = 0.76*ITBV + 80 ml; bias was 401 ml (CBV < ITBV) and the error was 21%. Loss of thermal indicator could possibly lead to overestimation of ITBV. The % error for both CO and volumes is considered clinically acceptable (< 30%).



CONCLUSION. First clinical comparison of UD vs. TT produced close agreement in adult hematology patients. New UD method works off existing catheters; is quick to set up and involves no blood loss.

Oral Presentations
Physiotherapy: Respiration and locomotion: 0783–0786

0783

ELECTRICAL MUSCLE STIMULATION: A TOOL TO PREVENT CRITICAL ILLNESS POLYNEUROMYOPATHY? PROSPECTIVE RANDOMIZED STUDY

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INTRODUCTION. Critically ill patients are characterized by increased loss of muscle mass, partially attributed to sepsis and multiple organ failure, as well as immobilization, which may lead to the presentation to critical illness polyneuromyopathy (CIPNM).Recent studies have shown that electrical muscle stimulation (EMS) may be an alternative to active exercise in COPD and CHF patients.Our aim was to investigate the EMS effect on muscle mass preservation of critically ill patients with the use of ultrasonography (US).

METHODS. In this prospective study 29 critically ill patients (age:56 ± 21 yr) (APACHE score:20 ± 5) (SOFA score:9 ± 3) were randomized after stratification upon admission to receive EMS sessions (45-min/5 days per week) of vastus lateralis, vastus medialis and peroneus longus muscles of both lower extremities (EMS–group) or to the control group (non-EMS).Nineteen patients were finally evaluated, 8 patients in the non-EMS and 11 patients in the EMS group.Muscle mass was evaluated with US, by measuring the Cross Sectional Diameter (CSD) of the quadriceps muscle (rectus femoris-vastus intermedius).US images were obtained using a GE Vivid 7 model ultrasound scanner with a 7.5 MHz linear probe.The position of the probe was selected at the midway between the anterior superior iliac spine and the midpoint of the patella and was placed ventral to the transverse plane and perpendicular to the skin.The measurements were performed on the 2nd and 7th day fo11owing admission.The MRC scale for the clinical evaluation of muscle strength was used for the diagnosis of CIPNM (cut off <48/60).

RESULTS. Rectus femoris CSD decreased significantly in the non-EMS group (from 1.48 ± 0.42 to 1.24 ± 0.35 cm, $p < 0.05$).In the EMS group the CSD of rectus femoris decreased although not significantly (from 1.37 ± 0.43 to 1.33 ± 0.40 cm, $p > 0.05$), however there was a significant between-group difference in the CSD decrease (EMS group: 0.04 ± 0.19 cm vs. non-EMS: 0.23 ± 0.11, $p < 0.05$).Vastus intermedius CSD decreased in both groups, however the decrease was not significant in the EMS-group (EMS group: from 0.75 ± 0.35 to 0.73 ± 0.34 cm, non-EMS: from 1.39 ± 0.63 to 1.05 ± 0.48 cm).There was a significant difference ($p < 0.05$) in the vastus intermedius CSD between EMS-group (−0.26 ± 0.19 cm) and non-EMS (0.34 ± 0.20 cm). In the non-EMS group 25% of the patients were diagnosed with CIPNM as compared to none in the EMS-group.

CONCLUSION. This is the first prospective randomized study for the evaluation of EMS for the preservation of muscle mass in critically ill patients and for the prevention of CIPNM. These preliminary data imply that EMS may preserve the muscle mass of critically ill patients and could have a decisive role for the prevention of CIPNM

GRANT ACKNOWLEDGEMENT. This research project (PENED) is co-financed by E.U.-European Social Fund and the Greek Ministry of Development (GSRT).

0784

ATELECTASIS AND PNEUMONIA IN TWO REGIMEN PHYSICAL THERAPY TREATMENT. FUNCTIONAL APPROACH

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INTRODUCTION. There is a need to determine the modification of the function as an indicator of the use of respiratory physiotherapy. The Method Functional Approach suggests that the action of the physiotherapist is based on the prioritization of signs and symptoms as functional markers in the interpretation of functionality.

Objective: To determine the incidence of pneumonia and atelectasis in two groups of patients in the postoperative care of cardiac surgery undergone.

METHODS. Prospective,randomized,controlled and blinded. The study was conducted at the Unit for Post-Operatório of Heart Surgery (UPC), Hospital Portuguese - Salvador/BA. 150 included in the study, patients must be 18 years old, that had hemodynamic stability. All patients were evaluated by physical therapists trained in both the pre about in the postoperative. After randomization, patients in Group I (control) were treated with NCPAP 20 cm/H2O, 30 min of 4/4 h until the time of discharge from the UPC, the patients in group II (experimental) were treated in accordance with the routine of Physical Therapy, Method Functional Approach.

RESULTS. The length of stay in UPC, 73.52 ± 36.33 h (about three days). There was no statistically significant difference between the groups studied. 9.8% had a diagnosis of atelectasis and 5.0% were diagnosed with pneumonia and was hired in group I, 12.7% had a diagnosis of atelectasis and 5.7% were diagnosed with pneumonia and were in Group II, there was no statistically significant difference between groups. Patients in group II, 64.7% of the interventions made was kinesiotherapy, appear drills active and walking, there was a relatively low frequency with regard to the need for interventions linked to respiratory.

CONCLUSION. The Method Functional Approach had the same efficiency as compared to prophylactic application of CPAP in preventing atelectasis and pneumonia in patients in the postoperative period of cardiac surgery. Considering the risk and cost benefit Functional Aproach obtained greater efficiency.

0785

IS THRESHOLD USEFUL IN ACCELERATING WEANING FROM MECHANICAL VENTILATION?

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INTRODUCTION. Threshold can be used as a physiotherapic tool in order to increase muscle strenght. This effect can be useful in weaning patients. However there are still controversies considering its advantages during weaning from mechanical ventilation (MV). This study aims to evaluate the effects of the threshold in such situation.

METHODS. Patients under MV for more than 48 h and prone to weaning were randomly assigned to control or to the threshold group (trained twice daily). They were followed until extubation, tracheotomy or death. All cardiorrespiratory variables, maximal inspiratory and expiratory pressures (MIP and MEP), length of weaning and success or failure were registered. Statistical analysis was performed using ANOVA, Mann-Whitney U test and Chi-Square test, where appropriate. It was considered a significant level of 0.05.

RESULTS. Eighty-six patients were studied (52% men, mean age 63 ± 17 years, 48% with chronic obstructive pulmonary disease). No differences were observed when comparing initial versus final cardiorrespiratory variables in both groups, with exception of the MIP (varied from −33,72 ± 13,5 cmH2O to −40,81 ± 12,67 cmH2O in the threshold group and from −37,67 ± 10,49 cmH2O to −34,19 ± 10,85 cmH2O in the control group, $p < 0{,}001$), MEP (varied from 25,47 ± 12,48 cmH2O to 29,65 ± 12,02 cmH2O in the threshold group and from 29,65 ± 11,97 cmH2O to 26,86 ± 11,6 cmH2O in the control group, $p < 0{,}05$) and tidal volume (varied from 386,16 ± 236,56 ml to 436,16 ± 228,39 ml in the threshold group and from 361,91 ± 168,81 ml to 357,14 ± 121,35 ml in the control group, $p < 0{,}05$). No differences were observed in length of weaning (1,36 days with threshold group versus 1,98 days in control group, $p > 0{,}05$) and weaning success (83,7% with threshold group versus 76,7% in control group, $p > 0{,}05$).

CONCLUSION. Threshold during weaning from MV can cause an increase in MIP, MEP and tidal volume. However, in this group of patients it was not associated with a decrease in length of weaning or an increase in weaning success.

GRANT ACKNOWLEDGEMENT. FIPE.

0786

THE EFFECT OF A STRUCTURED REHABILITATION PROGRAMME FOR PATIENTS ADMITTED TO CRITICAL CARE

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INTRODUCTION. The negative effects of mechanical ventilation and the associated bed rest are well documented (1). To counteract these effects there has been an increasing move towards early rehabilitation on Intensive Care units (ICU), with some evidence suggesting shortened lengths of stay (LOS) in response to these interventions (2). Following an earlier study at Manchester Royal Infirmary, which highlighted a significant reduction in LOS in response to early rehabilitation (3), a structured rehabilitation programme was implemented with the aim of decreasing overall length of stay and subsequently improve outcomes such as overall mortality. This study aimed to determine the effect of the introduction of a structured rehabilitation programme for patients admitted to critical care.

METHODS. The structured rehabilitation programme was implemented at the beginning of 2004. Physical function is improved by each patient having an individualised programme that starts in ICU as soon as the patient is conscious and is adjusted accordingly throughout the remainder of his or her hospital stay. Primary outcome measures used were mean ICU and post ICU LOS, with secondary measures of mortality. Baseline data was obtained retrospectively, with annual figures presented for the three years following the introduction of the rehabilitation programme. Data were analysed using students t-test.

RESULTS. In the year prior to the introduction of the structured rehabilitation programme the mean LOS on ICU was 9.8 days. Initially on introduction although a mean reduction of 0.9 days was observed this was not statistically significant. However in the following two years a significant reduction in LOS was then observed, with mean LOS falling to 8 days in 2005 ($p < 0.05$) and 7.7 days by 2006 ($p < 0.01$). Overall mortality also significantly fell from 45% in 2003 to 35% in 2006 ($P < 0.01$).

TABLE 1

	Mean ICU LOS (days)	Mean Ppost ICU LOS (days)	ICU mortality (%)	Post ICU in-pt mortality (%)	Total mortality (%)
2003	9.8	34	25	20	45
2004	8.9	40.6	25	15	40
2005	8.0	34.7	22	14	36
2006	7.7	27.8	19	16	35

CONCLUSION. Structured programmes of rehabilitation can significantly decrease length of stay on ICU, with resulting reductions in overall mortality for patients admitted to critical care. However, It is acknowledged that numerous variables need to be considered when interpreting these results.

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Poster Sessions
SIRS, MODS and shock: 0787–0800

0787

THE EFFECTS OF HYPOXIC HYPOXIA AND SYSTEMIC HYPOPERFUSION ON EX VIVO JEJUNUM MOTILITY

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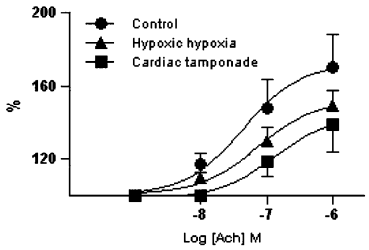
INTRODUCTION. Critical tissue oxygen availability may affect jejunal motility, and this can further be modified by nitric oxide. We studied ex vivo jejunum motility after exposure to two different conditions of low oxygen availability: hypoxic hypoxia and cardiac tamponade. We hypothesized that cardiac tamponade and hypoxic hypoxia decrease jejunal motility.

METHODS. 24 anesthetized and mechanically ventilated pigs were randomized to cardiac tamponade (CT, n = 8), hypoxia (HH, n = 8) or control (C, n = 8). In CT, cardiac output was reduced in 6-h steps to reach 50, 40 and 30 ml kg^{-1} min^{-1}. In HH, FiO2 was reduced in 6 hrs to reach a PaO2 of 50–60 mmHg and then at 12 h to < 50 mmHg. The lowest levels were maintained until 24 h or until death occurred. Cardiac output was measured by thermodilution and regional blood flows by Doppler ultrasound. At the end of the animal experiment, jejunal samples were analyzed by the tissue bath method. Acetylcholine (1–100 μM) and sodium nitroprusside (SNP, from 1 to 100 μM) effects were tested by constructing dose response curves. Maximum force and maximum relaxation values were calculated. Vascular reactivity data from the same animals are presented in another abstract.



RESULTS. Cardiac output decreased in CT from 77 ± 14 to 44 ± 12 ml/kg/min, increased in HH from 75 ± 15 to 113 ± 26 ml/kg/min, and did not change in controls (time-group interaction; p = 0.001 [ANOVA for repeated measurements]). Superior mesenteric artery blood flow decreased by 30 ± 5% in CT, and increased by 2 ± 17% in HH and 22 ± 15% in controls (p = 0.04). Acetylcholine dose response is presented in figure 1. Maximal acetylcholine responses were 119 (105–137)%, 160 (137–165)%, and 142 (124–181)% in CT, HH and C, respectively (p = 0.06). There were no differences in sodium nitroprusside-induced relaxation between the groups.

CONCLUSION. Jejunum motility is preserved after exposure to CT and HH. Ex vivo jejunal motility is not related to tissue oxygen delivery within the range of this experiment. The role of regional mediators should be addressed in further, larger series.

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0788

THE INFLAMMATORY RESPONSE TO ACUTE RENAL FAILURE

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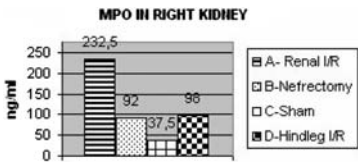
INTRODUCTION. Acute renal failure (ARF) is a common complication seen in 10–23% of patients admitted to the intensive care unit. When occurring, ARF leads to an increased mortality rate. The primary causes of death in this group of patients are extra renal, including infection, shock, sepsis, and respiratory failure. Post mortem examinations in these patients reveal cellular infiltration of lungs and kidneys. It is possible that ARF elicits an extra renal inflammatory reaction responsible for the increased mortality. We therefore investigated the effect on the immune system of renal ischemia/reperfusion (I/R) compared with I/R of the hind legs in mice.

METHODS. 80 mice in 4 groups A, B, C, D. A were subjected to I/R of the kidneys. B had unilateral nefrectomy. C were only anaesthetized. D had I/R to the hind legs. In each group, 2 and 24 h following the primary intervention, 10 mice were sacrificed and humoral inflammatory markers, lung and kidney tissue was obtained. The measured parameters included the adhesion molecule of CD11b, TNF-alfa, and MHCII on monocytes. In lungs and kidneys, TNF-alfa and myeloperoxidase (MPO) was measured.

RESULTS. In all the I/R groups we observed an up-regulation of CD11b and a down-regulation of MHC II. As illustrated in the figure, a pronounced increase in MPO was observed in the kidneys following I/R of the kidneys as compared to I/R of the extremities. In contrast the concentration of MPO in the lungs was more pronounced in the group exposed to I/R of the extremities.



CONCLUSION. Reperfusion following ischemic injury results in increased levels of inflammatory markers. Upon I/R of the hind legs, the inflammatory response in the lungs was more pronounced than following induction of I/R in the kidneys.

GRANT ACKNOWLEDGEMENT. Danielsens foundation.

0789

DIFFERENT CONTRIBUTION OF SPLANCHNIC ORGANS TO INCREASING SYSTEMIC LACTATE FLUX IN INFLAMMATORY VS. LOW PERFUSION STATE

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INTRODUCTION. While increased arterial lactate concentrations in sepsis have been attributed both to inadequate tissue oxygen delivery and impairment of oxygen extraction capabilities, they are the consequence of decreased hepato-splanchnic perfusion when cardiac output is low. We hypothesized that tissue oxygen delivery is adequate in sepsis, and therefore, the contribution of hepato-splanchnic lactate exchange to systemic lactate flux is not increased.

METHODS. 24 anesthetized pigs were randomized to fecal peritonitis (P), cardiac tamponade (CT), or to serve as controls (n = 8 per group). Systemic (thermodilution) and regional (ultrasound transit time) flows and lactate concentrations were measured and oxygen transport and lactate exchange were calculated over 24 h.

RESULTS. Cardiac output increased in P (116 ± 37% of baseline) and decreased in CT (59 ± 18% of baseline), hepatic arterial blood flow increased in P and remained unchanged in CT, and portal flow decreased in CT and remained unchanged in P (time-group interaction: all p < 0.03). In CT but not in P, hepatic oxygen consumption decreased (60 ± 38% of baseline and 101 ± 44% of baseline, respectively; p: 0.049). Lactate data are shown in the table.

TABLE 1

	Arterial Lactate*		Hepatic vein lactate*		SLF (% from baseline)*	HLE/SLF (%)*	
	Baseline	End	Baseline	End	End	Baseline	End
C	0.6 ± 0.2	1 ± 0.2	0.3 ± 0.1	0.4 ± 0.2	141 ± 54	16 ± 8	16 ± 6
P	0.6 ± 0.2	2 ± 0.6	0.4 ± 0.1	1 ± 1	295 ± 117	18 ± 8	12 ± 7
CT	0.6 ± 0.2	4 ± 2	0.3 ± 0.1	5 ± 2	486 ± 239	14 ± 4	32 ± 8

**ANOVA repeated measurements, time-group interaction: p < 0.01.Units: lactate, mmol/L*

CONCLUSION. Increasing systemic lactate flux in peritonitis is a consequence of an early increase in regional, extra-splanchnic lactate production without signs of tissue hypoxia but with a failure to increase hepatic lactate extraction. In cardiac tamponade, regional, extra-splanchnic lactate production is accompanied by hepatic tissue hypoxia and net hepatic lactate production.

GRANT ACKNOWLEDGEMENT. Supported by grant 3200BO/102268 from the Swiss National Fund.

0790

EFFECTS OF ACUTE REDUCTION OF CARDIAC OUTPUT AND ARTERIAL OXYGEN SATURATION ON RENAL OXYGEN TRANSPORT AND KIDNEY FUNCTION IN ANESTHETIZED PIGS

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INTRODUCTION. Mortality in critically ill patients with acute renal failure (ARF) is unacceptably high. Acute circulatory and respiratory failure at admission to an intensive care unit have been identified as the most important risk factors for the development of ARF. The aim of this study was to assess the effect of acute reduction of either cardiac output or arterial oxygen saturation on renal oxygen transport and kidney function.

METHODS. Prospective, randomized, controlled study in 24 anesthetized, mechanically ventilated pigs (weight: 42 ± 3.2 kg). In cardiac tamponade (CT; n = 8), cardiac output and blood pressure were reduced by filling the pericardial sac with HES 6%. In hypoxic hypoxia (HH; n = 8), FiO2 was reduced. Systemic (thermodilution) and renal (ultrasound Doppler) blood flow were measured at baseline and at 6 and 12 h. 8 animals served as controls. Differences between groups were assessed by repeated measurements ANOVA [RMA], all p-values are time-group [T × G] interaction).

RESULTS. Control animals remained stable. Cardiac index decreased in CT from 72.5 ± 14.2 to 57.3 ± 11.7 mlkg-1 min-1 and increased in HH from 71.5 ± 14.4 to 106.2 ± 27.4 mlkg-1 min-1 (p < 0.001). Arterial blood pressure remained stable in HH, while decreasing in CT from 73.6 ± 12.7 to 58 ± 14.9 mmHg (p < 0.06). In HH, arterial oxygen saturation decreased from 97 ± 0.0 to 68 ± 11 (p < 0.001). Renal blood flow and oxygen delivery decreased in CT from 4.9 ± 0.7 to 3.5 ± 1.0 ml kg^{-1} min^{-1}, and from 0.64 ± 0.15 to 0.43 ± 0.12 ml kg^{-1} min^{-1}, respectively (both p < 0.04). Renal perfusion pressure decreased in CT from 68.29 ± 13.9 to 47.14 ± 15.97 (p < 0.025). In HH, arterial and renal venous oxygen content decreased from 118.5 ± 6.6 to 89.0 ± 17.6 ml/l, and from 82.83 ± 12.4 to 50.9 ± 12 ml/l (both p < 0.05), while renal blood flow and oxygen delivery were maintained. In CT, creatinine clearance and urinary output decreased from 43.65 ± 8.45 to 27.25 ± 12.13 dl/hr (p = 0.09) and from 1.23 ± 0.7 to 0.48 ± 0.3 ml/kg/h (p = 0.08), respectively, and fractional sodium excretion from 2.03 ± 2.12 to 0.41 ± 0.2 (p = 0.035). These variables remained unchanged in HH and in controls.

CONCLUSION. Reduced renal blood flow and blood pressure but not reduced renal oxygen content are associated with ARF. Over the short term, severe arterial hypoxemia (SpO2 ≤ 70%) seems to be well tolerated when systemic hemodynamics are not compromised.

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0791

INTERLEUKIN-8 (IL-8) EVALUATION DURING ACUTE NORMOVOLEMIC HEMODILUTION

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INTRODUCTION. In recent years there has been increasing evidence that resuscitation strategy with different fluids can have divergent impacts on the immune response and cytokines release. This study was undertaken to measure the IL-8 in the serum samples and bronchoalveolar lavage fluid (BALF) during acute normovolemic hemodilution (ANH) performed with hydroxyethyl starch (HES), normal saline solution (NSS) or gelatin (GEL).

METHODS. Twenty eight pigs were anesthetized, instrumented and randomized into four groups: Control, ANH + HES, ANH + NSS and ANH + GEL. Animals in the ANH group were submitted to acute normovolemic hemodilution to a target hematocrit of 15% with volume replacement performed with HES 130/0,4, GEL both at a 1:1 ratio or with NSS at a 3:1 ratio. The withdrawn blood was returned to the animals 120 minutes after the end of hemodilution. Cardiac Index (l/min/m2) was determined at the following time points: before ANH (Baseline), after instrumentation (INST), immediately after ANH (H), 60 minutes after ANH (60H), 120 minutes after ANH (120H), 60 minutes after blood infusion (60BI) and 120 minutes after blood infusion (120BI). The measurement of IL-8 (pg/ml) was performed with blood samples collected at the femoral vein immediately after ANH (H) and in the BALF after the end of the experiment. The cytokine IL-8 quantification was determined by Enzyme Linked Immuno Sorbent Assay (ELISA). One-way Analysis of Variance (ANOVA) was performed to evaluate differences among groups. A p value of 0.05 was considered statistically significant.

RESULTS. Cardiac Index (CI) was significant higher in groups ANH + HES (7.3 ± 1.2; $p < 0.05$) and ANH + GEL (7.7 ± 1.0; $p < 0.01$) when compared to Control (5.6 ± 0.8) immediately after HNA. Sixty minutes after blood infusion, CI differed only in the ANH + GEL (8.3 ± 1.2; $p < 0.01$) when compared to Control (5.6 ± 0.8). When serum IL-8 was analysed, there were no significant differences at time point H. The same was observed with regard to IL-8 in BALF, following the values: Control (88.33 ± 24.51), ANH + HES (124.69 ± 29.47), ANH + NSS (106.87 ± 29.74) or ANH + GEL (126.43 ± 52.65).

CONCLUSION. Fluid replacement immediately after induced ANH increased cardiac index and inflammation expressed by Interleukin-8 release without significant differences among them.

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0792

EFFECT OF HIGH VOLUME CVVH ON GENE EXPRESSION

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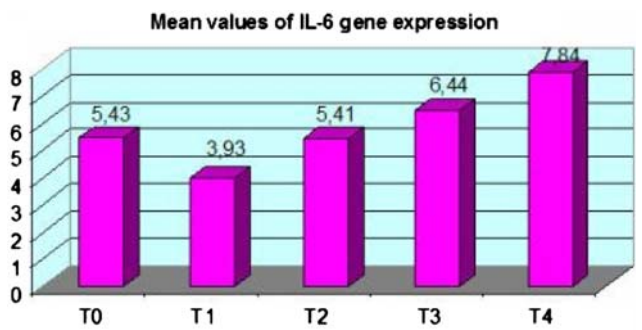
INTRODUCTION. Sepsis is a major clinical problems in ICU. Many critically ill patients with severe sepsis develop ARF (acute renal failure) as a part of multiple organ failure (MOF). Sepsis is characterised by an uncontrolled immune response with release of pro-inflammatory and anti- inflammatory cytokines, such as Il-6, TNF-\alpha, Il-10. A potential application of high volume continuous veno-venous haemofiltration is the extracorporeal removal of inflammatory mediators in septic patients, which can lead to an immunomodulatory effect. Aim of our study is to investigate the effect of high volume continuous haemofiltration on the transcriptional activity of mononuclear cells (PBMC).

METHODS. We enrolled 10 medical and surgical patients from our ICU suffering severe sepsis or septic shock. High flux CVVH was carried out and blood samples were obtained before the beginning of CVVH (T0), after 12 h (T1) and daily (T2-T4). Primary outcome measure was trend of IL-6 gene expression in our patients during CVVH.

RESULTS. Figure 1 shows trend of IL-6 gene expression. We observed Il-6 mRNA drop after 12 h of treatment (T1), then a progressive increase at 24, 48, 72 h.



CONCLUSION. Our data show an improvement of transcriptional activity of PBMCs in septic patients treated with high flux CVVH. These data could represent an expression of attenuation of sepsis-related immunoparalysis.

0793

EVALUATION OF ENTERIC DYSFUNCTION IN CRITICALLY ILL PATIENTS WITH MULTIORGAN DYSFUNCTION IN A MEDICAL AND SURGICAL ICU SETTING

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INTRODUCTION. Multiple organ dysfunction syndrome (MODS) is the leading cause of death in intensive care units (ICU). Little attention has been given to the status of gastrointestinal tract despite gut dysfunction occurs frequently among critically ill patients (CIP).The gut has often been suggested to be one of the essential factors in the pathogenesis of MODS and, CIP are susceptible to injury of the gastrointestinal tract. The aim of this study is to identify enteric dysfunction (ED) at admission and discharge, its association to other organ dysfunctions (OD), according to OD is acute or chronic, primary or secondary, its evolution to organ failure (OF) or not, and its relations to severity and outcome.

METHODS. Setting: Medical/Surgical ICU belonging to a 350 acute care teaching hospital. Study: Data of 603 CIP admitted consecutively to the ICU were collected prospective and descriptively from September'03 to July'04. SOFA has been used to identify OD and OF. To define ED the following diseases have been considered: diet intolerance > 3 days & ileus, stress ulcus, acute pancreatitis, non lithiasis cholecystitis, and peritonitis. Acidosis by itself is not considered as dysfunction. Chronic health and SOFA have been used to establishing when OD was previous.

RESULTS. 100 patients presented ED, prevalence 16.5%. Mean age: 71.1 years. Gender: men 62%. Length of stay: 7.7 days. Mortality: Global: 20%. SOFA: 13. Surgical CIP mortality: 45% (9), Medical CIP mortality: 55% (11). Case-mix: Medical CIP: 32%, Surgical CIP: 68%, Elective Surgery: 61%, Urgent Surgery 38%, Sepsis: 22%, Tumor: 38%, Invasive ventilated CIP: 48%. At admission: 86 CP with ED: 9 only 1 OD; 89,5%(77) with MOD: 25 (29%) with 2 OD, 22 (25.5%) with 3 OD, 20 (23.2%) with 4 OD, 8 (9.3%) with 5 OD and 1 with 6 OD and 7 OD. Mean SOFA:3.74. Type of OD (acute/chronic): Cardiovascular: 35 (21/ 14); Respiratory: 53 (49/5); Renal: 34 (26/8); Enteric: 86 (60/26); Hepatic: 19 (14/5), Haematologic: 25 (17/8), Neurologic: 6 (2/4). Acidosis: 30.23%. At discharge (OD developed during ICU stay): 14 CIP with ED, all with MOD: 3OD: 21.4%, 4OD 28.5%, 5OD 21.4%, 6OD 21.4% and 1 with 7 OD. Evolution to OF (total and OF): Cardiovascular: 11/7, Respiratory: 13/6, Renal: 11/4, Enteric: 14/5, Hepatic: 7/3, Haematologic: 6/3, Neurologic: 3/ 2. Primary dysfunction was identified in 66 CIP: Cardiovascular: 8 (12.2%), Respiratory: 10 (15.5%), Enteric: 37 (56.1%), Hepatic 8 (12.1), Renal 2 (3.1%), Haematologic 0, Neurologic 1 (1.5%).

CONCLUSION. Prevalence of ED is considerable. Its influence in overcome and severity is important. ED is the most prevalent primary OD. The majority of CP with ED presented MODS. Cardiovascular, respiratory and renal OD were mostly associated to ED. The association of ED to sepsis, tumor, metabolic acidosis and invasive ventilation is clinically relevant.

0794

ADRENAL INSUFFICIENCY AND ITS PROGNOSIS OF SEPTIC SHOCK PATIENTS IN INTENSIVE CARE UNIT

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INTRODUCTION. The objective of this study was to evaluate efficacy of corticosteroid therapy in a broad population of patients with septic shock not only who had relative adrenal insufficiency (RAI) but also who did not have RAI according to the results of high or low dose corticotropin stimulation tests.

METHODS. A retrospective study was conducted in an intensive care unit of Severance hospital, Seoul, South Korea, between June 2005 and December 2007. The study included 132 critically ill patients who underwent a short corticotropin test because of prolonged septic shock.

RESULTS. Among 132 patients, 79 patients were given high dose corticotropin (250ug) test and 53 patients were given low dose (1ug) corticotropin test. Among 79 patients, 36(45.6%) patients (22 in corticosteroid group and 14 in conservative group) showed and 43(54.4%) patients (12 in corticosteroid group and 31 in conservative group) did not show RAI. On the other hand, among 53 patients, 29(54.7%) patients (20 in corticosteroid group and 9 in conservative group) showed and 24(45.3%) patients (8 in corticosteroid group and 16 in conservative group) did not show RAI. At 28 days, in high dose corticotropin stimulation test group, there was no significant difference in mortality between corticosteroid group and conservative group within the patients with RAI (36.4% vs. 28.6%; $P = 0.74$) and patients without RAI (8.3% vs. 29.0%; $P = 0.18$) There was also no significant difference in mortality between corticosteroid group and conservative group within the patients with RAI (30% vs. 11.1%; $P = 0.42$) and patients without RAI (25% vs. 31.2%; $P = 0.66$) in low dose corticotropin stimulation test group.

TABLE 1

	Steroid 36	Conservative 43	*P* value
High dose corticotropin stimulation test			
Overall	9/34(26.5%)	13/45(29.9%)	0.83
Relative adrenal insufficiency (+)	8/22(36.4%)	4/14(28.6%)	0.74
Relative adrenal insufficiency (−)	1/12(8.3%)	9/31(29.0%)	0.18
N	Steroid 28	Conservative 25	*P* value
Low dose corticotropin stimulation test			
Overall	8/28(28.6%)	6/25(24%)	0.67
Relative adrenal insufficiency (+)	6/20(30%)	1/9(11.1%)	0.42
Relative adrenal insufficiency (−)	2/8(25%)	5/16(31.2%)	0.66

CONCLUSION. Corticosteroid did not improve survival of septic shock patients regardless of RAI. Moreover, whether low or high dose of corticotropin stimulation test was applied did not show any difference in survival. Therefore, short corticotropin stimulation test would not be helpful in identifying which patients to be given corticosteroid.

0795

ADRENAL RESPONSE IN PATIENTS WITH SEPTIC SHOCK TREATED WITH STERIODS: RELATHIONSIP WITH MORTALITY

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INTRODUCTION. The hypotalamic-pituitary-adrenal axis is a major determinant of the host's response to stress and its dysfunction can be present in septic shock. Adrenal dysfunction has been associated to higher mortality (1). However, the evaluation of the adrenal response is difficult (2) and substitutive use of low dose of steriods in septic shock is controversial (3). The objective of the study is to evaluate the prognostic value of the adrenal response to corticotropin in patients with septic shock treated with hydrocortisone.

METHODS. Prospective, observational study in a medical-surgical ICU. All adult patients admitted in the ICU last year with septic shock were consecutively included, except those already treated with steriods. Epidemiologic and treatment data using sepsis bundles were collected. Cortisol level at To, the response to the corticotropin test (250 micrograms) and the initial lactate were measured during the first 24 h. All patients received hydrocortisone 300 mg/day until the result of the corticotropin test and it was suspended when delta cortisol was greater or equal to 9 mcg/dl. The prognostic value of the adrenal response to corticotropin was studied comparing data between survivors and non survivors by Student's *t* test for continous variables and X^2 or Fisher exact test for categorical variables. ROC curve and Youden's index were used to select the cortisol level at To that better discriminated mortality.

RESULTS. 83 patients with septic shock were included (age 65 ± 16 years, APACHE II 19 ± 9, hospital mortality 30%). Patients that did not survive to septic shock were mainly men with abdominal sepsis, had higher lactate (54.8 ± 51.2 vs. 40.3 ± 26.3 mg/dl; $p = 0.165$) and were less compliant with the resuscitation bundle (0 vs. 11.3%; $p = 0.082$). Nonsurvivors had stastistically higher cortisol at To (44.5 ± 18.3 mcg/dl vs. 36.5 ± 17.2 mcg/dl; $p = 0.049$) and a tendency to lower response to the corticotropine test (23.8 vs. 41.9%; $p = 0.158$). Cortisol at To greater than 28 mcg/dl was the level that best discriminates mortality (sensibility 80% and specificity 42%). The subgroup of patients with cortisol at To greater than 28 mcg/dl and nonresponse to the corticotropin test had higher mortality than the rest (46.5 vs. 21.6%; $p = 0.02$).

CONCLUSION. The evaluation of the adrenal response to corticotropin is useful to discriminate patients with septic shock and a higher mortality risk, even if they are treated with hydrocortisone.

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0796

SYSTEMIC INFLAMMATORY RESPONSE IS ASSOCIATED WITH INCREASED RISK TO DEVELOP VENTILATOR-ASSOCIATED PNEUMONIA (VAP)

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INTRODUCTION. Inflammatory markers have been used in the diagnosis and follow-up of VAP, but their potential role in predicting the risk to develop VAP is unknown. This capacity has been proved in the case of community-acquired pneumonia. We prospectively assessed the evolution of inflammatory markers in mechanically-ventilated (MV) patients and their predictive and diagnostic role for VAP.

METHODS. Sequential measurements of C-reactive protein (CRP), procalcitonin (PCT) and cytokines (IL-1, IL-6, IL-8, IL-10 y TNF-alpha) were done in 44 MV patients. Exclusion criteria were active infection at ICU admission and subsequent extrapulmonary infection.

RESULTS. Patients were divided into three categories: patients without VAP suspicion (n 24), patients with clinical suspicion of VAP but without microbiologycal confirmation (n 11) and patients with microbiologically-confirmed VAP (n 9). At admission, demographics, severity scores, and clinical and standard laboratory values were similar in the 3 groups, but serum levels of IL-6 and IL8 were higher in patients with confirmed VAP (526 ± 221 for IL-6 and 68 ± 38 for IL-8 pg/mL) compared with those without suspicion or non-confirmed suspicion of VAP (174 ± 39 and 185 ± 55, respectively for IL-6, $p = 0.041$, and 4 ± 2 and 15 ± 3, respectively for IL-8, $p = 0.022$). At onset of VAP, serum levels of IL-6 (1232 ± 343 pg/mL) and IL-8 (52 ± 11 pg/mL) were also higher in patients with confirmed VAP, compared with those without suspicion or non-confirmed suspicion of VAP (151 ± 44 and 364 ± 147, respectively for IL-6, and 12 ± 2 and 34 ± 4, respectively for IL-8, $p < 0.001$ both). Serum levels of CRP and PCT, as well as CPIS and SOFA Score, were also highest in patients with confirmed VAP. The BAL levels of cytokines were similar between confirmed and non-confirmed VAP.

CONCLUSION. Increased systemic inflammatory response at admission might predispose patients to develop VAP. Serum biomarkers can be helpful in VAP diagnosis.

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0797

EVLWI IN CRITICALLY ILL PATIENTS WITH SIRS/SEPSIS

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INTRODUCTION. PiCCO catheterization has gained widespread use in ICUs worldwide. However there is a relative paucity in underlying evidence for its use and this study aims to investigate EVLW as a prognostic marker and assess its relationship to other clinical and pulmonary parameters.

METHODS. A prospective observational one-centre cohort-study in a mixed-bed ICU of a university hospital. 38 consecutive patients with SIRS and circulatory failure. Outcome parameters were time in ventilator, ICU-length of stay, ICU-mortality and 6 month-mortality. The clinical parameters investigated were PF-ratio, PEEP, APACHE- and SOFA-score. CI, ITBVI and P-lactate were also analysed.

RESULTS. There were no differences between survivors and non-survivors in EVLWIbaseline and EVLWImax. EVLWI did not correlate significantly to the clinical parameters. When divided into subgroups according to EVLWImax, a low and a very high EVLWImax were associated with high mortality, whereas the middle group had a lower mortality. When further analysed, the non-survivors with low EVLWImax were significantly older than the rest of the study material. For patients < 70 yo, EVLW was increased in the non-survivor group. Regardless of age, all patients with EVLW > 20 did not survive.

CONCLUSION. EVLWI can be used as a prognostic marker in younger patients with SIRS/sepsis and values above 20 mL kg-1 indicates a bad prognosis. In patients with advanced age, however, it should be interpreted more carefully.

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0798

TEMPORAL CHANGES OF OXIDATIVE STRESS INDEX AND TOTAL ANTIOXIDANT POTENTIAL OF PLASMA: MARKERS FOR SURGICALY PATIENTS WOUND HEALING

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INTRODUCTION. Hemodynamic management,in surgical patients,is associated sometimes,to progressively decreasing of Hb oxygen saturation(SaO2Hb),because of the stagnant ischemia (surgical stress),or hemodylution,following the hyper volemic repletion[2].Our study intended to observe the local O2 metabolism alteration[5],as a source for oxidative stress(OxS)production,and to verify the effects of antioxidant therapy.The study was approved by the Ethical Committee of UMF Craiova

METHODS. a prospective study realized upon 70 patients from Plastic and Reparatory Surgery (Emergency Hospital Craiova) who needed of reparatory interventions to the distal part of the limbs:duration of 4 ± 1 h.Patients were divided into three groups A:good healing of wound (40cases), B:bad or nonhealing (30 cases),and control (10 cases),without surgical interventions.We noted the evolution of the local morpho-clinical aspects induced by the stagnant ischemia,after the cuff inflation at the site of intervention.We prelevated the samples of blood at (T1), preoperative at 48 h postoperative (T2) and to the outcome (T3), to determine the following values: lactate, C-reactive protein (CRP), procalcytonin (PCT), SaO2Hb [3], oxidative stress index (OSI) and total antioxidant potential (TAOP). We have correlated these values to the SOFA and APACHE scores

RESULTS. Statistical analysis(t test and ANOVA)evidentiated that CRP,PCT,correlated to the two scores could be used as predictive indicators for endothelial and blood cells evolution.The seric level of antioxidant potential (TAOP) was:goup A:good healing of surgical wounds 551,7(107,4)and B:nonhealing:502, 3(102,8) µmol Trolox echiv./L ($p < 0.05$).The values of OSI was:3, 43(1,50):group B vs.2,42 (1,30) group A ($p < 0.001$).

CONCLUSION. Tissular exposure to the oxidative status induces a variability of local cellular reactions, representing the kind of their adaptability. To recognize the local mechanism of OxS production could be used to verify the adequate therapy and to predict the quality of wound healing.

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0799

SEPTIC SHOCK AND ACUTE RENAL FAILURE. WHEN SHOULD WE START RENAL DEPURATION?

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INTRODUCTION. Sepsis and specially patients with septic shock, have a high morbi-mortality, because of its quick evolution to multiorgan dysfunction syndrome (MODS). Acute renal failure (ARF) is common and continuous renal replacement therapies (CRRT) play an important role in the clinical management of septic patients.
Nowadays optimal CRRT in criticallly ill patients are directed to achieve depuration doses > 35 ml/kg/h (high volume hemofiltration-HVHF). The timing of these techniques is still controversial but many authors suggest that an early initiation of CRRT in septic patients is related to a better outcome. The objective of our study was to analyze the impact of an early CRRT strategy in patients with septic shock and ARF.

METHODS. We included 32 patients with septic shock and ARF admitted to an intensive care unit (ICU) in a prospective and observational study. CRTT with HVHF was initiated in all patients. Two different groups were studied attending to the time of HVHF initiation (based on RIFLE score). Group I: HVHF initiated in early stages of RIFLE score (Risk and Injury). Group II: HVHF initiated in Failure stage of RIFLE score.

Group I: 9 patients were included (n = 9); mean age 58 ± 16 years, 5 were males, mean APACHEII 24 ± 8. 90% of these patients were on mechanical ventilation (MV) at the beggining of HVHF, 22% had disseminated intravascular coagulation (DIC) and 22% had liver failure. Mean ultrafiltrate dose was 43,5 ± 6 ml/kg/h.

Group II: 23 patients were included (n = 23); mean age 61 ± 13 years, 17 were males, mean APACHE II 29 ± 9. 100% of these patients were on MV, 61% had DIC and 39% liver failure. Mean ultrafiltrate dose was 43,7 ± 6 ml/kg/h.

RESULTS. We did not observe adverse effects related to HVHF.
28 day survival was 89% in group I and 30% in group II with an important statistical significance (p < 0,004).
Days on HVHF were 6 ± 3 days in group I and 7 ± 6 days in group II.

CONCLUSION. Early initiation of HVHF in septic shock patients with ARF seems related to a better survival in our study.
We need further and much larger studies to confirm our results.

0800

SENSIBILITY AND SPECITIVITY OF PROCALCITONIN IN PATIENTS WITH CARDIOGÉNIC SHOCK AND SEPSIS

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INTRODUCTION. Some patients with cardiogenic shock present during their evolution a systemic inflammatory response syndrome (SIRS) that can be interpreted erroneously as septic shock.In this study we attempt to establish the usefulness of procalcitonin in those patients with cardiogenic shock and associated SIRS with suspicion of sepsis.

METHODS. A group of patients with cardiogenic shock and suspicion of sepsis were studied prospectively.We compare patients with cardiogenic shock and proved associated sepsis(G1) with those that they did not develop it(G2).The diagnostic of sepsis was established according sepsis criterions defined by ACCP and by microbiologic results.We analyzed :age,sex,-APACHE II and SAPS index,procalcitonina (PCT)and C-reactivates protein(PCR) levels,leukocyte count,lactate levels,type of shock according to hemodynamic parameters,focus of sepsis, isolated germens, mechanical ventilation days,ICU days and mortality.The Fisher Test and Spearman correlation was used for the study of the variables.A p < 0,05 was considered statistically significant.

RESULTS. A total of 32(100%)patient with cardiogenic shock and suspicion of sepsis were studied,11(34%) had associated sepsis confirmed with positive cultures(G1),while 21 (66%)did not present it(G2).The PCT test was positive for bacterial infection in 91%(10)of G1 while was negative in 95%(20)of G2,only 1 patient on this group has a false positive result(p = 0.006).The final PCT sensibility was 91% with a 95% of specitivity (prevalence 34.4%,PPV 90.9%, NPV 95.2%, LR + :19.08,LR -:0.1).Instead of there no were significant differences with PCR value, serum level of PCR was superior in G1(21 +14.36)compared with G2 (8 + 4.79). Multivariate analyses shown that days in mechanical ventilation, days in ICU and cardiac catheterization are risk factors for develop sepsis. Distributive hemodynamic pattern was frequent in G1 (82 % G1, 24% G2, p = 0.015). There no were differences among others studied variables.

CONCLUSION. In our study sepsis is a frequent complication observed in cardiogenic shock patients and associated SIRS with distributive hemodynamic pattern.The PCT level is a usefulness diagnostic test with high sensibility and specitivity for diagnosis of severe sepsis in this kind of patients.The accomplishment of cardiac catheterization, days in ICU and MV are risk factors for the development of sepsis in this group of patients.

Poster Sessions
Perioperative pain and abdominal problems: 0801–0814

0801

EPIDURAL ANESTHESIA WITH ROPIVACAINE/FENTANYL IN OFF-PUMP CORONARY ARTERY BYPASS GRAFTING

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INTRODUCTION. Off-pump coronary artery bypass grafting (OPCAB) can be accompanied by hemodynamic and respiratory disorders and postoperative pain, requiring adequate monitoring and treatment. Epidural anesthesia (EA) using continuous infusion of local anesthetics combined with fentanyl can provide effective analgesia and reduce the number of perioperative complications in thoracic surgery. However, the role of EA as a component of multimodal patient controlled analgesia (PCA) in OPCAB still remains disputable. Thus, the main goal of our study was to assess the efficacy of high thoracic EA followed by postoperative patient-controlled epidural analgesia with infusion of ropivacaine/fentanyl mixture in OPCAB patients.

METHODS. We enrolled 35 patients, who underwent elective OPCAB during anesthesia with propofol and fentanyl, in an ongoing prospective study. The patients were randomized into three groups with hemodynamics guided by PiCCOplus monitor (Pulsion Medical Systems, Germany) and postoperative pain control aiming at a visual analog scale (VAS) score in rest < 30 mm. All groups received lornoxicame 8 mg IV before OPCAB and every 8 h postoperatively. The control group (n = 11) received fentanyl postoperatively at an initial infusion rate of 0.7 mcg/kg/h IV. The epidural infusion (EI) group (n = 13), after placing the epidural catheter at Th2–Th4 level before OPCAB, received EA with ropivacaine 0.75% 1 mg/kg and fentalyl 100 mcg followed by postoperative continuous EI of ropivacaine 0.2% and fentalyl 2 mcg/ml at an infusion rate of 5–10 ml/h. The epidural infusion/PCA (EI/PCA) group (n = 11) received the same regimen of EA followed by EI combined with PCA using a programmable infusion pump (Graseby 3300, UK) with bolus 1 ml and lock-out interval 12 min. The measurements included hemodynamics, blood gases, VAS, and drug consumption throughout 24 h after OPCAB. Data were assessed using \chi^2 test or ANOVA followed by Scheffe's test or test of contrasts when appropriate. p < 0.05 was regarded as statistically significant.

RESULTS. Demographic data did not differ significantly between the groups, as well as mean VAS scores (within 20 mm in rest and 40 mm in coughing in all groups). The consumption of propofol, fentanyl, and nitroglycerin was significantly lower in both EA groups. The incidence of colloid administration was 86% during EA vs. 36% in the control group (p = 0.04). Mean arterial pressure and extravascular lung water were reduced in the EI and the EI/PCA groups (p < 0.05). In parallel, EA increased the PaO_2/FiO_2 ratio (p < 0.05). The duration of mechanical ventilation tended to decrease in the EI/PCA group (p = 0.1).

CONCLUSION. The perioperative epidural administration of ropivacaine/fentanyl provides adequate analgesia, attenuates arterial hypertension, decreases extravascular lung water, and increases arterial oxygenation thus improving lung function in OPCAB.

0802

SEVOFLURANE SEDATION USING ANESTHETIC CONSERVING DEVICE IN POSTOPERATIVE ABDOMINAL SURGERY PATIENTS IN ICU—COMPARISON TO AN INTRAVENOUS PROPOFOL-BASED REGIMEN

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INTRODUCTION. Since the approval of the Anaesthetic Conserving Device (ACD), the use of volatile anaesthetics in the intensive care unit (ICU) has become a more cost-effective and easy way of sedation than vaporizer techniques (1). Inhalational sedation has been studied with isoflurane (2,3), but sevoflurane has scarcely been evaluated to date (4,5). We studied the efficiency and practicability of a postoperative inhalational sedation with sevoflurane using the ACD compared to propofol in the ICU.

METHODS. After approval from the ethical and governmental committee, 70 patients following major abdominal, vascular or urological surgery were allocated to this prospective, randomized, single-blinded study, to either receive sevoflurane (n = 35) via the ACD (endtidal 0.5–1 Vol%) or intravenous propofol (n = 35) for postoperative sedation up to 24 h. Primary endpoint was extubation time from termination of sedation. Further focus was set on sedation quality using Richmond Agitation Sedation Scale (RASS) and BIS values, recovery times and the consumption of anaesthetics.

RESULTS. Both study groups were similar in terms of demographic and perioperative data. Time of sevoflurane and propofol sedation was similar (mean 10 h). Mean sevoflurane consumption was 3.7 ± 1.1 ml/h to obtain endtidal sevoflurane concentrations of 1.1 ± 0,4Vol%. Mean administration of propofol was 2.5 ± 0.7 mg/kg/h during sedation. Sedation quality including RASS and BIS values were similar in both groups throughout the time of sedation (50–65), and during recovery from sedation to extubation. Mean extubation times were significantly shorter (p < 0.001) with sevoflurane than with propofol (24.7 ± 31.8 min vs. 81.6 ± 45.8 min), as well as eye opening (11.1 ± 18.8 min vs. 32.5 ± 32.4 min) and following commands (10.9 ± 9.4 min vs. 40.6 ± 37.6 min). Ventilator time was significantly shorter (p < 0.01) in the sevoflurane group (10.2 ± 4.5 h vs. 13 ± 5.7 h). Length of ICU and hospital were comparable between the groups.

CONCLUSION. Postoperative sevoflurane sedation using the Anaesthetic Conserving Device appears to be a valid and safe alternative to the commonly used intravenous propofol-based regimen. Sevoflurane provided a comparable sedation quality to propofol at end-tidal concentrations of 1.1 Vol% (0.54 MAC). Patients showed a faster and more predictable return of recovery after sevoflurane, and shorter times of mechanical ventilation.

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0803

HIGHER EFFICACY OF INSULIN ASPART VERSUS HUMAN SOLUBLE INSULIN IN INTRAVENOUS TREATMENT OF HYPERGLYCEMIA

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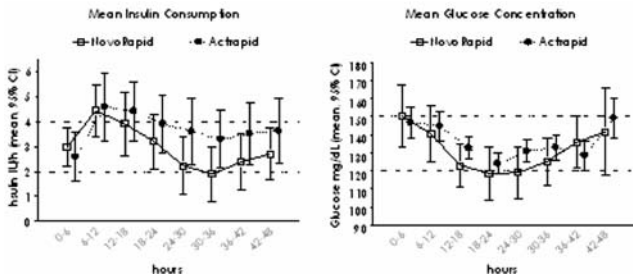
INTRODUCTION. Hyperglycemia typically occurs after major surgery due to alterations in glucose metabolism. Maintenance of normoglycemia prevents morbidity and reduces mortality in the critically ill (1). The objective of this study was to determine whether human soluble insulin (Actrapid®, Novo Nordisk) or insulin analogon insulin aspart (NovoRapid®, Novo Nordisk) allows a better glycemic control.

METHODS. Prospective, randomized double blind study. We included 50 ICU patients after elective cardiac surgery. Actrapid (n = 25) or NovoRapid (n = 25) was given as a continuous infusion according to a protocol. The study ended 48 h after admission. Blood glucose concentrations and insulin consumption were calculated for 8 intervals (6 h each). ANOVA for repeated measurements was performed to compare glucose concentrations and insulin consumption.



RESULTS. No difference was found in glucose concentrations (p = 0,481). A difference was found in the amount of insulin necessary. The patient group administered insulin aspart needed less international units/h (IU/h) of insulin compared to the group administered human soluble insulin (p = 0.032).

CONCLUSION. Our results indicate a higher efficacy of insulin aspart versus human soluble insulin in intravenous treatment of hyperglycemia.

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GRANT ACKNOWLEDGEMENT. Partial educational grant from Novo Nordisk.

0804

EFFECT OF NALOXONE AND REMIFENTANIL ON SMALL BOWEL AND COLONIC MOTILITY IN VITRO

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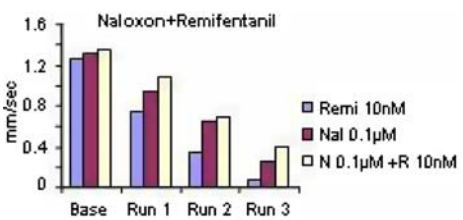
INTRODUCTION. When we use opioid antagonists to restore intestinal motility after opioid treatment we assume a uniform drug effect on small bowel and colonic motility. To exclude possible regional differences experimental studies are necessary. This study uses two different settings to evaluate the effect of naloxone and remifentanil on small bowel as well as colonic motility.

METHODS. Small bowel motility(1): A tissue bath with mounted guinea pig small bowel segments allows the evaluation of the pressure threshold (PT)—the intraluminal pressure necessary to trigger a peristaltic contraction. A drug-induced increased PT reflects inhibition of peristalsis, while a decreased PT reflects stimulation of peristalsis.
Colonic motility(2): A tissue bath with guinea pig colonic segments fixed on a polyacrylic tray allows the evaluation of the transit time (TT)—the time necessary for a wooden pellet to perambulate. A decrease of the TT reflects stimulation, and an increase inhibition of peristalsis.
After stable peristaltic activity in both settings the effect of increasing concentrations of remifentanil and naloxone alone were evaluated. In the second step naloxone and remifentanil were given together. Dose response curves were constructed, two way ANOVA (Sigma Stat) was used for statistics, p values ≤ 0.05 were considered significant.

RESULTS. Remifentanil has a concentration-dependent inhibitory effect on small bowel as well as colonic motility. Naloxone per se does not affect small bowel motility, but the inhibitory effect of remifentanil is antagonized. On colonic motility naloxone has a moderate inhibitory effect and the inhibitory effect of remifentanil is mitigated and not antagonized (figure).



CONCLUSION. This study clearly demonstrates a regional different effect of naloxone alone and in combination with remifentanil on small bowel and colonic motility.

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0805

ABDOMINAL COMPARTMENT SYNDROME. AN UNDERESTIMATE CLINICAL ENTITY

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INTRODUCTION. Multiple organ failure syndrome (MOFS) derived by intra-abdominal hypertension, has been called abdominal compartment syndrome (ACS) the epidemiology and the characteristics of which, have not been thoroughly determined. High degree of suspicion, continuous patient monitoring and bladder pressure measuring are the most helpful tools in making early diagnosis.

METHODS. From 2005 to 2007 in 45 patients (Median age 57,2 years, M/F 24/21) was posed the diagnosis of intra-abdominal hypertension (Median pressure 30 cm H2O). 16 of them were multitrauma patients (7 developed ACS), 9 had abdominal aorta aneurism rupture (4 developed ACS), 13 small bowel ischemical necrosis (3 developed ACS), and 7 acute pancreatitis (2 developed ACS). In 16 (35,6%) of them (Group A) ACS was confirmed (Median pressure 42 cm H2O), while in 29 (64,4%) (Group B) only intra-abdominal hypertension was occurred (Median pressure 30 cm H_2O).

RESULTS. Bladder pressure measurements were obtained at 4 h intervals. In all patients abdominal decompression was performed and a cover bag was placed. In Group A, 9 (56,25%) patients died (3 multitrauma, 2 with ruptured abdominal aorta aneurism, 1 with small bowel ischemical necrosis, and 2 with acute pancreatitis). In Group B, 6 (20,68%) patients died (2 multitrauma, 2 with ruptured abdominal aorta aneurism, 1 with small bowel ischemical necrosis, and 1 with acute pancreatitis) AvsB $p < 0{,}005$ (Chi-square test).

CONCLUSION. Abdominal Compartment Syndrome is occurred more frequently than it has been expected. Mortality is still high, even with continuous patient monitoring, and early abdominal decompression. Further studies regarding physiopathological meccanisms may be determinant in treating this syndrome definitely.

0806

INTRA-ABDOMINAL PRESSURE MONITORING WITH THE FOLEYMANOMETER DOES NOT INCREASE URINARY TRACT INFECTION

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INTRODUCTION. Little is known about the risk for urinary tract infection (UTI) in relation to intravesicular pressure monitoring as estimate for intra-abdominal pressure (IAP) (1). No data with regard to the FoleyManometer has been published so far. The FoleyManometer is a closed sterile system that uses freshly produced urine as IAP transmitting medium compared to other techniques that use saline (2).

METHODS. Retrospective database review of 5890 patients admitted to the 12-bed medical ICU of a tertiary hospital between 1/1/2000 and 31/12/2007. Four time periods with regard to IAP measurements were compared: period 1 (2000–2001) where IAP was measured in 28 patients, period 2 (2002–2003) with 146 patients, period 3 (2004–2005) with 422 patients and finally period 4 (2006–2007) with 501 patients. The following IAP measurement methods were used: a modified Cheatham technique (period 1 and 2), the 1st version FoleyManometer with 35 mL reservoir (period 3), and the FoleyManometer LowVolume (LV) with less than 10 mL infusion volume (period 4). The UTI rates were adjusted for disease severity by multiplying each crude rate by the ratio of control (group 1) versus study (groups 2–4) patient SAPS II probability of mortality. The standard Foley catheter used was the 14Fr Bard Biocath and urine drainage tubing, collection bags and FoleyManometers were replaced every 10 days.

RESULTS. Table 1 summarizes the patient data. The number of patients admitted decreased over the 4 periods but ICU length of stay increased from 4.1 tot 7.1 days. The total number of urine cultures taken and the number per patient increased from 915 to 1896 and from 0.5 to 1.7, respectively. The chance of identifying a UTI per urine culture sample remained stable at around 11%. The crude and adjusted UTI rates per 1,000 catheter days did not change significantly over time, although the FoleyManometer LV seems to decrease the UTI risk.

TABLE 1

	PERIOD 1 Control (2000–2001)	PERIOD 2 (2002–2003)	PERIOD 3 (2004–2005)	PERIOD 4 (2006–2007)
Patients (n)	2046	1480	1261	1103
Age (years)	66 ± 17.5	65 ± 16.2	65 ± 16.3	63 ± 18.7
SAPS II mortality probability	16.5 ± 23.8%	20.5 ± 25%	21.2 ± 25.6%	24.3 ± 26.3%
UTI/1000 catheter days (crude)	3.8%	3.6%	6.4%	4.5%
UTI/1000 catheter days (adjusted)	3.8%	2.9%	5%	3.1%

CONCLUSION. Intravesicular pressure monitoring as estimate for IAP either via a closed transducer or the closed FoleyManometer technique (especially the LV version) is safe and does not alter the risk of urinary tract infection in critically ill patients.

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0807

IMMEDIATE TRACHEAL EXTUBATION OF LIVING DONOR LIVER TRANSPLANT RECIPIENTS IN THE OPERATING ROOM

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INTRODUCTION. Immediate tracheal extubation of selected adult patients after liver transplantation (LT) is common practice. Historically, most of liver transplant patients have been extubated, within 10–12 h following surgery in our hospital. Today, new drugs and techniques, advanced monitoring and improved perioperative patient care contribute to rapid and uneventful recovery from surgery, fewer postoperative complications, shorter hospitalization, increased patient satisfaction and a better outcome. Recently, we tried to extubate aggressively in the operating room (OR) rather than in the intensive care unit (ICU). We hypothesized that selected patients may be safely extubated in the OR after living donor liver transplantation (LDLT) and avoid potentially deleterious effects of artificial ventilation and sedation.

METHODS. After May 2006, we chose immediate extubation in the OR unless a specific contraindication was identified. We have excluded emergent cases. Charts of all patients undergoing elective LDLT between January 2004 and December 2007 were reviewed to audit safety and outcome of this approach. At first, we identified 20 patients extubated in the OR (Group A). Then, we made the matched control group (Group B) using age, operation time, the amount of bleeding, and MELD score as matching variables. Patients in the Group B were extubated in the ICU after 10–12 h after LDLT. We have analyzed postoperative liver function tests, such as aspartate aminotransferase (AST), alanine aminotransferase (ALT) and prothrombin time (PT) taken at postoperative day 1, 2, 4 and 7. We have also collected respiratory complication, the incidence of reintubation, ICU stay, and hospital stay.

RESULTS. We could not find any significant differences in the patient characteristics and background between two groups. 20 patients were extubated in the OR safely. All patients did not need reintubation during postoperative course. In the group A, we had only one patient needed non-invasive positive pressure ventilation within 72 h after extubation. About the postoperative liver function test, mean AST and ALT were not significantly different between two groups. However, a mean PT-INR in the Group A was significantly decreased compared with Group B on POD 1, 2, 4, 7. (p value: < 0.0001). We have also found that T-Bil at POD 4, 7 were lower in the Group A compared with the Group B (p value: 0.04, 0.03). We could not find any significant differences about the respiratory complication, such as effusions and pneumonia. We also could not find any differences in postoperative complications and clinical outcomes between two groups.

CONCLUSION. Our early experience with 20 LDLT recipients extubated immediately after surgery showed good emergence from anesthesia safely. Postoperative liver function tests were better in the early extubation group than in the control group. Early extubation in an OR might facilitate the recovery of liver function after LDLT.

0808

RECTAL DICLOFENAC REDUCES MORPHINE REQUIREMENTS IN THE IMMEDIATE POST-OPERATIVE PERIOD FOLLOWING CORONARY ARTERY BYPASS GRAFTING

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INTRODUCTION. This study was to investigate the role and safety of Voltarol® Diclofenac 100 mg suppositories in patients following routine coronary artery bypass surgery. Non-steroidal anti-inflammatory drugs have been used post-operatively as part of a multi-modal analgesia regime in many types of surgery. With the aim to reduce ventilator dependency postoperatively and to reduce the morbidity and time spent in hospital by patients after CABG(1), it was hypothesised that by using rectal paracetamol and a rectal NSAID there would be a reduction in opioid requirements, that would facilitate earlier extubation.

METHODS. Eighty patients were intended for inclusion, powered on detecting a 20% reduction in morphine use over the first 48 h post-operatively. After hospital ethics approval and informed consent, patients fulfilling the inclusion criteria were randomised to recieve Diclofenac (A) or placebo (P)combined with Paracetamol, if the attending clinician deemed the patient to be 'fast-trackable' (planned extubation within 90 minutes). The physicians and data collectors were blinded to the content of the active component in the suppository until the end of the trial. After transfer to CITU patients were commenced on a morphine patient controlled analgesia protocol which was initially nurse administered, 1 mg boluses and a 1 min lock out. The patient was assessed and extubated in accordance with the standard Derriford Fast Policy. Following extubation the PCA was reprogrammed to 1 mg bolus and a 5 minute lockout. All patients were prescribed regular Paracetamol orally or per rectum and received Aspirin 75 mg the day after surgery. Morphine use, and a 10 cm Visual Analogue Score were recorded at various time points. Secondary outcomes were drain losses, blood product use, change in creatinine level, need for renal support and hospital stay.

RESULTS. Sixty one patients were recruited who were eligible for the trial and full data were available for 55 patients. Recruitment was stopped early due a change in prescribing policy with the introduction of intravenous paracetamol into the hospital formulary. The 24 h morphine use was lower in the active group 24.8 mg (15.8), compared with 33.8 mg (17.8) in the control group (total morphine (SD)). There was no difference in pain scores during the trial period. Extubation times were not significantly different although there was a trend towards earlier extubation in the active group. There were no differences in drain losses over the 24 h period nor rise in serum creatinine levels.

CONCLUSION. This study shows that the use of rectal Diclofenac following cardiac surgery reduces the 24 h morphine requirements. The use of NSAIDs appears to be safe with no alterations in post operative bleeding, renal function or post opeartive drains loss. There was no significant reduction in extubation time. A larger trial would be needed to decide if a significant reduction in extubation time was possible.

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0809

MODIFICATION OF ACID–BASE BALANCE IN CIRRHOTIC PATIENTS UNDERGOING LIVER RESECTION FOR HEPATOCELLULAR CARCINOMA

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INTRODUCTION. Acid-base disorders are frequently observed in cirrhotics; however, modifications during hepatectomy and their impact on prognosis have never been investigated. The aim of this study was to examine modifications of acid-base balance of cirrhotic patients undergoing hepatectomy for hepatocellular carcinoma (HCC).

METHODS. Two hundred and two hepatectomies for HCC on cirrhosis were reviewed. Arterial blood samples were collected immediately before and at the end of resection. Preresection and postresection acid-base parameters were compared and related to patient characteristics and postoperative course. The accuracy of acid-base parameters in predicting postoperative liver failure, defined as an impairment of liver function after surgery that led to patient death or required transplantation, was assessed using receiver operating characteristic analysis (ROC).

RESULTS. All patients showed a significant reduction in pH, bicarbonate, and base excess at the end of hepatectomy ($P < 0.001$ in all cases), worsened by intraoperative blood loss ($P < 0.010$) and preoperative Model for end-stage liver disease score ≥ 11 ($P < 0.010$). ROC curve analysis identifies patients with postresection bicarbonate < 19.4 mmol/L at high risk for liver failure (50.0%) whereas levels > 22.1 mmol/L did not lead to the event (0%; $P < 0.001$). Postoperative prolongation of prothrombin time and increases in bilirubin, creatinine, and morbidity were also more frequent in patients with lower postresection bicarbonate, resulting in a longer in-hospital stay.

CONCLUSION. In cirrhotic patients, a trend toward a relative acidosis can be expected during surgery and is worsened by the severity of the underlying liver disease and intraoperative blood loss. Postresection bicarbonate level lower than 19.4 mmol/L is an adverse prognostic factor.

GRANT ACKNOWLEDGEMENT. Support was provided solely by departmental sources.

0810

PERI-OPERATIVE CENTRAL VENOUS OXYGEN SATURATION FOLLOWING MAJOR LIVER RESECTION

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INTRODUCTION. Central venous oxygen saturation (ScvO2) reflects the balance between tissue oxygen delivery and consumption(1). A recent study has suggested there may be a link between derangements in ScvO2 and outcome in the high risk surgical patient (2). It was postulated this may be due to fluid depletion despite "normal" values of other parameters. During liver resection, patients are deliberately fluid restricted to assist surgery. We would therefore expect this patient group to be at high risk of developing a low ScvO2. Those patients may be at high risk of peri-operative morbidity. We therefore aim to ascertain the incidence of low ScvO2 (<65%) in patients having a liver resection.

METHODS. An observational study collecting physiological data normally recorded as part of standard practice: heart rate, blood pressure, central venous pressure and pulse oximetry. Blood samples are also taken for ScvO2. Recordings are made at the time of placement of the central venous catheter, when the liver resection is completed, on arrival on the intensive care unit (ICU) and then 6hr, 12hr and 18hr after arrival on the ICU. We intend to recruit 40 patients.

RESULTS. We have so far recruited 27 patients into the study. 62% of patients have an ScvO2 less than 65% in the early post-operative period.

TABLE 1

	Insertion of CVC	End of liverresection	1 h ICU	6 h ICU	12 h ICU	18 h ICU
Mean ScvO2 (%)	83.6	83.7	73.7	71.7	67	66.9
Incidence ScvO2 < 65%	0%	0%	8%	26%	36%	32%

TABLE 2

Patient group	ICU length of stay (h)	Hospital length of stay (days)	Hospital mortality (%)
ScvO2 < 65%	118*	17*	12.5*
ScvO2 ≥ 65%	53.6	12.2	0

**Non-significant difference*

CONCLUSION. 62% of patients have a low ScvO2 in the early post-operative period. We need to identify whether this group have an increase in post-operative morbidity once the study is completed. A further study using goal directed therapy in the early post operative period is warranted.

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0811

MANAGEMENT OF PHAEOCHROMOCYTOMA AND CRITICAL CORONARY ARTERY DISEASE

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INTRODUCTION. We describe the management of a patient with critical coronary artery disease and poor left ventricular (LV) function who also had phaeochromocytoma. Although a staged approach to surgery for coronary artery disease and phaeochromocytoma has previously been described[1], this rare problem has never been described for patients with poor LV function.

METHODS. A 59-year-old man with severe triple vessel disease, including 90% left main stem stenosis, poor LV function (EF 10%) and an apical LV aneurysm following a previous myocardial infarction, was admitted for coronary artery bypass grafting (CABG) and aneurysmectomy. Following induction in anaesthesia, the operation was abandoned due to uncontrolled hypertension, and he was admitted to our intensive care unit (ICU) where a pulmonary artery catheter (PAC) thermodilution showed cardiac index (CI) 1.6 l min^{-1} m^{-2} and systemic vascular resistance (SVR) 3205 dynes s^{-1} cm^{-5}. Urinary catecholamines were elevated and a CT scan showed an adrenal phaeochromocytoma. The patient was pre-optimised with long acting (T½ 24 h) alpha-adrenergic blocker phenoxybenzamine followed by eta-blockade with carvedilol and rehydration. A multidisciplinary meeting was called to plan treatment and a combined adrenalectomy-CABG was decided to be the safest approach. The phenoxybenzamine was stopped 2 days prior to readmission to the ICU where a PAC was used for calculations of cardiac output and SVR. Initial measurements revealed pulmonary capillary wedge pressure of 4 mmHg, CI 2.6 l.min^{-1} m^{-2} and SVR 1548 dynes.s^{-1} cm^{-5}. Infusion of short acting (T½ 19 min) alpha-blocker phentolamine was started initially at 0.2 and gradually increased over the next three days to 0.6 μg.kg^{-1} min^{-1} aiming at SVR of 1200 dynes.s^{-1} cm^{-5}. Before anaesthetic induction an intraortic balloon pump (IABP) was inserted and used throughout the perioperative period. A sternolaparotomy was performed followed by adrenalectomy, with excellent haemostasis prior to systemic heparinisation. Blood pressure was controlled without problems. Once the adrenal tumour was removed the phentolamine infusion was stopped and cardiopulmonary bypass (CPB) established. CABG and left ventricular aneurysmectomy were performed. During this time (bypass 59 minutes) the effects of phentolamine had substantially reduced, and CPB was weaned using dopamine 5.8 μg kg^{-1} min^{-1} and vasopressin 0.01 U kg^{-1} min^{-1}. The initial readings in ITU post-operatively showed PCWP 9 mmHg, CI 4.9 l.min^{-1} m^{-2} and SVR 418 dynes.s^{-1} cm^{-5}. The CI was maintained above 3 l.min^{-1} m^{-2} and the IABP, dopamine and vasopressin were slowly weaned over the next 48 h.

RESULTS. The patient was discharged home on day 10. At follow-up the patient was asymptomatic, but left ventricular function although improved remained poor

CONCLUSION. The key to success is likely to be the multidisciplinary approach and the staged use of vasoactive medication in the ITU which allowed controlled systemic vascular resistance by means of short acting alpha-blocker infusion in the pre-operative period and vasopressin in the post-operative period.

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0812

DOXAZOSIN IN PREOPERATIVE PREPARATION OF PATIENTS WITH PHEOCHROMOCYTOMA

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INTRODUCTION. Preoperative preparation with pheochromocytoma makes the patients safe for surgical removal of the tumor. It usually performed by alpha-adrenergic blockers. In this study we reviewed the antihypertensive efficacy of Doxazosin when used in monotherapy or in association with a beta-blocker, Atenolol

METHODS. We enrolled 22 patients with pheochromocytoma into two groups. D GROUP (11 patients) received only Doxazosin (1 mg-8 mg /day, taken orally) for two weeks. D + A GROUP (11 patients) was prepared for two weeks with the use of Doxazosin (2 mg-16 mg/day) plus Atenolol (50–100 mg daily). We measured pre-, intra- and post-operative blood pressure, heart rate, volume replacements and catecholamines levels .

RESULTS. After treatment, the both groups had a mean blood pressure value of 128/86 mmHg with a regular heart rate of 75 beats/min. Intraoperative hypertension occurred in 4 patients in the D Group (37 %) and in 3 patients in D + A GROUP (28 %) .There was no significant difference among the two groups . No dysrhythmia was seen until removal of the tumor. The operative and postoperative volume replacements were similar into two groups. Urinary and plasma cathecolamines levels decreased during both Doxazosin and Doxazosin plus Atenolol therapy.

CONCLUSION. We conclude that Doxazosin is a efficacious agent used alone or in association with Atenolol for preoperative preparation in patients with pheochromocytoma.

GRANT ACKNOWLEDGEMENT. Università degli Studi di Napoli "Federico II".

0813

EFFECTIVENESS AND SAFETY OF REMIFENTANYL IN MAXILLO-FACIAL SURGERY

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INTRODUCTION. Post-surgery pain is the cause of undesirable physiopathologic effects, of an increase in morbility, mortality and in costs applied to processes. Pain control with remifentanyl, an opioid agonist of u receptors, with a short mean life, is an adequate option. The analgesia efficacy and the safety of remifentanyl in maxillo-facial surgery patients is analyzed.

METHODS. All consecutive adult patients who underwent maxillo-facial surgery, admitted to the Intensive Care Unit (ICU) along 2007, were included in this study. Remifentanyl (0.15mcg.Kg-1.min-1) perfusion was initiated at admission and progressive weaning acquired before patients were discharged. We compiled hemodynamic (heart rate and blood pressure) and respiratory (respiratory rate and mixed blood oxygen saturation) parameters, the degree of sedation and post-anaesthetic recovery (Ramsey and Campbel scales), postoperative pain severity through elementary verbal (EVS) and visual analogical (EAV) scales at admission, 30 and 60 minutes after, and 6 h later; its side effects and the need for rescue analgesia. Data were registered as percentage or median. We applied ANOVA with multiple measures to compare cuantitative mean variables.

RESULTS. Fifty six patients were included (30 of them male) with a median of 63 years old. Surgery was due to tumour pathology in 43 patients (78%). Twenty seven (48%) were in the ASA III range group, most of them males ($p < 0.008$). The median length of mechanical ventilation in these patients was of 4 h. An EVS < 2 in 91% and an EAV < 4 in 100% was attained, being the sedation level 2–3 (Ramsay scale) and 0–1 (Campbel scale) the most frequently measured. There were no statistically significant differences in the measure of systolic blood pressure ($p = 0.124$), nor in cardiac rate ($p = 0.39$), neither in respiratory rate ($p = 0.14$) in the different cutting points.
Six patients (10.7%) suffered side effects, most of them (7%) described as bradycardial - hypotensive status, and the same percentage (10.7%) needed rescue analgesia, usually non-steroid anti-inflammation drugs.

CONCLUSION. Remifentanyl was effective for the management of pain in the inmediate postoperative period in patients who underwent maxillo-facial surgery patients. Hemodynamic and respiratory parameters maintained stable along its administration, not showing statistical differences in the cutting points of the study. An adequate pain control was attained (EVS < 2 and EAV < 4) and the side effects were limited.

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GRANT ACKNOWLEDGEMENT. To first PANDI.

0814

SPONTANEOUS AORTIC RUPTURE IN EHLERS-DANLOS SYNDROME TYPE IV UNDIAGNOSED PATIENT

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INTRODUCTION. We report a clinical case of spontaneous aortic rupture and emergency surgery of a 32-y old parturient patient, 10-day after c-section, previously healthy, with intensive care management for 72 h postoperatively in the post anesthetic care unit. Family history, phenotype characteristics and the clinical onset of this emergency episode foster the suspicion of vascular type of Ehlers-Danlos Syndromes (EDS sub-type IV). This vascular type represents 5% to 10% of all cases of EDS which have an estimated prevalence of 1/10,000 to 1/25,000 in general population. The intensive care management of potential fatal complications of EDS presents special challenges for anesthesiology and intensive care teams.

METHODS. Female patient, 32 years old, 10th day after labour (c-section dued to fetal bradycardia), transferred from a district hospital with hipovoelemic shock and angioCT diagnosing aortic rupture. An emergent laparotomy and intensive care procedures were instituted (invasive pressures, fluid and blood therapy, anesthesic and analgesia drugs, monitoring and register). The surgery revealed an aortic spontaneous dissection with difficult placement of 2 different aortic graft anasthomosis dued to extreme tissue fragility. The patient was heavily sedated with propofol 10–20 ml/h and remifentanyl 1–3 mcg/kg/min during 72 h postoperatively for clinical control and evaluation. Blood pressure limits were defined and maintained along with hemodynamics and physiologic normal range variables. Additional measures included non-invasing monitoring (CT angiography, ultrasound for CVP and pleural effusions, X-rays and echocardiography), prudent management of invasive procedures, diagnostics tests—histology, skin fibroblasts and DNA (COL3A1) and clinical findings (facial dismorphy, ecchymoses and haematomas, bruising, pale thin skin with visible subcutaneous vessels).

RESULTS. All clinical criteria for EDS type IV were met—positive family history, acrogeric patient and first instance arterial complication. CVP was withdrawn on the 4th day postoperatively. No intensive care related complications were found.

CONCLUSION. The vascular type of Ehlers-Danlos syndrome, known autossomic dominant connective tissue disorder, in an undiagnosed young parturient was responsible for a spontaneous aortic dissection with specific anesthetic and intensive care management. The disease frequently involves the proximal branches of the aortic arch, the descending thoracic aorta and the abdominal aorta. Potentially fatal complications of vascular EDS are increased by pregnancy, even during post-partum period.

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Poster Sessions
Sepsis and SIRS: Varias: 0815–0823

0815

IMPACT OF THE MANEUVER OF SEDATION AND CONNECTION TO MECHANICAL VENTILATION ON CENTRAL VENOUS OXYGEN SATURATION IN CRITICALLY ILL PATIENTS

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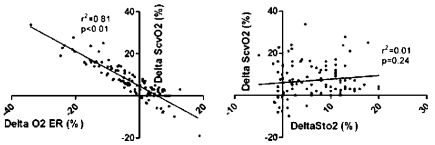
INTRODUCTION. After Rivers's study, central venous O2 saturation (ScvO2) has been widely used as resuscitation goal in critical pts, although criticisms have arisen. The Surviving Sepsis Campaign (SSC) recommends to achieve ScvO2 > 70% by increasing DO2. However, ScvO2 reflects DO2/VO2 adequacy in superior vena cava territories. The maneuver of sedation and connection to MV may markedly decrease VO2 with variable effects on DO2. > 50% of Rivers's study patients were ventilated during the first six h but causes, timing or impact of MV were not specified. SSC bundles do not include this intervention. We conducted a prospective observational multicentric study to determine the effect of this maneuver on ScvO2 in critically ill patients. We hypothesized that this isolated intervention may contribute significantly to achieve ScvO2 > 70% in most patients.

METHODS. During 6 months all consecutive ICU patients with a central venous catheter in place, and in whom intubation and connection to MV was decided were included. We evaluated immediately before and 15 minutes after intubation the following parameters: HR, RR, MAP, lactate, ABGs, arterial O2 sat (StO2), ScvO2 and O2 extraction (O2 ER). Demographics, SOFA, APACHE and concurrent inotropic or vasopressor use were also registered. Results are expressed as mean + SD. Statistical analysis included Chi square test, *t* test and ANOVA.

RESULTS. 103 patients were included (age 58 ± 17; severe sepsis 46%; APACHE II 26 ± 7; SOFA 9 ± 8; mortality 32%; more frequently intubated for shock or respiratory failure). ScvO2 increased in 81% (mean 7.08 ± 8.55) and was associated with a significant decrease in O2 ER. In a subgroup of 24 pts fulfilling Rivers's admission criteria (hypotension or lactate > 4 mmol/l), 21 pts (87.5%) increased dramatically their ScvO2 (mean 9.5% ± 7.43 (57.7–67.2%)) and 10 pts (41.7 %) achieved a ScvO2 > 70% with this sole maneuver. We found no correlation between changes in StO2 and ScvO2.



CONCLUSION. The isolated maneuver of sedation and connection to MV is highly effective in increasing ScvO2 and decreasing O2 extraction in critically ill patients. Almost 90% of septic patients increase dramatically ScvO2 with normalization in 41.7%. This maneuver should be considered earlier in resuscitation protocols and probably tested in future trials against protocols considering only increases in DO2.

0816

NO EXCESS OF NEW THROMBOEMBOLIC COMPLICATIONS AWAITING ANTIBODY TEST RESULTS IN SUSPECTED HEPARIN-INDUCED THROMBOCYTOPENIA

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INTRODUCTION. The diagnosis of heparin-induced thrombocytopenia (HIT) is notoriously difficult in the critically ill. When the pretest probability according to the 4T scoring system is high, heparin anticoagulants are stopped and pre-emptive treatment with alternative non-heparin anticoagulants is started awaiting test results. The decision to start alternative non-heparin anticoagulants in patients with low or intermediate pretest probability is questioned. Moreover, continuation of heparin anticoagulants does not disturb the diagnostic process in case of spontaneous recovery of the platelet count. We investigated the safety of withholding non-heparin anticoagulants in low and intermediate pretest probability awaiting the test results.

METHODS. Case–control study of critically ill patients suspected of HIT with low and intermediate pretest probability in whom HIT-antibody testing was performed between January 2006 and December 2007. Ideally, we use a strictly structured diagnostic and therapeutic strategy. If the pretest probability is low, HIT is considered unlikely, no laboratory testing is done and heparin anticoagulants are continued. If intermediate, HIT is considered possible, HIT-antibody (ELISA) testing is done and heparin anticoagulants are continued. If high, HIT is considered likely, HIT-antibody testing is done and heparin anticoagulants are stopped and fondaparinux 2.5 mg/day is started pre-emptively awaiting the test results (bridging therapy). We compared continuation of heparin anticoagulants with fondaparinux bridging therapy. Primary endpoints were the occurrence of new thromboembolic complications (TEC) and new bleeding complications during the period awaiting the test results.

RESULTS. In 30 patients, 8 tests were performed for low pretest probability and 23 tests were performed for intermediate pretest probability. The median duration of waiting for the test results was 2 days (range 1–9 days). In sixteen cases heparin anticoagulants were continued and in 15 cases fondaparinux bridging therapy was started. Two new TEC occurred (1 during heparin versus 1 during fondaparinux; Fisher exact p = 1.0). Six new bleeds occurred (5 during heparin versus 1 during fondaparinux; Fisher exact p = 0.17).

CONCLUSION. Fondaparinux can be safely withheld as bridging therapy in patients with low and intermediate pretest probability without increased risk of new TEC.

0817

RETROSPECTIVE ANALYSIS OF TREATMENT OF ABDOMINAL COMPARTMENT SYNDROME IN TARTU UNIVERSITY HOSPITAL IN 2004 – 2007

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INTRODUCTION. Intra-abdominal hypertension (IAH) and abdominal compartment syndrome (ACS) have been increasingly recognised as causes of significant morbidity and mortality over the past decade[1].
The aim of the study was to analyse the incidence and treament methods of ACS in the general ICU of Tartu University Hospital.

METHODS. Retrospective analysis of prospectively stored data and patients' charts.

RESULTS. Of 1374 patients admitted to the ICU from January 1, 2004 to December 31, 2007 intraabdominal pressure was measured in 556. The case-mix does not include cardiac surgical and neurosurgical patients. ACS developed in 21 cases (1,5% of all patients). Primary ACS occurred in 18 and secondary in 3 cases. Tertiary ACS developed in 5 patients (altogether 7 episodes). APACHE II score of the ACS patients on admission was 17,9 ± 6,9 (mean ± sd), and SOFA score 9,8 ± 2,9 (mean ± sd). Mortality rate was 61,9% (overall ICU mortality 24,4%). ACS was documented in clinical diagnosis in 2 cases (both from 2007). In 10 cases ACS was mentioned in the patients notes. Despite that all patients received at least one method of conservative treatment[2]. Nasogastric aspiration was used in 21, laxatives and additional sedatives or analgesia in 15, CVVHD in 13, neuromuscular blockade in 8, enema in 6, paracentesis in 4, rectal gas tube in 2 and negative fluid balance in 2 patients. 14 patients were operated at least once during their disease; in 7 tension-free abdominal closure with nylon mesh was used. 2 operations were performed specifically for ACS, decompressive laparotomy and tension-free abdominal closure was performed.

CONCLUSION. ACS occurs seldom but mortality is high. More aggressive conservative treatment can be recommended. Tension free abdominal closure should be applied after laparotomy in all patients with or at risk of ACS.

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0818

EFFECTIVENESS OF ANTITHROMBIN SUPPLEMENTATION IN SEPTIC SHOCK CASES WITH A DIAGNOSIS OF ACUTE-PHASE DIC ACCORDING TO JAAM (JAPANESE ASSOCIATION FOR ACUTE MEDICINE)

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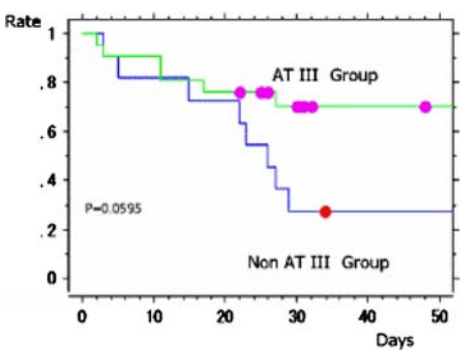
INTRODUCTION. The diagnostic criteria of acute-phase disseminated intravascular coagulation (DIC) were reported by the Japanese Association for Acute Medicine (JAAM) in 2005.The relation between the JAAM diagnostic criteria of acute- phase DIC and the effectiveness of antithrombin (AT) supplementation in septic shock patients has not been reported.

METHODS. A retrospective analysis was performed in 32 septic shock patients diagnosed to have DIC according to the JAMM DIC criteria, who were admitted to our intensive care unit from July 2005 to February 2007. The patients were separated into two groups for analysis: the AT group (21 cases), in which the patients were treated with AT within 24 h of the DIC diagnosis, and the non AT group (11 cases), in which no AT treatment was administered.

RESULTS. The average Acute Physiology and Chronic Health Evaluation (APACHE) II score (AT group, 27.8 ± 8.0; non AT group, 31.0 ± 7.5) and the average sepsis-related organ failure assessment (SOFA) score (AT group, 11.5 ± 4.3;. non AT group, 14.9 ± 5.3) were not significantly different between the two groups. The AT group showed a good outcome (Figure), with significant improvement of the PAI-1 (day 0, 144.9 ± 58.2 ng/ml; day3, 59.9 ± 39.4 ng/ml; p < 0.0001) and protein C (day 0, 33.5 ± 9.9%; day3, 50.8 ± 30.2%; p = 0.0104) levels.



CONCLUSION. Early institution of AT treatment after confirmation of the diagnosis according to the by JAAM DIC criteria seems to be an effective strategy in the management of septic DIC. And we suggested that AT treatment was effective for improvement of coagulation factor that connection with the septic shock was reported.

0819

DISSEMINATED INTRAVASCULAR COAGULATION DIAGNOSED BY NEW CRITERIA FOR CRITICALLY ILL IS A HIERARCHICAL CONTINUUM TO OVERT DISEMINATED INTRAVASCULAR COAGULATION IN PATIENTS WITH SEPSIS

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INTRODUCTION. Sepsis is the most common disease associated with disseminated intravascular coagulation (DIC). To test the hypothesis that DIC diagnosed by the Japanese Association for Acute Medicine (JAAM) DIC scoring system constitutes a dependent continuum to the International Society on Thrombosis and Haemostasis (ISTH) overt DIC in patients with sepsis, we conducted a retrospective study.

METHODS. The databases from two prospective, multicenter clinical investigations were analyzed. The inclusion criteria comprised patients with sepsis-related DIC, who met the JAAM DIC criteria.

RESULTS. The present study enrolled 166 patients, of whom 67 met the ISTH overt DIC criteria. All patients with sepsis who developed to overt DIC during the study period could be identified by the JAAM DIC diagnostic criteria in the first study. While the overall 28-day mortality was 31.3%, mortality (40.3%, $p = 0.0040$) and the incidence of multiple organ dysfunction syndrome (70.1%, $p = 0.008$) of the patients with overt DIC was approximately one and a half times that of the patients associated with only the JAAM DIC. A stepwise increase in the ISTH DIC scores and the incidence of overt DIC were also observed in accordance with the increase in the JAAM DIC scores.

CONCLUSION. DIC diagnosed based on the JAAM DIC diagnostic criteria exists in a hierarchical continuum to overt DIC in patients with sepsis, enabling them to receive early treatment.

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0820

COLLAGEN SYNTHESISIS DEPRESSED IN SKIN BLISTERS IN PATIENTS WITH SEVERE SEPSIS

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INTRODUCTION. Collagen synthesis is a central feature of tissue repair. In sepsis coagulation, inflammation and tissue regeneration are activated aiming to restore homeostasis. Skin is essential barrier in maintaining a stable internal environment. It is not known whether the massive host response in sepsis alters skin collagen synthesis.

METHODS. In this prospective observational study experimental blisters were induced on abdominal skin four times: within the first 48 h from the first organ failure, on the fifth day after the first set of blisters and at 3 and 6 months. To evaluate skin collagen synthesis, aminoterminal propeptides of collagens I and III (PINP, PIIINP) were measured from blister fluid. 44 patients with severe sepsis were enrolled. The median age was 63 years (25th–75th percentile 53–71). The median APACHE II score on admission was 26(22–30). 30-day mortality was 25%.15 healthy adults were used as controls.

RESULTS. PIIINP and PINP levels in septic patients were lower in comparison with controls in the early blister (40.8[25th–75th percentile 22.2–77.1] vs. 69.6[47.2–104.7], $P = 0.028$ and 69.9[32.4–112.7] vs. 243.2[82.3–342.9], $P < 0.001$, respectively), as well as in the late blister (38.8[19.9–68.5] vs. 69.6[47.2–104.7], $P < 0.001$ and 90.0[35.1–138.8] vs. 243.2[182.3–342.9], $P < 0.001$, respectively). In long time survivors PIIINP and PINP levels were increased at 3 and 6 months compared to levels in sepsis.

CONCLUSION. Skin collagen synthesis is depressed during severe sepsis and is followed by a compensatory response at 3 and 6 months after the onset of sepsis.

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0821

EOSINOPHILIA IN THE SEVERE BURN PATIENT. WHAT DOES IT MEAN?

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INTRODUCTION. Eosinophilia has an important role in skin reparation as it has been published in numerous studies. However its incidence and the meaning in the critical burn patient have not been reported up to now.

METHODS. We present a prospective study including 178 critical burn patients (total body surface area over 20%) between March 2003 and December 2006. Blood samples were taken for eosinophilia detection and the relation with burn characteristics, patient evolution, drugs, surgery, skin grafts, concomitant diseases and blood transfusions was studied.

RESULTS. 33 patients (18.5%) showed eosinophilia over 700/μL (range 700–4300/μL). Patients presented the following characteristics: 22 were male and 11 female, being mean age 43 ± 21 years old. Mean total body surface area was 41.57% ± 21. Mechanism was flame in 73%, scald in 12% and electric in 12%. Main depth affected was papillary dermis in 2%, reticular dermis in 66% and subcutaneous layer in 32% of the patients. Days under mechanical ventilation and ICU stay were 1.7 ± 22.8 and 46 ± 28 respectively.

Eosinophilia started 17 ± 14 days after admission with a mean of length of 8 ± 11 days. The higher eosinophils account was recorded on day 20 ± 17. 19% of the patients showed a second peak in their eosinophilia starting on day 30.6 ± 14.5; 5% of the patients had a third episode and one of them showed a fourth peak.

Multivariate analysis was done, and no correlation was found with drugs, burn characteristics or mechanism, total body surface area, anaemia, renal insufficiency, suprarenal impairment, diabetes mellitus, respiratory disease, blood transfusions, days of stay and mortality. Relation with surgery or autologous skin grafts and Biobrane could not be demonstrated although there was a trend for eosinophilia to show on 5 to 10 days after surgery. Eosinophilia levels were higher the latest days of stay at the ICU, remaining elevated in 27% of the patients at discharge.

CONCLUSION. Eosinophilia is frequent in burn patients. Its late apparition suggests that eosinophils stimulus is related with the activation of several skin recovery mechanisms that favour cutaneous reparation. Further studies must be done, investigating possible relations with promyelocytic cells pathways and skin biopsies should be taken to deepen in the appropriate meaning of the eosinophilia.

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0822

CLINICAL PROFILE OF HELLP SYNDROME IN AN INTENSIVE CARE UNIT

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INTRODUCTION. HELLP syndrome is a life-threatening obstretic complication considered by many to be a variant of pre-eclampsia. HELLP is an abbreviation of Hemolytic anemia, Elevated Liver enzymes and Low Platelet count. It is considered one of pre-eclampsia's manifestations. It is believed that represents a vasculopathy mediated by an abnormal concentration of vascular growth factors, but, nowadays, controversies in the diagnosis and management of HELLP syndrome persist. We report our experience within our Gynecological ICU.

METHODS. Prospective study from January-2001 till December-2007. Data from all woman admitted in our ICU, suffering from HELLP syndrome, were recorded (clinical, obstetrical and demographical data, complications, fetal and maternal mortality and stay in the ICU) and were expressed in percentage, median or mean. T-test and chi-square test were used in a SPSS program.

RESULTS. We recorded 43 patients with HELLP syndrome.Demographical and clinical data are registered in Table 1.Delivery was caesarean section (97.7%) and vaginal labor (2.3%). The maternal deaths were due to accute liver failure and multiorganic failure. Fetal deaths were related ($p = 0.001$) to low birthweight (< 1 kg).Gestational age in fetal deaths is lower than in fetal survival ($p = 0.001$).The length of stay was 7 days.(Table1.PreHBP:previous high blood pressure; Gestati.Week:Gestational Week; SBP/DBP:systolic blood pressure/diastolic blood pressure; m:mean; M:median)

TABLE 1 DEMOGRAPHICAL AND CLINICAL DATA

Risk Factors	Age	Obesity	Smoker	PreHBP	Primipara
	30.21(m)	2.3%	2.3%	14%	69.8%
Clinical Data	Edemas	Proteinuria	SBP/DBP	Hemoglobin	Platelets
	86.6%	93%	159.6/95.3	10.8(m)	90860
Complication 11.6(%)	Seizures	RenalFailure	LiverFailure	HeartFailure	DIC
	7	4.7	1	4.7	7
Mortality (%)	Maternal	Fetal			
	4.7	23.3			

CONCLUSION. Our patients with HELLP syndrome are mostly primipara, 30.21 years old, in the gestational week 30.9, with clinical data of high blood pressure (159/95 mm Hg), edemas, proteinuria, with moderately severe thrombocytopenia (class II in Mississippi classification), elevated liver enzymes (ALT > 300; AST > 200) and low hemoglobina (10.8 gr). The mean length of stay is 5 days. They suffered elective cesarea section. The most frequent maternal complication was DIC and seizures. Fetal mortality was associated with low fetal weight and with gestational age. Maternal mortality was due to multiorganic failure and hepatic failure.

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0823

PRO-ATRIAL NATRIURETIC PEPTIDE DOES NOT PREDICT SURVIVAL IN PATIENTS WITH SEPSIS

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INTRODUCTION. To evaluate the concentration of pro-atrial natriuretic peptide in patients with sepsis, severe sepsis and septic shock. To assess the diagnostic and prognostic value of mid-regional pro-atrial natriuretic peptide (ANP) levels with these diagnoses. To assess the correlation of pro-ANP levels with those of interleukin-6, interleukin-8, interleukin-10, procalcitonin, lipopolysaccharide-binding protein and physiological scores

METHODS. Serum concentrations of pro-ANP was determined using the immunoluminometric assay in 28 patients admitted to the medical intensive care unit for sepsis(6), severe sepsis(7), and septic shock(15). Pro-ANP levels as well as those of procalcitonin, interleukin-6, interleukin-8, interleukin-10 and lipopolysaccharide binding protein were measured on day 1 and during the course of the stay at the intensive care unit. The diagnostic and prognostic value of pro-ANP was compared with that of the Acute Physiology and Chronic Health Evaluation (APACHE II) and SOFA score. Mid-regional pro-ANP was detected in serum using immunoluminometric assay (ILMA). Pro-ANP was also determined in 15 healthy adults.

RESULTS. No significant differences of pro-ANP levels were found in patients with sepsis, severe sepsis and septick shock (385,3 pmol/l, resp. 209 pmol/l, resp. 888 pmol/l). On the day of admission, pro-ANP levels were not significant different in survivors compared to non-survivors(396,4 pmol/l, resp. 816,8 pmol/l, $p = 0{,}077$). Pro-ANP levels on the day of admission were significant lower than pro-ANP levels taken on the last day of the stay on ICU (816,8 resp 1254,4 pmol/l, $p = 0{,}0108$) in the group of non-survivors . In a receiver operating characteristic curve analysis for survival, the cut - off 664 pmol/l on the day of admission on ICU had a sensitivity of 41,7% and specificity of 87,5%.The area under the curve(AUC) for pro-ANP was 0,625. The cut-off 503,4 pmol/l on the last day of the stay on ICU was found to have a sensitivity of 83,3% and specificity of 68,7%. The area under the curve was 0,797. We found the correlation between pro-ANP, SOFA and APACHE II score in survivors. In non-survivors only pro-ANP and APACHE II correlation was found. The correlation was determined between pro-ANP and procalcitonin in non-survivors. No correlation was found between pro-ANP and IL-6,IL-8,IL-10 and lipopolysaccharide binding protein.

CONCLUSION. We did not find statistically significant differences of pro-ANP levels in patients with sepsis, severe sepsis and septic shock. Pro-ANP levels on the day of admission were not significant different in survivors and non-survivors. Pro-ANP levels on the day of admission were significant lower than the last pro-ANP levels in the group of non-survivors . Further studies are necessary for the evaluation of pro-ANP as a diagnostic and/or prognostic parameter in patients with sepsis.

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0824

PASSIVE REWARMING IS ASSOCIATED WITH BETTER NEUROLOGICAL OUTCOME IN PATIENTS TREATED WITH INDUCED MILD HYPOTHERMIA AFTER CARDIAC ARREST

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INTRODUCTION. Induced mild hypothermia (IMH) has improved neurological outcome in patients after cardiac arrest. However, the prediction of outcome in the first days remains challenging. After stopping active cooling, there is a wide variation in normalization of temperature. Some patients must be actively rewarmed because of slow spontaneous rewarming, probably due to cerebral injury. Rapid normalization of temperature after stopping active cooling might reflect an intact brain stem function. Therefore, we studied whether the mode of rewarming (active versus passive) was prognostic of neurological outcome in a population of resuscitated patients treated with IMH.

METHODS. We retrospectively studied the data of all consecutive patients treated with IMH in our mixed medical and surgical intensive care unit between January 2006 and January 2008. Inclusion criteria were: (1) treatment with IMH after resuscitation for cardiac arrest, (2) target temperature of 32–34°C achieved. Patients whose condition necessitated premature stopping of IMH were excluded. Patients were divided into two groups according to the mode of rewarming: active or passive. Neurological outcome was determined according to the Glasgow Outcome Scores at ICU and hospital discharge (GOSic and GOShp). GOS ranges from 1 to 5: 1 = death, 2 = vegetative state, 3 = severe disability, 4 = moderate disability, 5 = good recovery. A GOS of 4–5 was defined as favorable and a GOS of 1–3 as poor. The groups were compared by means of Pearson's Chi-square test and relative risk (RR). A $p < 0.05$ was considered statistically significant.

RESULTS. Ninety-six patients met the inclusion criteria. Sixty-six patients were passively rewarmed and 30 actively. The median duration of rewarming to 36°C was 775 minutes (approximately 13 h). As shown in the table, 44% of the passively rewarmed patients had a good neurological outcome at ICU discharge, compared with 20% of the actively rewarmed patients ($p = 0.02$). The relative risk for a good neurological ICU outcome was significantly lower in the actively rewarmed group (RR 0.73, 95% CI 0.57–0.94). For hospital outcome, there was a strong trend to a better neurological state in the passively rewarmed group. Unfortunately, the difference did not reach statistical significance, probably because of the small number of patients.

TABLE 1

Neurological outcome	PASSIVE (N = 66)	ACTIVE (N = 30)	p-value
GOSic good (%)	29(44)	6(20)	0.02
GOSic poor (%)	37(56)	24(80)	
GOShp good (%)	28(42)	7(23)	0.07
GOShp poor (%)	38(58)	23(77)	

CONCLUSION. In patients treated with mild therapeutic hypothermia after cardiac arrest, passive rewarming was associated with a better neurological outcome.

0825

TIME REQUIRED TO REACH TARGET TEMPERATURE WITH MILD HYPOTHERMIA AFTER CARDIAC ARREST IS NOT RELATED TO OUTCOME

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INTRODUCTION. Mild hypothermia (MH) is a key component of treatment of patients after cardiac arrest [1]. Although a short time to reach target temperature (33 0C) is likely to be an essential aspect of MH, the HACA trial showed survival benefit even when target temperature of 33 0C was reached beyond 12 h after cardiac arrest [2]. We hypothesized time required to reach target temperature to be related to (neurological) outcome.

METHODS. Retrospective multicenter observational study on consecutive patients admitted after cardiac arrest to 3 intensive care units (ICU) in the Netherlands from April 2006 – April 2007. Neurological outcome was defined as "good" when the Glasgow Outcome Score (GOS) was 4/5 or "unfavourable" with a GOS of 2/3 at hospital discharge, respectively. Statistical analysis: data are presented as medians [IQR] or means (range) where appropriate; patients were dichotomized according to < 5 vs. > 5 h to reach target temperature.

RESULTS. MH was applied in 82 patients; data of 68 patients were analysable. Admission temperature was 35.4 (32.3°C – 39.0)°C. Median time required to reach target temperature was 5.0 [2.5 – 6.4] h. Time required to reach target temperature was not related to neurological outcome (time as a continuous variable, Mann Whitney U $p = 0.4$; dichotomized, table, Pearson X^2 $p = 0.4$).

TABLE 1

Outcome at hospital discharge	Time to reach target t°/< 5 h	Time to reach target t°/> 5 h
Number of patients	N = 40	N = 28
Demographics Age, years	65	57
Temperature on admission, 0 C	35.1	35.8
Coronary artery interventions, N (%)	7 (18%)	13 (46%)
Intra–aortic balloon pump, N (%)	6 (14%)	13 (46%)
Outcome Alive, N (%)	20 (50%)	17 (60%)
Good neurological outcome, N (%)	17 (43%)	15 (54%)
Unfavourable neurological outcome, N (%)	3 (7%)	2 (6%)
Dead, N (%)	20 (50%)	11 (40%)

CONCLUSION. Time required to reach target temperature with MH in our ICU confirms results from others [3]. We found no relation between time required to reach target temperature with MH and (neurological) outcome. However, since there were significant differences in case–mix, larger studies are needed.

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0826

TREATMENT WITH INDUCED HYPOTHERMIA AFTER OUT-OF-HOSPITAL CARDIAC ARREST HAS A HIGH INCIDENCE OF LOWER RESPIRATORY INFECTIONS

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INTRODUCTION. Induced hypothermia (IH) has shown a beneficial effect on neurological outcome in out-of-hospital cardiac arrest (OHCA)victims in recent trails. Hypothermia increases the risk on infections due to immune suppression. The aim of the study was to evaluate the incidence of lower respiratory infection (LRI) in the first 5 days in OHCA patients treated with IH and the possible effect on the outcome.

METHODS. Retrospective cohort study in a university hospital in the period between January 2005 and June 2007. An endovascular cooling technique was used (Alsius CoolGard™ System). During 24 h IH was installed at a temperature between 32–33°C. LRI was defined by the presence of at least 2 of the following: fever > 38°C, witnessed aspiration, new pulmonary infiltrate on chest radiography and isolation of a respiratory pathogen in an endotracheal aspirate. Data was collected on demographics, initial rhythm, incidence of LRI, isolated microorganisms in endotracheal aspirate, lenght of stay on ICU, ICU- and In-hospital mortality and neurological outcome at discharge ICU (Pittsburgh cerebral-performance category, CPC 1–2 was defined as good outcome).

RESULTS. 82 OHCA victims were treated with IH. Isolated microorganisms in endotracheal aspirate are presented in Table 1.LRI was present in 88%. Antibiotics were overall prescribed in 89%. Length of stay on ICU was prolonged in the presence of LRI (LRI 8.5 ± 5.1 days; no LRI 4.0 ± 1.4 days). There was no obvious influence of LRI on mortality or neurological outcome.

TABLE 1

N = 82	Total (%)	Mort. ICU (%)	Mort. In-Hospital (%)
Total induced hypothermia	100	36.6	45.1
No endotracheal aspirate	11	77.8	77.8
No isolated organism	18.3	33.3	46.7
Stafylococcus aureus	31.7	26.9	34.6
Streptococcus pneumoniae	12.2	20	40
Hemophilus influenzae	13.4	18.2	18.2
Escherichia coli	12.2	60	70
Klebsiella spp	8.5	42.8	57.1
Pseudomonas aeruginosa	4.9	50	75
Candida albicans	12.2	0	10
Others	18.3	46.7	46.7
Monomicrobial isolate	37.8	29	35.5
Polymicrobial isolate	32.9	33.3	44.4
Gram-positive bacteria	39	28.1	37.5
Gram-negative bacteria	45.1	35	43.2

CONCLUSION. LRI is a very common problem in patients treated with IH. Length of stay on ICU is prolonged in the presence of LRI but there is no obvious influence on mortality or neurological outcome. The most common isolated microorganisms in the endotracheal aspirate are *S.aureus, S.pneumoniae, H.influenzae* and *E.coli.* Polymicrobial isolates and the presence of Gram-negative bacteria are associated with a higher mortality. Antibiotic therapy is very common and the choice of antibiotics in OHCA should include activity against the most common isolated microorganisms.

0827

AUDIT ON COOLING TARGETS IN THERAPEUTIC HYPOTHERMIA

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INTRODUCTION. Mortality rate following out-of hospital cardiac arrest lies between 65 and 95%. Severe neurological symptoms are present in up to half of survivors. [1,2]

Following landmark studies in the NEJM in 2002[3,4] the International Liaison Committee on Resuscitation (ILCOR) published guidelines on the use of Therapeutic Hypothermia (TH) to improve neurological outcome post-arrest. They advised that comatose patients with return of spontaneous circulation (ROSC) following out-of-hospital (OOH) VF arrest should be cooled to 32–34C for 12–24 h.[5] Uptake of TH by UK ICUs has been limited by concerns over the need for specialised equipment.[6]

Practice in our ICU has been to use simple, inexpensive techniques such as ice packs, fans and damp sheets to induce TH. This audit aimed to assess their efficacy.

METHODS. We identified all patients admitted to our unit between Jan 2005 and Dec 2007 with ROSC after OOH cardiac arrest. Cooling targets were assessed using the 2003 ILCOR guidelines as a standard. Mortality rate and gross neurological outcome were also reviewed.

RESULTS. 28 patients were identified with VF as an initial rhythm. TH was attained in 92%, within 8 h in 70%. TH was maintained for 12–24 h in 86%, with overcooling to less than 32°C in only 4.5%. Survival rate in the VF group was 54.5%, similar to that found in major trials. [3,4] Four patients were lost to follow-up, but of the remainder 87.5% had a positive neurological outcome, classed as discharge from hospital to their original level of care. Outcomes post non-VF arrest (10 patients) are presented separately.

CONCLUSION. Our results reflect that TH is achievable and effective through simple techniques that could be implemented in all UK ICUs.

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0828

MILD THERAPEUTIC HYPOTHERMIA AFTER CARDIO-PULMONARY RESUSCITATION; PATIENTS OVER THE AGE OF 75

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INTRODUCTION. Therapeutic hypothermia (TH) is gaining acceptance as a treatment modality for cerebral protection in post cardiac arrest coma. The Netherlands has a population of almost 17 million people. The mean age is 78 years for men and 82 years for women. A quarter of the population is over 65 years of age [1–2].
The aim of this study was to compare the outcome of elderly patients treated with TH (≥75 years) versus younger patients (< 75 years).

METHODS. We analysed the outcome of all patients treated with TH since the implementation of TH in relation to their age.

RESULTS. In the period between April 2005 and December 2007 seventy eight patients were treated with TH on our ICU. The hospital mortality in the elderly group was 92% and in the younger group 85%, p = 0.32. Mechanical ventilation days, ICU and hospital LOS showed no significant difference between the groups. Neurological outcome in the elderly survivors was almost as good as in the younger survivors (CPC after six months 1.9 ± 1.3 vs. 1.47 ± 0.9).

TABLE 1 OUTCOME AFTER TH IN RELATION TO AGE

	75-	75+	p
N	44	34	
Male	30 (68%)	20 (59%)	0.40
Age	60.5 ± 12.9 [19.1–73.9;65.9]	83.2 ± 5.5 [75.0–95.60;82.2]	
Survival	12 (15%)	6 (8%)	0.32
CPC	3.7 ± 1.7 [1.0–5.0;5.0]	4.1 ± 1.5 [1.0–5.0;5.0]	0.30
CPC after 6 months	1.47 ± 0.9 [1.0–4.0;1.0]	1.90 ± 1.3 [1.0–4.0;1.0]	0.37
Mechanical Ventilation (days)	6.03 ± 4.65 [1.0–27.0;5.5]	5.59 ± 4.80 [1.0–24.0;4.0]	0.71
LOS hospital (days)	7.34 ± 5.72 [1.0–30.0;6.0]	7.17 ± 6.20 [1.0–26.0;5.0]	0.90
LOS ICU (days)	14.97 ± 16.84 [1.0–71.0;8.0]	12.00 ± 15.29 [1.0–79.0;6.0]	0.45

(mean ± sd)[range,median] or N (%)

CONCLUSION. Patients > 75 years admitted to ICU after cardiac arrest age did not show a worse outcome compared to younger patients. Based on these observations no age-related limitations for TH should be used.

REFERENCE(S). 1. RIVM and CBS.

0829

SPONTANEOUS HYPOTHERMIA IS RELATED TO WORSE NEUROLOGICAL OUTCOME IN PATIENTS AFTER CARDIAC ARREST

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INTRODUCTION. Induced mild hypothermia (IMH) is a recommended strategy to limit neurological damage after cardiac arrest. Although pre-hospital cooling is not practiced in the Netherlands, patients may arrive in the intensive care unit (ICU) with spontaneous hypothermia. It is known that patients with spontaneous hypothermia due to trauma or sepsis have a higher mortality rate. The aim of the current study was to examine if admission temperature of patients after cardiac arrest is related to neurological outcome.

METHODS. Consecutive patients resuscitated for cardiac arrest and treated with IMH in our ICU between January 2006 and January 2008 were eligible for this retrospective study. Patients were excluded if cardiac arrest was a result of trauma, intracranial bleeding or drowning. To evaluate the neurological outcome, the ICU and hospital Glasgow Outcome Scores (GOSic and GOShp) were retrieved A GOS of 1–3 was defined as poor, and 4–5 as good neurological outcome. Patients were divided according to their admission temperature into a spontaneous hypothermia group (< 35.1°C) and a normothermia group (≥ 35.1°C). The groups were compared by means of Pearson's X^2 and relative risk (RR). A $P < 0.05$ was considered statistical significant.

RESULTS. From a total of 215 patients treated with IMH, 102 patients were excluded. The remaining 113 had a median admission temperature of 35.1°C (32–38°C). Spontaneous hypothermic patients had a worse outcome (table). The RR for good neurological outcome was significantly lower in the hypothermia group (OR 0.71, 95%CI 0.53–0.95).

TABLE 1

Neurological outcome	Hypothermia n = 54 (%)	Normothermia n = 59 (%)	P value
Good GOSic	14 (26)	28 (47)	< 0.02
Good GOShp	15 (28)	27 (46)	<0.05

CONCLUSION. Patients resuscitated for cardiac arrest arriving in the ICU with spontaneous hypothermia have a worse neurological outcome than normothermic patients.

0830

THERAPEUTIC HYPOTHERMIA AFTER CARDIAC ARREST

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INTRODUCTION. In 2007 mild therapeutic hypothermia (TH) after cardiopulmonary resuscitation (CPR) was introduced in our hospital. Early and fast cooling after restoration of spontaneous circulation remains a challenge during the first hours after CPR. But no less important during these first hours are the optimal intensive care and timely cardiac interventions to diagnose and to treat (PTCA,CABG etc.) the reason of cardiac arrest (CA). An analysis was made to evaluate our first year results and the protocol we had used.

METHODS. A retrospective cohort study of 20 TH patients between February 2006 and January 2008 . Different cooling methods were combined: an external cooling technique with ice-cold bags, intravenous cold saline infusion and intravascular cooling catheter method (Alsius Coolgard) were used depending in wich department the patient first arrived and if any other invasive procedure was done during the first hours post CPR. Intravascular cooling, with target temperature 32–33 degrees Celsius for a period of up to 24 h was started in the intensive care unit (ICU). Additionally to the hospital mortality and neurological outcome we studied also the rate of hyperglycemia, hypokalemia, hemodynamic instability, arrhythmias and bleeding disorders during the period of TH.

RESULTS. 20 patients, with a mean age 62,7 (27–80) years, male 18/20.
Primary rhythm VF-8, asystolia-8, PEA-4.Acute myocardial infarction was diagnosed 17/20. Mean time of the transportation to the hospital was 48 (0–114) min, to the ICU 83 (0–175) min and cooling with intravascular cooling catheter was started 205 (75–305) min after CA. During the cooling period an insulin infusion was used 13/20; hypokalemia (K < 3,5 mmol/l) was seen 9/20, additional antiarrhythmic therapy was used 9/20, vasoactive drugs or inotropes were infused 13/20 cases. Muscle relaxants to avoid shivering were used 16/20. there were diagnosed pneumonia 4/20, bleeding disorders 3/20.Percutaneous coronary angiography was done to the 12/20 patients. 4 patients were treated with PTCA and 2 patients with CABG. Mortality of our patients was 50 % (10/20) but in the subgroup of patients having a PCI it was 42% (5/12). There was a good neurological outcome (Cerebral Performance Score 1–2) 7 days after CA in the survival group.

CONCLUSION. Our first year experience of TH is comparable with results published in literature. It is important to start with cooling as fast as possible and to build up the inhospital treatment algorithms for intensive care and PCI after CA.

0831

HYPOTHERMIA AFTER CPR ARE WE DOING IT RIGHT?

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INTRODUCTION. Hypothermia is a common treatment after CPR to avoid brain cell apoptosis. In some children after severe hypoxia and prolonged cardiopulmonary resuscitation (CPR) treated with 24 h hypothermia we detected cerebral hyperperfusion (low Resistance Index RI and high systolic and diastolic cerebral blood flow) by transcranial Doppler-Ultrasound(DU)during re-warming (0.1 degree Celsius/h). These children who developed hyper-perfusion under re-warming died or were severely brain damaged. Prior to the re-warming their cerebral structure and ventricle size was normal indicating that there was no brain oedema or swelling. Under re-warming they showed hyperperfusion RI 0.3–0.5, a hyperdense echogenity of the brain tissue, and decreasing ventricle sizes and pre-final an RI of 1,0 and at the end now flow. We interpreted this as reperfusion injury well known from the beginning of the era of hypothermia used for cardiac surgery. We needed to question: we were we doing it right?

METHODS. After CPR four children aged between 2 and 16 years, pH 6.5–7.0,lactate 100–200 mg/dl, were treated with hypothermia. CPR duration times were 15, 20, 60 and 90 minutes. Three children needed magnesium and enoximone to re-establish cardiac function on top of standard treatment according to EPLS guidelines. After 48 h they were re-warmed under Doppler-Ultrasound (DU)steering as described in the following: If the cerebral vascular Resistance Index (RI), taken every 6 h after beginning of the re-warming, was > 0.65 warming up was continued (0.1 degree/h).
Patients with decreased RI $< 0,6$ were cooled down by 0.5–1.0°C until the RI was above 0.65 again and kept at that temperature for 24 h, than re-warming was restarted by 0.05 –0.1/h under DU and down again if necessary, if the RI was between 0.60 and 0.65 re-warming was withhold for 24 h.

RESULTS. Two patients were cooled down by 0.5 to 1.0 degrees during the re-warming to reach a normal cerebral perfusion. In one child (CPR 15 minutes) the RI decreased to 0.54. A second child (CPR 90 minutes, lactate 200 mg/dl) had three decreases in RI to 0.54, 0.56, 0.58. The later was cooled and re-warmed three times until no more signs of cerebral hyperperfusion under re-warming could be detected. The shortest hypothermia treatment duration took 3 days the longest 9 days. All four children survived without any neurologic defects.

CONCLUSION. Despite the fact, that this is a very small number, we believe that reperfusion injury after hypothermia should not be underestimated and furthermore that in the past, even holding the right treatment in our hands we might have destroyed the success of hypothermia on the one hand by not cooling not long enough and on the other hand not by re-warming slow enough.

0832

DIVING ACCIDENTS ARE NOT ALWAYS CAUSED BY DECOMPRESSION SICKNESS

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INTRODUCTION. Decompression sickness (DCS) is a possible life-threatening complication of scuba (self-contained underwater breathing apparatus) diving and requires early recompression therapy (with hyperbaric oxygen) when severe symptoms are present. During diving nitrogen is absorbed into bodily tissues, which expands during decompression leading to air bubbles. These bubbles may cause local tissue damage or secondary ischaemia when air bubbles enter the circulation. However, not all patients who collapse during or shortly after diving have decompression sickness and recompression therapy might lead to a significant delay in diagnostics. This possibly results in serious deterioration of the patient's clinical condition.

METHODS. We present two diving fatalities, treated with hyperbaric oxygen for suspected DCS.
RESULTS. CASE I: a 46-year-old female diving instructor developed shortness of breath during scuba diving and lost consciousness when she reached the surface. Basic Life Support was performed for at least 10 minutes. Due to pulmonary edema, probably as a result of aspiration of water, the patient had to be ventilated with high pressures to ensure oxygenation. A chest CT-scan showed small amounts of air in the left internal jugular vein and in the vena cava superior, raising the suspicion of DCS. She was treated with recompression therapy for 5 h. The patient remained in an anoxic-ischaemic coma after cardiopulmonary resuscitation and eventually she died. Retrospectively, she had complained of dyspnoea, swollen legs and muscle cramps since three weeks. She was diagnosed with hyperthyroidism (TSH $< 0,01$ mE/l, FT4 > 70 pmol/l) and a dilated cardiomyopathy with acute decompensation during diving. The air bubbles in the venous system seen on CT-scan were caused by a peripheral drip system.
CASE II: a 28-year-old male with a family history of arterial dissections developed a dysarthria while playing underwater-polo. Shortly after climbing out of the pool he lost consciousness and was presented on our ER. Brain CT-scan showed no abnormalities and DCS was considered. After consultation of specialized diving physicians, recompression therapy with hyperbaric oxygen was initiated to treat a possible cerebral artery gas embolism. During this treatment his neurological condition deteriorated dramatically. Repeated imaging by CT and MRI showed ischaemic lesions in the brainstem and cerebellum, together with an irregularity of the right vertebral artery. 48 H later the patient was brain dead and supportive treatment was withdrawn. Post-mortem examination showed multiple dissections in the vertebro-basilar arteries.

CONCLUSION. These two cases clearly show that loss of consciousness or other neurological symptoms occuring during or shortly after diving are not always caused by DCS. Treating physicians have to consider all possible options and seriously seek for other explanations.

0833

NEUROLOGICAL OUTCOME AND MORTALITY AFTER CARDIAC ARREST AND PROTECTIVE HYPOTHERMIA

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INTRODUCTION. According with previous studies, protective hypothermia (PH) seems to improve neurological outcome and long-term mortality after ventricular fibrillation (VF). It seems to be useful when another rythm is present.

METHODS. We analyzed retrospectively every patient admitted at a 22-beds medical ICU after successful cardiopulmonary resuscitation between January 2000 and December 2007. Multivariate analysis was used to evaluate factors associated with mortality and neurological outcome.

RESULTS. 84 patients were included. 59.5% were males. The mean age was 64 years. Because of the characteristics of our ICU, the most frequent cause of cardiac arrest (CA) (44%) was a respiratory failure. 18 patients (21.4%) suffered the CA in the out-of-hospital area. Between in-hospital CA, 25 took place in the Emergency Room, 16 in the ICU, and 25 in other hospital areas. 49 patients (58.3%) presented asistolia as the first rythm, 20 (23.8%) electromechanical dissociation and 15 (17.9%) ventricular fibrillation. 27 patients (32%) received PH treatment. ICU mortality was 60.7% and hospital mortality 73.8%. Among patients who were treated with PH, the ICU mortality was as high as 74%. The only factor associated with mortality in ICU was the total time (in minutes) of CPR (OR 1.1, $p = 0.01$), whereas ICU mortality between patients who received PH was associated with the delay (in hours) to reach < 34°C (OR 0.6, $p = 0.03$). In-hospital mortality in the total sample was associated with the use of PH (OR 4.4, $p = 0.03$) and with APACHE II score at admission (OR 1.7, $p = 0.09$) while, among patients who received PH, in-hospital mortality was only associated with the delay in receiving CPR. The only factor associated with good neurological outcome (Glasgow Outcome Scale score of 4–5) was the treatment with PH (OR 0.2, $p = 0.08$).

CONCLUSION. In our study, PH was associated with better neurological outcomes. It was associated with a mild increase in mortality, probably caused by the previous patients features. Its benefits in CA, wich has poor neurologic outcomes between survivors, have to be confirmed in larger prospective studies.

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0834

PREDICTORS OF CANDIDATE SUCCESS IN ADVANCED LIFE SUPPORT PROVIDER COURSES

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INTRODUCTION. Purpose of the study. To identify possible predictors for the outcome (fail/pass/instructor potential) of the candidates (doctors/nurses) participating to the European Resuscitation Council (ERC) Advanced Life Support (ALS) provider course (1).
Type of study: observational cohort study.
Setting: University Teaching/Training Centre

METHODS. At the end of the ERC ALS course candidates were tested on their practical ability to manage a simulated standardised cardiac arrest testing scenario as team leaders. Candidate knowledge was evaluated immediately before and after the course using a standardised 120-item multiple-choice quiz (MCQ)(2). Candidate demographic and professional data as well as the pre-course MCQ scores were analysed as predictors of the course outcome (Fail/Pass/Pass with Instructor Potential [IP]) using Chi and Mann-Whitney tests.

RESULTS. Three-hundred and six candidates (58.8% female) were included. Nine (2.9%) of them did not pass the final test, 267 (87.3 %) passed the final test and 30 (9.8%) were identified as having IP. Failed candidates were older (mean age 40.4 vs. 35 years) had a significantly lower median score at pre-course test (73 vs. 83, $p = 0.05$), none of them was an instructor in other medical disciplines and none of them worked into an intensive care unit (ICU) ($p = 0.03$). hose candidates having IP had a significantly higher score at final MCQ (mean 92.5 vs. 89.0, $p = 0.01$), were more frequently nurses (13.3% vs. 4.3%; $p < 0.05$) and had more frequently a specialty in anaesthesiology, cardiology and emergency medicine (69.2 vs. 46.2; $p = 0.03$) and more frequently worked in ICU (56.7 vs. 29.9%; $p < 0.01$).

CONCLUSION. Conclusions: candidates having a specialty in anaesthesiology, cardiology and emergency medicine and those working in ICU are significantly more likely to pass the ERC ALS provider course and to obtain instructors status. Older age and low scores at pre-course MCQ are associated to an increased risk of course failure.

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0835

SIGNIFICANCE AND IMPLICATIONS OF TROPONIN I ELEVATION IN CRITICALLY ILL TRAUMA PATIENTS

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INTRODUCTION. Troponin I (TnI) is a sensitive and specific marker of myocardial injury. Its diagnostic value has been extended beyond ischemic syndromes, like sepsis, pulmonary embolism and chronic renal insufficiency. TnI elevation in non-traumatic acute brain injury has been associated to worse prognosis. We proposed to examine TnI elevation in severe trauma patients and in particular traumatic brain injury (TBI) and its prognostic significance.

METHODS. Cohort of trauma patients admitted in the emergency room (ER) over a 5 year-period with serial TnI measurements as part of a screening trauma protocol. A subpopulation with isolated TBI and intensive care unit admission (ICU) was studied. Patients with shock (systolic pressure < 90 mmHg or lactate > 4) were excluded. TnI measurement ≥ 0.07 µg/dl was considered positive. Univariate and multivariate logistic regressions were performed to determine prognostic significance of TnI elevation as well as to determine independent factors related to its positivity.

RESULTS. There were 1199 patients admitted to the ER, 20.8% female, 79.2% male, with median age 41y. 93.3% resulted from blunt trauma and the main cause was motor vehicle accident (57.1%), followed by falls (29.2%). Mean RTS was 5.99, 83.1% patients had ISS > 15 and 77.2% TRISS $\geq 50\%$. Overall mortality was 28.8%.
Most of the patients (51.1%) had positive TnI on admission. Mean value was 0.33 µg/dl (SD $= 1.25$) and maximum measurement occurred (mean 0.67 µg/dl; SD $= 2.43$) on the 4th h after-admission. TnI positivity was independently related to trauma severity, ISS (OR 1.02, $p = 0.049$). When multivariate regression was performed, several variables had independent relation with TnI elevation, namely: thoracic trauma (OR 1.45, $p = 0.049$), rhabdomyolysis (OR 3.57, $p < 0.001$) and shock (OR 1.92, $p = 0.001$). TnI positivity was an independent factor for mortality (OR1.559, $p = 0.02$) after correction for background variables and severity.
Only 162 patients had isolated TBI who did not differ from the politrauma population above described. Elevated TnI occurred in 28.1% isolated TBI patients and no statistically significant difference was observed in ICU-stay (7 days vs. 8 days, $p = 0.185$) or mortality (33.3% vs. 29.9%, $p = 0.667$), compared with patients with normal TnI values.

CONCLUSION. The results suggest that the association between TnI elevation and mortality is dependent on multiple factors, such as the presence of rhabdomyolysis, shock and thoracic trauma. TnI is a valid predictor of mortality in politrauma population. However, this prognostic value was not observed in isolated TBI. Further studies with larger number of TBI patients are needed to allow more accurate conclusions.

0836

HYPERTONIC SOLUTIONS EFFECTS ON INTRACRANIAL AND CEREBRAL PERFUSION PRESSURES

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INTRODUCTION. The choice of hyperosmolar solution for elevated intracranial pressure (ICP) decreasing is still under discussion. We have evaluated and compared the effects of different hypertonic solutions on the intracranial and cerebral perfusion pressures in multicenter study of Russian Federation of Anaesthesiologists and Reanimatologists.

METHODS. 25 patients with intracranial hemorrhage and GCS 4–9 enrolled in the study. All patients had invasive ICP and central hemodynamic monitoring (PICCO plus or Swan – Ganz). ICP elevation higher than 20 mm Hg was an indication for the treatment. We used 15% mannitol –400 ml ($n = 38$), 10% NaCl – 200 ml ($n = 17$) and HyperHAES (7,2% NaCl in 6% HES 200/0,5) – 250 ml ($n = 31$) to decrease ICP. ICP and cerebral perfusion pressure (CPP) were registrated before infusion and 5, 30, 120 minutes after it.

RESULTS. PaO2, PaCO2 and blood temperature were comparable between groups during the investigation. Mannitol infusion decreased ICP from (M ± SD) 30 ± 6 mm Hg to 17 ± 6 mm Hg ($p < 0,05$). After 30 min ICP was 17 ± 7 mm Hg ($p < 0,05$), but after 120 min more than 20 mm Hg (24 ± 9 mm Hg). The same results were obtained during the 10% NaCl infusion. ICP decreased from 30 ± 8 mm Hg to 16 ± 4 mm Hg ($p < 0,05$). After 30 min ICP was 15 ± 5 mm Hg ($p < 0,05$), but after 120 min - 22 ± 5 mm Hg. HyperHAES decreased ICP from 28 ± 5 mm Hg to 16 ± 6 mm Hg ($p < 0,05$). After 30 and 120 min ICP was in normal ranges (12 ± 6 mm Hg ($p < 0,05$) and 16 ± 8 mm Hg ($p < 0,05$)).
The 15% Mannitol infusion increased CPP from 73 ± 18 mm Hg to 90 ± 21 mm Hg ($P < 0,05$). After 30 and 120 min CPP was 89 ± 21 mm Hg ($P < 0,05$) and 80 ± 18 mm Hg. 10% NaCl increased CPP from 74 ± 17 mm Hg to 90 ± 30 mm Hg. After 30 and 120 min CPP was 90 ± 26 mm Hg ($p < 0,05$) and 81 ± 18 mm Hg. HyperHAES markedly increased CPP from 72 ± 16 mm Hg to 94 ± 14 mm Hg ($p < 0,05$). After 30 and 120 min CPP was 92 ± 15 mm Hg ($P < 0,05$) and 87 ± 17 mm Hg ($p < 0,05$).

CONCLUSION. Infusion of 15% Mannitol, 10% NaCl and HyperHAES (7,2% NaCl in 6% HES 200/0,5) is an effective method of ICP management, but HyperHAES has the most prolong effects on the intracranial and cerebral perfusion pressures.

0837

UTILITY OF NASAL FLARING DETECTION TO ASSESS SEVERITY IN PATIENTS WITH DYSPNEA

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INTRODUCTION. The presence of nasal flaring is related to severe respiratory failure, but only few studies in healthy adults have demostrated the relationship between alae nasi muscle activity and hypercapnia and between this sign and an imposed respiratory load. Other studies questioned the usefulness of respiratory rate to assess dyspnea severity, as this measurement is difficult and poorly reproducible in the Emergency department scenario.

The aim of our study was to evaluate the utility of nasal flaring detection in the assessment of severity in patients with dyspnea.

METHODS. Prospective observational study of 50 patients attended in the Emergency Department (ED) with dyspnea as major symptom and triage level II or III in the SAT (Sistema Andorrà de Triatge). We recorded vital signs, oxygen saturation, arterial blood gases and nasal flaring presence at ED arrival. We recorded hospital admission necessity, UCI admission, mechanical ventilation and lenght of hospital stay (LOS).

RESULTS. 7 patients were excluded (respiratory rate not recorded) and 43 patients were analyzed. Only 7 patients (15%) had evident alae nasi activity. Patients with nasal flaring were more taquipneic (Respiratory rate 25 ± 6 vs. 38 ± 5 breaths/min, $p < 0,05$) and acidotic (pH 7,42 ± 0,05 vs. 7,34 ± 0,12, $p < 0,05$), and had lowest level of bicarbonate (HCO3 30,5 ± 7,1 vs. 22,0 ± 5,6 mEq/L, $p < 0,05$). There was no significant differences in PaO2 or PaCO2 between groups.
29 patients in the no nasal flaring group (80,5%, LOS 8 ± 7 days) and 6 patients in the nasal flaring group do (85,7%, LOS 9 ± 8 days)needed hospital admission.

CONCLUSION. Evident alae nasi muscle activity at ED arrival in patients with dyspnea could be a non invasive indicator of metabolic acidosis.

Poster Sessions
Improving ICU: 0838–0842

0838

COMPARATIVE OF CUFF PRESSURE CONTROL AMONG THREE TYPES OF OROTRACHEAL TUBES

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INTRODUCTION. To evaluate differences among different orotracheal tubes regarding its capability to maintain cuff pressure in a normal range between its measurements.

METHODS. Prospective and observational study including all patients intubated in six ICU. It was follow up over one week. The cuff pressure was measured with a Mallinckrodt manometer Hi-LoTM. With a target of cuff's pressure 25–30 cm H_2O. Low cuff pressure was defined as values < 20 cm H_2O.

The statistical analysis was performed with SPSS 11.0.

RESULTS. A total of 53 intubated patients admitted to Intensive Care Unit were included. Admission diagnosis was medical in 24 (45.3%), surgical in 22 (41.5%) and trauma in 7 (13.2%). 660 measurements were analyzed. Mallinckrodt Hi-Contour tubes were used in 129 measurements (19.5%), Mallinckrodt Hi-Lo tubes in 180 (27.3%) and Rusch tubes in 351 (53.2%). A higher frequency of measurements with cuff pressure < 20 cm H2O in the Mallinckrodt Hi-Contour tube were observed when compared to Mallinckrodt Hi-Lo tube (73.6% vs. 58.3%, $p < 0.05$), and to Rusch tube (73.6% vs. 42.4%, $p < 0.05$). When comparing Mallinckrodt Hi-Lo and Rusch tubes difference was found (58.03% vs. 42.4%, $p < 0.05$).

TABLE 1 CUFF PRESSURE AND DIFFERENT TYPES OF OROTRACHEAL TUBES

	Mallinckrodt Hi-Contour	Mallinckrodt Hi-Lo	Rusch
<20 cm H2O	73.6%	58.3%	42.4%
Normal Range	26.3%	41.6%	57.5%

CONCLUSION. The adequate control of cuff pressure is influenced by the tube choise.

In spite of adequate cuff control, types of tubes may influence aspiration risk and Ventilator-Associated Pneumonia (VAP) incidence.

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0839

CONFUSION ASSESSMENT METHOD FOR THE INTENSIVE CARE UNIT (CAM-ICU). TRANSLATION, RETRANSLATION AND VALIDATION INTO SWEDISH INTENSIVE CARE SETTINGS

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INTRODUCTION. Patients in intensive care sometimes have strange and frightening experiences and may show symptoms of acute confusion or delirium. CAM-ICU, the Confusion Assessment Method for the Intensive Care Unit is a concept of diagnosing ICU delirium. In Sweden there is no commonly used instrument or method to test the development of the ICU delirium. The aim of this study was to translate, retranslate and validate CAM-ICU for use in Swedish ICU settings.

METHODS. The translation of the instrument was done according to the guidelines suggested by The Translation and Cultural Adaptation group. In the validation process the applicability of the Swedish version of the instruments was tested in a Swedish intensive care unit.

RESULTS. Fourteen adult patients were included in the study, forty paired tests were carried out, and eighty CAM-ICU instruments were completed. The participating patients were given CAM-ICU ratings at least twice during the patients' stay in ICU. Interrater reliability was very good. In our material we recognized a delirium rate of 48 %, which is in accordance with previous studies.

CONCLUSION. The translation of the instrument CAM-ICU showed good correlation with the original version and could therefore be applicable in a Swedish ICU setting. Although there are limitations in using CAM-ICU, previous studies reveal a need for a homogeneous screening instrument making it possible to detect and determine ICU delirium; and from this basis are able to implement and make the necessary decisions required in medical and nursing care practice preventing ICU delirium.

0840

HAND HYGIENE BY HEALTH CARE WORKERS IN AN ICU

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INTRODUCTION. Hand decontamination is crucial to the prevention of nosocomial infections. The aim of this study is to evaluate the compliance of the local guidelines for hand hygiene.

METHODS. A point in time observational study without advanced notice for 3 h/daily, on a level 3 intensive care unit. Simultaneously we collected data through a postal survey about the knowledge of content of the guidelines for hand hygiene among nurses and medical staff.

RESULTS. A total of 281 opportunities for hand hygiene were observed. Overall compliance with hand hygiene recommendations was 25 %.
There is a negative association between glove use and subsequent hand hygiene.

Survey
28 (50 %) nurses and 7 (50%) physicians answered 13 questions about the local guidelines for hand hygiene. The outcome of the postal survey showed a lack of knowledge of the content of the local guidelines, although the medical workers believed that they had a good understanding of the content of the local guidelines.

TABLE 1

	Hand hygiene opportunities (N)	Overal compliance, %	gloves use opportunities (N)	Hand hygiene comp before gloves use	Hand hygiene comp after gloves use
Nurses	211	51 (24%)	82	8 (10%)	50 (60%)
Physicians	18	6 (33%)	7	0 (0%)	4 (57%)
Consultants	52	9 (7%)	21	0 (0%)	9 (43%)
Total	281	69 (25%)	110	8 (7%)	63 (58%)

CONCLUSION. Despite local guidelines for hand hygiene the compliance with hand washing is low. We recommend further research to explore the effectiveness of problem-based and task-orientated education programs to improve hand hygiene compliance among medical health workers.

0841

A QUESTIONNAIRE FOR POST-ICU FOLLOW UP

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INTRODUCTION. Current studies reveal a lack of consensus for the evaluation of physical and psychosocial problems after ICU-stay and their changes over time. The aim of this study was to develop and evaluate the validity and reliability of a questionnaire for assessing physical and psychosocial problems over time of patients following ICU-recovery.

METHODS. The questionnaire was constructed after a review of the literature in three sets, physical problems, psychosocial problems and follow-up care. It was tested for face, content, construct, concurrent validity as well as stability and internal consistency reliability. Thirty-nine patients completed the questionnaire, 17 were re-tested.

RESULTS. Face and content validity were tested by nurses, researchers and patients and seem to be satisfying. The questionnaire showed good construct validity in all three sets and had strong factor loadings (explained variance > 70%, factor loadings > 0.5) for all three sets. There was good concurrent validity compared with the SF12 (rs 0.5). Internal consistency was shown to be reliable (Cronbach's α 0.70–0.85). Stability reliability on retesting was good for the physical and psychosocial sets (rs 0.5).

CONCLUSION. The 3-set 4P questionnaire was a first step in developing an instrument for assessment of former ICU-patients' problems over time. The overall validity was good, but some items must be modified to obtain stronger validity. Regarding reliability test–retest showed good correlation in two of the three sets. Since the sample size was small, further studies are needed to confirm the questionnaire.

0842

DAILY MANAGEMENT DECISIONS OF CHARGE NURSES AND PHYSICIANS AT THE ICU - ON WHAT INFORMATION GROUNDS?

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INTRODUCTION. The primary processes of intensive patient care are quite well supported with information technological devices. However, the secondary processes of ICU daily activities like staffing and patient flow management still lack this support. The purpose of the present study was to investigate what decisions charge nurses and physicians made and what information they needed when managing daily activities of the ICU.

METHODS. This unstructured observation study was conducted in two medical-surgical university hospital ICUs during April and June in 2007. It included 12 charge nurses and 8 physicians acting as a shift leaders managing daily activities. The think-aloud technique was used as a study method and voluntary participants were observed during one shift. Verbalizations of thoughts were recorded while study subjects performed their tasks. Protocol analysis with the first and the second verbalization levels was applied to the analysis (1) and software program NVivo7® was used in the data analysis.

RESULTS. Altogether 92 h and 26 minutes of saturated data was recorded. Both charge nurses and physicians made more second level decisions than the first level which meant that they needed more information or reasoning before their decisions. Decisions and information about human resources were mostly emphasized by the nurses and medication by the physicians. The general patient information with information about patients' vital signs was highly needed in both groups.

CONCLUSION. Charge nurses and physicians at the ICUs are making several decisions per day concerning the fluent patient care flow and managing a vast amount of information related to their decisions. The processes of decision making differed from each other but the information needs were quite similar. While most of the information was stored in the units database most of the decisions and information were managed via papers and with the help of the decision makers' own memory.

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Poster Sessions
Advances in neuro-critical care VIII: 0843–0856

0843

TRACHEOSTOMY IN NEUROCRITICALLY ILL PATIENTS

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INTRODUCTION. Tracheostomy is a common procedure in critical care units, particularly in neurointensive care units (NICU), due to its impact in morbidity, mortality and length of stay. The purpose of this study was to compare, according to the employed technique and time of its fulfillment, tracheostomies done during one year in neurocritically ill patients in a neurologic institution in Colombia and its impact on the clinical outcomes.

METHODS. Retrospectively, all neurologic and neurosurgical critically ill patients who were subject to tracheostomy between March 2007 and April 2008, were included. The following were evaluated: indication for tracheostomy, time lapse until tracheostomy (early if done before 8 days of mechanical ventilation or late as anytime thereafter), tracheostomy technique (percutaneous or surgical), duration of mechanical ventilation, length of stay, respiratory infections, complications, decanulation and in-hospital mortality.

RESULTS. Eighty-three trachostomies were evaluated; 54.2% of the patients were males; average age 49 years old. Diagnosis patient on whom the procedure was assessed were: traumatic brain injury (26.5%), after endovascular treatment of intracranial aneurysms (14.5%), hemorrhagic stroke (12%), acute ischemic stroke (12%) and after neurosurgical clipping of aneurysms (9.6%). The procedure indications were: 95.2% for airway protection, 3.6% for neuromuscular dysfunction and only one airway obstruction. Percutaneous tracheostomy was done in 77.1% and 45.8% were early tracheostomies. 15.7% of the patients presented some type of complication; the immediate ones were: hemorrhage (4.8%) and false way (2.4%); early complications were stoma infection (4.8%) and accidental decanulation (1.2%) and late complications: stenosis (1.2%) and tracheal granuloma (1.2%). 59% of the patients were successfully in-hospital decanulated; the majority of the nondecanulated ones had a vegetative state (77.7%). Mortality in this group of neurocritical tracheostomized patients was 20.5%. The length of stay in the NICU and mean time of mechanical ventilator support, were significantly less in those patients with early tracheotomy compared with late tracheostomy (12.54 ± 7.62 versus 18.96 ± 7.68; p: 0.000; and 10.61 ± 6.97 versus 17.36 ± 7.11; p: 0.000, respectively). Hospital length of stay, incidence of ventilator associated pneumonia and tracheitis after tracheostomy and in-hospital mortality were not significantly different neither according to the employed technique or timing of tracheostomy.

CONCLUSION. For neurocritically ill patients, early tracheostomy decreases length of stay in the NICU as well as days on mechanical ventilation, without major risks for the patients.

0844

CLINICAL AND LABORATORY PREDICTORS OF BOWEL ISCHEMIA AND NECROSIS IN ACUTE BOWEL OBSTRUCTION

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INTRODUCTION. Although acute bowel obstruction is a common emergency, immediate and correct diagnosis is essential, and appropriate treatment is of utmost importance, accurate early recognition of bowel strangulation in these patients still remains a difficult problem. The aim of this study was to identify clinical and laboratory predictors of bowel ischemia and necrosis in bowel obstruction.

METHODS. Prospective study of all adult patients with acute small or large bowel obstruction in a one-year period ($n = 206$). Operated patients ($n = 87$, 42.2%) were divided in Ischemia Group ($n = 30$, 14.6%) and Non-ischemia Group ($n = 57$) and additionally into Necrosis ($n = 20$, 9.7%) and Non-necrosis Group ($n = 67$) according to the presence of intestinal ischemia (reversible and irreversible) and necrosis, respectively. Comparison between Ischemia and Non-ischemia Group was performed to identify predictive factors of ischemia and between Necrosis and Non-necrosis Group for predictors of necrosis. Data analyzed were: age, sex, initial vital signs, symptoms as well as clinical examination findings and blood results (WBC, LDH, CPK, phosphate, amylase, base deficit, metabolic acidosis) on presentation at the emergency department, time between symptoms onset and arrival and between arrival and operation, and obstruction cause.

RESULTS. In univariate analysis, heart rate ($p = 0.002$), WBC ($p = 0.004$), constant abdominal pain ($p = 0.01$), and hernias ($p = 0.003$) were associated with ischemia, while heart rate ($p = 0.001$), systolic arterial blood pressure ($p = 0.003$), WBC ($p = 0.007$), constant pain ($p = 0.005$), rebound tenderness ($p = 0.002$), and hernias ($p = 0.01$) with necrosis. Moreover, ICU admission, morbidity and mortality rates were significantly higher in Ischemia and Necrosis Group in comparison to Non-Ischemia and Non-necrosis Group, respectively. Multivariate analysis identified age ($p = 0.05$; OR:1.04; 95% CI: 1.002–1.082), heart rate ($p = 0.02$; OR:1.06; 95% CI: 1.010–1.122), WBC ($p = 0.05$; OR:1.02; 95% CI: 1.001–1.043), and hernias ($p = 0.02$; OR:4.75; 95% CI: 1.202–18.808) as independent predictors of ischemia, whereas heart rate ($p = 0.01$; OR:1.09; 95% CI: 1.029–1.165), rebound tenderness ($p = 0.04$; OR:8.87; 95% CI: 1.098–71.678), and hernias ($p = 0.05$; OR:5.46; 95% CI: 1.371–30.788) for necrosis.

CONCLUSION. High intestinal ischemia and necrosis rates were identified. Age, heart rate, WBC, and hernias were independent predictors of ischemia while heart rate, rebound tenderness, and hernias of necrosis. In contrast, other traditional, commonly used parameters such as constant abdominal pain, hypotension, temperature, base deficit, and metabolic acidosis were not predictors of strangulation in patients with acute bowel obstruction.

0845

INTRAHOSPITAL TRANSPORT OF NEUROCRITICALLY ILL PATIENTS

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INTRODUCTION. Intrahospital transport of critically ill patients from intensive care unit to any other place of the hospital for diagnostic or therapeutic procedures has implicit hazards; his physiologic reserve is poor and minor adverse issues can produce serious complications. The aim of this study was to describe the characteristics and immediate consequences of the transport of neurointensive care unit (NICU) patients to computerized tomography unit for non invasive diagnostic procedures with the use of guidelines for transportation of the Instituto Neurologico de Antioquia (INDEA) in Colombia.

METHODS. Prospective study between March 2007 and April 2008. TISS-28 and FOUR Score were assessed before transport; cardiovascular, respiratory, neurological and therapeutical conditions were monitored and reported at the beginning of transport, every five minutes during transportation and 1 h after return the patient to the NICU.

RESULTS. Two hundred ninety-three intrahospital transports of neurocritically ill patients were evaluated; the average duration of transport was 24 ± 7.56 minutes. Diagnosis patients on whom the transport was done were: traumatic brain injury (41.3%); after neurosurgery of central nervous system tumors (19.1%); after endovascular treatment of intracranial aneurysms or vascular malformations (11.2%); after neurosurgical clipping of aneurysms (10.2%) and hemorrhagic stroke (8.8%). TISS-28 was 38 ± 6.1 points and FOUR Score was 9 ± 3.3 points. The transport team included: nurse in chief and nurse assistant in 100% of transportations, respiratory therapist in 81.3% and medical doctor in 1%. Rates of medical problems with clinical significance during the evaluated period of transport were: intracraneal pressure higher than 20 mmHg in 53%; cerebral perfussion pressure lower than 60 mmHg in 26.3%; alteration of partial pressure of end-tidal carbon dioxide in 21.3%; alteration of systolic blood pressure in 5.8%; alteration of heart rate in 1.7% and decrease of oxygen saturation in 0.6%; only one medical complication was life-threatening. None of technical complications (12.3%) was life-threatening.

CONCLUSION. Rate of adverse outcomes generated by the transportation of neurologic and neurosurgical critically ill patients can be minimized through use of guidelines for transportation: careful planning, selection of appropriate transport equipment, specially qualified team and proper patient evaluation and stabilization.

0846

PROGNOSIS AND RISK FACTORS OF EARLY ONSET PNEUMONIA IN VENTILATED PATIENTS WITH GUILLAIN BARRÉ SYNDROME

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INTRODUCTION. Invasive mechanical ventilation is required in 30% of patients with Guillain-Barré syndrome (GBS) and is associated with pneumonia and increased mortality. Our objective was to determine the incidence, characteristics, outcomes, and risk factors of pneumonia in GBS patients receiving mechanical ventilation.

METHODS. Design: Study of a prospective database.

Setting: Intensive care unit in a university hospital.

Patients: 81 patients who required intubation for GBS were included. Neurological findings, vital capacity (VC), and signs of respiratory distress were recorded at admission and at intubation. A score predicting the risk of intubation (0–4) was calculated for each patient. Pneumonia was diagnosed based on predefined criteria and retrospectively confirmed by two observers. Early-onset pneumonia was defined as pneumonia diagnosed within 5 days after intubation.

RESULTS. Mean vital capacity was $57 \pm 22\%$ of predicted at admission and $33 \pm 11\%$ at intubation. Pneumonia developed in 63 (78%) patients, including 48 with early-onset pneumonia. Bacteria were consistent with aspiration. Of the 63 patients with pneumonia, 11 (18%) had septic shock, 6 (10%) had ARDS, and 9 (14%) died. In the univariate analysis, milder weakness, a lower risk of intubation (score < 2), and time from admission to intubation >2 days were associated with early-onset pneumonia. Time from admission to intubation was the only independent predictor ($P = 0.0009$) in the multivariate logistic regression model.

CONCLUSION. Early-onset pneumonia is a common and severe complication that is related to aspiration in patients with GBS. Delaying intubation may increase the risk of early-onset pneumonia.

0847

USE OF CLONIDINE FOLLOWING THE WEANING PHASE IN PATIENTS UNDERWENT ELECTIVE ON-PUMP CARDIAC SURGERY: A PILOT STUDY

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INTRODUCTION. Alpha-2 adrenergic agonists reduce mortality and myocardial infarction following vascular surgery. During cardiac surgery, they reduce ischemia and may also have effects on mortality and myocardial infarction(1,2,3,4,5). Few data exist about the effects of Clonidine following the weaning in this setting.

METHODS. Design: Analysis of a prospective, randomized and double blinded collected database. Setting: Intensive Care Unit (ICU) in an University Hospital. Patients: A total of 40 patients aged 30–80 (31 M, 9 F; ASA II-III) submitted to elective on-pump cardiac surgery from August 2007 to January 2008. Randomization: On ICU admission, once obtained a preoperative informed consent, the patient was assigned to group 1 (Clonidine, intervention group) or group 2 (Placebo, control group). Interventions: The patients of Group 1 received intravenous (IV) bolus of Clonidine 0.5 microg/kg followed by continuous infusion of 1–2 microg/kg/h all over the weaning protocol phase. The patients of Group 2 received IV continuous infusion of Sodium Chloride 0.9% all over the weaning phase. Data collection: We evaluated hemodynamic parameters, Troponin I (TnI) blood levels, weaning parameters, Delirium Detection Score (DDS) (6), weaning duration and ICU length of stay. The patients were evaluated preoperatively, on ICU admission, after 6 h and 30 minutes after the start of weaning protocol (7).

RESULTS. The preoperative and operative variables were comparable between the two groups ($p = NS$ for all measurements). The incidence of postoperative atrial fibrillation was lower in group 1 ($p = 0.001$). Following the weaning phase, Heart Rate, Central Venous Pressure, Mean Pulmonary Arterial Pressure and Pulmonary Arterial Occlusion Pressure were lower in group 1 (respectively $p = 0.001$, $p = 0.001$, $p = 0.017$ and $p = 0.034$). The TnI levels was lower in group 1 ($p = 0.05$). The ratio of respiratory rate and tidal volume (RR/TV) and the product of RR and pressure support (RR × PS) were lower in group 1 (both $p < 0.001$); the ratio of PaO2 and FIO2 (PA/FI) and PaCO2 blood levels were higher in the treatment group (respectively $p = 0.004$ and $p < 0.001$). DDS was lower in group 1 ($p = 0.003$). Weaning duration and ICU length of stay were similar in the two groups ($p = NS$).

CONCLUSION. The use of Clonidine in this setting seems to reduce the stress-response during the weaning phase, improving hemodynamic stability and myocardial protection.

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0848

POST-INTUBATION TRACHEAL RUPTURE: A LITERATURE META-ANALYSIS

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INTRODUCTION. Various single cases and consecutive series of patients suggest that there are risk factors related with post-intubation tracheal rupture. However we do not know the association degree between them. The purpose of this study was to apply metaanalysis methodology to evaluate risk factor related with post-intubation tracheal rupture and to study prognostic variables.

METHODS. The design was a systematic review and a meta-analysis. The data source was MEDLINE, years 1966 to 2006.Two independent reviewer screened studios for inclusion and extracted data. Results are expressed as relative risk with 95% confidence intervals. The statistical significance was assessed by the Pearson's Chi-squared test with significance interpreted as a p value < 0.05.

RESULTS. 51 studies totalling 182 patients met inclusion criteria. Sixty nine of patients were diagnosed after surgical procedure and the rest of the cases were diagnosed during surgical intervention. Females were more frequently reported but males showed a tendency towards higher mortality than females (RR 2.38; 95% CI: 0.84–6.72; $p = 0.09$). Patients who died were older than survivors although this association was not significant. Post-intubation tracheal rupture length was not associated with prognosis. Emergency intubations increased the mortality in global population (RR 5.23; 95% IC: 2.19–12.60; $p < 0.05$) and in extra-surgical group (RR 5.07; 95% IC: 1.93–13.30; $p < 0.05$). The absence of emphysema increased the mortality risk (RR 3.93; CI: 1.53–10.12, $p < 0.05$).

CONCLUSION. Post-intubation tracheal rupture is rare but potentially life-threatening complication. The early diagnosis and treatment are influential in prognosis. Emergency intubation is a risk factor which increases fivefold the mortality risk. The training of physicians who manage the air way may decreased the risk of post-intubation tracheal rupture.

0849

TWO-YEAR EXPERIENCE WITH SIMULATION-BASED TRAINING ON AIRWAYS MANAGEMENT

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INTRODUCTION. Endotracheal intubation and ventilation can be life saving for a patient in respiratory distress. Airways management is among the key requirements of appropriate therapy in emergency and critically ill patients. Medical simulation used in combination with traditional training methods can provide a comprehensive learning opportunity that allows the clinician to safely learn, practice, and repeat the procedure until proficiency is achieved. Our objective was to address the use of medical simulation as a way for medical learners to acquire and maintain skills needed to manage difficult airways; to evaluate the students satisfaction with the course.

METHODS. The study was performed at Berkeley Training Center – Brazil, between August 2005 and February 2007, with a total number of 311 trainees. Trainees received a baseline evaluation followed by an 8 h-training sessions that involved an introdutory lecture, a computer-enhanced mannequin simulator, clinical scenarios for training procedural skills in a difficult airway algorithm, and instructor-facilitated debriefings. After finishing the course, the trainees were retested and completed a numerical scale survey of their perceptions about our course (1 = poor, 2 = fair, 3 = good, and 4 = excellent)

RESULTS. Performance improved significantly after simulator training (48.5% vs. 72.7%, $p < 0.001$); 75% of participants scored less than 60% in the baseline evaluation while 25% scored less than 65% in the retest; the course was considered excellent by 70% of the participants and good by 29%.

CONCLUSION. The positive response to simulation–based training on airways management found in this pilot study suggests that this training modality may be valuable in the training of medical students and physicians. Most students considered the course excellent. Simulation-based training is expected to become routine in many health care settings in the coming decade.

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0850

EARLY MECHANICAL VENTILATION FOR GUILLAIN BARRE SYNDROME

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INTRODUCTION. Hospital acquired pneumonia are a common and severe complications of Guillain Barre Syndrome, mainly related to aspiration and probably a delayed beginning of mechanical ventilation. We reasoned that a strategy of early mechanical ventilation may prevent pneumonia in these patients.

METHODS. Monocentre, randomised and controlled study. Inclusion criteria were: vital capacity (VC) < 60 % of predicted values, impossibility to lift the head, onset of symptoms <7 days. The exclusion criteria were: Presence of signs of respiratory distress, age <18-years, coma, haemodynamic instability, pneumonia, pregnancy. Patients were randomised to early ventilation (EV) or to "classic ventilation" (CV). Early ventilation strategy consisted in proposing non invasive ventilation (NIV) if no swallowing impairment were identified or invasive (IV) if swallowing impairments were present at inclusion. If non invasive ventilation was used first, secondary apparition of swallowing trouble indicated intubation. In classic ventilation group, indication for intubation was let to physician's judgement.

RESULTS. 39 patients were included, 22 in the EV group (11 NIV/11IV) and 17 in the CV group (10IV/7 Not ventilated). Neurological presentation was similar in the two groups. Global percentage of pneumonia was 48 % (54 % in the EV group and 42 % in the CV group). No significant difference was identified between the group EV and the ventilated patients in the CV group (54 % vs. 70 %, $p = 0.8$). The percentage of early pneumonia was 32% in the EV group and 29 % in the CV group. There was no difference between the groups, CV and EV, concerning the durations of invasive and no invasive ventilation, also for the duration of hospitalisation in ICU and mortality.

CONCLUSION. At this stage the EV strategy is not associated to an increase of the frequency of pneumonia. There remains possible that it allows decreasing them. The study will thus be pursued until 50 patients are included as previously calculated.

0851

IS TONGUE WEAKNESS AN INDICATOR OF BULBAR DYSFUNCTION AND RESPIRATORY FAILURE IN GUILLAIN–BARRÉ SYNDROME? A PILOT STUDY

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INTRODUCTION. Because swallowing impairment may worse respiratory weakness and conduct to respiratory complications as aspiration pneumonia in Guillain–Barré syndrome (GBS), we prospectively evaluate how tongue weakness could be an early indicator of bulbar dysfunction and respiratory failure in severe GBS patients.

METHODS. Tongue protrusion strength (using a force transducer), dysphagia and respiratory parameters (vital capacity, maximal inspiratory and expiratory pressures) were prospectively measured in 16 GBS patients at ICU admission and discharge and in 7 controls.

RESULTS. Tongue strength was decreased in the GBS patients (279 ± 226 versus 745 ± 147 g, $P = 0.0006$). At admission, patients with dysphagia (199 ± 165 versus 537 ± 166 g, $P = 0.021$) and those requiring MV (198 ± 185 versus 414 ± 202 g, $P = 0.0393$) had greater tongue weakness. All the patients with initial tongue strength less than 150 g both had dysphagia and required MV during ICU stay. Tongue strength also correlated significantly with respiratory parameters: Vital capacity ($r^2 = 0.505$, $P = 0.0001$), Pemax ($r^2 = 0.366$, $P = 0.0017$) and strongly with Pimax ($r^2 = 0.597$, $P < 0.0001$).

CONCLUSION. This study confirm that monitoring bulbar dysfunction is a major challenge in respiratory evaluation in GBS. Tongue weakness is present early in severe GBS. Tongue strength lower than 150 g may indicate higher respiratory risk. Tongue strength measurement may help to identify bulbar dysfunction and patients at high risk for respiratory complications.

0852

EMERGENCY AIRWAY MANAGEMENT USING THE BONFILS INTUBATION FIBERSCOPE

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INTRODUCTION. Emergency physicians are frequently called on to provide quick airway interventions for extremely severe patients, with acute respiratory failure or unclear airway from different causes. Direct laryngoscopy remains the mean way for securing the airway patency in emergency. Standard tracheal intubation, however, may not provide a definitive airway in every patient with a difficult airway. We evaluated the feasibility of the Bonfils fiberscope intubation for emergency airway management.

METHODS. The Bonfils intubation fiberscope (Karl Storz GmbH,Tuttlingen, Germany) is a reusable, rigid, straight fiberoptic device with a 40° curved tip, 40 cm long and 5 mm in diameter. A flexible eyepiece is mounted on the handle of the scope. The fiberscope has a connector that fits onto the 15-mm tracheal tube adapter and thereby allows oxygen insufflation. A cold light source or a small battery handle can be attached to the stylet handle. The tip of the Bonfils intubation fiberscope is positioned just proximal to the tip of the attached endotracheal tube, thereby preventing the lens to be soiled with some amount of blood and/or secretions. We report our experience of use of the Bonfils intubation fiberscope in emergency department (ED) in patients with difficult airway.

RESULTS. During one year, 10 adult patients underwent endotracheal intubation (cardiac arrest $n = 2$, multiple injuries $n = 2$, acute respiratory failure $n = 6$) with the Bonfils intubation fiberscope. At the first attempt all intubations were successfully completed, even in two patients (1 cardiac arrest and 1 with multiple injuries) with difficult airway (Cormack-Lehane grade 4 under direct laryngoscopy). In trauma patients, with cervical immobilization, collar did not need to be unfastened or removed for endotracheal intubation. In all cases we administered a flow of 6 liter/min of oxygen throught the appropriate channel to decrease the fogging of the view. The procedure time ranged from 20 to 35 seconds.

CONCLUSION. Despite these promising series, physicians should be trained with Bonfils device in elective situations (for example in OR) before the use in emergency. The learning time seems to be short and the presence of a supervisor instructor is sufficient to achieve adequate skillness. The Bonfils intubation fiberscope confirms to be an additional airway management device in emergency setting too.

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0853

NEUROSURGICAL NURSES' DEFENITION, ATTITUDES AND COPING STRATEGIES, IN CARING FOR THE UNCONCIOUS PATIENT

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INTRODUCTION. Unconscious patients are in a state that is difficult to define, are they alive or dead? Van Gennep (1960) termed situations that cannot be defined into a clear cut known category as "liminal state".In neurosurgical intensive care units, nurses commonly take care of unconscious patients. There is limited research regarding attitudes of nurses towards the unconscious patient.

Purpose of the study. To identify how nurses, in neurosurgical intensive care units, define the state of the unconscious patient and what are their attitudes and coping strategies in caring for these patients.

METHODS. A questionnaire was constructed, based on Van Gennep theory, literature review and the clinical experience of the researchers and was distributed to nurses, working in neurosurgical intensive care units in 4 medical centers .

RESULTS. Main RESULTS. 56 responded to the questionnaire (50% response rate). 62% of nurses have academic degree, 43% work over 10 years in neurosurgery ICU and 70% non religious.
The majority of the nurses (66%) define the unconscious patient as being alive, 2% as dead and 32% as "not dead and not alive" meaning "liminal state". In spite of considering the unconscious patient as being alive, nurses have negative attitudes and feelings towards the patient. Positive statistical correlations ($p < 0.01$) were found between negative feelings and attitudes and coping strategies of the nurses, such as avoidance. Coping strategies are learned between the nurses in the unit and seniority is a major factor.

CONCLUSION. Nurses have complex feelings towards the unconscious patient and in spite of knowledge and experience, they have a great need to develop coping strategies and behavioral norms, in order to continue to deal with theses patients and to maintain the unit cultural structure.

0854

IMPACT OF A PAIN PROTOCOL INCLUDING STANDARDIZED OPIOID PRESCRIPTION, OPIOID ROTATION AND HYPNOSIS ON PAIN LEVELS AND CLINICAL EVOLUTION AFTER MAJOR BURNS

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INTRODUCTION. Inefficient pain control is a major issue after burns. Side effects of opioids are often reported. The present study aimed at measuring the impact in burns of a protocol driven prescription of opioids including hypnosis on the intensity of pain, and the patients' anticipation of the painful treatments. The study also aimed at quantifying the various parts of the process through standardization of pain assessment, opioid drugs and doses.

METHODS. Before and after trial design, including paired cases, matched for sex, age, burned %BSA and inhalation. Inclusion criteria: age > 18 years, ICU stay > 24 h, and to accept hypnosis. Pain treatment: standardized opioid prescription with a pain control objective based on multiple daily visual analog scale (VAS) assessments. Opioids were converted to morphine equivalents: procedural and basal opioids were recorded separately. Clinical outcome variables as well as economical data were recorded.

RESULTS. 46 patients aged 36 ± 14 years and burned 27 ± 15 %BSA were included—the groups were well matched. The first hypnosis session was carried out as a median after 9 days: as a mean 3.6 preparation sessions per patient were required before a painful procedure could be carried out. Pain and opioid treatment could be quantified: the protocol resulted in the delivery of higher early opioid doses during the first 10 days in the ICU, and a latter reduction of the requirements. It was associated with a significant reduction of pain scores in the intervention group. Hypnosis resulted in significant reduction of number of procedures under anaesthesia, of mean daily VAS, and of procedural related anxiety with trends to shorter stay in ICU and hospital. Total grafting requirements were significantly reduced ($p = 0.014$), as were hospital costs per patient.

CONCLUSION. The pain protocol improved pain treatment in burned patients, reduced anxiety, and was associated with better wound healing, trends to shorter ICU and hospital stay and reduced costs. The systematic assessment and structured prescription of opioids improved patient care without side effects.

0855

SUBGLOTTIC STENOSIS POST OROTRACHEAL INTUBATION

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INTRODUCTION. Long-term airway management is a complex problem, and the subject of unresolved controversy. The literature suggests that translaryngeal intubation, considered the standard initial airway support may be associated with a higher incidence of infectious complications, longer weaning times from the ventilator and with damage to the trachea and laryngeal structures. The cricothyrotomy is indicated in emergency airway in situations when translaryngeal intubation can′t be achieved.

METHODS. A 20 years old man with personality disorders was envolved in a motor vehicle collision. Because of severe craniofacial injury the pre hospital medical team performed a translaryngeal intubation and was transported to hospital. He had a Traumatic brain injury, C7 spinal fracture, multiple face bone fractures, and open fracture of the left femur. Was admitted in ICU, staying entubated and ventilated for 10 days. Was transferred on the 12th day to the orthopedics department extubated and in spontaneous ventilation. At the 57th day he began respiratory and stridor that did not respond to pharmacologic therapy. He developed severe respiratory acidosis and progressive confusion. Facing this problem we have decided to proceed to an orotracheal intubation. Despite presenting a grade 1 laryngoscopy the orotracheal tube didn′t progress below the vocal cords. Several attempts were made with smaller size orotracheal tubes (including TTn 3), but none of them passed the cords. Progressively the patient became difficult to ventilate.

RESULTS. Suddenly he had a cardiopulmonary arrest (CPA), with pulseless electrical activity (PEA); advanced life support (ALS) maneuvers were started and cricothyotomy was performed. After 30 min of ALS algorithm, he regained pulse with sinus rhythm and was transferred to the O.R to perform tracheostomy. During this procedure the patient has new CPA that reversed after 5 cycles of ALS. Transferred to ICU being discharged after 48H with good evolution. He was conscious cooperative oriented in space and time, without focal neurological deficits. The endoscopic examination revealed a subglottic stenosis (degree V).

CONCLUSION. Early experience revealed that prolonged translaryngeal intubation is associated with irreversible damage to laryngeal and vocal cord structures. The most common cause of the trachea stenosis in adults is by iatrogenic injury after intubation. The stridor appears when the lumen of the trachea is less than 5 mm.

0856

INTRA-AORTIC BALLOON PUMP COUNTERPULSATION IN THE MANAGEMENT OF NEUROGENIC PULMONARY EDEMA AND CARDIAC FAILURE ASSOCIATED WITH SUBARACHNOID HEMORRHAGE

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INTRODUCTION. Neurogenic pulmonary edema (NPE) is a well recognised complication of subarachnoid hemorrhage (SAH) and severe traumatic brain injuries. The incidence of NPE was reported to be 6% in a serie of 457 patients with SAH [1]. NPE is characterized as an acute, protein-rich lung edema occuring shortly after cerebral injury. NPE may compromise hemodynamic, decrease cerebral blood flow and increase cerebral vasospasm witch increase the morbidity of SAH. Yet, the precise pathogenetic mechanisms remain unclear, but the role of sympathic storm may be the most important cause.

METHODS. We report two patients with neurogenic pulmonary edema and cardiac failure after subarachnoid hemorrhage treated with intra-aortic balloon pump counterpulsation (IABP) therapy.

RESULTS. Case 1: A 51 year old man was admitted in cardiac intensive care unit for cardiac arrest with pulmonary edema. Coronarography was normal. CT scan showed an extensive SAH with intraventricular hemorrhage and secondary hydrocephalus. Initial Glasgow coma scale was 3 (Hunt & Hess grade V). Cerebral angiography showed an aneurysm of the anterior communicant artery. Chest radiograph showed frank pulmonary edema. Echocardiography showed acute severe left ventricular dysfunction (ejection fraction (EF) 25%) associated with left ventricular apical ballooning (takotsubo-like myocardial dysfunction). The PaO2/ FIO2 ratio was 75 on admission. Despite conventional treatment (mechanical ventilation, dobutamine) IABP was necessary to treat cardiac failure and pulmonary edema. Four hours after the insertion of IABP, PaO2/ FIO2 ratio was 315. Left ventricular EF reached 50% 12 h after insertion. The IABP was removed after 17 hours. Despite embolization of the aneurysm and treatment of intracranial hypertension by decompressive craniectomy, the patient death occurred at day 8.
Cas 2 :A 46 year old woman was admitted in ICU for SAH (Hunt & Hess grade IV). Her medical past history included diabetes, hypertension, coronaropathy (EF 50%)and she was treated with clopidogrel and acetyl salicilyc acid. Ten hours after admission, she developed arterial hypotension and pulmonary edema (cardiogenic and neurogenic). PaO2/ FIO2 ratio was 150. At day two, despite conventional therapy (mechanical ventilation and high dose of dobutamine, norepinephrine, epinephrine), EF was less than 20%. IABP was inserted to optimize hemodynamic function. Three hours after the insertion of the IABP, infusion of dobutamine, norepinephrine, epinephrine was stopped. Than the IABP was removed after four days. The patient was extubated at day 13, and was discharged of the ICU at day 18 with EF 45% and a good cardiac and neurologic outcome.

CONCLUSION. These two cases illustrate the potential usefulness of the intra-aortic balloon pump counterpulsation as an adjunctive therapy in neurogenic pulmonary edema and cardiac failure after subarachnoid hemorrhage.

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Poster Sessions
Glucose control: 0857–0870

0857

COMPARISON OF TWO INSULIN INFUSION MODALITIES IN PATIENTS RECEIVING INTENSIVE INSULIN THERAPY IN ICU: A BEFORE–AFTER STUDY

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INTRODUCTION. Intensive insulin therapy (IIT) to achieve normoglycemia in ICU remains controversial, especially because of the risk of severe hypoglycemia (< 2.2 mmol/l), which appeared to be statistically associated with poor outcome (1,2).

METHODS. In our ICU, an insulin algorithm aimed to reach strict glucose control (< 6.1 mmol/l) in patients under mechanical ventilation (MV) is part of our standard practice. Patients with an effective duration of MV $\geq$ 48 h were consecutively included during two periods between November 2006 and August 2007. Continuous intravenous (IV) insulin infusion was administered without a dedicated perfusion line during the first period (DPL- period) and on a dedicated perfusion line during the second period (DLP + period). Insulin administration on a dedicated perfusion line with no additional catheter was made possible by using the multilumen connector Octopus® (Vygon, Ecouen France) directly connected to the hub of the peripheral catheter or one of the perfusion lines of a central venous catheter.

RESULTS. 100 patients were included, 50 during the DPL- period and 50 during the DPL + period. Age (66 in the DPL- group vs. 64 in the DPL + group), admission SAPS II (52 vs. 55), percentage of medical patients (78% vs. 80%) and patients with prior history of diabetes (22 vs. 22%) or requiring vasopressors (66% vs. 78%), and glucose level at admission (9.8 vs. 8.7 mmol/l) were not significantly different between the 2 groups. Normoglycemia (defined by a mean glucose level $\leq$ 6.1 mmol/L during IIT strategy) was obtained in 76 and 80% of the patients of the DPL- group and DPL + group, respectively ($p = 0.81$). Episodes of severe hypoglycemia (24 in the DPL-group vs. 4 in the DPL + group, $p = 0.01$) and percentage of patients with at least one episode of severe hypoglycemia (22% vs. 6%, $p = 0.02$) were significantly reduced in the DPL + group. ICU mortality was similar between the 2 periods (36% vs. 40%).

CONCLUSION. In patients under IIT strategy, a dedicated perfusion line to administer insulin infusion significantly reduced the incidence of severe hypoglycemia.

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0858

HYPERGLYCEMIA AUGMENTS BACTERIAL TRANSLOCATION NOT THROUGH THE MODULATION OF INTESTINAL MICROFLORA IN ENDOTOXEMIC RATS

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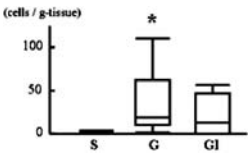
INTRODUCTION. Recent clinical trials demonstrated that tight glycemic control improved the modality and mortality in critically ill patients (1,2). The present study was aimed at examining whether hyperglycemia would augment bacterial translocation through abnormal alterations of intestinal microflora by using a quantitative real-time RT-PCR method in endotoxemic rats.

METHODS. Twenty-one male Wister rats (200–250 g), intravenously infused of lipopolysaccharide (4 mg/kg) after preparatory surgery, were randomly assigned to three groups: saline group (Group S: n = 6) receiving saline solution, hyperglycemia group (Group G: n = 7) receiving 40% glucose solution, and glucose-insulin group (Group GI: n = 8) receiving 10% glucose solution with insulin (0.5 IU/kg/h). All solution was infused at 10 ml/kg/hr for 3 hrs. After laparotomy was performed under sterile condition, mesenteric lymph nodes (MLNs) and cecal contents were collected and RNA was extracted for quantitative real-time RT-PCR analysis (3).

RESULTS. Total counts of bacteria in MLNs were significantly higher in Group G *versus* Group S (Figure). Those in Group GI appeared to be reduced versus Group G, but did not reach to statistical significance. No significant differences in total cell counts of intestinal microflora ($\log_{10}$counts/g-contents) were found among three groups (Group S 10.3 $\pm$ 0.6, Group G 10.2 $\pm$ 0.3, Group GI 10.8 $\pm$ 0.1). Each component of microflora including *Clostridium, Bacteroides, Bifidobacterium, Lactobacillus, Enterobacteriacae*, *Enterococcus, Staphylococcus* and *Pseudomonas* was not significantly different between the study groups.



CONCLUSION. Hyperglycemia is a major contributor to the augmentation of bacterial translocation not via modulating intestinal microflora in endotoxemia.

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0859

TIGHT GLYCEMIC CONTROL IN PATIENTS TREATED WITH GLUTAMINE DIPEPTIDE SUPPLEMENTED PARENTERAL NUTRITION: A TIME SERIES ANALYSIS

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INTRODUCTION. The aim of this study was to assess the effect of glutamine dipeptide-supplemented TPN (Glu-TPN) on tight glycemic control in critically ill patients compared with a standard TPN (S-TPN) using a time series analysis.

METHODS. Entry criteria: Adult patients in ICU requiring TPN for 3or more days and APACHE II score > 12. Exclusion criteria: Malnutrition or obesity, chronic renal or hepatic failure, immunocompromised patients and poor life expectancy. Both groups received iso-nitrogenous and isocaloric TPN. Nutritional needs were calculated: 0.25 g N kg^{-1} d^{-1} and 25 kcal kg^{-1} d_{-1}. Glu-TPN group received 0.5 g kg-1 d-1.of glutamine dipeptide and the S-TPN group a similar amount of aminoacids. Vitals, sepsis and septic shock on admission, type of patient and daily calories administered. A tight glycemic control protocol was placed using a target plasmatic glycemia of 120 mg/dL. Hourly glycemia and the hourly dose of insulin was recorded at least 15 times a day. After an exploratory analysis, glycemia and insulin values were depurated. We apply six different time series models to find the model that better fits using the Root Mean-Square Error (RMSE) between patients and individual determinations. A hierarchical mixed model, with two levels, patient and measurement, was applied to identify the effect of insulin dose and the type of diet. A lineal and sinusoidal model was used to assess the circadian rythm.

RESULTS. 117 patients received any intervention, 53 assigned to Glu-TPN and 64 to S-TPN. Baseline characteristics were similar in both groups. Plasmatic glycemia was 149 ± 46 in Glu-TPN and 155 ± 51 in S-TPN group ($p < 0.04$) and mean hourly insulin dose was 4.3 ± 3.3 in Glu-TPN and 4.7 ± 3.7 in S-TPN group ($p < 0.001$). The best model of fitness was an ARMA (1,2) with a RMSE of 24.5. The effect of insulin dose on plasmatic glycemia was best measured using a regression model with autocorrelation with one previous measurement ($\beta = -0.94$; $p < 0.0001$). When looking to the effect of the different diets, Glu-TPN group needed lesser insulin than the S-TPN group (β S-TPN minus β Glu-TPN = –0.54; $p < 0.0001$), that means a 54% reduction of the amount of insulin for the same levels of plasmatic glycemia. We were unable to find circadian differences between the dose of insulin in both groups.

CONCLUSION. Glutamine dipeptide supplemented parenteral nutrition for more than 3 days significantly reduces the needs of insulin (54%) to obtain a tight glycemic control in critically ill patients.

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0860

APPLYING INTENSIVE INSULIN THERAPY ON THE INTENSIVE CARE UNIT WARRANTS RAPID ASSESSMENT OF GLUCOSE LEVELS AFTER SAMPLING

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INTRODUCTION. Intensive insulin therapy (IIT) has been shown to decrease the morbidity and mortality in patients in the intensive care unit (ICU). However, application of IIT is associated with an increased risk of severe hypoglycemia. Therefore adequate and precise assessment of glucose levels is a prerequisite when implementing IIT.
The aim of the present study was to assess the effect of time between sampling and the measurement of blood glucose levels.

METHODS. In a prospective study, 15 consecutive patients were included. From every patient blood was simultaneously collected in three different containers: 2 ml sodium fluoride/potassium oxalate, (Greiner®); 4 ml lithium heparin, (Greiner®); and 3 ml arterial blood sampler with balanced heparin (70 IU), (Bayer®). Blood glucose levels were measured immediately after sampling and 10, 20, 30, 45 and 60 minutes thereafter.
Changes in glucose levels on several time points per container type and differences of glucose levels between the three containers were analyzed using Friedman's and Mann Whitney *U* tests. A p-value < 0.05 was considered statistically significant.

RESULTS. The median blood glucose level of all 15 patients at baseline was 5.8 mmol/L. Subsequently it decreased to 5.7, 5.6, 5.6, 5.4, and 5.2 mmol/L at T = 10, 20, 30, 45 and 60 minutes, respectively ($p < 0.01$). This significant decrease in time was observed in all three container types ($p < 0.01$). There were no significant differences between the three different container types at the different time points.

CONCLUSION. The level of blood glucose decreases significantly with increase in time between sampling and assessment of samples. This finding is of major importance in the ICU when applying IIT. We therefore recommend that only point of care glucose measurements should be used.

0861

RELATION BETWEEN LACTATE AND GLUCOSE LEVELS AFTER OPEN HEART SURGERY

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INTRODUCTION. Glucose is routinely monitored and treated with insulin to reduce hyperglycemia. With the availability of advanced point-of-care equipment it is possible to simultaneously determine glucose and lactate in arterial samples taken for glucose control. Glycolysis converts glucose into pyruvate, and pyruvate can be converted into lactate. Thus changes in glucose levels can affect lactate levels. The relation between glucose and lactate has not been studied in detail. Since lactate is of prognostic importance in several classes of critically ill patients, distinguishing a relation with glucose levels may be of relevance. We evaluated the relation of lactate with glucose in a cohort of patients admitted to the ICU after open heart surgery.

METHODS. From May 2007 through February 2008 all first admissions to the thoracic ICU after coronary artery bypass and/or valve replacement were evaluated. Glucose was regulated with the GRIP-computer program that adjusts the insulin infusion in order to aim at glucose levels of 4.0–7.5 mmol/L. Glucose and lactate were determined in samples from arterial lines with a Radiometer 800 series analyzer. To discern if a relation between glucose and lactate might vary according to duration of ICU stay, two phases were defined: early: from 0 h tot 12 h after ICU admission and late: from 12 h to 2 days. For each patient, the mean glucose and mean lactate over these phases were calculated before further analysis. For both phases we assessed the relation between glucose and lactate with univariate analysis after which multivariate analysis was performed. Hospital survival was used as outcome measure.

RESULTS. Over the study period 542 patients (70% males) with a mean age of 65 ± 13 years were included. Hospital mortality was 3.5%. A total of 4304 paired glucose and lactate measurements were available during the first 48 h. Glucose decreased from 8.4 ± 1.5 mmol/L to 6.8 ± 0.8 mmol/L from the early to the late phase ($p < 0.001$). Lactate decreased from 1.4 ± 1.1 to 1.2 ± 0.5 mmol/L for the early and late phase($p < 0.001$). The Spearman coefficient for the correlation between glucose and lactate was 0.44 and 0.25 for the early and late phase (both $p < 0.001$). Upon multivariate analysis including phase, mean glucose, maximum glucose, age and sex, only phase of ICU stay and mean glucose were independent determinants of lactate. During the early phase glucose was 8.4 ± 1.4 and 10.5 ± 3.8 in survivors and non-survivors respectively ($p < 0.001$). Lactate levels for these groups were 1.4 ± 0.6 and 3.9 ± 4.5 mmol/L respectively ($p < 0.001$).

CONCLUSION. Lactate levels are positively related with glucose levels after open heart surgery. This may result from a direct metabolic relation between glucose and lactate or it may result from an association between hyperglycemia and impaired hemodynamics.

0862

THE CGAO SOFTWARE IMPROVES GLYCAEMIC CONTROL IN INTENSIVE CARE PATIENTS WITHOUT INCREASING THE INCIDENCE OF SEVERE HYPOGLYCAEMIA NOR THE NURSE WORKLOAD

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INTRODUCTION. Acute hyperglycaemia associated with insulin resistance is common in critically ill patients. Tight control of blood glucose is considered important, although difficult to perform in routine care. Moreover, concerns remain about the risk for severe hypoglycaemia, with reported rates up to 20% and the increased nurse workload due to frequent check of the blood glucose level imposed by usual protocols for achieving tight glycaemic control with hourly measurements when the blood glucose target is not reached. We demonstrated elsewhere that the software CGAO was more effective for achieving tight glycemic control than a conventional method based on daily medical prescriptions. The software CGAO does not only recommend an insulin rate but also the time for the next control of the blood glucose level with an interval between 30 min to 4 h. The aim of the study was to evaluate the use of the software CGAO during routine care in terms of efficacy, safety and nurse workload.

METHODS. Since May 2006, we used routinely the software CGAO, a preliminary version based on a PID (Proportional Integral Derivative) controller (LK2, Saint-Avertin, France). All the blood glucose levels with the date and time of the measurement, the insuline rates actually applied by the nurse, and all the quantitative changes of the nutritional intake were automatically stored in a database permitting to calculate numerous parameters for each stay in the ICU, such as the mean and the standard deviation of the blood glucose level, the hyperglycaemic index calculated above 6.1 mmoles/l, the fraction of time with hyperglycaemia > 6.1 mmoles/l, and the mean daily insulin requirement during the whole stay. The nurse workload was quantitatively evaluated by the mean sampling interval for the blood glucose control. The results are presented as mean ± standard deviation and/or median and interquartile range.

RESULTS. Between July 2006 and October 2007, we analysed 546 ICU stays during which the software CGAO was used (mean age: 62.7 ± 18.4 years, SAPS 2: 42.5 ± 20.6). There were a total of 30,366 glucose measurements (mean blood glucose level of 7.0 ± 2.6 mmoles/l) representing 86,773 h of operation and 3,490 patient days. With the ICU stay being the unit of analysis, the fraction of time above 6,1 mmoles/l was 55 ± 24% (median and interquartile range : 58 % [40–70%]) and the mean daily insulin requirement was 64 ± 54 UI. There was only 40 episodes of severe hypoglycaemia (< 2.2 mmoles/l) representing 1.3/1000 measurements occurring in 36 patients (6.6 %). The mean sampling interval for the blood glucose control was 166 ± 35 min.

CONCLUSION. The software CGAO improves glycaemic control in critically ill patients with a relatively low incidence of severe hypoglycaemia and without increasing the nurse workload. The benchmarking of different computerized glucose control systems should include criteria permitting to explore these three fields : efficacy, tolerance, and nurse workload.

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0863

TIGHT GLYCAEMIC CONTROL IN CRITICALLY ILL PATIENTS – FEASIBILITY TRIAL OF CLINICIP CS-2 DECISION SUPPORT SYSTEM

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INTRODUCTION. Tight blood glucose (BG) control reduces morbidity and mortality in critically ill patients (1) but is difficult to achieve safely with current insulin administration algorithms. A software enhanced model predictive control algorithm (eMPC) that provides advice on insulin infusion rate and time to next glucose measurement (running on a bedside computer) has been shown to be safe and effective over 72 h in critically ill patients (2). This study investigated the effectiveness over 24 h of a decision support system (CLINICIP CS-2) that comprises the eMPC algorithm integrated into a device that includes infusion pumps for enteral and parenteral feeding and insulin (B Braun Space system). The decision support system provides automatic transfer of data concerning carbohydrate and insulin administration from the infusion pumps to the algorithm and is controlled via a graphical user interface that includes a display of glucose concentration history and reminder alarms.

METHODS. 10 adult patients admitted to ICU at RBH after elective cardiac surgery (mean age 64.5 yrs, weight 80.5 kg, APACHE II med 13) with hyperglycaemia (glucose > 6.7 mmol/L), were treated with intravenous insulin infusion as advised by the decision support system. The decision support system requires input of bodyweight, carbohydrate input, current insulin requirements and BG concentration. The system advises time to next BG measurement, (maximum 4 h) and insulin infusion rate targeted to maintain BG at 4.4–6.1 mmol/L.

RESULTS.

TABLE 1

- BG, study entry* (mmol/L) 7.5 (0.5)
- BG, mean* (mmol/L) 5.8 (0.3)
- HGI (> 6.1)* (mmol/L) 0.4 (0.2)
- BG < 3.3 mmol/L (n) 3
- BG < 2.2 mmol/L (n) 0
- Study time* (hrs) 21.2 (3.1)
- Time to target range* (mins) 194 (160)
- % time in target range* (%) 48.2 (25.0)
- BG sampling interval* (mins) 87 (10)

** mean (SD), HGI - hyperglycaemic index*

CONCLUSION. The CS-2 decision support system provided effective blood glucose control with an acceptable glucose sampling interval.

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0864

INTENSIVE INSULIN THERAPY INCREASES 28-DAY AND HOSPITAL MORTALITY IN LEAST SEVERELY ILL PATIENTS

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INTRODUCTION. Tight glucose control by Intensive Insulin Therapy (IIT) failed to improve survival in two large multi-centre randomized controlled trials (1,2). Nevertheless, the lack of efficacy of IIT on the global population does not exclude possible benefits on subgroups with a given severity at admission.

METHODS. In the prospective randomized Glucontrol controlled trial, patients older than 18 years admitted in one of the 21 European participating intensive care units (ICU) were randomized into two groups: IIT (glucose target 80–110 mg/dl) or conventional group (CIT, glucose target: 140–180 mg/dl). The patients were stratified according to the APACHE II score at admission into 6 strata, score < 11 (n = 165), 11–15 (n = 269), 16–20 (n = 171), 21–25 (n = 123), 26–30 (n = 62), score > 30 (n = 39)). ICU, hospital and day 28 mortality have been compared by treatment group stratified by APACHE II score (Mantel-Haentzel test) and within each stratum (chi square).

RESULTS. The comparative analysis of the data from 829 patients (mean age 61.6 ± 16.6 years, men 63.5%, median APACHE II: 15 (6–43), ICU and hospital length of stay (10.5 ± 12.6 and 24.7 ± 26.8 days)) showed an higher hospital and 28-day mortality in the IIT patients than in the CIT patients of the APACHE II 11–15 stratum (table). However, the comparison stratified by APACHE II score did not demonstrate significant differences between treatment groups (respective p-values by Mantel-Haentzel = 0.22, 0.09 and 0.07).

	ICU mortality IIT	CIT	Hospital mortality IIT	CIT	28-day mortality IIT	CIT
APACHE II 11–15	10.4	5.2	18.5	9.7*	13.4	5.2*
APACHE II 16–20	18.0	16.7	21.6	22.0	20.5	19.5
APACHE II 21–25	29.7	29.3	42.2	34.5	34.4	28.1
APACHE II 26–30	46.2	27.8	56.0	33.3	38.5	22.2

** p < 0.05 (chi square)*

CONCLUSION. These data suggest a worsened outcome in a low severity group receiving IIT. Although no causal relationship can be deducted from these data, detrimental Effects of treatment-induced hypoglycaemia can be suggested. In any case, the present data do not support the recommendation of widespread tight glucose control by IIT.

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0865

PROGNOSTIC FACTORS OF KETOACIDOSIS IN A MEDICAL INTENSIVE CARE UNIT

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INTRODUCTION. The diabetic ketoacidosis represents a frequent cause of hospitalization in medical ICU. The purpose of this study is to specify the prognostic factors of diabetic ketoacidosis.

METHODS. It is a prospective study performed during 2 years (2006–2007). The inclusion criterions were diabetic patients hospitalized in MICU who had dehydration, GCS < 13 with glycemia > 2,5 g/L, pH < 7,35, massive glucosuria and qualitative ketonuria. The clinic, biologic, therapeutic and evolutive data have been collected. We identified two groups: survivors and dead patients. The quantitative variables are expressed on average ± standard derivation, and the qualitative variables by percentage. The univariate analysis was based on Chi-square test for the qualitative variables and Student test for the quantitative variables. A multivariate analysis using the models of logistic regression has been also realized. The statistic analysis has been based on SPSS 11.0.

RESULTS. During the period of study, 100 patients have been hospitalized for diabetic ketoacidosis. The mean age was 42 ± 17,6 with a sex-ratio (F/M) of 1,4. The mortality rate was 13 %. At univariate analysis, we have identified the following prognostic factors: low systolic arterial pressure (p = 0,4), APACHE II (p = 0,03), SAPS II (p < 0,001), length of stay (p = 0,001), quantity of isotonic saline (p < 0,001) and septic shock (p = 0,02). The independent prognostic factors were SAPS II < 17 (OR = 0,81; CI (95 %): 0,67–0,98; p = 0,03), length of stay < 3 days (OR = 0,53; CI (95 %): 0,31–0,89; p = 0,01) and quantity of isotonic saline < 3 l (OR = 0,26; CI (95 %): 0,07–0,95; p = 0,04).

CONCLUSION. The factors that we conclude from our study as being the factors of bad prognosis permit a better understanding of the causes of death and so, a better management of the patients.

0866

BLOOD GLUCOSE CONTROL ON ICU: COMPARISON OF DIFFERENT INSULIN PROTOCOLS

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INTRODUCTION. In cardiac-surgery patients intensive insulin therapy and maintaining blood glucose (BG) levels within normoglycaemia markedly reduces mortality. We compared the effectiveness of three published insulin protocols: absolute glucose value based approach (Mathias Protocol; MP), relative glucose change approach in combination with four glucose ranges (Bath Protocol; BP) and the new fully automated model predictive controller (eMPC2) algorithm with variable sampling interval.

METHODS. 120 consecutive post-cardiac surgery patients were investigated for 48 h on admission to ICU. Forty patients were randomized to each of the three protocols. The target BG range for all three protocols was 4.4–6.1 mmol/L. Arterial BG samplings were taken according to each protocol.

RESULTS. The algorithms showed the differences in the effectiveness of BG control. While there was no difference between MP and BP in entire study mean BG (6,7 ± 0,8 resp. 6,5 ± 1,0 mmol/l), eMPC2 algorithm performed significantly better (5,9 ± 0,8 mmol/l; p < 0,05). Also time to normoglycaemia was significantly shorter for eMPC2 (10,9 ± 6,1 vs. 12,3 ± 9,2 vs. 8,8 ± 5,4 h; p < 0,5). In normoglycaemia maintaining after reaching target range both BP and eMPC2 protocols performed equally (5,8 ± 0,7 vs. 5,2 ± 0,8 mmol/l) compare to MP (6,2 ± 0,7 mmol/l), there were no significant difference in sampling interval (2,1 ± 0,3 vs. 1,8 ± 0,6 vs. 2,3 ± 0,3 h), in clinically important hypoglycemic events (1 vs. 2 vs. 0 event), but in % of time under target range (10,9 ± 8,8 vs. 13,1 ± 7,9 vs. 22,2 ± 4,6 % of time; p < 0,05).

CONCLUSION. First, all evaluated insulin protocols were safe with respect to hypoglycaemia. Secondly, both absolute glucose value based approach and relative glucose change approach were comparably effective in BG management, while significantly more effective control of BG showed predictive eMPC2 algorithm. The higher % of time under target range in eMPC2 group did not show any clinical importance in our study, but further studies in larger cohorts of patients are needed to determine whether such hypoglycaemia is out of any clinical importance.

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0867

EFFICACY AND USER ACCEPTANCE OF AN AUTOMATED ALGORITHM [EMPC] IN AN INTERACTING INFUSION PUMP SYSTEM FOR THE ESTABLISHMENT OF GLYCAEMIC CONTROL

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INTRODUCTION. The presence of hyperglycaemia in hospitalised patients indicates an increased risk for mortality and morbidity. Single-center trials have demonstrated that tight blood glucose improves prognosis for ICU patients. However, normoglycaemia is not easy to establish in this environment and multicenter trials were stopped due to the increased rate of hypoglycaemia. The objective of the present trial was to investigate the performance of a newly developed decision support system for the establishment of tight glycaemic control in medical ICU patients for a period of 72 h.

METHODS. The study was conducted as a single-center, open, non-controlled clinical investigation in ten mechanically ventilated patients. After admittance to the ICU blood glucose values were monitored and the CS-1 Decision Support System (interacting infusion pumps with integrated algorithm eMPC controlled via a graphical user interface) was used to adjust the infusion rate of intravenously administered human soluble insulin to normalize arterial blood glucose (4.4–6.1 mM).

RESULTS. Percentage of time in target and mean blood glucose under treatment with the CS-1 System were 47.04% (± 13.05) and 6.08 mM (± 0.73), respectively. The average hourly insulin need was 4.2 IU (± 2.78) and the carbohydrate content of enteral and parenteral nutrition 7.47 g/h (± 1.98). No single hypoglycaemic episode (<2.2 mM) occurred. Eleven times (1.5% of all given advice) the nurses did not follow and, thus, overruled the advice of the CS1 system. According the results of a conducted survey the majority of nurses (19 vs. 2) stated that glucose control was more efficient to handle as using the regular protocol. Several technical malfunctions of the device (repetitive error messages and missing data in the data log) owing to communication problems between the new hardware components were shortcomings of the present version of the device.

CONCLUSION. The performance of this prototype CS-1 Decision Support System was from a clinical point of view already effective in maintaining tight glycaemic control and well accepted by the ICU nursing staff. With improvement of technical stability the CS1 system has the capacity to serve as a reliable tool for routine establishment of glycaemic control for critical ill patients

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0868

LIMITED EVIDENCE OF MAJOR COMPLICATIONS OF HYPOGLYCEMIA DUE TO TIGHT GLYCEMIC CONTROL. A SYSTEMATIC REVIEW OF THE LITERATURE

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INTRODUCTION. It has been shown that tight glycemic control (TGC) results in reduced morbidity and mortality in intensive care in selected patient groups. Concern about the associated increase in hypoglycemia limits the implementation of TGC and was one of the reasons to discontinue 2 multi-centre trials to the effects of TGC. We wonder if the effects of incidental hypoglycemia in ICU-patients justify us to be anxious to implement TGC. To solve this question, we review the literature for observed consequences of hypoglycemic episodes in critically ill patients.

METHODS. We performed a search of the PubMed and Embase databases for full text papers of clinical trials to glycemic control in ICU-setting mentioning possible consequences of hypoglycemia. In case one or more eligible studies used the data of the same study-group, only the most relevant paper was selected.

RESULTS. 23 full text papers, concerning 12,023 patients, were judged to be appropriate for our systematic review. Though hypoglycemia is common, the episodes were often reported to be short. Possible severe adverse effects were described in 17 of 609 (2.8%) patients experiencing hypoglycemia in 16 studies - a certain relation between the hypoglycemia and the event could not be ascertained. Seven other studies stated over 726 hypoglycemic episodes in 6,359 patients and did not result in any complications. Hypoglycemia coincided with a higher mortality; nevertheless, we did not find sound evidence that conclude TGC-induced hypoglycemia was directly responsible for the higher mortality.

CONCLUSION. We found little evidence in the literature of severe adverse effects of hypoglycemia associated with TGC in ICU-patients that might offset the benefits of TGC.
A high quality and safe TGC-protocol is always needed to limit the number and duration of hypoglycemic episodes. Fear of possible severe consequences of hypoglycemia should not keep us from further studying TGC.

0869

PERIOPERATIVE BLOOD GLUCOSE CONTROL: COMPARISON OF PREDICTIVE ALGORITHM EMPC2 TO ROUTINE INSULIN PROTOCOL

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INTRODUCTION. Increased blood glucose levels are frequently observed in patients undergoing cardiac surgery procedures, with or without diabetes. Intensive insulin therapy decreases mortality, length of hospitalization and number of complications as it has been shown in recently published studies. Many protocols have been developed to implement tight glycaemic control. The aim of this study was to compare blood glucose control by the automated model predictive algorithm with variable sampling interval (eMPC2) with a routine glucose management protocol (RP) in the peri- and postoperative period in cardiac surgery patients.

METHODS. Sixty patients were included in this study (41 men, 19 women, mean age 69 ± 7, BMI 27.9 ± 2.6 kg/m^2). Duration of the study was 72 h. All patients underwent an elective cardiac surgery procedure and were treated from the beginning of the surgery with a continuous insulin infusion to maintain glycaemia in a target range of 4.4–6.1 mmol/l. 30 patients were randomized for treatment using the eMPC algorithm and 30 patients for routine protocol management. Blood glucose was measured in 1- to 4-h intervals as requested by each algorithm during surgery and postoperatively. Statistical analysis - the patients from different groups were compared using ANOVA followed by Holm-Sidak test, Student t-test or Mann–Whitney U-test as appropriate. The significance level was set at $p = 0.05$.

RESULTS. Mean blood glucose was significantly lower in the eMPC group vs. RP group (5.99 ± 0.32 vs. 6.54 ± 0.47 mmol/l, $p < 0.05$). Percentage of time in the target range was significantly higher in eMPC group vs. RP group (60.9 ± 9.5 vs. 45.1 ± 12.3 %, $p < 0.05$). No significant difference was found in average insulin infusion dose - eMPC group vs. RP group (3.21 ± 1.66 vs. 3.4 ± 1.55 IU/hour, $p = 0.7$) or in average sampling interval - eMPC group vs. RP group (2.04 ± 0.17 vs. 1.96 ± 0.17 hour, $p = 0,09$). No severe hypoglycaemia (defined as a blood glucose level of 2.2 mmol/l or less) in either group occurred during the study.

CONCLUSION. eMPC algorithm is comparably safe as compared to a routine glucose management protocol with respect to hypoglycaemia. The results of our study suggest that eMPC algorithm is more effective in maintaining euglycaemia in peri- and postoperative periods in patients undergoing cardiac surgery procedure.

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GRANT ACKNOWLEDGEMENT. This study was supported by grant of Charles University in Prague – GAUK 44407.

0870

IMPLEMENTING STRICT GLUCOSE CONTROL: A SURVEY OF PRACTICE IN ADULT INTENSIVE CARE UNITS IN THE UK

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INTRODUCTION. Strict glucose control has been shown to decrease mortality in intensive care patients, with maximum benefit being seen in those patients who achieve the target of 4.4 – 6.1 mmol/l (1). However, concerns about hypoglycaemia have resulted in some commentators recommending the use of wider target ranges.

This survey was designed to map current practice in UK adult intensive care units.

METHODS. All UK adult intensive care units (ICUs) in the Directory of Critical Care (2007) were contacted by telephone (between October 2007 and February 2008). The nurse in charge of the unit was surveyed using a predefined questionnaire.

RESULTS. 283 (99%) of the 286 UK ICUs took part in this survey. Of these, 243 (86%) had a written policy for glucose control. The upper limit for the glucose target range is shown in Table 1. Insulin was given by intravenous infusion by all but one unit which used intravenous boluses. 255/264 (97%) ICUs used arterial blood glucose monitoring. Of 9 that did not use it, 8 used capillary monitoring and 1 used venous monitoring. Bedside glucometers were used by 153/264 (58%) units. Of these 75 (49%) used them exclusively, though 76 (50%) combined them with use of the blood gas machine. 110 (42%) units used the blood gas machine alone. Laboratory assays were used by only 5 (3%) units and always in conjunction with either a glucometer or blood gas machine.. 126 (52%) of units used a sliding scale to determine insulin dose, whilst 90 (37%) used algorithms (dynamic protocols) that adjusted dose according to rate of change of blood glucose. Of the remainder the insulin dose was decided by the nurse at the bedside in 25 (10%) units and 2 units used other methods.

TABLE 1

Upper limit of blood glucose target range (mmol/l)	Number (%) of units
<= 6.1	80 (32%)
6.2–7.0	83 (33%)
7.1–8.3	67 (27%)
>8.3	18 (7.3%)

CONCLUSION. The vast majority of UK ICUs have a written policy in place for implementing strict glucose control, and for most the upper limit of the blood glucose target range is ≤7 mmol/L. Arterial blood glucose is monitored by almost all ICUs, most commonly using bedside glucometers though blood gas analysers are also used. Wide variation exists in the methods used to determine insulin dose, with most units using simple sliding scales.

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Poster Sessions
Microcirulation and coagulation: 0871–0883

0871

CARDIOPULMONARY BYPASS EFFECTS ON MICROCIRCULATION AS ASSESSED BY NEAR INFRARED SPECTROSCOPY

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INTRODUCTION. Patients undergoing cardiac surgery with cardiopulmonary bypass (CBP) may develop a systematic inflammatory response syndrome in the post-operative period, considered to be the result of a complex immunologic reaction consisting of humoral, cellular and hemostatic factors, caused by an imbalance of pro and anti inflammatory mechanisms. Vascular endothelial cells perform a pivotal role in mediating the response to this systemic inflammation and the cross talk between coagulation and inflammation. The effect of this inflammatory response on the peripheral microcirculation per se has yet to be thoroughly investigated. The purpose of our study was to assess the potential effects of CBP on the microcirculation of cardiac surgery patients, as assessed non-invasively by Near Infrared Spectroscopy (NIRS).

METHODS. We compared parameters of the microcirculation as obtained with the help of In Spectra Model 325 Near-Infrared Spectrometer (NIRS) in 12 cardiac surgery patients (Standard Euroscore 6 ± 4, Logistic Euroscore 9.1 ± 11.5), before the surgical procedure and 6 h post-operatively. Tissue oxygen saturation (StO2%) values of the thenar, deltoid and masseter muscles were noted and the brachial vascular occlusion technique was utilized to better assess the endothelial function, with the calculation of the oxygen consumption rate (CR), the reperfusion rate (RR) and the vascular reactivity (VR). Haemodynamic parameters were obtained with the use of a Swan-Ganz catheter.

RESULTS. The patients' baseline haemodynamic values post-operatively were MAP 82 ± 10 mmHg, CVP 8 ± 4 mmHg, PCWP 11 ± 4 mmHg, MPAP 23 ± 6 mmHg, CI 2.5 ± 1.2 L/min/m2, SVR 1427 ± 535 dyne x s/cm5, PVR 247 ± 134 dyne × s/cm5, HR 93 ± 18 bpm, Hb 11.9 ± 1.4 g/dl, lactate 2.6 ± 2 mg/dl, ScvO2 75 ± 8 %, SvO2 70 ± 4 %. The microcirculation parameters at baseline post-operatively were CR 19 ± 10%/sec, RR 246 ± 188%/s, VR 38 ± 21%*sec, thenar StO2 80 ± 9%, deltoid StO2 64 ± 27%, masseter StO2 65 ± 26%. We found a statistically significant decrease in the CR values post-operatively (CR 19 ± 10%/s versus 32 ± 16 %/s pre-operatively, $P = 0.005$). As the h after surgery progressed, the CR improved and six h post-operatively did not differ significantly from preoperative values. A similar difference was noted in RR (246 ± 188%/sec versus 640 ± 263 preoperatively, $P = 0.004$), with the value at 6 h not differing statistically from preoperative values.

CONCLUSION. The microcirculation of patients having undergone cardiac surgery with CBP, as assessed by NIRS, is affected, and tends to return to the preoperative state as time from surgery progresses. As the inflammatory process occurring during CBP has been associated with a serious increase in morbidity and mortality, the potential introduction of a non-invasive monitoring technique of the microcirculation to perioperative monitoring could possibly aid in the better understanding and management of this condition.

0872

POSTOPERATIVE PLATELET COUNT DECLINE IS A PROGNOSTIC MARKER IN CARDIAC SURGERY

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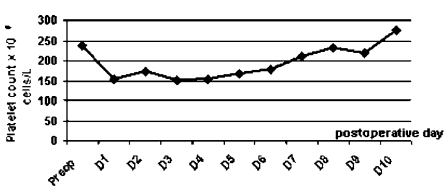
INTRODUCTION. Platelet count decline occurs frequently after on-pump cardiac surgery (1). Decline in platelet count in intensive care unit (ICU) patients provides prognostic information (2). The aim of our study is to investigate the platelet count decline post cardiac surgery and the correlation with the perioperative risk scores.

METHODS. We prospectively studied consecutive cardiac patients operated on pump during the year 2007. The data registered were: age, gender, type of surgery, EUROSCORE, daily platelet count during ICU stay, APACHE II score on admission in ICU and daily SOFA. Patients with preoperative thrombocytopenia (platelet count < 150 × 109cells/L) were excluded. Results were expressed as mean value and standard deviation. For statistical correlations the Pearson test was used.

RESULTS. 318 patients with on pump cardiac surgery were analyzed: 214 (67.3%) males and 104 (32.7%) females, age 55.5 ± 14.7 years. 202 (63.5%) patients developed postoperative thrombocytopenia. The evolution of postoperative platelet count is illustrated in fig.1. Mean platelet count declined 27.8% in day 1, 33.4% in day 2, 36.2% in day 3 and 29.1% in day 4 compared to the preoperative value. The peak platelet decrease in postoperative day 3 was higher in female than in male patients: 40.5% versus 32.8% ($p < 0.05$). Older patients (> 65 years) had a decrease of the platelet count of 42.1% compared to 35.3% in younger patients ($p < 0.05$). The percentage decrease of the platelet count in postoperative day 3 compared with preoperative values is significantly correlated with EUROSCORE, APACHE II score on admission and SOFA score ($p < 0.01$). Patients with EUROSCORE 0–2 have a 30% decrease of the platelet count in day 3, SOFA score 2.2 ± 2.2 and APACHE II score 7.1 ± 3.6. Patients with EUROSCORE 3–5 have a 35.5% decrease of the platelet count, SOFA score 2.8 ± 2.4 and APACHE II score 9.1 ± 4.1. Patients with EUROSCORE > 6 have a 46.2% decrease of the platelet count, SOFA score 4.7 ± 3.0 and APACHE II score 11.7 ± 4.4.



CONCLUSION. In our postoperative cardiac patients the highest percentage of platelet count decline was registered in day 3(36.2%). Older patients and female patients had a higher decrease of the platelet count. The percentage of platelet count decline is correlated with EUROSCORE, APACHE II and SOFA scores. Postoperative platelet count decline could be a prognostic marker in cardiac surgery.

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0873

IMPACT OF DISSEMINATED INTRAVASCULAR COAGULATION AFTER CARDIOPULMONARY BYPASS ON POSTOPERATIVE EXCESSIVE BLOOD LOSS AND PULMONARY MORBIDITY; BASED ON INTERNATIONAL SOCIETY ON THROMBOSIS AND HAEMOSTASIS (ISTH) SCORING SYSTEM

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INTRODUCTION. The stimulation of fibrinolysis during cardiopulmonary bypass (CPB) appears to contribute to the postoperative coagulopathy. Widespread vascular injury following CPB may result in uncrolled platelet activation, thrombin generation. However, it is difficult to define the occurrence of disseminated intravascular coagulopathy (DIC) after CPB due to the absence of diagnostic criteria of DIC. Recently, ISTH has proposed an overt and nonovert DIC scoring system, based on the outcome of several laboratory tests (1).

Therefore, the aim of present study was to investigate the incidence of overt DIC after CPB using ISTH scoring system. And another aim of the study was to examine whether the overt DIC after CPB was related to the post CPB excessive blood loss and morbidity.

METHODS. To estimate the ISTH score FDP, fibrinogen, prothrombin time, and platelet count were measured in (a) Time 1; before initiation of CPB, (b) Time 2; on admission to ICU, and (c) Time 3; 1st postoperative day. The occurrence of over DIC was determined when the ISTH score was 5. The 24-h postoperative blood loss and transfusion requirement were documented. The definition of excessive blood loss (EB) in ICU was greater than 1L blood loss for 24 h. The D-dimer levels before and after the CPB, postoperative oxygen index, intubation time, ICU stay were also documented.

RESULTS. DIC was not occurred at time point 1 and 3 in all enrolled patients. In time point 2, ISTH score was over 5 in 31 patients (D group), below 5 in 63 patients (C group). The D-dimer level after CPB, intubation time, and ICU stay were significantly higher in D group. The oxygen index on 1st postoperative day was lower in D group. The incidence of EB and proportion of patients transfused were higher in D group.

CONCLUSION. The overall incidence of post-CPB DIC was 33%. The post-CPB DIC was related to post-operative pulmonary morbidity and blood loss

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0874

DETERMINANTS OF ACUTE RENAL FAILURE AFTER SURGERY

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INTRODUCTION. Development of Acute Renal Failure (ARF) during perioperative period is associated with increases in morbidity and mortality. Our aim was to evaluate incidence, determinants and outcome in patients with previous normal renal function who developed ARF in the immediate postoperative period.

METHODS. Observational, prospective study conducted in a post-anesthesia care unit (PACU) with 5 intensive care beds from March to August 2006. Patients were followed for the development of ARF defined as creatinine blood levels higher than 20mg L^{-1} during the first 24 h after PACU admission. Patients' demographics, intra- and postoperative data were collected. We also recorded PACU and hospital length of stay (LOS) and mortality.

RESULTS. A total of 326 patients were studied. Eleven patients developed ARF. Age (OR 11.6, 95%CI 1,46–91.51, $p = 0.020$ for age ≥ 65 years), high risk surgery (OR 4.05, 95%CI 1.06–15,57, $p = 0.042$), ischemic heart disease (OR 3.88, 95%CI 1.11–13,54, $p = 0,034$), ASA physical status (OR 7.61, 95%CI 2.07–28.0, $p = 0.002$ for ASA IV/V patients) and total Revised cardiac Risk Index (RCRI) sore (OR 1.93, 95%CI 1.17–3.19, $p = 0.011$) were found to be independent predictors for development of ARF in the immediate postoperative period. Score of Acute Physiology Score II (SAPS II) was significantly higher in ARF patients ($p < 0.001$). In hospital mortality of these patients was higher (27% vs. 4%, $p = 0,001$).

CONCLUSION. This study shows that age, high risk surgery, ischemic heart disease, ASA physical status and RCRI score are risk factors for the development of ARF in the first 24 h in patients needing intensive care after surgery. ARF has serious impact in hospital and PACU mortality.

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0875

EXTENDED INVESTIGATIONS OF THE PRODUCT CHARACTERISTICS DEMONSTRATE THAT THE STATE-OF-THE-ART PROTHROMBIN COMPLEX CONCENTRATE OCTAPLEX® IS STABLE WHEN STORED AT ROOM TEMPERATURE

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INTRODUCTION. The state-of-the-art prothrombin complex concentrate Octaplex® has been used safely and successfully for the prophylaxis and treatment of acquired deficiency of factors of the prothrombin complex. Storage of the product at room temperature (RT) is desirable, promoting increased transport and storage convenience. Therefore, formal stability studies and extended biochemical characterisations were performed to demonstrate product integrity.

METHODS. Octaplex® stability studies for 36 months at RT were conducted according to ICH guidelines. Octaplex® (containers, freeze-dried product) stored at RT was compared with product containers kept cold (+2 to 8°C). Beyond investigation of prothrombin factors and the proteins C and S, physicochemical parameters and markers of activation were performed. In addition, the rabbit Wessler stasis model, an assay for the assessment of thrombogenic properties was used to demonstrate the absence of elevated thrombogenic activity.

RESULTS. Throughout the entire study period all parameters assessed revealed excellent stability complying with the product specifications. Samples stored at RT were indistinguishable from samples stored at +2 to 8°C. At a dose of 400 IU/kg body mass no signs of thrombotic activity were found in the Wessler model.

CONCLUSION. The integrity of Octaplex® was demonstrated upon storage for 36 months at RT, substantiated by extended physicochemical and biochemical studies. Moreover, the Wessler stasis model, did not indicate any elevated thrombogenic potency. Octaplex® RT storage for 2 years was recently granted in Germany.

0876

NEW METHOD DIAGNOSTICS COAGULATION DISORDERS AFTER SURGERY

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INTRODUCTION. Despite the evidence of perioperative hypercoagulability in cancer patients, there are no consistent data evaluating the extent, duration, and specific contribution of platelets and procoagulatory proteins by in vitro testing. This study compared efficacy of haemoviscoelastography versus thromboelasthgraphy for monitoring of coagulation imbalance.

METHODS. 128 Patients undergoing surgery for abdominal cancer we examined the efficacy of a variety of coagulation tests. A complete coagulation screening, thromboelasthgraphy (TEG) and haemoviscoelastography (HVG) were performed before and at the end of surgery.

RESULTS. We calculated the elastic shear modulus of standard MA (Gt) and HVG MA (Gh), which reflect total clot strength and procoagulatory protein component, respectively. The difference was an estimate of the platelet component (Gp). There was a 14% perioperative increase of standard MA, corresponding to a 48% increase of Gt ($P < 0.05$) and an 80–86% contribution of the calculated Gp to Gt. We conclude that serial standard thromboelastography and HVG viscoelastic test may reveal the independent contribution of platelets and procoagulatory proteins to clot strength. Using multiple linear regression, all coagulation, TEG and HVG variabities were used to model postoperative hypercoagulation. Results showed that some components of the TEG failed to identify hypercoagulation ($r < 0.2$, $P > 0.75$). All components of the HVG test reflect postoperative coagulopaties.

CONCLUSION. Hypercoagulability is not reflected completely by standard coagulation monitoring and TEG and seems to be predominantly caused by increased platelet reactivity. HVG provides a fast and easy to perform bedside test to quantify in vitro coagulation, may be usefull in determining the coagulation status of cancer patients perioperatively.

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0877

EFFECTS OF PLATELET TRANSFUSION EVALUATED WITH ROTATIONAL THROMBOELASTOMETRY

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INTRODUCTION. Thrombocytopenia is a common complication of hematologic malignancies, but it also accompanies other conditions, e.g. major blood loss. The clinical effects of platelet transfusions has been debated and several efforts to evaluate the effects of such transfusions. Previous evaluations have frequently focussed on the increase in platelet count and on the viability of the transfused platelets after transfusions, while studies evaluating the coagulation system after platelet transfusions are lacking. We have used ROTEM to evaluate the effects of platelet transfusions given to thrombocytopenic patients.

METHODS. Ten patients suffering from leukemia and thrombocytopenia with a platelet count below $50x10^9$ /l scheduled for insertion of a central venous catheter (CVC) were included in the study. The patients were planned to recieve one unit of platelets prior to insertion according to hospital guidelines. Hb, platelet count, PT, aPTT and ROTEM analyses were performed before and after transfusion of one unit of platelets. ROTEM analysis was performed according to the INTEM procedure using the contact activator ellagic acid for initiation of the coagulation process. Maximum Clor Firmness (MCF), Clot Formation Time (CFT and Clotting Time (CT) were analysed.

RESULTS. Platelet count increased from a median value of 31,5 to 43 $\times$ 10^9/l. The ROTEM parameter MCF was increased from 42 to 51.5 mm after transfusion ($p = 0.005$) and CFT was decreased from 181.5 to 123 s ($p = 0.005$) while CT was unchanged. PT and aPTT were unchanged.

CONCLUSION. MCF is primarily a measure of platelet activity so this study indicates a positive effect of platelets when given to patients with a low platelet count. CFT reflects in part platelet activity, but is is affected also by humoral coagulation factors. As PT and aPTT together with the ROTEM parameter CT are unaffected it is likely that the effect on CFT is also an effect of the increased platelet count.

0878

TROMBOELASTORGAPHIC DETECTION OF RECOMBINANT ACTIVATED FACTOR VII EFFICACY

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INTRODUCTION. During treatment of bleedings, related with different hemostasis abnormalities, the average recommended dose of the rFVIIa (NovoSeven) medication (90 mg/kg) may be inadequate or excessive. In the published papers it is possible to find the recommended doses from 60 up to 300 mg/kg. Serious adverse events (thrombosis) associated with rFVIIa use occure than 1%. Nevertheless we need the objective method for the efficacy and safety control of this medication.

METHODS. In this study tromboelastography was used during the therapy of bleedings by rFVIIa in the patients with different hemostasis abnormalities (thrombocytopenia, hemophilia A with inhibitor to factor VIII, warfarin's coagulopathy, hepatic coagulopathy, factor VII or factor $\times$ deficiency) or without them. Blood samples of 47 patients were measured before, 15 min and 2 h after injection of the rFVIIa at average dose 90 mg/kg (60–160 mg/kg). The dynamic of several TEG properties were measured: time to clot initiation (R), clot propagation (K and a angle), clot tracings - maximum amplitude (MA) and the 30 minutes fibrinolysis. At the same time the platelet count, activated partial thromboplastin time (APTT), prothrombin time (PT), thrombin time (TT) and fibrinogen were controlled.

RESULTS. The improvement of the TEG indices was registered in 30 patients (64%), the effect's absence in 4 patients (8,5%), decreasing in 13 patients (27,5%). Two patients (4%) have showed the excessive superfluous effect - signs of hypercoagulation. Fibrinolysis activation was registered in 2 patients (4%). The maximal improvement of the TEG indices was shown in hemophilic patients with inhibitor to factor VIII, in patients with factor VII deficiency and coagulopathy associated with oral anticoagulants intake or liver disease. Significant effect was obtained in patients with moderate thrombocytopenia (PLT $> 20\times109$/l). Absence or minimal effect was occurred in cases with severe thrombocytopenia (PLT $< 20\times109$/l), hypofibrinogenemia (fibrinogen $< 1,5$ g/l) and particularly in cases of combination of these conditions. In this cases transfusion of platelets and fibrinogen-containing medications, in addition to injections of rFVIIa, considerably improved the TEG indices. The absence of the effect in 3 patients was due to acidosis and hypothermia. The clinical effect did not always coincide with the TEG data: in 6 patients (13%) the break or decrease of bleeding's pace was noted while the laboratorial dates were not improve.

CONCLUSION. The effect of injection of the standard doses of rFVIIa is not always predictable as it correlates with several factors. TEG can be used as the complementary method for the efficacy estimation and for dose selection of rFVIIa, for the choice of optimal combination with other means of hemostasis correction and to reveal undesirable effects as hypercoagulation, hemostasis depletion, fibrinolysis, their correction and prophylaxis.

0879

POINT OF CARE PLATELET MONITORING IN THE OPERATING THEATRE

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INTRODUCTION. Platelet dysfunction during cardiac surgery leads to increased blood loss and transfusion requirements and may result in reopening of patients. Dysfunction may be due to many causes including the effect of anti platelet medication (aspirin and clopidogrel). Point of care monitoring of platelet function may help to identify those patients at risk and guide appropriate therapy.

METHODS. We assessed platelet function in the operating theatre in ten patients having off pump coronary artery bypass grafting using two methods—the plateletMapping TEG™ (Haemoscope, IL) and the Multiplate analyzer (Dynabyte, Munich). The multiplate analyser is a multiple electrode whole blood aggregometer which uses a single test cell with 2 separate impedance sensors per test. Aggregation was triggered with ADP (6.4 mcmol, ADP test) and Arachidonic Acid (0.5 mM, ASPI test). Platelet function was quantified by the Area Under the aggregation Curve (AUC).The plateletMapping TEG™ is a modification of the TEG™ which allows the calculation of the percentage of platelets inhibited by ADP receptor antagonists or aspirin. It uses factor XIIIa and reptilase to form a clot without thrombin generation in heparinised blood. The resulting maximum amplitude of the clot is dependant on platelet agonists (either ADP or Arachidonic Acid) added to the blood. These agonists attempt to stimulate platelet aggregation and clot formation. If the platelets are inhibited aggregation will not occur. Platelet function was quantified by the percentage of platelets inhibited.

RESULTS. The instruments gave results which correlated well with each other particularly when looking at the dysfunction due to aspirin. As expected those who had stopped aspirin for 5 days had near normal function, whilst those who had only stopped it for a day had almost completely inhibited platelets. The ADP results were less conclusive—2 patients had stopped clopidogrel 5 days before but were shown on both tests to have inhibition of platelet function.

TABLE 1 PLATELET FUNCTION DEMONSTRATED BY TEG AND MULTIPLATE (NA, NEVER TOOK CLOPIDOGREL)

Patient number	TEG AA inhibition (%)	AA AUC	Days stopped aspirin	TEG ADP inhibtion (%)	ADP AUC	Days stopped clopidgrel
1	7.8	538	5	51.4	442	5
2	9.4	461	5	8	478	NA
3	10.8	510	5	76.3	286	NA
4	20.3	382	5	94.9	0	5
5	25.3	402	5	15	126	NA
6	56.4	247	3	9	468	NA
7	61.6	461	3	96.9	4	5
8	83.5	0	3	11	452	NA
9	95.7	0	1	12	468	NA

AA correlation = − 0.91, p = 0.001, ADP correlation = − 0.73, p = 0.01, selection of result

CONCLUSION. In this small pilot study we have demonstrated that both of these instruments have potential to be used as point of care monitors of platelet in the perioperative setting when looking at the effects of anti platelet medication. This testing has potential to be used in the pre operative setting to identify those patients at risk of severe bleeding and plan accordingly

0880

BASE DEFICIT IS RELATED TO MORTALITY IN MASSIVE TRANSFUSED TRAUMA PATIENTS UNDERGO TO DAMAGE CONTROL SURGERY AND 1:1 RED BLOOD CELLS/FRESH FROZEN PLASMA RATIO TRANSFUSION

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INTRODUCTION. Damage control surgery is an accepted approach for severe trauma patients management. Recent retrospective reports have shown a probable decreased mortality with 1:1 red blood cells (RBC)/fresh frozen plasma (FFP) ratio transfusion. Our objective was to determine which factors were associated to mortality in massive transfused trauma patients undergo to damage control surgery in a population subjected systematically to coagulopathy correction with the 1:1 strategy.

METHODS. DAMACON is a prospective registry of severe trauma patients subjected to damage control surgery in a I trauma level hospital in Colombia between 2000 and 2007. Patients receiving more than 5 red blood cells packs in the first 24 h were identified as massive transfused and included for analysis. General demographic variables, type of trauma, volume of blood derivates, physiologic and laboratory variables at ICU admission and 24 h after, and 30 day mortality were collected. 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. Fifty three patients subjected to damage control surgery and receiving politransfusion registered in DAMACON database were identified and included for analysis. 30 days mortality was 41.5%. Significant differences for RTS and PT and base deficit at 24 h were observed for survivors and non survivors. No significant differences in ATI, ISS, trauma mechanism, RBC/FFP ratio and other physiologic and laboratory variables at ICU admission and 24 h after trauma were found. After multivariate analysis only base deficit maintained significant difference (OR 0.62, 95%IC 0.43–0.91).

TABLE 1

	Survivors, n = 31	Non survivors, n = 22	p
ATI (IQ 25–75)	25 (20.5–38.0)	33 (20.5–48.5)	0.22
ISS (IQ 25–75)	26 (19.5–34.0)	34 (25.0–38.0)	0.09
RTS (IQ 25–75)	7.84 (7.84–7.84)	7.55 (6.38–7.84)	0.004
Penetratingtrauma, n%	24 (77.4)	16 (72.7)	0.75
PT 24 h (IQ 25–75)	13.5 (12.0–15.0)	16.0 (13.0–19.0)	0.02
RBC/FFP ratio	1.35 (0.87–2.06)	1.38 (0.66–2.57)	0.92
BE 24 h (IQ 25–75)	−6.3 (−8.2 to −4.4)	−12.4 (−20.12 to −9.1	<0.001

CONCLUSION. In patients with severe trauma subjected to damage control surgery and to a 1:1 RBC/FFP ratio transfusion strategy, persistent acidosis demonstrated by base deficit at 24 h was associated with a higher mortality. Future research efforts should be carried out focusing on the early improvement of perfusion variables.

0881

CLINICAL SIGNS AND RISK FACTORS OF ACUTE DEEP VEINS THROMBOSIS OF LOWER EXTREMITIES IN PATIENTS AFTER ABDOMINAL SURGERY FOR CANCER. EFFICIENCY AND SAFETY OF DIFFERENT TYPES OF ANTICOAGULANT THERAPY

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INTRODUCTION. Background of our research was to conduct the retrospective analysis of clinical signs and risk factors of acute deep veins thrombosis (ADVT) of lower extremities, and to compare effectiveness and safety of therapy of LMWH enoxaparin and UFH in patients after abdominal surgery for cancer.

METHODS. For period from 2003 to 2008 the diagnosis of ADVT was set for 318 patients, among them 156 (49.4%) men and 162 (50.6%) women. Among patients with ADVT with primary localization in ileofemoral and popliteal segments which treated in the departments of vascular surgery prevailed senior persons more than 60 years old (62.7%). All of patients with ADVT got therapy with anticoagulants. Enoxaparin sodium was prescribed in 240 (74.9%) cases, UFH in 56 (17.3%) and in 22 (7.8%)—others LMWH. Were have analysed efficiency and complications after antithrombotical therapy in a hospital period. A complete coagulation screen, activated clotting time(ACT), thromboelasthography (TEG) and lowfrequency haemoviscoelasthography (HVG) were performed to reveal coagulation disturbances.

RESULTS. In 82.6% cases the most frequent symptoms of disease are an edema of extremity (in 79.1%) and pain syndrome 74.1% wich at a monosymptomal variant (37.7% patients), are marked in 67.5% and 46.4% accordingly. Most frequent risk factors (RF) they had the prolonged (more than 8 days) immobilization and malignant tumors. Therapy of UFH and LMWH was effective (on the average a good result is got in more than in 75% cases) enough. Enoxaparin treatment was related to considerably less of hemorrhagic complications, than treatment of UFH ($p < 0.05$), that concerned all of types of such complications.

CONCLUSION. Efficiency of anticoagulant therapy (decreasing of the number of ascending thrombosis, recurrent DVT, and episodes of pulmonary embolism (PE) was identical at enoxaparin and UFH groups, however in cases of enoxaparin application regress of clinical signs in was rapider. Treatment of with enoxaparin as compared to UFH accompanied with reduced frequency of all hemorrhagic complications in 2.1 times, serious in 2.7 times and moderate in 3.1 times. HVG is effective point-of-care monitor for routine clinical practice and clinical research.

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0882

EFFECTS OF MORPHINE AND DEXMEDETOMIDINE ON COAGULATION IN POSTOPERATIVE PATIENTS

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INTRODUCTION. Inflammation impacts the initiation, propagation and the inhibitory phases of blood coagulation. In this respect, the analgesic agents which inhibit inflammatory response may have impact on the coagulation status in postoperative patients. Dexmedetomidine and morphine are frequently used for postoperative analgesia and their anti-inflammatory effects were shown in animal models. The aim of this study is to evaluate the impact of dexmedetomidine and morphine on coagulation in postoperative patients admitted to ICU.

METHODS. Twenty patients who underwent orthopedic, reconstructive or abdominal surgery using a standardized anesthesia protocol were included in to the study after admission to the ICU. The criteria for exclusion were hemodynamical instability, acidosis, hypothermia and bleeding requiring transfusion of blood products. Morphine ($n = 10$) or dexmedetomidine ($n = 10$) were used for 8 h postoperatively with the infusion rates of 60 mic.gram/kg/h and 0.5 mic.gram/kg/hour, respectively. Blood coagulation analysis was performed with venous bloods which were taken before the initiation of analgesic regimen and after 8 h of infusion. Thromboelastography (ROTEG analyzer- Pentapharm GMBH, Munich, Germany) and coagulation screening tests like prothrombin time (PT)/partial thromboplastin time (PTT)/ international normalized ratio (INR) were performed to evaluate blood coagulation.

RESULTS. Tromboelastography analyses revealed a decrease at clotting time (CT) after 8 h in morphine (168 ± 52 sec vs. 153 ± 26 sec) and dexmedetomidine (219 ± 82 s vs. 177 ± 36 s) groups but the differences were not significant ($p > 0.05$). Cloth Formation Time (CFT), Maximum Clot Firmness (MCF) and Alpha-angle (AA) values were not changed after 8 h of morphine or dexmedetomidine infusion. There was no difference in terms of tromboelastography parameters and coagulation screening tests between morphine and dexmedetomidine groups performed after 8 h of infusion.

CONCLUSION. The coagulation profile of the postoperative patients was not changed after 8 h of morphine or dexmedetomidine infusion.

0883

IS RECOMBINANT FACTOR SEVEN FRIEND OR FOE DURING INTRA– AND POSTOPERATIVE BLEEDING?

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INTRODUCTION. Intra- and post-operative haemorrhage is a frequent and difficult to treat complication during and after prolonged and traumatic operations. The off-license administration of activated Recombinant Factor VII (rFVIIa) to treat haemorrhage in surgical patients without haemophilia has been investigated, but understanding over potential profit or adverse events hasn't been achieved [1,2]. This report describes some mistakes during rFVIIa's administration.

ETHODS: 7 patients with massive intraoperative blood loss (mediana 80 ml/kg, min 69 ml/kg, max 126 ml/kg), postoperative bleeding above 10 ml/min (mediana 12 ml/min, min 10 ml/min, max 14 ml/min) and clotting time above 30 min were included in study group. All patients received rFVIIa (mediana 119 mkg/kg, min 103 mkg/kg, max 129 mkg/kg) after fresh frozen plasma (FFP) administration and RBC to maintain Hct above 27. We investigated speed of active bleeding and clotting time after rFVIIa administration, early outcome and FFP volume.

RESULTS. a. Active bleeding has been stop and clotting time decreased after rFVIIa administration in four cases. The FFP volume was above 40% for blood loss in this patients. All of them discharged from ICU. b. Active bleeding increased in spite of clotting time decreased in one case. Bleeding was stopped by surgery. The FFP volume was above 41% for blood loss in this case. Patient discharged from ICU. c. Active bleeding and clotting time increased in spite of rFVIIa administration in the other two cases with FFP volume under 35% for blood loss. Bleeding stopped after FFP administration in one case. And one patient died from disseminated intravascular coagulation (DIC).

CONCLUSION. RFVIIa may stop hypocoagulation bleeding inducing by massive intraoperative blood loss only after plasma volume compensation more than 40% for blood loss. The rFVIIa maybe initiate DIC syndrom during clotting factor deficit (especially platelets) induced by massive intraoperative blood loss. RFVIIa can not stop surgical bleeding of course.

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Poster Sessions
Nutrition: 0884–0897

0884

PILOT "123 ICU NUTRITIONDAY 2007": OBSERVED/PREDICTED MORTALITY FOR DIFFERENT NUTRITIONAL APPROACHES

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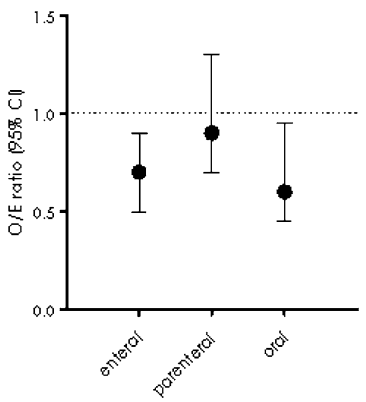
INTRODUCTION. 123 ICU Nutrition Day 2007 was the pilot study of a project that has the aim to develop the tools and infrastructure to run a multi-centre cross-sectional audit in all national languages about nutritional care and outcome in European ICU's. Sixty-four ICUs from different European countries participated.

METHODS. We have used the data from the 44 ICUs that provided 60 day outcome for more than 75% of the patients. Patients were analysed as Parenteral Group (PG), the Enteral Group (EG), and the Oral Group (OG). Based on SAPS2, we calculated the predicted mortality of each patient and the O/E ratio with 95% confidence intervals.

RESULTS. The quality data sample of NutritionDay 2007 included 666 patients. The three groups were made of 94 (PG), 172 (OG), and 207 (EG) patients and the median predicted mortality was respectively 17.3%, 16.7% and, 19.6%. The observed mortality for each group was 24 (25.53%), 31 (18.02%) and 40 (19.32%) patients. O/E ratios and upper/lower limit CIs are shown in Figure.



CONCLUSION. The following data has shown patients that received oral and enteral nutrition has had a better mortality rate than expected. Patients that received parenteral nutrition showed a worse mortality rate.

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0885

PREVALENCE OF VITAMIN DEFICIENCIES ON ADMISSION AND THEIR ASSOCIATION WITH HOSPITAL MORTALITY IN CRITICALLY ILL PATIENTS

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INTRODUCTION. Vitamin deficiency is believed to be common in critical illness. Water soluble and antioxidant vitamins are those most frequently used for supplementation in these patients. There is no data to confirm the prevalence of vitamin deficiencies in high-risk emergently admitted intensive care patients, nor their association with hospital mortality.

METHODS. 129 consecutive, critically ill patients who were emergently admitted to intensive care were enrolled in this prospective observational cohort study. Patient data including diagnosis, source of admission and severity of illness scores were prospectively collected. Within the first 48 h of admission, concentrations of C-reactive protein, vitamins A,E,B1,B12 and folate were measured on arterial blood. Multivariate stepwise logistic regression modelling was performed to examine the association of vitamin concentrations with hospital mortality. Separate models were calculated for all patients [Model A], and for those who had received thiamine supplementation prior to admission[Model B].

RESULTS. 55 (43%) had a biochemical deficiency of one of the five vitamins on admission to the ICU. A total of 18 patients died (14.0%) during their hospital stay (15 of those in the ICU). Moderate correlations with C-reactive Protein (CRP) concentrations were demonstrated for Vitamins B12, A and E (Spearman's $r = 0.309$, -0.541 and -0.299, $p = 0.001$, 0.001 and 0.007 respectively).Hospital mortality was significantly associated with age, APACHE II score, admission and maximum SOFA scores, and admission source in the univariate analyses, but only APACHE score was significant on multivariate analysis (OR 1.180 (1.06–1.3), $p = 0.001$), for either Models A or B.

CONCLUSION. Deficiencies of water soluble and antioxidant vitamins are common on admission in unplanned or emergent admissions to the ICU, but they are not independently associated with hospital mortality.

0886

COMPARISON OF THREE ENTERAL FORMULAS TO GLYCEMIC AND INFECTIOUS CONTROL IN CRITICALLY ILL PATIENTS UNDER MECHANICAL VENTILATION: HIGH-PROTEIN, HIGH-PROTEIN DISEASE-SPECIFIC AND DISEASE-SPECIFIC DIET SUPPLEMENTED WITH GLUTAMINE

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INTRODUCTION. Infectious complications in critically ill patients determine high morbidity and mortality. Glycemic control with disease-specific diets, insulin therapy and immunonutrients (glutamine) may reduce these complications. We aimed to:1) Evaluate if the administration of a disease-specific enteral formula supplemented with glutamine reduces infectious complications compared to a disease-specific high-protein formula and to a conventional high-protein enteral formula.2) Determine metabolic control with the three diets.

METHODS. Prospective, randomized, single-blind and independent samples study. 150 patients were estimated to detect, with a power of 90%, a 15% reduction in infectious complications. Three groups were established: A: conventional high-protein formula, B: disease-specific high-protein formula, C: disease-specific formula supplemented with glutamine (0.5gr/Kg/day). Eligibility criteria: age $\geq$ 18 years, enteral nutrition $\geq$ 5 days. Exclusion criteria: acute kidney failure (creatinine $>$ 3 mg/dl), liver failure (bilirrubin $>$ 3 mg/dl) APACHE II score $<$ 10 or $>$ 30, obesity (BMI $>$ 35Kg/m2). Target level for blood glucose was established between 110–150 mg/dl by insulin continuous infusion. The Harris-Benedict formula with a stress factor of 1.2 was used to calculate caloric needs. Volume ratio, glycemic control and gastrointestinal and infectious complications were evaluated every day. An intention-to-treat analysis was performed and data analysis was done by: Fisher exact test, Ji-square and ANOVA analysis corrected by Bonferroni method.

RESULTS. Preliminary communication with the first 42 patients. Age(years): 59.52 ± 14.98. Sex (male): 59.5%. APACHE II score on admission: A 20.33 ± 6.07, B 22.70 ± 6.99,C 21.71 ± 4.37. Mortality: A 40%, B 40%, C 29.4%. Days of mechanical ventilation: A 13.87 ± 12.66, B 17.30 ± 19.96, C 9.88 ± 4.44 (n.s). ICU length of stay (days): A 17.67 ± 13.09, B 19 ± 19.48, C 14.82 ± 6.40 (n.s). There were no significant differences either in infectious complications or in Homeostasis Model Assessment (HOMA). Metabolic control (Table 1).

TABLE 1

	A (n = 15)	B (n = 10)	C (n = 17)
Plasma glucose level mg/dl	142.62 ± 36.67	142.60 ± 34.01 (n.s)	133.10 ± 32.00*
Capillary glucose levl mg/dl	131.86 ± 33.76	134.26 ± 27.80 (n.s)	131.88 ± 29.06 (n.s)
Insulin (UI)/day	24.24 ± 31.96	24.81 ± 23.77 (n.s)	19.85 ± 26.53 (n.s)
Insulin/gr CHO received	0.13 ± 0.18	0.16 ± 0.17 (n.s)	0.16 ± 0.37 (n.s)

p-value: n.s non significant; (*) p < 0.05

CONCLUSION. (1) A significant reduction in plasma glucose level on group C has been shown. (2) Target level of plasma and capillary glucose has been achieved in three groups. (3) A tendency to reduce days of mechanical ventilation in group C is appreciated.

0887

DOES INTRAVENOUS IRON INDUCE INFLAMMATION AND OXYDATIVE STRESS IN A MOUSE MODEL OF PERITONITIS?

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INTRODUCTION. Blood loss, leading to iron loss, plays an important role in ICU anemia; but iron is rarely proposed, because of his supposed toxicity (1). We recently demonstrated that spleen iron is mobilizable at day 5, in a mouse model of ICU anemia, based on Zymosan (Z) peritonitis (2). The aim of this study was to evaluate the effect of iron on inflammation and oxydative stress, in mice with Z peritonitis.

METHODS. We compared the effect of high dose (3 mg) and low dose (0.3 mg) intravenous (iv) iron in control (C) mice and of low dose in Z mice at day 5. Mice were killed at 1, 2 and 24 h post iv. We measured blood levels of iron, IL-6 (by ELISA) and AOPP (Advanced Oxidation Protein Product). Data are expressed as mean ± sd, and compared with a Kruskall-Wallis test.

RESULTS. There is a positive correlation between iron and AOPP levels ($r2 = 0,27$, $p = 0,01$). High iron doses are associated with high iron levels, till H24 (H1 381 ± 181, H2 273 ± 179, H24 47 ± 10 µmol/l) compared with C (25,6 ± 3 µmol/l, $p < 0,05$). Iv iron is associated with an early IL-6 induction for the low dose and with a late induction for high dose; but surprisingly not in Z mice. AOPP are increased in high dose only (table).

TABLE 1

	C (+NaCl) n = 5	Z (+NaCl) n = 8	Z + Iron (0.3 mg) n = 10	C + Iron (0.3 mg) n = 9	C + Iron (3 mg) n = 15
IL-6 (ng/ml) H1	53 ± 23	252 ± 1 *	99 ± 45	876 ± 357 *	152 ± 16
H2			128 ± 90	278 ± 106 *	275 ± 238 *
H24		139 ± 190	39 ± 44	162 ± 166	505 ± 181 *
AOPP(µmol/l)	54 ± 34	15 ± 3	38 ± 15	83 ± 17	211 ± 9 *
H2			39 ± 4	47 ± 11	264 ± 290 *
H24		61 ± 25	18 ± 7 *	24 ± 4	71 ± 27

** $p < 0.05$ vs. control; C = control; Z = Zymosan*

CONCLUSION. In our mice Zymosan model low dose of iron (equivalents to 300 mg for human) are not associated with induction of inflammation or oxidative stress. Nevertheless, tissue examination and long term analysis are required before proposing iv iron in ICU clinical setting.

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0888

ENERGY EXPENDITURE DURING WEANING FROM MECHANICAL VENTILATION USING INDIRECT CALORIMETRY

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INTRODUCTION. Indirect calorimetry (IC) can be useful in the evaluation of metabolic status from critical care patients, especially during weaning from mechanical ventilation (MV) when energy expenditure can increase. The goals from this study were to compare the energy expenditure (EE) from patients during weaning from MV comparing pressure support ventilation (PSV) and T tube (TT) using IC as well as to compare these findings with results calculated with Harris-Benedict equation.

METHODS. Patients clinically ready to discontinue MV support were evaluated from August 2006 to January 2007. They were studied, in a random order, during PSV and TT. Measurements from EE were registered during 20 minutes in both methods. Indirect calorimetry was registred using a specific metabolic monitor (Datex-Ohmeda/M-COVX). EE was also estimated using Harris Benedict equation with and without activity factor. Results are shown in mean and standard deviation. Statistical analysis was done with paired T test, Pearson correlation coefficient and Bland and Altman. Significance level was $p < 0.05$.

RESULTS. Forty patients were enrolled. Mean age was 56 ± 16 years, APACHE II score was 23 ± 8 and the majority of patients were male (70%). Mean EE during TT was 14,43% greater than during PSV ($p < 0.001$). Mean EE estimated by Harris-Benedict equation was 1455,05 ± 210,4 Kcal/24 h and, considering the activity factor, 1608 ± 236,14 Kcal/24 h. Both calculated values showed correlation with measured by IC during PSV ($r = 0,647$) and TT ($r = 0,539$). The agreement limits comparing measured and estimated EE with the Bland and Altman analysis suggest that Harris-Benedict equation underestimates EE during TT.

CONCLUSION. Comparing EE during PSV and TT, using IC, we observed that during TT there was, as expected, an increase in EE (14,43%). The results also suggest that Harris-Benedict equation underestimates EE during TT.

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0889

EARLY IMMUNO-ENHANCING ENTERAL FEEDING IN A COHORT STUDY OF CRITICALLY ILL PATIENTS WITH SEVERE TRAUMATIC BRAIN INJURY

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INTRODUCTION. The role of early enteral immuno-nutrition in critically ill patients and especially in the sub-group of severe traumatic brain injury (TBI) is highly disputed. Optimal nutrients constitution, dose scheme, starting point and duration still remain subjects of debate. Recent data from microdialysis studies argue for a role of NO metabolism (closely related to arginin's). The goal of this study was to compare the effects of an early immuno-enhancing enteral diet in TBI patients VS standard feeding formula in terms of clinical indices/outcome and parameters of nutritional and immunological status.

METHODS. Prospective, randomized, controlled trial, with consecutive patients. Two groups: A = standard enteral feeding 1 kcal/ml (Nutrison STD) and B = immuno-enhancing feeding, 13 g/L Arginine (Impact, Novartis, oral/enteral). 30 days follow up, clinical/nutritional assessment (1–7 days,30th day), immunological profile—cytokines, pre-albumin, NO derivatives (admission, 1st, 4th, 7th day), DNA analysis (sample on admission), std labs (every day), hormone profile—cortisol (admission, 1st, 4th, 7th day) severity scores (Apache-II, GCS, GOS)and mortality to 30 days. Results analysed with SPSS.

RESULTS. From Sep.2007 to Apr.2008, 33 patients enrolled (A = 16, B = 17, M/F = 25/8, Age 34 ± 12, GCS 9 ± 4, Apache II score 18 ± 5), enrollment continues. We had 1 death by the 30th day. 52% of patients started enteral feeding before the 2nd day and 83% by the 3rd day post-admission, 75% met their theoretical nutritional needs (Harris Beneddict). The two groups were comparable regarding demographics and severity of TBI (both scores). Primary end points of this study : infections percentage and timing, length of mechanical ventilation (7 ± 6 VS 8 ± 7 days) and laboratory profile were not different between the two groups (A, B) with the exheption of pre-albumin levels at the 7th day (in favor of immuno, 13.8 ± 2 VS 17.8 ± 9.2, $p < 0.05$). ANOVA (separate for the 2 groups) did not reveal any significant variance over time (1st, 3rd, 7th day) in WBC and pre-albumin level. Results from cytokines and NO metabolism are pending.

CONCLUSION. It seems that early enteral immunonutrition (based mainly on high Arginine content) is not clearly beneficial in a small group of critically ill ventilated patients with TBI. Awaited results will further enlight us concerning the immunological/biochmeical/hormonal mechanisms involved.

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0890

ENERGY NEEDS OF CRITICALLY ILL PATIENTS

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INTRODUCTION. Accurate measurement of resting energy expenditure (REE) is helpful in determining the energy needs of critically ill patients requiring nutritional support. Currently, the most accurate clinical tool used to measure REE is indirect calorimetry, which is expensive, requires trained personnel, and has significant error at higher inspired oxygen concentrations.
Objective: The purpose of this study was to compare REE measured by indirect calorimetry with REE calculated by Harris-Benedict equation (H.B.E.).

METHODS. Prospective study conducted in a polyvalent ICU. REEs of 197 patients [mean age 57,35 ± 19,12 years and mean length of stay 16,44 ± 20,52 days] receiving mechanical ventilation were measured by using indirect calorimetry and compared with REEs calculated from H.B.E.

RESULTS. we performed 587 measurements of I.C. (median time of useful measurement – 14 h). Mean estimated energy requirements using H.B.E. –1462,09 ± 238,4(20,92 Kcal/kg/day)) and mean energy requirements by I.C. – 1849,74 ± 394,66 (27,34 Kcal/kg/day). Trauma patients had the higher energy requirements (31,28 ± 7,81 Kcal/kg/day) and the schedule surgery (25,61 ± 6,51 Kcal/kg/day)and liver transplant (22,63 ± 4,93 Kcal/kg/day) had the lower energy requirements. The Estimate Stress Factor varies between 0,96 (liver transplant) and 1,31 (trauma patients).

CONCLUSION. Traditionally, the Harris-Benedict equation (HBE) has been the accepted standard for determining the energy requirements of critically ill patients. But the accuracy of the HBE is limited in ventilator-dependent patients, patients who are either morbidly obese or severely malnourished and underweight, transplant patients, and patients with marked fluid overload, ascites, extensive limb amputations, or paraplegia. In critically ill patients indirect calorimetry, if available, remains the most appropriate clinical tool for accurate measurement of REE. Indirect calorimetry offers a scientifically-based approach to customize a patient's energy needs and nutrient delivery to maximize the benefits of nutrition therapy. With recent advances in technology, indirect calorimeters are easier to operate, more portable, and affordable. Increased utilization of indirect calorimetry would facilitate individualized patient care and should lead to improved treatment outcomes.

0891

FEEDING ELDERLY CRITICALLY ILL PATIENTS: IS IT A PROBLEM?

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INTRODUCTION. Critically ill elderly patients are at high risk to develop protein-energy malnutrition. Their optimal recovery depends on an adequate nutritional state. To prevent and treat malnutrition is fundamental to provide good patient care, yet providing nutritional support (NS) to the critically ill elderly is a major challenge. The goal of this study was to compare NS between elderly (≥ 65 years old) and non-elderly (< 65 years old) critically ill patients.

METHODS. Prospective analysis of consecutively admitted patients in two mixed ICU. Exclusion criteria were: NS for < 2 days, age < 16 years and length-of-stay (LOS) < 3 days. Patients were followed for the first 7 days of NS. Data collection included: demographic data, NS (route, target volume (TV) and delivered volume), reasons for suspension and reduction of NS. Chi-square, Mann-Whitney U and T-test were used in statistical analysis.

RESULTS. Forty of the one hundred and two patients studied were ≥ 65 years old mainly male (60%) with a mean SAPS II score 54,8 ± 16,1. Most of the elderly were medical patients (60%) followed by surgical (22,5%) and trauma (17,5%). Although not statistically significant ($p = 0,088$) NS was started earlier in the elder 30,2 ± 17,1 h after ICU admission, mostly by enteral route (82,5% vs. 93,5%; $p = 0,105$). TV achievement was similar in both groups (47,5% vs. 38,7%; $p = 0,380$). We analyzed 687 nutrition days (ND) with statistical difference ($p < 0,001$) between the two studied populations (Table 1). In elderly patients NS was suspended in 22,6% of the days (22,6% vs. 24,0%; $p = 0,675$) due to gastrointestinal dysfunction (GI) (42,6%), diagnostic and therapeutic procedures (29,5%), airway management (8,2%) and lack of route delivery (4,9%). GI dysfunction was less frequently responsible for enteral nutrition reduction in elderly than in non-elderly patients (7.4% vs. 9.4%; $p = 0.374$). More than 90% of prescribed NS was delivered in a significantly higher number of ND in the elderly group (64,1% vs. 52,7%; $p = 0,003$). Median ICU LOS was 20 days with a higher ICU mortality in the elderly (45,0% vs. 12,9%: $p < 0,001$).

TABLE 1 NUTRITION DAYS DISTRIBUTION

	Total ND (%)	Enteral nutrition (EN) (%)	Parenteral nutrition (PN) (%)	Mixed nutrition (MN) (%)	No NS (%)
≥ 65 years old	270 (39,3)	212 (78,5)	41 (15,2)	13 (4,8)	4 (1,5)
< 65 years old	417 (60,7)	371 (89,0)	28 (6,7)	9 (2,2)	9 (2,2)

CONCLUSION. In this study we observed that NS in elderly critically ill patients does not seem to be a problem. In this group of patients NS was started earlier, PN was more frequently used and ≥ 90% of the NS prescribed was delivered in a higher number of ND. No differences were found regarding NS suspension or reduction between the two groups.

0892

IS IT BETTER TO USE A NON STANDARD FORMULATION IN ICU PATIENTS?

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INTRODUCTION. When selecting an appropriate enteral formulation both formula characteristics and patient-specific factors should be considered in nutrition support (NS). Recent data suggest that whole protein formula should be used. The goal of our study was to determine if the specificity of the enteral formulation (standard vs. non-standard) has impact on critically ill patients enteral feeding.

METHODS. Prospective analysis of consecutively admitted patients in two mixed intensive care units (ICUs). Exclusion criteria were: NS for < 2 days, age < 16 years and length-of-stay (LOS) < 3 days. Patients were followed for the first 7 days of NS. Data collection included: demographic data, NS (route, target volume (TV) and delivered volume), reasons for suspension and reduction of NS. Chi-square, Mann-Whitney U and T-test were used in statistical analysis.

RESULTS. One hundred and two patients (687 nutrition days (ND): enteral (EN) 84,9%, parenteral (PN) 10% and mixed (MN) 3,2%) were studied: mainly male (69,6%) with a mean age 57,9 ± 17,8 and a mean SAPS II score 49,6 ± 14,4. The most frequent reason for ICU admission was medical (52%) followed by trauma (26,5%) and surgical (21,6%). NS was started 34 ± 18,3 h after ICU admission most times by enteral route (89,2%). TV was achieved in 42,2% of the cases. EN was started in 81,3% of the patients with a polymeric standard formulation. We analyzed 605 enteral feeding days (EN 583 and MN 22): 464 were with a polymeric standard formulation (SF) and 141with a non standard formulation (NSF). EN was suspended in 23,6% of the days with no differences between SF and NSF concerning the incidence (22,2% vs. 28,4%; $p = 0,131$) and the motives ($p = 0,486$). However, the incidence of EN reduction was significantly lower in SF days (7,8% vs. 16,3%; $p = 0,003$). Gastrointestinal intolerance (GI) was higher in NSF but the difference did not reach statistical significance (20,6% vs. 14,4%; $p = 0,081$). No differences were found between the two groups regarding the NS percentage delivered to the patients (SF 91,5% vs. NSF 93,84%; $p = 0,919$) and ICU length of stay (SF 19,5 days vs. NSF 18 days; $p = 0,068$). The use of a NSF was associated with a significantly higher ICU (36,2% vs. 17,7%; $p < 0,001$) and hospital mortality (47,5% vs. 33%; $p = 0,002$).

CONCLUSION. In this study, the use of a polymeric non standard formulation was associated with a higher enteral feeding reduction, a higher GI intolerance and a significantly higher ICU and hospital mortality. No correlation was found between the type of formulation used and the incidence of EN suspension as well as the NS percentage delivered to the patients.

0893

SOME PECULIARITIES OF LIPID METABOLISM IN SEVERE SEPSIS

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INTRODUCTION. During last 5–7 years we found increasing number of publications and trials devoted to lipid metabolism in SIRS patients and role of lipids as precursors of SIRS and sepsis mediators –eicosanoids.

METHODS. After the resolution of local Ethical Committee in 2005–07 yy we investigated serum levels of triglycerides (TG), IL-6, IL-8, NO, arterial lactate, glucose on 1,3,5,7,10 day by « Immulite » DPC in 56 septic patients, including bacterial peritonitis (20 pts), endometritis (20 pts), skin infections (4 pts), endocarditis (3 pts), urological sepsis (2 pts), meningoencephalitis (2 pts). Mean age of patients was 37,9 ± 2,05. Mean APACHE-II score after admission was 17,5 ± 0,83 and SOFA score - 6,6 ± 0,58, MURREY score −1,8 ± 0,16 balls. All patients demonstrated 3 and more signs of SIRS. LOS in ICU was 11,6 ± 0,98 days and in the hospital-27,9 ± 2,67.28 days. Total 28 days mortality was 26,8%. We used descriptive statistics and estimate the p by t-student for continue variables.

RESULTS. Normal serum levels of TG 1,3 ± 0,1 mmol/l) corresponded with lower concentrations of IL-8–68,3 ng/ml ($p < 0,05$). In the group with high TG (2,9 ± 0,2 mmol/l) we found out increased IL-8 concentrations (613 ng/ml) . On day 7 in high TG group IL-8 levels decreased. In normal TG group IL-6 concentrations also decreased on day 10, and in high TG group IL-6 levels increased on day 5 and decreased on day 7 ($p < 0,05$).High TG levels were closely connected with hyperglycemia, high serum concentrations of NO and lactate. It is important to emphasize that 28 days mortality was 50% in high TG group in comparison with normal TG group −23,5% ($p < 0.01$).

CONCLUSION. Increased serum TG concentrations in severe sepsis are closely connected with negative clinical outcome. Clarification of relationship between pro and anti-inflammatory mediators synthesis and lipid metabolic alterations in severe sepsis may become one the most perspective issues of future investigations.

0894

ARE QUALITY NUTRITIONAL INDICATORS (QNI) MARKERS OF NUTRITION MANAGEMENT AT THE ICU?

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INTRODUCTION. Indicators are instruments for the improvement of quality as such monitoring them should never be considered end in and of itself. In other words the measuring stage is necessary and sometimes essential to determine the level of the quality of care and it enables us to take action to improve the weak points in the system and to select the most effective course of action. Aim: Evaluate eight QNI providing a point of reference (standards) with which to compare our practice.

METHODS. We did a prospective observational research study from March 2007 to December 2007. Sixty hundred and seventy admitted patients were included. Indicators were evaluated according to SEMICYUC (Spanish Society of intensive and Critical Care and coronary units) provides for the development of instruments to aid in the continual improvement of the quality of care. Indicators for nutritional support are as follows (Standards are in parenthesis): 1.Complications of Total parenteral Nutrition as hyperglycemias (25%) and liver dysfunction (< 10%), 2.Maintaining appropriate levels of glycaemia (80%), 3.Severe Hypoglycaemia (0.5%), 4.Identification of Nutritional (100%), 5.Assessment of Nutritional Status (100%), 6.Early Enteral Nutrition (100%), 7.Monitorization of Enteral Nutrition (100%), 8.Calorie and Protein Requirement (100%).

RESULTS. Standards were calculated according to the score and the outcome as follows:

TABLE 1 NAME OF THE INDICATOR

Indicator	We got (Average)	Standards (%)
Complications of total parenteral nutrition	Hyperglyc 20% (Average 5.75%)	25
Maintaining appropriate control of glycaemi	20%	80
Severe hypoglycaemia	0–1% (Average 0.25%)	0.5
Identification of nutritional risk	(17.2–76.7%) (Average 42.4%)	100
Assessment of nutritional status	(6.6–100%) (Average 83.7%)	100
Early enteral nutrition	(5.8–100%) (Average 44.8%)	100
Monitorization of enteral nutrition	(79.1–100%) (Average 94.8%)	100
Calorie and protein requirement	(92.3–100%) (Average 98.3%)	100

CONCLUSION. According to our results was difficult to get a complete attachment to the indicators, probably due to deficit of computer systems to collect the information, however, result show us if our nutritional group should be alert about any management out of standards of quality, and analyze what we do and how we do it in order to help us determine those aspects that reduce complications and mortality

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0895

NUTRITIONAL SCORE RISK FOR MORTALITY IN CRITICALLY ILL PATIENTS

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INTRODUCTION. The hospital malnutrition is a universal problem that currently can be detected routinely and consequently combat effectively. It is observed both in developed countries and in the so called third world, unfortunally in ICU there is nothing universally accepted to do nutritional diagnosis, therefore, the aim of our study has been applying a nutritional score risk to mortality in critically ill patients.

METHODS. We did a prospective observational research study from April 2004 to December 2006. Two hundred and twenty eight admitted patients were included, the surveys were filled by the near relative who lived with the patient, at that moment that the relative showed non-coexistence with the patient and/or ignorance of its pattern of food ingestion during the newspaper the survey was discarded. Critically ill patients were selected at random with pathologies (neurocritical, Sepsis, trauma, patients, obstetrics critics, etc.) in 2 units of adult intensive cares. Patients were evaluated according to Nutritional Risk Score *NSR): Has food intake declined due to los of appetity, digest problems 2 points, How many full meals does the patient eat daily, less than two 3 points, At least one serving of dairy products, one serving of fruits and vegetables 2 points, takes more than 3 prescription drugs per day 1 point, how much alcohol per week 2 points, mode of feeding unable to eat without assistance 2 points, weigh loss or increase in the last 6 months 2 points, Economical level for eating 4 points Statistical analysis: A validation of the data was used to assess the ability to the new Nutritional Risk Score to predict mortality in ITU based receiver operating characteristic (ROC) analysis. The statistical analysis was carried out with the SPSS 10 package, and $p < 0,05$ was considered statistically significant.

RESULTS. Age average 48.8 ± 21.5 and NSR 5.48 ± 3.73. ROC analysis were done for mortality according to NSR > 7 shows a sensibility of 57.9% (IC: 40.8–73,3) and specificity of 72,8% (IC: 64.5–80.1) with a +LR: 2.13, -LR: 0.58 : +PV: 34.7, AUC: 0.66, SE: 0.053, IC: 0.59–0.735, $p = 0.0017$. Our study demonstrated that the alterations of the NSR can be observed in all ages, established by not having a direct correlation between the age and the found NSR ($r = 0.15$, $p = 0.018$). In addition, was found that suffering chronic diseases that alter the conditions of ingestion it would feed suitable is an isolated parameter significant to increase the death probability if the patient is in the ICU ($p = 0.002$).

CONCLUSION. The Nutritional Risk Score should be included in the Nutritional assessment for critically ill patients at admission to the intensive care unit in order to detect mortality by nutritional risk.

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0896

INSULIN ENHANCES RENAL POTASSIUM EXCRETION IN CRITICALLY ILL PATIENTS

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INTRODUCTION. Insulin is regularly applied to lower elevated serum potassium levels. This action of insulin is effected by increasing the cellular uptake of potassium. Whether the potassium lowering effect of insulin is also effected by changes in renal potassium secretion is unclear. Since the therapeutic goal in hyperkalemia is to remove potassium from the body, it is of relevance if insulin inhibits renal potassium excretion. Most studies in human volunteers have suggested that insulin has an antikaliuretic effect [1]. These studies are however hampered by insufficient control of decreased serum potassium levels. In our ICUs we have a computer supported system called GRIP-II (Glucose and potassium Regulation Intensive care Patients) that strictly regulates potassium levels with periodic adjustments of continuous potassium infusion. Such a form of regulation approaches potassium clamping. In this setting we studied the effect of insulin and potassium on renal potassium excretion.

METHODS. In a 12-bed surgical ICU unit in a tertiary teaching hospital we routinely collected 24-h urine samples that were analyzed for potassium concentration. Calculated 24 h renal potassium excretion was compared with the total daily amounts of potassium and insulin that were administered by syringe pump, both of which were determined by GRIP-II. The time-averaged daily mean blood potassium and glucose levels were also determined. Multivariate regression analysis with potassium excretion as the dependent variable was performed with the amount of insulin administered, mean blood glucose, mean serum potassium, mean glucose administration, mean potassium administration and ICU day as independent variables.

RESULTS. 297 patients with 2,078 24 h urinary samples were analyzed. Mean ± sd serum potassium was 4.2 ± 0.4 mmol/L, mean blood glucose 6.8 ± 0.9 mmol/L with a mean amount of potassium administered of 69 ± 48 mmol/d and mean insulin dose of 41 ± 39 U/d. The mean potassium excretion was 105 ± 58 mmol/d. Upon multivariate analysis the plasma potassium, potassium administration, insulin administration and ICU days were independent predictors of potassium excretion with a correlation coefficient of 0.57 (R^2 0.331; $p < 0.001$).

CONCLUSION. In contrast with previous reports that were only performed in healthy subjects under partially controlled circumstances, under conditions with strict potassium and glucose control, the administration of insulin was associated with increased renal excretion of potassium in critically ill patients.

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0897

CRITICAL NUTRITION: 24 HOURS AND COUNTING…

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INTRODUCTION. It is widely accepted that enteral nutrition (EN) is preferable to parenteral – preserving gut integrity, incurring fewer serious complications and lower cost. ESPEN recently reached consensus that haemodynamically stable critically ill patients who have a functioning GI tract should be fed within 24 h of admission to Critical Care (1); a recommendation supported by ASPEN (2). The guidelines also support strategies to optimise feed delivery, such as feeding protocols and prokinetics. This review was carried out to assess to what extent current practice on critical care complies with these recommendations.

METHODS. Data was collected over a 4-week period for patients (level III) entering critical care fed via a nasogastric tube(NG). Exclusions included patients requiring parenteral nutrition, where nasojejunal tube or jejunostomy tubes were placed prior to admission, or where length of stay was less than 48 h.

RESULTS. The 20 patients recorded were admitted via A&E (10), theatre (5) or hospital ward/transfer (5), and presented from Neurosciences (9), Medicine (6) and Surgery (5). The 8 men and 12 women had an average age of 53 years (R = 23–76yrs), average actual body weight of 71 kg (R = 45–110 kg, 18 patients), average ideal body weight of 57 kg (R = 43–75 kg, 10 patients), and an average BMI of 27 kg/m2 (R = 16–48 kg/m2, 10 patients). Prior to admission 1 patient reported weight loss, 2 had poor intake (3 days, and 3–4 months), 4 were nil by mouth for an average of 2.75 days (total days 13), whilst 14 reported no prior weight loss and normal intake; 4 were alcohol-related admissions. Feed commenced an average of 14.45 h (total h 289, R = 1–52 h) after admission. 20 patients were fed using a standard whole-protein (1.0 kcal/ml) enteral feed. 19 patients (1 died prior) achieved target rate after an average of 21.7 h (total h 12, R = 4–68 h), during which time additional fluids were provided. Prokinetics were administered in 5 cases—3 receiving metoclopromide, and 2 with erythromycin in addition. 13 patients were prescribed laxatives to stimulate bowel function. At the close of the study period, 8 patients took oral diet in addition to NGF, were extubated or transferred from the unit; 8 patients continued NG only; 3 patients had died.

CONCLUSION. This data supports the recommendation that haemodynamically stable critically ill patients can successfully commence early EN within the first 24 h, achieving adequate energy, protein and micronutrient provision with minimal need for prokinetic agents. Although limitations exist, patients admitted to critical care may have better nutritional status than previous described.

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Poster Sessions
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0898

THE INCIDENCE AND CHARACTERISTICS OF PATIENTS WITH VENTILATOR-ASSOCIATED PNEUMONIA AFTER HEART SURGERY

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INTRODUCTION. Ventilator-associated pneumonia (VAP) is the most common and fatal nosocomial infection of intensive care.It affects between 9% and 27% of intubated patients and doubles the risk of dying /1/.Different intensive care units (ICU) populations may have different incidences of VAP. Patients undergoing heart surgery have a high frequency of VAP (7,87%)/2/.Our aim was to determine the frequency, etiology, and risk factors of VAP in patients who have undergone heart surgery in order to direct more extensive prophylactic measures for the high risk population.

METHODS. Design: Prospective study. Setting: Heart surgery intensive care unit. Patients: Intubated heart surgical patients. Criteria: Centers for Disease Control and Prevention (CDC). National Healthcare Safety Network Definition for VAP.

RESULTS. Total of 198 patients were screened during one month after major heart surgery. The frequency of VAP was 3,03% (6 patients).No one patient died during the study. All VAP patients had joined significant preoperative chronic disease or risk factor (diabetes,low ejection fraction, emergency surgery,advanced age,obesity,renal failure,HOBP, cerebrovascular event)and postoperative complication (bleeding,myocardial infarction,pericardial tamponade). Average duration of mechanical ventilation till the VAP onset was 5,00 days.

CONCLUSION. Our population of patients has lower incidence of VAP than other studies for cardiac surgery patients had shown. Tailoring strict infection control (nonpharmacological and pharmacological) for patients with multiplied (two or more) risk factors is strongly recommended. Infections surveillance cultures and risk stratification in that group could be studied further.

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0899

VENTILATOR ASSOCIATED PNEUMONIA IN PATIENTS WITH TRAUMATIC BRAIN INJURY

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INTRODUCTION. We studied the factors which may influence the development of Ventilator Associated Pneumonia (VAP) in patients with Traumatic Brain Injury (TBI).

METHODS. Retrospective analysis of prospectively gathered data of 141TBI patients ventilated > 48 h in the last 4 years. TBI Patients with VAP(Group I) where compared with TBI patients (Group II) without VAP. We registered: prior illness,patients characteristics, GCS, surgical procedure, vital signs- laboratory parameters- dislocation of the middle shift at ICU admission, duration of mechanical ventilation(MV) and intubation(TT) before and during ICU stay, day of VAP onset, MODS and Clinical Pulmonary Infection Score (CPIS) measured at the onset of VAP, isolated microorganisms, colonization data, length of stay (LOS) in the ICU and hospital, and patients outcome (ICU and hospital.) We defined haemodynamic instability as low mean blood pressure and support with vasoactive and/or inotrop drugs and hypoxaemia as PaO2 < 80 mmHg or FiO2 > 0.5. Statistical evaluation was performed using univariate and multivariate logistic regression, Students t-test, Pearson's chi square and Fisher's exact statistic.

RESULTS. From the 141 studied patients 32–22.6% (4 women and 28 men) aged(-mean ± sd) 44.1 ± 9.3 years, with APACHE II score 21.8 ± 4.9, GCS 6.1 ± 1.5, time of tracheal intubation 31.3 ± 14.5 days,duration of mechanical ventilation (in the ICU) 29.51 ± 17.5 days, MV time before ICU admission 5.06 ± 1.5 days, developed VAP after 10.2 ± 3.1 days. On the day of VAP detection CPIS was 7.3 ± 0.9 and MODS 9.4 ± 0.8. Patients who did not develop VAP were 38.8 ± 7.9 years old, had a APACHE II score 19.06 ± 2.3, a GCS score 7.8 ± 1.9, were intubated 23.2 ± 6.5 days and ventilated before ICU admission 2.3 ± 1.2 days and in the ICU 21.51 ± 11.0 days. Most cases of VAP were caused by MDR Gram negative microorganisms, except 3 patients in whom VAP was caused by MRSA. Age ($p < 0.03$), APACHE II ($p < 0.04$), GCS ($p < 0.05$), middle shift dislocation ($p < 0.02$), haemodynamic instability ($p < 0.01$), hypoxaemia ($p < 0.01$) and longer time of mechanical ventilation before ICU admission ($p < 0.001$) were the strongest associated factors of VAP development. Patients who developed VAP did not have higher ICU ($p < 0.4$) or hospital ($p < 0.3$) mortality, but had a longer duration of intubation ($p < 0.002$), mechanical ventilation ($p < 0.001$) and hospitalization ($p < 0.02$). Bacterial colonization (with Gram negative bacteria) was an independent risk factor for VAP. Prior illness, surgical procedure, temperature, laboratory parameters were not associated with VAP appearance.

CONCLUSION. Age, APACHE II, GCS, middle shift dislocation, hypoxaemia, hemodynamic instability and prolonged time of mechanical ventilation before ICU admission are directly related to the development of VAP. VAP does not influence mortality of TBI patients but contributes to longer duration of intubation, mechanical ventilation and hospitalization.

0900

A THREE-YEARS RETROSPECTIVE STUDY OF LOCAL MICROBIOLOGICAL PROFILE IN ICU

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INTRODUCTION. The identification of local clinical and microbiological profiles are essential to develop institution-specific guidelines when selecting empiric treatment for community and hospital-acquired infections.

METHODS. Retrospective analysis of bacterial isolates in 1142 consecutive patients admitted to 12 bed mixed ICU, during January 2005 to December 2007. Product sites with fewer than 25 isolates were excluded and only first isolates of the agent were considered. Bacterial agents with fewer than 25 isolates are collectively considered as a category.

RESULTS. A total of 1035 first isolates were considered. Tracheal aspiration, bronchial alveolar lavage and aspiration represented 60.0%. Urine, blood, abscess pus, peritoneal fluid and CVC's tips account for the remaining. The most prevalent were P. aeruginosa (16.8%), MRSA (10.8%), MSSA (9.9%), E. coli (9.8%) and Haemophilus sp. (7.9%). Using logistic regression, S. pneumoniae ($p < 0.001$), Haemophilus sp. ($p < 0.001$), MSSA ($p < 0,001$), E. coli ($p = 0.001$), E. faecalis ($p = 0.016$), S. epidermidis ($p = 0.016$) and Klebsiella sp. ($p = 0.019$) were manly isolated in the first 72 h. MRSA, P. aeruginosa and A. baumannii appeared in later isolates. Using cluster tree analysis, 4 distributions were defined ($p < 0.001$): (1) respiratory; (2) urine; (3) peritoneal fluid and abscess pus and (4) blood cultures and cvc tips. Respiratory isolates were P. aeruginosa (22.4%), MSSA (14.2%) and MRSA (12.1%). E. coli (19.1%) and E. faecium (15.3%) were more frequent in peritoneal fluid and abscess pus isolates. E. faecalis (22.3%) and E. coli (21.5%) were more prevalent in urine. Non-aureus Staph represented 33.1% of isolates in blood cultures and CVC's. A difference ($p = 0.002$) was detected concerning A. baumannii prevalence that has declined abruptly from 2005 to 2007. In 2007, a total of 389 patients were admitted and 304 were considered for analysis. Age was 53.3 ± 19.4 years and 208 were males (68.4%) and 96 (31.6%) females. SAPS II average was 43,6 ± 16.5 points. Delay was 9.7 ± 8.5 days. Mortality rate was 23.4%. Admissions were classified in: medical –46.9%; urgent post-operatory –24.2% and trauma –28.9%. No association between admission type and mortality was found. During 2007, 398 cultures were positive (177 patients). A difference was found ($p = 0.003$) between the isolates and admission type. Medical were associated with P. aeruginosa (22.4%) and MRSA (13.1%). Urgent post-operatory were associated with E. coli (17.2%) and P. aeruginosa (10.2%). Trauma were associated with MSSA (18.3%), Haemophilus sp. (18.3%) and *P. aeruginosa* (16.3%). The overall impact of *P. aeruginosa* is mostly related to ventilator-associated pneumonia.

CONCLUSION. Analysis of the microbiological data is considered as one of the most important activities to improve the outcome of patients by adequate initial empirical selection of antibiotics. The study defines the framework to achieve it.

0901

AUDIT OF A CARE BUNDLE FOR VENTILATED PATIENTS WITHIN THE DEPARTMENT OF CRITICAL CARE, QUEEN ALEXANDRA HOSPITAL PORTSMOUTH

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INTRODUCTION. Ventilator associated pneumonia (VAP) causes significant morbidity and mortality amongst critically ill patients. In a Europe wide study, VAP was the most frequent infection accounting for 45% of Intensive Care infections[1]. High Impact Interventions[2] were introduced to encourage best practice in "reducing infection, delivering clean and safe care". HII No.5 is a care bundle for ventilated patients aimed at preventing VAP. In our department we use a modified ventilator care bundle based on these guidelines. An audit of compliance was undertaken in December 2007.

METHODS. We collected data from bedside paper and electronic patient records. We recorded if an element of care had been prescribed on the patients' bedside chart and if the element had been performed. Data was summarised as a % compliance, with a target of 100% for each element. The results were presented at a multi-disciplinary departmental meeting.

RESULTS. 33 patient observations were made. Areas of poor performance were found in bed head elevation (30% compliance) and daily sedation holding (39% compliance). Gastric ulcer and deep vein thrombosis prophylaxis (85 and 79% compliance respectively) were provided in the majority of patients. The target of 100% compliance was not achieved for any elements.

TABLE 1 RESULTS OF COMPLIANCE FOR ELEMENTS OF CARE (N = 33)

Element of care	Performed signed	Performed not signed	Not performed signed	Not performednot signed	Clinically exempt
Elevation of head no. patients (%)	5(15.1)	17(51.5)	2(6.1)	8(24.2)	1(3.1)
Ulcer prophylaxis no. patients (%)	20(60.6)	8(24.2)	4(12.1)	1(3.1)	0(0)
DVT prophylaxis no. patients (%)	17(51.5)	9(27.3)	5(15.2)	2(6.0)	0(0)
Sedation break no. patients (%)	6(18.2)	7(21.2)	3(9.1)	4(12.1)	13(39.4)

CONCLUSION. Lack of awareness and incomplete data recording for all elements by medical and nursing staff were highlighted as probable causes of the poor compliance observed. This audit has allowed our department to identify and focus upon areas for improvement in care provision. We have instigated a programme of education for all staff. New IT systems are being considered to allow improved documentation of patient observations. The departments' care bundle will be reviewed in light of recommendations to be published by the National Institute of Clinical Excellence in September, 2008. We will re-audit following implementation of these recommendations.

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0902

ASSESSMENT OF SEVERITY IN ICU PATIENTS WITH COMMUNITY-ACQUIRED PNEUMONIA USING PIRO-BASED SCORE

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INTRODUCTION. None of the available scores accurately stratify risk in ICU admitted patients with severe Community-acquired Pneumonia (CAP).The objective of this study was to develop a severity assessment tool for patients admitted with community-acquired pneumonia in intensive care unit.

METHODS. A Secondary analysis of prospective, observational cohort study in 33 ICU's. A severity assessment score was defined based on the PIRO concept including the presence of the following variables: Comorbidities (COPD, immunocompromise); age > 70 years; multilobar opacities in chest x-ray; shock, severe hypoxemia; acute renal failure; bacteremia and ARDS. CAP PIRO score was obtained at ICU within 24 h from admission and one point was given for each present feature (range 0–8 points). Statistical analysis was performed with SPSS 11.0.

RESULTS. We have included 529 patients with CAP diagnosis. The mean CAP PIRO score was significantly higher in non-survivors than in survivors (4.6 ± 1.2 vs. 2.3 ± 1.4). Considering the observed mortality for each CAP PIRO score the patients were stratified in four levels of risk: (a) Low; 0–2 points, (b) Mild; 3 points, (c) high; 4 points and d) Very high; 5 to 8 points. Mild risk (HR 1.8;95%CI = 1.1–2.9;$p < 0.05$), high risk (HR 3.1;95%CI = 2.0–4.7;$p < 0.001$) and very high risk level (HR 6.3;95%CI = 4.2–9.4;$p < 0.001$) were significantly associated with higher risk of death in Cox proportional hazards regression analysis. Moreover, analysis of variance showed that higher levels of CAP PIRO score were significantly associated with higher 28-day and ICU mortality ($p < 0.001$), prolonged length of ICU stay ($p < 0.001$) and days of mechanical ventilation ($p < 0.001$). ROC curves showed CAP PIRO score (AUC = 0.88) outperformed the ATS/IDSA criteria (AUC = 0.80,$p < 0.001$) and APACHE II (AUC = 0.75,$p < 0.001$) to predict 28-day and ICU mortality.

CONCLUSION. The PIRO score performed well as a severity and 28-day mortality assessment tool in CAP patients requiring ICU admission. Moreover, PIRO score also is associated with increased health-care resource utilization in CAP patients admitted in ICU.

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0903

PROCALCITONIN: PREDICTOR OF POSITIVE MICROBIOLOGICAL CULTURES IN CRITICALLY ILL PATIENTS ON THE ICU : AN INVESTIGATIONAL STUDY

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INTRODUCTION. Procalcitonin is widely reported as a useful biochemical marker to differentiate sepsis from other non-infectious causes of systemic inflammatory response syndrome (SIRS). The course and duration of antibiotic therapy is often an empirical choice.This investigational study is performed to examen if there is a link between procalcitonin and positive microbiological cultures together with the course of disease in critically ill patients.

METHODS. In total 26 patients were analyzed with sepsis with at least one organfailure. We compared series of procalcitonin with CRP and the course of disease together with positive microbiological cultures and the course of antibiotic therapy.

RESULTS. In total 105 procalcitonin-samples has been performed in series, in 68.5% of the samples the procalcitonin-level (PCT) was > 2 ng/mL, (PCT 2–5 ng/mL: 17,1%, PCT 5–10 ng/mL: 31.4%, PCT > 10 ng/mL: 20%). Positive bloodcultures were found in 34.6% of the patients, 88.9% of these patients had a procalcitonin > 2 ng/mL (PCT > 10 ng/mL: 44.4%, PCT 5–10 ng/mL: 22.2%, PCT 2–5 ng/mL: 22.2%) . Only 1 patient with a positive bloodculture had a procalcitonin between 0.5 and 2 ng/mL. In general only 15.2% of the total amount of microbiological cultures (sputum, urine, woundfluids, cathetertips, etc.) was associated with a procalcitonin-level below 0.5 ng/mL, and most of these cultures were positive with candida-species (not bacterial). This means that 84.8% of the total amount of microbiological cultures was linked with a procalcitonin above 0.5 ng/mL.

In total 10 patients died, 100% of them had a procalcitonin > 2 ng/mL.The course of antibiotic therapy was in the beginning of the critically illness adapted on empirical grounds, later adapted based on the microbiological cultures in combination with the procalcitonin-level.

CONCLUSION. It seems that a procalcitonin-level above the treshold can predict positive microbiological cultures in critically ill patients on the ICU. Positive bloodcultures seem to be associated with high procalcitonin-levels.

0904

CLINICAL AND ENVIRONMENTAL SAMPLING OF AN ADULT INTENSIVE CARE UNIT

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INTRODUCTION. Epidemiologic control in an ICU environment is a key-component leading to a more successful prevention of nosocomial infections. We conducted this study in order to identify 1. bacterial contamination on inanimate surfaces and hands of healthcare workers 2. colonization or infection in patients.

METHODS. At a given day, ICU surfaces (ventilator tube surfaces, bedrails, bedside monitors, cardiograms, dressing trolleys, sinks, telephones, wall oxygen humidifiers)were screened and cultured by using sterile cotton swabs inoculated into thioglucolate broth and incubated aerobically at 37°C for 48 h. At the same day, hand impressions were taken from all ICU staff and also blood, bronchial secretions and urine were cultured from all patients. Microorganism identification was performed by the VITEK-II method (Biomerieux-FRANCE) and susceptibility testing by the disk diffusion testing according CLSI. Some were further evaluated by E-test. Production of extended spectrum beta-lactamases (ESBLs) was determined by the double disk synergy test (DDST) and metallo-beta-lactamase (MBLs) production by the EDTA-synergy test.

RESULTS. Colistin-resistant, MBL positive Klebsiella pneumoniae strains with an identical resistant phenotype were isolated from blood and ventilator tube surface of the same patient. Multiresistant K. pneumoniae strains with the same phenotype and production of ESBLs and MBLs were isolated from bedrails and bedside monitor of another patient. Multiresistant, carbapenem resistant Pseudomonas aeruginosa of an identical phenotype were cultured from bronchial secretions and ventilator tube of a patient, ventilator tube of another and bronchial secretions of a third patient. Environmental sampling also revealed the presence of 11 Enterococcus strains 3 of which were Vancomycin resistant, a multiresistant Pseudomonas putida and also Candida parapsilosis from a dressing trolley shelf. A multiresistant Acinetobacter baumanii was also cultured from the hands of a healthcare worker.

CONCLUSION. The bacteriological profile of the ICU revealed the presence of highly resistant microorganisms exhibiting multiple and complicated resistance mechanisms. The fact that identical phenotypes were observed, is an indication of a possible genetic relation among some of these strains. These isolates will further be analysed by PCR and PFGE methodology. Hand antisepsis and infection control measures were encouraged. Cooperation between intensivists and the laboratory is of vital importance for the prevention of nosocomial infections.

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0905

ATTRIBUTABLE COST, ICU LENGTH OF STAY PROLONGATION AND OUTCOME OF NOSOCOMIAL INFECTIONS IA A GREEK ICU. A 6-MONTH PROSPECTIVE STUDY

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INTRODUCTION. To evaluate attributable cost, ICU Length Of Stay (LOS) prolongation and outcome of Bloodstream Infection (BSI) and Ventilator-Associated Pneumonia (VAP) among ICU patients in a 1200-bed tertiary Greek hospital.

METHODS. All patients, uninfected at admission, treated in our unit more than 48 h, between 1/1/2007 and 1/7/2007, were prospectively studied. ICU treatment prolongation relevant to BSI or VAP, attributable cost (estimated by the method bottom down) and patient outcome were assessed.

RESULTS. 74 patients were screened for inclusion in our study. In 25 patients (33,8%) more than one infections occurred during their ICU stay and were excluded. 10 out of 74 (13,5%) suffered a single BSI episode (6 male, 4 female, age 59,6 ± 22,9 years, admission APACHE II score 12,8 ± 6,4) and 9 out of 74 (12,1%) suffered a single VAP episode (7 male, 2 female, age 53,1 ± 16,8 years, admission APACHE II score 13 ± 4). Finally, 30 patients (14 male, 16 female, age 52,1 ± 19,3 years, admission APACHE II score 12,6 ± 7,1) remained uninfected during their ICU stay. In patients with BSI, ICU LOS was 24,8 ± 9,37 days, prolongation of ICU LOS relevant to infection was 7,4 ± 3,1 days and attributable cost was 7178 € /patient (antibiotic use contributed to 16,6% of the total cost). In patients with VAP, ICU LOS was 21,6 ± 7 days, prolongation of ICU LOS relevant to infection was 6,4 ± 1,6 days and attributable cost was 6251 € /patient (antibiotic use contributed only to 15,7% of the total cost). Patients without infection had an ICU stay of 7,2 ± 3,6 days and a mortality rate of 13,3%, while in patients with BSI, mortality was as high as 40% and in patients with VAP 22,2%.

CONCLUSION. Patients with BSI or VAP have a longer ICU stay, a higher mortality rate and a higher treatment cost compared to uninfected ICU patients. Adequate staff availability, infection control protocols implementation and microbiological surveillance in the ICU may save important resources and affect patient outcome.

0906

COMMUNITY ACQUIRED ACUTE BACTERIAL MENINGITIS IN AN INTENSIVE CARE UNIT VS THE REST OF MEDICAL UNITS IN SPAIN

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INTRODUCTION. The aim of this study is to know the different of epidemiology, clinical features, management and outcome between patients with community-acquired acute bacterial meningitis (ca-ABM) who was admitted to the intensive care unit (ICU) vs. patients with ca-ABM admitted to the rest of medical units.

METHODS. A descriptive, prospective, and multicenter study carried out in 9 hospitals of the Spanish Network for the Research in Infectious Diseases (REIPI) between 1/11/2003 and 31/07/2006. Patients were diagnosed on the basis of a compatible clinical (fever, neck stiffness, meningeal signs, and/or low altered mental status [GCS < 14]); and cerebrospinal fluid (CSF) findings (pleocytosis ≥ 100/mm^3, hipoglycorrachia < 40 mg/dL or CSF/blood glucose ratio < 40%, and increased protein level > 100 mg/dL);and microbiological criteria (positive CSF Gram-stain, positive culture of CSF and or hemoculture). An adverse clinical outcome was defined as death or cure with disabilities. An univariant and multivariate statistical analysis was performed.

RESULTS. Two hundred and ninety-seven adult patients with ca-ABM were included; 163 (54.8%) were attend in ICU and 134 (45.2%) in the rest of medical units. The median age ± IQR of patients ICU admitted was 54.38 ± 33 years old vs. 62.77 ± 31 years old patients in the rest of units (p = 0.01). The principal etiological agent in ICU patients vs. rest of unit was: S. pneumoniae 78/163 (48%) vs. 49/134 (36%); N. meningitidis 46/163 (28%) vs. 15/134 (11%); Listeria monocytogenes 15/163 (9%) vs. 27/134 (20%) (p > 0.001). The classic triad of fever, neck stiffness and altered mental status was present in 90/163 (55%) in ICU patients vs. 54/134 (40%) (p = 0.010). The mean Glasgow Coma Score (GCS) at ICU admission was 11 vs. 14 (p > 0.0001). The median of delayed to start antibiotic treatment in ICU was 5 h 34 min vs. 7 h 52 min in the rest of units (p = ns). Dexamethasone was used in 138/163 (85%) in ICU patients vs. 94/132 (71%) in the rest of units patients (p = 0.003). The mortality rate in ICU was 33/163 (20%) vs. 18/134 (13%) (p = ns). In the multivariate model risk factors for unfavorable outcome were age ≥ 65 years old (OR: 0.967; 95%IC:0.953–0.981; p < 0.001); classic triad (OR: 2.43; 95%IC:1.43–4.14; p = 0.001); Streptococcus pneumoniae agent (OR:2.01; 95%IC:1.18–3.40; p = 0.009); and independent risk factors associated to mortality were renal failure (OR:9.67; 95% IC:1.41–66.1; p = 0.021), and age ≥ 65 years old (OR 1.04; 95%IC:1.022–1.067; p < 0.001).

CONCLUSION. Community-acquired acute bacterial meningitis in patients admitted in ICU present more severe clinical vs. patients attend in the rest of medical units. The antimicrobial treatment was earliest initiated in those cases admitted to UCI. However, this entity also remains a serious disease that carries high morbidity and mortality rates, specially in patients over 65 years old.

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0907

LOW PREVALENCE OF CYTOMEGALOVIRUS VIREMIA IN ICU PATIENTS WITH PROLONGED LOS

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INTRODUCTION. Cytomegalovirus (CMV) is an important cause of morbidity and mortality in immunocompromised patients. Some observational studies have suggested a high prevalence of viremia in immunocompetent septic patients in intensive care units. CMV influence on the outcome of immunocompetent critically ill patients is still not well understood. The objective of the study was to determine the prevalence and clinical significance of CMV viremia in a population of immunocompetent adult critical care patients with prolonged length of stay (LOS).

METHODS. Between May 2006 and September 2007, we screened adult patients admitted to our academic 24-bed medico-surgical intensive care unit (ICU). Patients were enrolled, after informed consent was given, if they stayed more than ten days in ICU and were not immunocompromised. Patients receiving steroids were not excluded. Blood samples for CMV serology (House IgG and IgM ELISA) and serum CMV Polymerase Chain reaction (PCR, Cobas Amplicor CMV Monitor TM, Roche) were collected at study entry (on day 10 of ICU admission) and weekly thereafter until the patient was discharged to the ward or after one month of ICU stay. Predetermined demographic, physiological and laboratory data were collected and descriptive statistics were computed. Data are presented as Mean ± standard deviation.

RESULTS. During the study period, 50 consecutive patients were enrolled: 36 men and 14 women with a mean age of 46.2 ± 22.9 years. The length of stay was 23 ± 11 days, APACHE II score was 20 ± 6 and the overall mortality was 14%. 50% were trauma patients, and the others were medical (25%) and surgery (25%) patients. Most patients (92%) received antibiotics for a mean duration of 18 ± 12 days, 22% received antifungal drugs and only 1 patient received acyclovir. Corticosteroids were used in 36% of patients. 96% of patients were on mechanical ventilation for a mean duration of 19.2 ± 12.7 days. Serology for CMV (IgG) was positive in 44% of the patients. A total of 169 samples for CMV-PCR were collected. Of the 144 PCR results available at this time, only 4(2.8) were positive in two different patients (Table 1). One of them had three consecutive positive results over a 3 weeks period.

TABLE 1

	Positive	Negative
ELISA CMV- IgG, n (%)	22(44%)	28(56%)
ELISA CMV- IgM, n (%)	6(12%)	44(88%)
CMV-PCR, n (%)	4(2.8%)	140(97.2%)

CONCLUSION. In our non-immunocompromised ICU population with prolonged LOS, prevalence of CMV viremia remains low. Accordingly, our data does not support empiric screening of non-immunocompromised intensive care patients in the absence of clinical suspicion for CMV infection. Further studies in more specific subgroups such as sicker septic patients should be considered.

GRANT ACKNOWLEDGEMENT. The CMV-PCR kits were provided by Roche.

0908

INCREASE OF THE LEVEL OF INTERLEUKIN 6 (IL6) AS A EARLY SIGN OF INFECTION AFTER THE CARDIO SURGICAL INTERVENTIONS

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INTRODUCTION. Well known parameters for diagnostic and valuation the degree of inflammation and for stress are: high sensitive C reactive protein (hs-CRP), prokalcitonin, lactate, fibrinogen, D-dimmer, and number of leukocytes, but they are not always available for valuation of sepses, septic shock, and for anticipation of the risk from unexpected development after spacious cardio surgical interventions. Prevention, diagnostic and early antibiotic treatment is highly significant. The aim of this study was to show that the level of Interleukin 6 (IL6) in serum can be used for an early valuation of bacterium infection in patients.

METHODS. 57 patients were evaluated in the Unit of intensive care, after cardio surgical intervention. We measured the level of IL6 in serum and we chose and statistically evaluated 20 patients: I group 10 patients with clinical and laboratory signs of infection, II group 10 patients without clinical and laboratory signs of infection. We measured the level of IL6 before, 4 h, 24 h, and 72 h after the intervention. The patients serums were kept on – 70 C degree before testing. The level of IL6 was measured by hemiluminiscence immunity test on immunochemical analyzer "Access" (Immunoassay Systems Access), Beckman Coulter, in the immunology laboratory at the Institute for cardiovascular diseases. The parameters for statistical analysis were: arithmetic center, linear trend and Fishers test of reliability.

RESULTS. The level of IL6 starts to increase 4 h after the tissue damage. The highest level of IL6 was after 24 h (the middle value IL6 for I group of patients with infection was 54, 16 pg/ml, and the highest value in the II group of patients without infection was 25, 70 pg/ml). The increase of the level of IL6 in I group was for 79, 31% higher than in the II group.

CONCLUSION. In 72 h the value of IL6 in the II group became normal, and in I group they were still high. As a result of preliminary analysis on a small number of patients, and due to literature information's, changes of the level IL6 in serum and his increase can be one of the early signs of infection and it makes possible to start with appropriate antibiotic treatment and to valuate the result of cardio surgical interventions.

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0909

SINGLE CENTER ASSESSMENT OF ICU INFECTION CONTROL MEASURES AWARENESS AMONGST INDIAN CRITICAL CARE NURSES AND IMPACT OF SHORT TERM FOCUSED EDUCATION INTERVENTION ON IT

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INTRODUCTION. Nurses are critical for implementation of infection control measures in ICU. Nurses in India have no specialized training in Critical Care and mostly learn on the job. Despite this ICU outcomes can be comparable to the western world. (1) High rates of ICU acquired infections have been reported from India. (2) Education is an effective tool to improve infection control in ICU. (3) No published Indian data is available regarding nurses' awareness of infection control measures or effect of educational intervention thereof.

METHODS. Awareness of infection control measures amongst critical care nurses of Fortis Escorts Hospital and Research Center, Faridabad, India was assessed using a multiple choice questionnaire (MCQ). Education levels and length of total and ICU experience was also recorded. The nurses were subjected to a month long focused education initiative regarding the infection control measures using both didactic lectures and bedside hands on training. Thereafter changes in awareness levels were reassessed using the same MCQ. The results were statistically analyzed.

RESULTS. Sixty eight nurses were evaluated initially with the MCQ. Only mean ±- SD 41.8 ± 14.13 % questions were answered correctly. After a month long education initiative only 53 of these nurses could be reevaluated. A mean of 57.0 ± 14.9% questions were answered correctly as compared to a base line of 42.1 ± 15.2 % ($p = 0.78$) in this subset of 53 nurses. Only 8 out of these 53 nurses were nursing degree (BSc.) holder while the rest had a diploma (GNM). The number of former was too small for meaningful subset analysis based on qualification. Theses nurses had 33.26 ± 17.27 (range 4–103) months of total post qualification experience and 16.43 ± 15.31 (range 1–60) months of ICU experience. No significant correlation was observed with quantum of either total or ICU nursing experience with awareness levels at either the baseline (0.07 ($p = 0.61$) and 0.18 ($p = 0.21$) respectively) or post education initiative period (0.22 ($p = 0.10$) and 0.06 ($p = 0.64$) respectively).

CONCLUSION. Despite no specialized training in intensive care nursing and low average total and ICU experience, the nurses could answer a mean of 41.8 ± 14.13 % (42.1 % in the subset of 53 subsequently followed up) questions correctly. There was a trend towards improvement after only a month long focused education initiative although this did not reach significance. This study highlights the need for intensive nurse educational initiative, perhaps for longer duration, to improve awareness regarding infection control measures in the ICU.

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0910

ACUTE CHOLECYSTITIS IN THE INTENSIVE CARE UNIT

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INTRODUCTION. Acute cholecystitis can be seen in the Intensive Care Unit (ICU) patients with the two distinct forms the calculous and acaclculous. Acalculous cholecystitis accounts for approximately 4–8% of all cases of acute cholecystitis and is typically seen in critically ill patients and can results in significant morbidity and mortality. The aim of this study was to evaluate the cases of the acute cholecystitis in the ICU patients.

METHODS. During 2-year period we examined retrospectively the ICU patients who developed acute cholecystitis during their treatment. We examined the epidemiologic characteristics of the patients, the form of acute cholecystitis, the diagnostic criteria, the management and finally the outcome.

RESULTS. From 153 consecutive patients, 15 of them developed acute cholecystitis during their treatment in the ICU. 7 patients presented calculous cholecystitis, while the rest of them acalculous. The diagnosis performed with ultrasound. High index of suspicion warranted in all cases where the main symptom was the unexplained fever. The ultrasound findings were thickening of the gallbladder wall, subserosal oedema, and fragmentation of gallbladder wall. Surgical treatment was required in 4 cases. The rest of them responded well to antibiotic therapy. There was no mortality as a result of cholecystitis.

CONCLUSION. Half of the cases of acute cholecystitis in ICU patients represent the acalculous form. In cases of fever of unknown origin acute cholecystitis with the two distinct forms must be in mind. Aggressive management may be required if did not respond to antibiotic therapy.

0911

COMMUNITY-ACQUIRED ACUTE BACTERIAL MENINGITIS IN ICU: EPIDEMIOLOGY, THERAPY AND OUTCOME

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INTRODUCTION. The aim of this study is to analyse the epidemiological, clinical features, management and outcome of patients with community-acquired acute bacterial meningitis (ca-ABM) admitted to the intensive care unit (ICU) of nine Spanish hospitals

METHODS. A descriptive, prospective, and multicenter study carried out in 9 hospitals of the Spanish Network for the Research in Infectious Diseases (REIPI) between 1/11/2003 and 31/07/2006. Patients were diagnosed on the basis of a compatible clinical, cerebrospinal fluid (CSF) findings and microbiological criteria (positive CSF Gram-stain, positive culture of CSF and or hemoculture). An adverse clinical outcome was defined as death or cure with disabilities. Outcome predictors were identified through logistic-regression analysis.

RESULTS. Two hundred and ninety-seven adult patients diagnosed by ca-ABM were included and, 163 (54.8%) were attend to the ICU. The median age ± IQR of ICU patients was 54.38 ± 33 years old. The principal etiological agents were: S. pneumoniae 81 patients (48%), N. meningitidis 47 (28%), Listeria monocytogenes 15 (9%), Streptococcus agalactiae 4 (2%); Escherichia coli 2 (1%), Haemophilus influenzae 2 (1%), others 8 (5%), and without isolate 10 (6%). Predisposing conditions were: oto-mastoiditis or sinusitis in 37 patients (22%), previous immunosuppression 21 (12%), diabetes 22 (13%), CSF leak 15 (9%) and alcoholism 15 (9%). The clinical symptoms most frequent were: fever 146 (87%), Glasgow Coma Scale (GCS) ≤ 14 137 (81%), neck stiffness 128 (77%), cephalea 124 (75%). The classic triad (fever, altered mental status and meningeal sings) was present in 94 patients (55%). The most frequent cause which these patients were admitted to the ICU was altered mental status (the median value of GCS was 11). Seventy patients (41%) received empirical antimicrobial monotherapy with third-generation cephalosporins, the rest of the cases combination of 2 or more antibiotics. Dexamethasone was used in 144 cases (85%), 79 patients (47%) receiving phenytoin and 45 patients (27%) mannitol. Seventy-eight patients requiring (50%) mechanical ventilation. The median length of stay in ICU was 4 days (1–88). The mortality rate was 20% (33 of 163 patients) and 27 (16%) developed adverse clinical outcome (neurological and/or auditory sequels). In the multivariate model risk factors for unfavorable outcome were: alcoholism (OR 6.98; CI 95%: 1.19–40.8; $p = 0.031$); age ≥ 65 years old (OR 3.24; 95%IC:1.28–8.19; $p = 0.013$); mechanical ventilation (OR 11.0; 95%IC:4.38–27.9;$p < 0.001$); and therapy with mannitol (OR 0.36; 95%IC: 0.13–0.95; $p = 0.042$).

CONCLUSION. S pneumoniae was the most common pathogen in patients with ca-ABM admitted to the ICU. Altered mental status was the principal cause at admission. Age, alcoholism, mechanical ventilation and therapy with mannitol were risk factors associated with unfavorable outcome in these critical patients.

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0912

TOXICITY OF GLUCOSE DEGRADATION PRODUCTS IN INTRAVENOUS INFUSION FLUIDS

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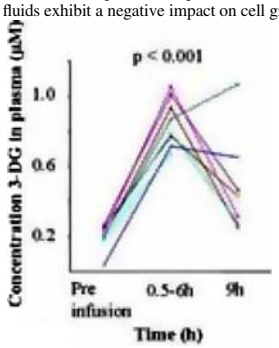
INTRODUCTION. Provision of nutritional support is seen as a therapeutic tool to attenuate disease severity and to modulate the immune response. Heat sterilisation of glucose-containing fluids promotes the formation of compounds termed glucose degradation products (GDPs). Many of the GDPs have been identified and their biological toxicity has been characterized. Several clinical studies demonstrate that the removal of GDPs from the peritoneal dialysis fluids leads to a preserved peritoneal function, decreased inflammation, decreased peritonitis incidence, and preserved residual renal function and a significant survival advantage.

METHODS. In order to investigate whether infusion fluids contain toxic GDPs and if these GDPs are found in patients, we included 11 patients undergoing surgery (55% women). All patients received a standard fluid therapy consisting of 1.7 L glucose containing infusion fluids. Blood samples and urine were collected and analyzed for GDP content. The influence of infusion fluids on cell viability and secretion of cytokines was investigated on human neutrophils. The effect of these fluids on cell growth was investigated on murine L929 fibroblasts.

RESULTS. The results demonstrate that all investigated infusion fluids contained high concentrations of GDPs. 3-DG increased rapidly in the serum in the patients after receiving fluid therapy (Figure 1), and several of the GDPs were not recovered in the urine. The concentration of GDPs in most of the tested fluids was lethal to neutrophils and impaired their immunomodulatory function. Furthermore, several of the fluids exhibit a negative impact on cell growth.



CONCLUSION. These findings indicate that normal preoperative fluid treatment involves infusion of potentially dangerous fluids into the patients. A reduction of GDPs in the infusion fluids, which may be easily obtained through altered manufacturing processes, could improve patient outcome within ICU.

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0913

THE DISPOSITION OF MORPHINE AND MIDAZOLAM IN MAN DURING THERAPEUTIC HYPOTHERMIA (33–34C)

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INTRODUCTION. Therapeutic hypothermia (33–34C) is induced in comatose survivors of cardiac arrest. Sedation is required, but complicated by hypothermia and critical illness, factors increasing elimination half-lives and serum concentrations of drugs. This study explored the disposition of morphine and midazolam during therapeutic hypothermia (33–34C).

METHODS. Prospective, open, non-randomised study where 15 hypothermic (33–34C) patients treated with therapeutic hypothermia following cardiac arrest were compared to 6 normothermic (36–38C) critically ill controls. All patients were sedated to a MAAS-score of 0–1. At least 8 h after their start, continuous infusions of morphine and midazolam were replaced with equivalent doses of fentanyl and propofol. A series of 13–15 blood-samples for validated quantitative analysis of morphine and midazolam were drawn 0–8 h after the switch. The groups were compared using a two-tailed t-test for two independent samples with unequal variances (Table 1).

TABLE 1

	Hypothermia (33–34°C)	Normothermia (36–38°C)	95% CI for difference of mean
Age (years)	61.1 (10.5)	66.7 (6.3)	(–13.4, 2.5) n.s.
Male sex (male/total)	12/15	6/6	
Duration of morphine/ midazolam infusion (min)	909 (261)	1024 (269)	(−406, 177) n.s.
SAPS-II score 24 h after admission	68.9 (8.5)	57.0 (15)	(−3.8, 27.7) n.s.
Morphine terminal elimination half-life (min)	250 (53)	177 (30)	(34, 113) $p = 0.001$
Midazolam terminal limination half-life (min)	392 (105)	530 (285)	(−438, 160) n.s.

Values are given as mean (± SD). "n.s." = non-significant ($p > 0.05$)

RESULTS. The terminal half-lives for morphine were 177 and 250 minutes for the normo- and hypothermic groups ($p = 0.001$), respectively. The corresponding values for midazolam were 530 and 392 minutes ($p = 0.296$).

CONCLUSION. Elimination of morphine but not midazolam was decreased in patients treated with therapeutic hypothermia. The lack of difference in terminal half-life for midazolam may be explained by the known inhibitory effect of fentanyl and propofol on midazolam metabolism. Compared to critically ill controls, the increased half-life by 40% in the hypothermic group may indicate that the infusion rate of morphine during hypothermia should be reduced.

0914

SINGLE POINT DETERMINATION OF MIDAZOLAM CONCENTRATION IS AN ACCURATE MEASURE OF MIDAZOLAM METABOLISM IN CRITICALLY ILL PATIENTS

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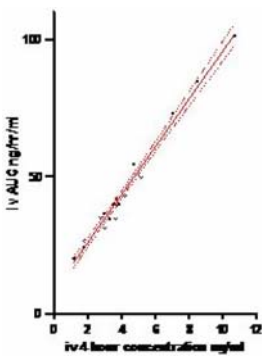
INTRODUCTION. The importance of pharmacogenetics in the metabolism of drugs in critically ill patients is untested. Three cytochrome P450 enzymes and their numerous isoenzymes account for over 60% of all drug metabolism. The CYP450 enzymes have a number of functional alleles with varying clinical significance. Midazolam is an established in-vivo probe of cytochrome P4503A (CYP3A) activity in healthy volunteers. This study investigates whether a single plasma midazolam concentration acts as an accurate predictor of total midazolam clearance in critically ill patients with a view to more complex in-vivo studies of the effects of critical illness on the metabolic activity of CYP3A.

METHODS. Patients admitted to the adult intensive care unit were excluded if they had; acute or chronic liver failure, received benzodiazepines in the past 24 h or were pregnant. I.V. Midazolam (1 mg) was given at time 0 and serum was collected at 5,15,30,60,120,180,240,300,360 and 480 mins. Serum midazolam concentration was determined by mass spectrometry (HPLC/MS/MS). Area under the curve (trapezoid rule) was correlated (Spearman rank) to serum 4 h midazolam concentration.



RESULTS. 20 patients (13 male). Age 75 (50–87). Mean APACHE 18. 4 h midazolam correlated with AUC; $r = 0.956$, $p < 0.0001$ (graph).

CONCLUSION. Single point determination of midazolam concentration four h after administration accurately predicts the metabolic rate of midazolam metabolism in critically ill patients. In accordance with previous studies this probe can now be used as a method of studying the effects of genotype variation and critical illness on drug metabolism.

0915

AMINO-TERMINAL PRO-BRAIN NATRIURETIC PEPTIDE IN CRITICAL ILLNESS: ASSOCIATION WITH ORGAN FUNCTION AND MORTALITY

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INTRODUCTION. The association between amino-terminal pro-brain natriuretic peptide (NT-pro-BNP) levels, organ function and mortality in a general ICU population has not been well characterized.

METHODS. To investigate this issue a total of 233 consecutive critically ill patients (109 men) having a median age of 60 years, with a wide range in admitting diagnoses were studied. Blood samples were drawn on admission in the ICU to determine NT-pro-BNP levels. Severity of critical illness and organ function were assessed by APACHE II and SOFA scores respectively. Receiver Operator characteristics (ROC) curves were constructed to determine diagnostic performances. Multiple logistic regression analysis was performed to identify variables that independently predicted ICU mortality. The following possible prognostic factors were entered: age, APACHE II and SOFA scores on admission in the ICU, the presence of sepsis, and two categories in admission NT-pro-BNP (based on the best cutoff point). NT-pro-BNP levels were compared with regard to PaO2/FIO2, platelet count, creatinine, total bilirubin, and the use of inotropic agents. For this purpose, patients were divided in two groups according to the SOFA subscores: those with a subscore of 1 to 2 and those with a subscore of 3 to 4.

RESULTS. Nonsurvivors ($n = 98$) had significantly higher NT-pro-BNP levels than survivors ($n = 135$) on admission in the ICU (2074 vs. 283 pg/ml, $p < 0.001$). ROC analysis showed that the area under the ROC curve in predicting ICU mortality was 0.70 for APACHE II and 0.77 for admission NT-pro-BNP ($p = 0.08$). The cutoff in admission NT-pro-BNP that best predicted outcome was 941 pg/ml. Multiple logistic regression analysis revealed that APACHE II score (O.R. = 1.06, $p = 0.007$), and the best cutoff point in admission NT-pro-BNP (O.R. = 7.74, $p < 0.001$) predicted independently ICU mortality. Elevated NT-pro-BNP was associated with thrombocytopenia (platelet count lower than 50x103/microl), renal failure (creatinine > 3.5 mg/dl) and cardiac dysfunction as reflected by the requirement in inotropic agents ($p < 0.02$ to 0.03). Furthermore, admission NT-pro-BNP levels were predictive for renal failure (Cr > 3.5 mg/dl).

CONCLUSION. In a large diverse cohort of ICU patients elevated NT-pro-BNP concentrations are associated with increased morbidity and mortality. In particular, patients with admission NT-pro-BNP plasma levels > 941 pg/ml are 7 times more likely to die in the ICU than patients with lower values.

0916

PANTOPRAZOL VS RANITIDINE AS PROPHYLAXIS FOR ACUTE GASTRIC MUCOSAL LESIONS IN CRITICALLY ILL PATIENTS

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INTRODUCTION. To describe the incidence of acute gastric mucosal lesions (AGML) in critically ill patients under mechanical ventilation for at least seven days and receiving pantoprazole or ranitidine as prophylaxis.

METHODS. We prospectively studied all adult patients admitted to our ICU who received prophylatic treatment for AGML and were under mechanical ventilation for at least seven days since admission. Preventive treatment for AGML was 40 mg pantoprazole i.v. once daily or 50 mg ranitidine i.v. every eight h. Treatment was decided by the physician in charge. After obtaining informed consent we performed a fibrogastroscopy between days 7 and 9 in the ICU to determine the presence or absence of AGML. Gastric pH, hemoglobin and hematocrit were determined daily. Data concerning blood transfusion requirements, SAPS II, APACHE II, sex, age, reason for admission, number of days in ICU, number of days on mechanical ventilation and outcome were also recorded.

RESULTS. From a total of 695 patients admitted to our ICU between June 2006 and January 2008, we screened 225 patients under mechanical ventilation for at least 7 days. Six patients were excluded due to previous gastric haemorrhage. Forty-seven patients needing mechanical ventilation for over seven days completed the study. We excluded patients with gastrointestinal bleeding or ulcer history, extubated patients, those who died before seven days and cases without informed consent. Mean age was 65 ± 12 years, 10 (21.3%) were males and 37 (78.7%) females. APACHE II was 20.0 ± 7.1 and SAPS II was 49.6 ± 14.5 at ICU admission. Thirty-three patients received pantoprazole and 14 ranitidine. Eighteen (54.5%) patients receiving pantoprazole and 8 (57.1%) on ranitidine had AGML at fibrogastroscopy (P = NS). Three patients on ranitidine and 1 on pantoprazole had gastric ulcer. None of the 47 patients presented active gastric bleeding during ICU admission. The study was stopped due to lack of patients included in the ranitidine group.

CONCLUSION. The incidence of AGML was similar in critically ill patients treated with pantoprazole or ranitidine and was high despite this prophylactic treatment. Pantoprazole could be a valid alternative to ranitidine for prophylaxis of ALGM.

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0917

PRONOSTIC VALUE OF CORTISOL LEVELS IN CORTICUS SEPTIC SHOCK POPULATION

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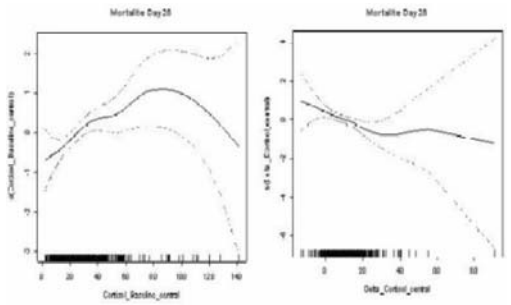
INTRODUCTION. We aimed at clarifying the prognostic value of cortisol response to ACTH in a broad population of septic shock.

METHODS. Relation between cortisol response to ACTH and mortality was tested with nonlinear models in 487 CORTICUS1 pts.

RESULTS. In logistic regression, basal cortisol ($p = 0.0005$) and delta cortisol ($p = 0.01$) were independent predictors of death. Nonlinear modelling showed increased mortality with increasing cortisol or decreasing delta cortisol.



CONCLUSION. Septic shock mortality may vary positively with basal cortisol and negatively with delta cortisol.

REFERENCE(S). 1. Sprung et al. NEJM 2008,358:111.

GRANT ACKNOWLEDGEMENT. European Union, ESICM, ISF.

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0918

IRON METABOLISM DURING ACUTE PHASE OF HEMORRHAGIC AND SEPTIC SHOCK

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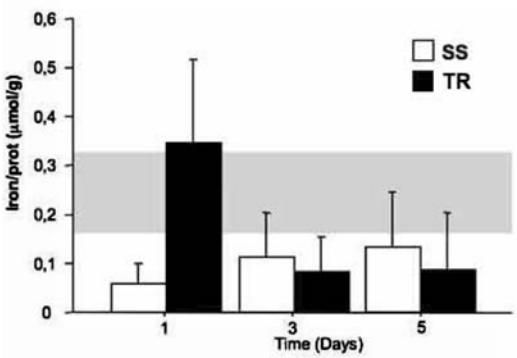
INTRODUCTION. In intensive care (ICU) patient's anemia is frequently associated with serum iron status disturbance. It may be due to two major phenomenons: inflammatory response and red blood cell loss. However, few studies described the serum iron status evolution in these patients and particularly those in shock state. We therefore explored the serum iron status of patients admitted in ICU for septic shock (SS) or in trauma patients (TR)

METHODS. Patients admitted in ICU for TR (ISS > 16) or SS (Bones criteria) were prospectively included. Blood samples were obtained on admission (day 1), day 3 and day 5 after admission. Serum iron (Fe), transferrin (Tf), ferritin, and soluble transferrin receptor (rTf) were measured. Usual clinical and biological parameters were assessed. Statistical analysis consisted in ANOVA for repeated measurements and Mann-Whytney test.

RESULTS. Twenty five patients were included (13 SS, 12 TR). Mean age was 57 ± 13, mean SAPS II was 51 ± 18 and mean ISS was 33 ± 15 for TR. Serum iron status parameters were corrected with protidemia. Serum iron was significantly lower in SS and TR compared to laboratory usual range. This diminution was observed at day 1 for SS whereas it occured at day 3 for TR. ($p = 0.0425$). Ferritin rates rised significantly in both groups (SS $p = 0{,}0025$; TR $p = 0.0098$) compared to laboratory usual range. Tf rate are significantly more elevated in TR ($p = 0.0073$). No differences were observed in rTf rates.



CONCLUSION. There is an acute decrease of serum iron during SS and TR. Difference between TR an SS may be explained by the delay between the beginning of the pathology (SS or TR) and sample.

0919

OXYGEN CONSUMPTION IS DEPRESSED DURING HUMAN BIGUANIDE-ASSOCIATED LACTIC ACIDOSIS

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INTRODUCTION. Lactic acidosis during animal biguanide intoxication may be due to mitochondrial damage [1]. Mitochondria account for > 90% of human body oxygen consumption (VO_2). Aim of the study was to verify if VO_2 is impaired in patients suffering from biguanide-associated lactic acidosis.

METHODS. We retrospectively studied 10 ICU-admitted patients with biguanide-associated lactic acidosis, undergoing renal replacement therapy. VO_2 was estimated as arterio-central venous difference in oxygen content ($AVDO_2$; normal value: 3.0–5.0 ml/dl). In 5 patients having their cardiac index monitored, VO_2 was also calculated (normal value: 110–160 ml/min/m^2). Data collected during the first 5 days were analyzed using a one-way repeated measures ANOVA.

RESULTS. Main results are presented as mean ± sd in table.

TABLE 1

	Day 1	Day 2	Day 3	Day 4	Day 5	p
pH	7.04 + 0.12	7.36 + 0.07	7.41 + 0.06	7.44 + 0.05	7.44 + 0.04	<0.001
Lactate (mM)	16 + 7	4 + 3	2 + 1	2 + 1	1 + 1	<0.001
$AVDO_2$ (ml/dl)	1.8 + 1.2	2.8 + 0.7	3.0 + 0.6	3.9 + 0.9	3.5 + 0.2	<0.001
VO_2 (ml/min/m²)	75 + 22	111 + 31	127 + 45	128 + 47	116 + 24	0.009

CONCLUSION. $AVDO_2$ and VO_2 are abnormally low in biguanide-intoxicated patients and return to normal during recovery. This finding suggests that the associated lactic acidosis may be due to mitochondrial damage.

REFERENCE(S). 1. El-Mir et al., J Biol Chem 275:223–8.

0920

DOES NICOTINE REPLACEMENT THERAPY AFFECT MORTALITY IN CRITICALLY ILL SMOKERS?

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INTRODUCTION. Nicotine Replacement Therapy (NRT) has been advocated to prevent withdrawal in hospitalised smokers; however data from the ICU population are sparse. [1] We undertook a retrospective case control study to assess the effect of NRT on ICU and hospital mortality.

METHODS. Cases were identified from a 30 bed general ICU as all those who had been prescribed NRT over 18 months (n = 73,); controls included adult smokers admitted during the same period who were not prescribed NRT, matched for age and weight (n = 86). The probability of receiving NRT was calculated via a propensity score (including APACHE2 mortality risk, sex, alcohol use and number of sedatives required), which was then used as an adjustment variable in two further logistic regression models examining ICU and hospital death as the outcomes.

RESULTS. The NRT group had both lower unadjusted ICU (8.2 vs. 22.1%) and hospital mortality (15.1 vs. 31.4%).The propensity score discriminated well (AUC 0.768), identifying that patients who received NRT were more likely to have a lower APACHE mortality risk, a history of alcohol use, be female, and require more sedatives. After adjustment for both propensity score and mortality risk, NRT therapy was no longer associated with ICU mortality (OR 0.41, 95% CI 0.13 – 1.25, p = 0.12); however there was a borderline association between NRT and lower hospital mortality (OR 0.40, 95% CI 0.16 – 1.00, p = 0.05). Both models discriminated adequately (AUC 0.74 and 0.72) and were well calibrated (X2 = 2.13 and 5.62).

CONCLUSION. Contrary to a previous report [1], NRT therapy may be associated with a reduction in hospital, but not ICU mortality. This requires confirmation in a larger dataset.

REFERENCE(S). 1. Lee AH, Afessa B. The association of nicotine replacement therapy with mortality in a medical intensive care unit. Crit Care Med. 2007;35(6):1517–1521.

0921

RELATION BETWEEN URINARY CREATININE EXCRETION AND OUTCOME IN CRITICALLY ILL PATIENTS

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INTRODUCTION. The adverse impact of cachexia and muscle wasting on patient outcome has long been acknowledged. In this context several physical and laboratory parameters of muscle mass have been evaluated in different patient groups. Creatinine is the irreversible and stable product of muscle degradation and dietary meat intake. Since creatinine is excreted into the urine, measurement of urinary creatinine excretion in 24 h urine samples (UCE) has been a widely accepted method for muscle mass estimation. Although UCE was studied in outpatients, no studies have been performed in critically ill patients. We evaluated if UCE at ICU admission, as a marker of muscle mass, is associated with patient outcome.

METHODS. In this observational study in a 12-bed surgical ICU in a tertiary teaching hospital, we used our hospital database to analyse 24-h urine and serum samples of all patients admitted from 2000–2006. Samples were collected on the first 3 days after ICU admission. UCE and creatinine clearance were calculated. Since muscle mass is sex and age dependent, these factors were also recorded. Patients who were discharged within 24 h of admission, had a diuresis < 400 ml/day or serum creatinine levels > 250 umol/L, or had received renal replacement therapy (RRT) were excluded. Hospital mortality and length of stay were used as outcome measures.

RESULTS. Of a total of 3505 patients admitted during the study period, 1514 patients with 3757 samples were analyzed. There were 63% male and 37% female patients. 432 Patients were excluded due to severe oliguria, serum creatinine levels above cut-off level or RRT. Mean creatinine excretion in 24 h-urine samples was 13.5 ± 5.3 and 8.6 ± 3.8 mmol/day for males and females respectively ($p < 0.001$). Hospital mortality was 18%. After univariate analysis UCE was strongly correlated with hospital mortality, with different relations for males and females. After multivariate logistic regression analysis with UCE, baseline serum creatinine, sex, and age, UCE and age were independently associated with mortality ($p < 0.001$). When UCE was expressed in equal quintiles, patients in the lowest UCE quintile had a 4-fold increased mortality risk compared to patients with the highest UCE quintile. Likewise, ICU and hospital length of stay for patients patients in the lowest UCE quintile were 2-fold increased compared to patients with the highest UCE quintile.

CONCLUSION. Urinary creatinine excretion after ICU admission is approximately 50% higher in critically ill male patients compared to female patients. For both sexes urinary creatinine excretion as a measure of muscle mass is strongly associated with patient mortality.

0922

TREATMENT OF CENTRAL PONTINE AND EXTRAPONTINE MYELINOLYSIS WITH THYREOTROPIN RELEASING HORMONE: A CASE REPORT

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INTRODUCTION. Central pontine and extrapontine myelinolysis is an osmotic demyelinisation disorder precipitated by an agressive correction of a dysosmolar state. It is often caused by a rapid correction of hyponatremia. Clinical manifestations usually develop 2–7 days after the electrolyte disturbance had occured, the severity of symptoms differs with the most severe being quadriplegia and coma. Once the symptoms have developed, the neurological prognosis is unfavourable. Several modes of therapy have been reported as effective once the neurological symptoms had occured (plasmapheresis, corticosteroids, immunoglobulins and thyreotropin releasing hormone - TRH), all were reported only as individual case reports. Through a search of literature we found 3 case reports of succesfull treatment with TRH followed by a prompt neurological recovery.

METHODS. A case report and a literature review.

RESULTS. A 61-year old man was admitted with a severe hyponatremia, which was too rapidly corrected. Six days later he developed a progressively worsening neurological symptomatology (quadruparesis, dysartria, bulbar symptomatology). Central pontine and extrapontine myelinolysis was confirmed on MRI. The patient remained virtually unresponsive with a severe quadruparesis and a severe bulbar symptomatology for 4 weeks. The only sign of his consciousness was a tiny movement of his fingers on verbal comand. Therapy with TRH was started 4 weeks since the onset of symptoms in a daily dose of 2 mg i.v. for 30 days. A dramatic neurological improvement began within a few days and continued through the full course of therapy. He was discharged 6 weeks after the end of therapy with TRH. The patient made a practically complete recovery with only a slight residual neurological symptomatology. He returned to his work as manager 6 months later. Thyroid function tests were repeatedly within normal limits and no side effects were observed.

CONCLUSION. Our case is, according to literature, a fourth reported treatment with TRH followed by a neurological improvement. TRH appears to be a safe and beneficial treatment of central pontine and extrapontine myelinolysis. Compared to other therapies, which are all immunosupresive, it appears to have no apparent side effects.

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0923

ORAL MELATONIN PHARMACOKINETIC IN CRITICALLY ILL PATIENTS

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INTRODUCTION. Critically ill patients have a reduced secretion of melatonin (M), both in nocturnal peaks and in baseline daily levels. The oral M supplementation has been hypothesized useful for its sedative, anti-oxidant and oncostatic properties. This study is designed to define both the enteral absorption and the daily pharmacokinetic of M in critically ill patients.

METHODS. 9 high-risk patients (2 cardiac arrest, 4 polmonitis, 3 septic shock, 1 pulmonary edema) were enrolled in this prospective trial: mean age was 73.1 ± 4.9, mean SAPSIII 69.8 ± 5.3. During their third and fourth days of ICU, they undergo in two series of repeated blood samples at these times: 20:00 (t0), 20:05 (t1), 20:10 (t2), 20:20 (t3), 20:30 (t4), 20:45 (t5), 21:30 (t6), 24:00 (t7), 03:00 (t8), 06:00 (t9), 14:00 (t10), to detect serum M levels by radio-immuno-essay. One tablet containing M 3 mg (manufactured by Procemsa - Torino, Italia - with the pure M produced by Helsinn - Biasca, Switzerland) was gave at 20:00 of the fourth day, immediately after t0 sampling, by pounding the tablet in a pestle and administering it by a naso-gastric tube. To build the pharmacokinetic curve were used the serum M values of the fourth (exogenous) minus the third (endogenous) day.

RESULTS. All basal values of serum M were found below the normal level, frequently under the lower detection limit of 3 pg/ml. The serum M values (all in pg/ml) describing the enteral absorption were: **t0** = 8.2 ± 4.5; **t1** = 4729.3 ± 541.5; **t2** = 11888.9 ± 8290.0; **t3** = 11479.3 ± 7835.1; **t4** = 7923.1 ± 6030.4; **t5** = 6806.5 ± 6125.2; **t6** = 6504.2 ± 3068.2; **t7** = 2283.6 ± 2094.1; **t8** = 693.1 ± 586.5; **t9** = 169.2 ± 100.6; **t10** = 86.2 ± 83.9. Pharmacokinetic values: **Cmax** = 13811.41 ± 7337.83 pg/ml; **Tmax** = 15.0 ± 8.4 minutes; **half life** = 31.1 ± 14.7 minutes.

CONCLUSION. Critically ill patients have reduced serum M levels. By administration of exogenous M 3 mg, supraphysiologic levels are reached already after 5 minutes, with a serum peack of 13811 pg/ml reached after 15 minutes, showing a satisfactory enteral absorption even during the early phase of critically illnesses. The decrease of serum M level become significant after midnight, even maintaining supraphysiological levels until 06:00.

0924

ADRENERGIC STIMULATION AND ELEVATED BLOOD LACTATE LEVELS

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INTRODUCTION. Stress reaction of the body is a stereotype pattern of neuro-humoral response. The key role in this „fight-or-flight" reaction is based in activation of the axis of cerebral cortex-hypothalamus-adrenal medulla, and resulting secretion of adrenaline. One of many actions of adrenaline includes glycolysis escalation and hence elevated blood lactate levels. Hyperlacticaemia may not necessarily only mirror tissue hypoxia. The aim of our study was to: 1) determine potential relationship between blood lactic acid levels and urinary adrenaline levels at the time of admission to the ICU; 2) utilize lactate plasma levels and urinary adrenaline levels as a marker to measure stress severity.

METHODS. We have ran the assay in 57 patients – 45 males and 12 females, median age 51 years (17–80), out of them 33 trauma patients and 24 non-trauma patients, median APACHE II score – 20 points (11–30). The investigation was performed from the first urine sample taken at admission, in average 45 minutes (25 – 70 minutes) after the insult. At the same time we assayed lactate levels in the arterial blood. Excluded were those patients who had been administered dopamine, adrenaline and/or noradrenaline in the pre-hospital setting, and patients with preexisting kidney disease. Adrenaline was assayed using a validated high-performance liquid chromatography method with electrochemical detection (HPLC-ECD). Thus determined adrenaline levels were recalculated relative to urinary creatinine levels. This concentration ratio compensates for the influence of variable urine output and corresponds with blood catecholamine levels at the moment of urine production.

RESULTS. 1. Urinary adrenaline/creatinine ratio was significantly elevated in non-surviving vs. surviving patients, 64 vs. 24 nmol/mmol of creatinine ($Z = -3.38$, $DF = 1$, $p = 0.0007$).
2. Lactate plasma levels were significantly elevated in non-surviving vs. surviving patients, 4.3 vs. 2.8 mmol/l ($Z = -2.93$, $DF = 1$, $p = 0.0034$).
3. There was significant correlation between lactate plasma levels and urinary adrenaline levels ($r = O.31$, $t = 2.43$, $p = 0.018$).

CONCLUSION. Association between plasma lactate levels and urinary adrenaline levels may suggest non-hypoxic cause of hyperlactataemia in the initial stage of stress response. The efforts to reach normal plasma lactate levels may thus be not the most appropriate therapeutic strategy. Elevated urinary adrenaline and plasma lactate levels in the non-surviving group may suggest higher stress burden of this group.

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0925

ROLE OF RELATIVE ADRENAL FAILURE IN THE RESUSCITATION OF MAJOR BURNS

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INTRODUCTION. Burn patients often receive far more resuscitation fluid than predicted by usual formula. Even few of them need support with vasopressor agents to achieve classic resuscitation end points (urinary output, mean arterial pressure). These variations are related with negative consequences described in the literature such as abdominal compartmental syndrome and progression of burn necrosis. Some of the factors related with the increased requirements of fluids are known (electrical buns, inhalational injury). In cases where these circumstances do not concur other factors are unknown.
Adrenal failure is common in critically ill conditions. The diagnosis of relative adrenal failure (RAF), and its treatment with low doses of corticosteroids, showed reduction of vasopressor support, shock reversal and improved survival in septic shock. Our main objective is to know the prevalence of relative adrenal failure in the resuscitation phase of major burns. Secondly we study its implication as a possible factor of increased requirements in burn resuscitation

METHODS. Descriptive study of the prevalence of RAF in major burns carried on in Hospital Virgen del Rocío, a tertiary hospital regional reference centre for major burns. From March 2007, major burns accomplishing criteria were included. After written consent, 250 micrograms of Tetracosactrin (synthetic corticotrophin) was IV administered within the first 48 h of resuscitation. Measures of cortisol were obtained before and 60 minutes after administration. Every patient included received resuscitation following Parkland formula. Resuscitation volume (predicted and real), 24 h diuresis, use of vassopresors and demographic data were collected. We defined RAF as an increase in post-administration cortisol

RESULTS. 14 subjects were included. The mean burn surface area was 52%. The prevalence of RAF was 31%. RAF was statistically significant associated with young age group (RAF 27 years [21–30] vs. non RAF 41 years [37–46]). Increased resuscitation volume (real > predicted) and use of vassopresors were not related with RAF. It seems that mean burn surface area (BSA) and RAF are related but it does not reach statistical significance (RAF 65[45–78] % BSA vs. non RAF, 42[27–45] % BSA).

CONCLUSION. Prevalence of RAF in resuscitation phase of major burns is relevant. Its association with increased resuscitation volume, use of vassopresors and BSA, however not being statistically significant, shows a marked trend that a major sample size probably would strengthen.

Poster Sessions
Surviving sepsis: 0926–0939

0926

IMPACT ON PROCESS-OF-CARE AND MORTALITY OF A NATIONAL EDUCATIONAL PROGRAM (EDUSEPSIS STUDY). EFFECTIVENESS ACCORDING PROCESS-OF-CARE AT BASELINE

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INTRODUCTION. A national educational effort based on the Surviving Sepsis Campaign (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 analyze the impact of baseline care on the effectiveness of this intervention.

METHODS. Measurement of baseline compliance with the recommendations of the SSC guidelines in a pre-intervention cohort (2 month period: November-December 2005) and re-measurement in a post-intervention cohort (4 month period: March-June 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: 59 medical-surgical adult ICUs located throughout Spain. ICUs were classified in 3 categories by percentiles depending on the process-of-care at baseline, measured by the number of tasks included in the bundles completed. 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. Baseline care of patients treated in Category 1 ICUs (20 ICUs) complied with less than 4 tasks; baseline care in Category 2 ICUs (19 ICUs) complied with 4 to 5 tasks; and baseline care in Category 3 ICUs (20 ICUs) complied with more than 5 tasks. No differences in APACHE II between pre-intervention cohort and post-intervention cohort were observed in any category. The educational program improved the process-of-care in all 3 categories of ICUs (relative improvement of tasks completed of 36.0% en ICUs Category 1, 12.2% in Category 2 and 9.3% in Category 3) but only reduced mortality in Category 1 ICUs (48.0 vs. 39.3%; $p = .046$).

CONCLUSION. There is a possible relationship between baseline compliance with the guidelines and the effect of the educational program, suggesting that educational efforts are most effective when applied in ICUs with low baseline compliance with the guidelines.

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0927

SURVIVING SEPSIS GOALS ACHIEVED AND MORTALITY

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INTRODUCTION. Severe sepsis (SS) is the leading cause of death in the ICU. The Surviving Sepsis Campaign (SSC) recommends a package of evidence based interventions known as the sepsis resuscitation bundles and the sepsis treatment bundles. The aim is to ensure that eligible patients receive all appropriate treatments in a timely fashion, utilising protocol driven prescriptions. The SSC was implemented in our ICU February 2006. We studied the relation of implementation and outcome.

METHODS. A prospective cohort study was performed in all (266) ICU-patients with SS between January 2006 and September 2007. Patient demographics, sepsis origin (abdominal, pulmonary, urogenital or otherwise), APACHE-II score, SSC goals achieved and hospital mortality were recorded. SSC-points were given for every SSC-goal reached.

RESULTS. Total SSC compliance changed from 80.0% to 86.1% ($p = 0.004$). This change was attributable to improvement in Resuscitation Bundle goals ($p = 0.005$). Severity of illness did not change over time. No SS mortality change was noted overall.

TABLE 1 SSC GOALS

1	arterial lactate taken
2	cultures taken before antibiotics
3	anitbiotics started
4	volume resuscitation cvp 8–12 mmHg
5	ScvO2 > 70%
6	steroids given

Mortality varied among categories: abdominal 22 vs. 37%, pulmonary 45 vs. 37%, urogenital 0% vs. 0% and other 33% vs. 19%. Overall mortality was 38%. A clear trend to better outcome was observed in the optimal implementation group (5–6 SSC points) with mortality 32% versus the suboptimal group (< 4 points) mortality 44% ($p = 0.05$) without differences in APACHE II score ($p = 0.58$).

CONCLUSION. Our hospital mortality of 38% is in range with the reported mortality of severe sepsis-patients. A significant better outcome after successful implementation of SSC guidelines was demonstrated (mortality 44% vs. 32%; $p = 0.05$). Enrolling more patients and combining data from other Dutch centers into our national SSC database should prove the ultimate effect of implementation on outcome. Time delay data and goals not reached are relevant to plan actions to improve the SSC guidelines implementation.

0928

POST-MORTEM FINDINGS IN 243 SURGICAL INTENSIVE CARE PATIENTS WITH SEPSIS

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INTRODUCTION. While detailed analyses of the post-mortem findings of various critically ill patient groups were published, no such study has been performed in patients with sepsis. Detailed knowledge of post-mortem findings in these patients could not only improve our understanding and treatment of sepsis, but also direct at future research strategies. This retrospective cohort study reviews the post-mortem examinations of surgical intensive care unit (ICU) patients who died from sepsis or septic shock.

METHODS. Between 1997 and 2006 the ICU database and autopsy register of a tertiary university teaching hospital were reviewed for patients who were admitted to a twelve bed surgical ICU because of sepsis/septic shock or who developed sepsis/septic shock at a later stage during their ICU stay and subsequently died because of sepsis/septic shock. Clinical data and post-mortem findings were documented in all patients. Descriptive statistical methods were applied to evaluate the frequency of single organ pathologies. Chi^2-test was used to compare the frequency of organ pathologies between the two most frequent clinical causes of death or during the observation period.

RESULTS. Post-mortem results of 243 patients (87.7%) were available for statistical analysis. The main causes of death were refractory multiple organ dysfunction syndrome (50.6%) and uncontrollable cardiovascular failure (36.6%). Pathologies of the lungs, kidneys/urinary tract, cardiovascular system, gastrointestinal tract, liver, spleen, central nervous system, and pancreas were detected in 89.7, 59.7, 53.9, 53.1, 47.3, 32.1, 18.5, and 9%, respectively. Myocardial ischemia (88.6% non-occlusive; 11,4% occlusive) was the most frequent cardiac pathology. In 182 patients (74.9%) the autopsy revealed an ongoing septic focus. The most frequent ongoing foci were pneumonia (39.9%), tracheobronchitis (28.8%), peritonitis (22.6%), uterine/ovarial necrosis (9.2% of female patients), intra-abdominal abscesses (9.1%) and pyelonephritis (6.2%). Of the seventy-one patients who were admitted to the ICU because of sepsis/septic shock and treated for longer than seven days an ongoing septic focus was observed in 63 cases (88.7%).

CONCLUSION. Relevant post-mortem findings explaining death in surgical ICU patients who died because of sepsis/septic shock were an ongoing septic focus in 80% and cardiac pathologies in 50%. The most frequently affected organs were the lungs, the abdomen, and the urogenitary tract. More diagnostic, therapeutic and scientific efforts should be launched to identify and control the infectious focus in patients with sepsis and septic shock.

0929

IMPACT OF INTENSIVE INSULIN THERAPY ON SEPTIC PATIENTS IN A MEDICAL SURGICAL ICU

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INTRODUCTION. Hyperglycemia or relative insulin deficiency (or both) during critical illness may directly or indirectly confer a predisposition to complications, such as severe infections, multiple-organ failure, and death.

METHODS. In a closed medical –surgical ICU, university affiliated at the Kingdom of Saudi Arabia. we prospectively planned sub analysis of a randomized controlled trial evaluating the effect of Intensive Insulin Therapy (IIT) versus Conventional Insulin Therapy (CIT) on morbidity and mortality in critically ill patients. The effects of this intervention on patients admitted with sepsis were assessed.
A total of 122 consecutive septic patients > 18 years of age and had serum glucose level > 6.1 mmol/L (110 mg/dL) during the first 24 h of ICU admission. We excluded patients with type I diabetes, diabetic ketoacidosis, hypoglycemia on ICU admission, brain death, (DNR) status, terminal illness, post cardiac arrest, seizures within past 6 months, pregnancy, liver transplantation, burn victims, readmission to ICU within the same hospitalization, expected ICU length of stay (LOS) of less than 24 h, no consent or enrollment in a competing trial.
The primary end point was ICU mortality. Secondary endpoints included hospital mortality, ICU or hospital length of stay (LOS), mechanical ventilation duration as well as the rate of hypoglycemia (defined as BG $\leq$ 2.2 mmol/L or 40 mg/dL).

RESULTS. Among 122 patients with a mean APACHE II score of 27.6 $\pm$ 7.6 (IIT) and 28.6 $\pm$ 7.5 (CIT), P- value = 0.48 There was no difference between the two group in ICU mortality 32.7% (IIT) and 22.4% (CIT) Adjusted Hazard Ratio (AHR) = 1.6, P = 0.2. Among non-diabetics, mortality was higher in the (IIT) group 42% than the (CIT) group 31%, AHR = 4.0, P = 0.01; similar finding was observed in patients with inclusion blood sugar $\leq$ 10 mmol/L. Hypoglycemia occurred more frequently with IIT (46 events/100 treatment days vs. 3 events/100 treatment days, P < 0.0001).There was no difference between the IIT and CIT in any of the other secondary endpoints.

CONCLUSION. In septic medical surgical ICU patients, IIT had no mortality difference from those on CIT. However, IIT was associated with higher mortality in non-diabetics and in patients with inclusion blood sugar $\leq$ 10 mmol/L. Also, IIT increased the occurrence of hypoglycemia. Further studies are needed to explore the benefit of this intervention in this category of patients. Prevention and early detection of hypoglycemia is major concern when implementing this therapy.

0930

THE ACHIEVEMENT OF THE EARLY GOAL DIRECTED THERAPY ENDPOINTS IS THE ONLY ELEMENT OF THE SEPSIS CARE BUNDLES WITH MAJOR IMPACT ON HOSPITAL MORTALITY

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INTRODUCTION. The purpose of the study was to describe the effectiveness of the Surviving Sepsis Campaign (SSC) bundles with regard to both implementation and outcome in patients with septic shock.

METHODS. This was a single-center prospective observational study of patients admitted to the medical-surgical ICU of an urban tertiary care teaching hospital fulfilling criteria for the international sepsis definitions. After a widespread 2 months educational program, implementation of SSC Resuscitation Bundles (RB) and Management Bundles (MB) were accomplished. Patients were recruited from September 2005 to February 2008. We determined the rate of compliance and the prognostic value of the RB, the MB and of each bundle element.

RESULTS. We analyzed 295 consecutive episodes of septic shock. The main sources of infection were: abdomen 34.8%, lung 34.8%, and UTI 12.6%. The mean age was 64 $\pm$ 15, APACHE II 23 $\pm$ 7, SOFA 9.5 $\pm$ 3, and global hospital mortality 40.3%. The rate of compliance with the RB was 32%. There were significant differences in mortality between compliant (C) and non compliant (NC) groups despite the similar characteristics and the severity of septic shock. Mortality rate was 46.7% in the NC group and 27.7% in the C group. Compliance rate with MB was only 16%, there were not differences in mortality between C and NC groups (48.4 vs. 55.50%). When the influence of age, severity, emergency department origin, and ICU admission delay was controlled by multivariate analysis, compliance with RB was independently associated with survival (OR = 0.49, 95% CI 0.26–0.94, p = 0.03). We only found differences in mortality between C and NC groups in three bundle elements: serum lactate measured before 6 h (35.2 vs. 54.2%; p < 0.01), early broad-spectrum antibiotics use (34% vs. 47.3%; p = 0.02), and treatment with activated protein C when indicated (25 vs. 55.5%; p = 0.04). In the multivariate analysis, compliance with the three early goal-directed therapy endpoints, age, SOFA score, and mechanical ventilation were independently associated to mortality.

CONCLUSION. Implementation of resuscitation bundle was associated with decreased mortality in patients with septic shock. Among all sepsis bundle elements, compliance with the three early goal-directed therapy endpoints was the only independent predictor of survival. Compliance rate with management bundles was poor and had no impact on survival.

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0931

AWARENESS AND PRACTICE OF SURVIVING SEPSIS CAMPAIGN AMONGST TRAINEES IN UNITED KINGDOM

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INTRODUCTION. The surviving sepsis campaign aims to achieve globally a 25% reduction in mortality due to severe sepsis. The campaign is in its third phase, and aims to inform, implement and check the compliance, improvement and outcomes of the resuscitation bundles. In UK, patient with severe sepsis are identified usually by the Registrars and referred to Intensive therapy unit team. Therefore for compliance with the Resuscitation Bundle, it is essential to identify sepsis, severity of sepsis and initiate resuscitation measures.

METHODS. A questionnaire was designed for online access. Questions tried to elicit knowledge about awareness of the campaign, its aims and practise. Recent experience in Intensive therapy unit was elicited. The e mail links were sent to Registrars across UK.

RESULTS.(1) 182 Registrars completed the survey, completion rate 54.00%. (2) 52.20 % were aware of the surviving sepsis campaign. (3) Awareness by Specialty, 15.58% Obstetrics and Gynaecology 12/77, 35.71% Surgical specialty 10/28, 66.60% Medical specialty 8/12, 100.0% Emergency Medicine 11/11, 00.0% Anesthesia 54/54. (4) 23.62%(43/182) knew the aim of the Surviving Sepsis Campaign. (5) 29.12% (53/182) knew that individual hospitals should use the bundles to create customized protocols and pathways specific for their institutions. (6) 25.27% (46/182)knew,Sepsis Resuscitation bundle needed to be achieved in 6 h. (7) Of those who worked in ITU in last one year,

(a) 45.45% (25/55) knew Sepsis Resuscitation Bundle needs delivery in 6 h.
(b) 40.00% (22/55) knew Sepsis Management Bundle needs delivery in 24 h.

CONCLUSION. Awareness of Surviving Sepsis Campaign, has not fully reached beyond the specialties of Emergency Medicine and Anaesthesia. To achieve the realistic targets of 25% reduction in mortality due to severe sepsis, there needs to be a greater emphasis on targeted education. Trainees in Acute care specialties need to build greater awareness of the campaign, its purpose, initiatives, and knowledge of the care bundles.

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0932

SEVERE SEPSIS OUTCOME: ARE MEN DIFFERENT FROM WOMAN?

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INTRODUCTION. Among factors postulated to affect outcome in sepsis is the gender of the patient, with a suggestion that females may have lower mortality. We sought to evaluate whether gender is associated with differences in intensive care unit (ICU) mortality in patients with severe sepsis/septic shock.

METHODS. Concurrent data collection on patients with severe sepsis admitted to our ICU from December 2001 to November 2007. Data was collected regarding demographic characteristics of the patients, comorbidities, focus of infection, number of organ dysfunctions, severity of sepsis, SAPS II, ICU and hospital length of stay (LOS) and mortality.

RESULTS. During the study period, 1031 patients admitted to our ICU, more men than women (66 vs. 34% for all admissions, $p = 0.025$). In the group of patients admitted with the diagnosis of severe sepsis/septic shock (214 patients, of whom 64% had septic shock) no significant differences were found between man and women, regarding age (57 vs. 61, $p = 0,157$), SAPS II score (45 vs. 48, $p = 0,202$), comorbidities (no comorbidities 65 vs. 64%, $p = 0,801$), septic shock (62 vs. 66%, $p = 0,497$), ICU (9 vs. 9, $p = 0,844$) and hospital (19 vs. 16, $p = 0,607$) LOS and ICU (38% vs. 29%, $p = 0,165$) and hospital (40 vs. 36%, $p = 0,575$) mortality. Men have more pneumonia (70 vs. 52%, $p = 0,008$) and central nervous system infection (7 vs. 0%, $p = 0,012$). Women have more urinary infection (10 vs. 3%, $p = 0,028$) and intra-abdominal infection (27% vs. 16%, $p = 0,047$).

CONCLUSION. Our results indicate a significantly smaller number of female patients requiring intensive care. This difference might be because illness progresses differently for men and women. There are significant differences regarding focus of infection without differences in chronic comorbidities like respiratory chronic disease that could explain the higher incidence of pneumonia in men. The reason for this difference in focus of infection still needs clarification.

0933

SEPSIS CAMPAING CRITERIA ADMISSION AT THE UNIVERSITY HOSPITAL DOES NOT AFFECT THE SEPSIS OUTCOMES AT THE ICU

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INTRODUCTION. Improving early and accurate diagnosis was one of the six point action plan to reduce global mortality from severe sepsis by 25% by 2009. Statistics and epidemiologic variables about sepsis, SIRS and sepsis campaign criteria (SCC) have been unknown at South America (1). Aim: Our objective was to analyse the difference about admission criteria of sepsis and severe sepsis in order to identify any significant differences between reduced parameters of SIRS vs. amplified SCC criteria and reduction of mortality from a South America country

METHODS. We performed a prospective observational research study from March 2007 to December 2007. Of six hundred and seventy patients admitted to the ICU, 342 patientes on SIRS, 369 on sepsis diagnosis and 359 patientes with diagnosis of severe sepsis were included. Interventions: Data were collected based on sepsis campaign criteria (2004) and SIRS criteria (1992). Statistical analysis: A descriptive analysis was performed, data are presented as mean $\pm$ sd. The statistical analysis was carried out with the SPSS 10 package and $p < 0.05$ was significant

RESULTS. The study included six hundred and seventy critical ill patients, mean age of 63.3 ± 18.4 yrs, APACHE II score 14 ± 6.6. 64% of the patients with SIRS, 66.7% with sepsis criteria and 69.9% with severe sepsis according to sepsis campaign criteria of admitted patients. 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 no significant correlation between three kinds of sepsis classifications and mortality in our critically ill patients independent of significant differences between mortality in each group (Table).

TABLE 1

Variable clasification	Death yes	Death not	*p*
SIRS	135 (39.8%)	204 (60.1%)	0.00001
Sepsis	148 (40.4%)	218 (59.5%)	0.00001
Severe Sepsis	150 (42.2%)	205 (57.7%)	0.000003

CONCLUSION. In Colombia there is not an educational sepsis campaign program. The changing of sepsis classification was created to increases sensitivity of sepsis diagnosis and finally reduces mortality. We could not demonstrate that increasing diagnosis of sepsis will affect the mortality because Colombia is far from the developed countries in sepsis campaign educative program focus on treatment and outcomes

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0934

ENHANCED PATIENT MONITORING TO ASSIST WITH THE IDENTIFICATION AND TREATMENT OF SEPSIS

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INTRODUCTION. Evidence suggests that early, timely and aggressive resuscitation for patients with septic shock can have a significant impact on both morbidity and mortality. However, even with the widespread awareness of the Surviving Sepsis Campaign (SSC) guidelines, adherence varies widely. It has been shown that clinical decision support systems can help clinicians improve various aspects of clinical practice, particularly when they are integrated into clinical practice and present at the point of care. Protocol Watch (PW) was developed as a bedside tool to assist clinicians with both implementation of and compliance with the SSC guidelines. The purpose of this research was to measure the impact that using PW had to adherence to the SSC guidelines.

METHODS. Participants were critically ill patients in two large university-affiliated teaching hospital intensive care units in the United States. Prior to the installation of PW, implementation of the SSC was done using a paper-based system of standing orders. Base line data on compliance with the SSC guidelines were collected. Protocol Watch, which offers an electronic version of the guidelines and is resident on the bedside patient monitor, was then installed in all critical care beds. The post PW installation data collection is currently being collected.

RESULTS. Preliminary results show improvements in compliance with the resuscitation bundle, and a decreased time for completion of both the resuscitation and management bundles. In addition, the feedback from the clinical users has been extremely positive.

TABLE 1 MEAN VALUES FOR AGE, APACHE II, AND RESUSCITATION/MANAGEMENT BUNDLE COMPLETE

Age	APACHE II	Resuscitation Bundle Complete	Time to completion hr	Management Bundle Complete	Time to completion mi	
Group 1 (N = 39) Prior to PW	67.6 (14.4)	21.2 (8.1)	61.5%	11.6 (17.1)	85.2%	21.1 (16.5)
Group 2 (N = 46) After PW imple	61.7 (17.6)	21.6 (6.3)	72.1%	9.1 (6.0)	85.3%	16.3(9.7)

CONCLUSION. If the final data analysis supports the preliminary findings, PW could emerge as an important method for assisting in the implementation of the SSC guidelines, thus making a valuable contribution in the care of critically ill patients with sepsis.

0935

SEVERE SEPSIS AND SEPTIC SHOCK IN AN INTENSIVE CARE UNIT: PRONOSTIC FACTORS AND MORTALITY

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INTRODUCTION. Sepsis is the main cause of mortality in our intensive care medicine (ICU) units. There are numerous factors related to mortality in these patients. In the last years many therapeutic interventions have been studied, most of them based on new approaches in sepsis phisiopatology. Most of them have failed to improve sepsis survival.
Our objective in this study was to define the mortality predictor factors in our septic patients and to analize our global mortality.

METHODS. In our third level hospital (>1000 beds), we analized 285 ICU patients with severe sepsis-septic shock in a prospective observational study developed between 2005 and 2007 with three different periods. Sepsis incidence in our ICU was 45%.
n = 285 patients, mean age 59 ± 15 years; males 68%; APACHE II 22 ± 8; septic shock 65%; mechanical ventilation 61%. We defined three different groups based on the initial infection location: emergency(32%), floor room(27%) and ICU(41%).
Sepsis ethiology was: pneumonia 47%, abdominal 27%, meningitis 5%, soft tissues 5%, urinary tract infection 4%, catheter 3%.

RESULTS. Univariant analysis identified as unfavourable outcome factors: Lactate > 3 mmol/L ($p < 0{,}00001$); Glucose < 4, 1 mmol/L ($p < 0{,}00001$); platelets < 100.000x10.9/L ($p < 0{,}0012$); coagulopathy INR > 1.5 ($p < 0{,}0001$); leucopenia < 3500x10.9/L ($p < 0{,}002$); bilirrubin > 36 umol/L ($p < 0{,}007$); creatinine > 177 umol/L ($p < 0{,}004$); albumin < 25 gr/L($p < 0{,}005$); shock ($p < 0{,}006$); hypotension ($p < 0{,}002$); use of steroids ($p < 0{,}016$); bicarbonate < 24 mmol/L ($p < 0{,}045$).
Favourable outcome factors were: correct hemodynamic resuscitation ($p < 0{,}045$); pneumonia as infection ethiology ($p < 0{,}05$).
Multivariant analysis (cox-regresion)only identified as independent pronostic factors: Lactate > 3 mmol/L (HR:3,04 (1,74–5,32)$p < 0{,}00001$); trombocythopenia (HR:2,32 (1,25–4,31)$p < 0{,}0015$); hypoglucemia (HR:2,94 (1,41–6,2)$p < 0{,}04$) and leucopenia (HR:1,86 (1,04–3,3)$p < 0{,}04$).
Global survival at 28 days was 58,8%.

CONCLUSION. Sepsis incidence in our ICU enviroment is high (45%).
We identified four major unfavourable outcome independent factors: lactate > 3 mmol/L, trombocythopenia, hypoglucemia and leucopenia.
Our 28 day survival rate was 59%.

0936

IMPACT OF THE SURVIVING SEPSIS CAMPAIGN IN A THIRD LEVEL HOSPITAL

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INTRODUCTION. Since the publication of the guidelines for the management of septic patients, many efforts have been done to systemize the treatment, specially the hemodynamic resuscitation within the first 6 h. The acomplishment of these guidelines in the hospital enviroment is increasing but it is necessary to study the final impact on mortality. Our goal was to analyze the impact on mortality in a third level hospital of the educational campaign based on different bundles of resuscitation within the first 6 and 24 h.

METHODS. We studied 285 septic patients divided in three groups depending on the educational period. Fase I (2005-preeducational period): 56/285. Fase II (2006-post first educational campaign): 161/285. Fase III (2007-post second educational campaign): 69/285. We defined different diagnostic and therapeutic goals as a good predictors of accomplishment. First line bundles within the 6 first h from the begining of the infection: lactate determination (Q1), blood culture before antibiotherapy (Q2), early antibiotherapy during the first 3 h in an emergency unit and room floor, and in the first h in ICU (Q3), properly haemodynamic resuscitation (Q4), to reach a central venous pressure ≥ 8 mmHg (Q5) and a venous mixed saturation > 70% (Q6). Second line bundles within the first 24 h from the beginning of the infection: steriod therapy (Q7), glucose blood level > 4,1 mmol/L (Q8), protective ventilation (Q9). We analyzed the impact of the educational campaign on the acomplishment of the guidelines and the impact on mortality.

RESULTS. Only two predictor goals reached the statistic signification when we compared the outcomes of the different fases: glucemia control during the first and second fase ($p = 0{,}023$) and during the second and third fase ($p = 0{,}01$), and the protective ventilation durind the second and third fase ($p = 0{,}01$). Survival rate after 28 day was: Fase I 55%. Fase II 63%. Fase III 46%. These differences between fases as the location of presentation did not achieve statistic signification.

TABLE 1

	FASE I (%)	FASE II (%)	FASE III (%)
Q 1	25	20	28
Q 2	25	20	28
Q 3	50	56	44
Q 4	60	59	64
Q 5	50	47	58
Q 6	22	19	29
Q 7	41	22	41
Q 8	34	47	51
Q 9	65	60	82

CONCLUSION. We observe a trend to acomplish the guidelines although there is any statistic significance. Despite of this trend we have not been able to demonstrate an impact on mortality.

0937

WHAT ABOUT OUTCOME OF SEVERE SEPSIS IN THE ELDERLY?

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INTRODUCTION. Sepsis is an increasingly common and lethal medical condition that occurs in people of all ages. The effect of age on outcome of adults patients with sepsis it is not completely understood.We sought to evaluate whether if age is associated with differences in clinical outcomes of severe sepsis patients.

METHODS. Concurrent data collection on patients with severe sepsis admitted to our ICU from December 2001 to November 2007. Data was collected regarding demographic characteristics of the patients, comorbidities, focus of infection, number of organ dysfunctions, severity of sepsis, SAPS II, ICU and hospital length of stay (LOS) and mortality. To investigate of the influence of age, we chose a cut-off of 65 years.

RESULTS. During the study period 1031 patients were admitted to our ICU, with a mean age of 54 ± 19 years. In 214 patients admitted with diagnosis of severe sepsis (64% had septic shock). Patients aged ≥ 65 were more post surgery (33 vs. 19%, $p = 0{,}035$), had higher SAPS score (52 vs. 42, $p < 0{,}001$), more septic shock (74 vs. 55%, $p = 0{,}004$). No difference was found in the number of comorbidities in the two groups but, when we considerer the comorbidities in particular, regarding long and short steroid therapy, chemotherapy, radiotherapy, AIDS, chronic hepatic, heart, respiratory, haematological and cancer diseases, more AIDS was found in the younger group (0 vs. 6%, $p = 0{,}016$ for both). Regarding the focus of infection, there is a significantly higher incidence of pneumoniae and meningitides in the younger group (69% vs. 55%, $p = 0{,}031$, and 8 vs. 0%, $p = 0{,}005$, respectively) and of intra-abdominal infection in the elderly (32 vs. 10%, $p < 0{,}001$). Elderly patients have higher ICU mortality (47 vs. 25%, $p = 0{,}001$) and hospital mortality (53 vs. 26%, $p < 0{,}001$).

CONCLUSION. Elderly patients have more severe illness that translates in higher mortality in ICU and hospital. Apparently there is a relationship between age and focus of infection.

0938

INITIAL RESUSCITATION OF SEVERE SEPSIS IN AN EMERGENCY UNIT

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INTRODUCTION. Early diagnosis and treatment of severe sepsis has been shown to improve outcome. The initial resuscitation in the emergency department should not be delayed pending ICU admission.

METHODS. The initial recommendations (during the first 6 h) include: 1.Serum lactate measured. 2. Blood cultures obtained prior to antibiotic administration. 3. Broad-spectrum antibiotics administered within 3 h. 4. In the event of hypotension: Minimum of 20 ml/kg of crystalloid (or 7 ml/kg of colloid) delivered. For hypotension not responding to volume resuscitation, vasopressors employed to maintain mean arterial pressure (MAP) > 65 mm Hg. 5. In the event of persistent arterial hypotension refractory to volume resuscitation (septic shock) and/or initial lactate > 4 mMol/L (36 mg/dl): Central venous pressure (CVP) of > 8 mm Hg achieved. Central venous oxygen saturation (ScvO2) of > 70% achieved. An educational program on sepsis addressed at doctors and nurses working in the emergency department was developed.
Consecutive patients with severe sepsis or septic shock admitted in ICU from the OU between july 2007 and april 2008 were registered. Age, ICU length of stay, source of infection, isolated bacteria, blood lactate concentration, APACHE II score and mortality were collected. To assess the implementation of the Surviving Sepsis Campaign recommendations in the initial resuscitation of patients with severe sepsis or septic shock admitted in the Observation Unit (OU), and to describe the clinical outcome of patients admitted in ICU from the emergency department.

RESULTS. 42 septic patients were admitted in ICU during the time of study, global mortality was 38,1%. 23 patients were admitted in ICU from medical and surgical wards and 19 patients from the OU. In this subgroup the median time from emergency department to ICU admission was 5 h. Recommendations of Survival Sepsis Campaign 1,3 and 4 were performed in the emergency department before admission in ICU in all the patients. Recomendation 2 was performed in 12 patients (63%). Recommendation 5 was not performed in the Observation Unit, monitoring of central venous pressure was early performed at admission in the ICU. The mean age was 64,6 years (9 males, 10 females), ICU length of stay was 8,84 ± 7 days, the mean APACHE II score at admission in ICU was 19,05 ± 7,42. Urinary tract infection, 7 cases (36,8%), and abdominal infection, 7 cases (36,8%) were the commonest causes of severe sepsis, other causes were pneumonia, 4 cases (21,1%) and unknown 1 case (5,3%). Seven patients (36,8%) had a positive bacterial culture, the mean baseline lactate level was 3,9 ± 2,52 mMol/l. Mortality in the subgroup of patients stem from OU was 21,1%.

CONCLUSION. 1. Mortality was lower in the group of patients admitted in ICU from the emergency department than the group admitted from medical and surgical wards. 2. Educational program improves the management of severe sepsis in the emergency department.

0939

THE PIRO - CONCEPT: DESCRIPTIVE CLASSIFICATION OF PATIENTS WITH SEPSIS

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INTRODUCTION. A classification—concept for septic patients was published in 2003 based on the TNM classification system consisting of 4 items: P for predisposition, I for infection, R for response, O for Organdysfunction. This study evaluates the practical use of PIRO in a University-hospital setting.

METHODS. This observational study was approved by the local Ethics Review Board and the data safety authorities. 474 patients were included who experienced treatment on 5 ICUs (1 cardiosurgical, 1 neurosurgical, 2 interdisciplinary, 1 intermediate care) for at least 2 consecutive days. Data were analysed retrospectively for PIRO - criteria: Predisposition [age, gender, immune suppression], infection [SIRS of non-infectious origin, low- risk, high-risk, infection with special pathogens], response [adapted, anergia, hypergia], organdysfunction [using SOFA-Score]. Univarate statistic was calculated using Chi2- test (alpha = 0.05).

RESULTS. All patients were classified using the PIRO criteria. Total mortality was 9.5% [45/474]. Significant differences in mortality were demonstrated between the categories "infection" (I0 2.9%, I1 3.8%, I2 14.1%, I3 24.4%; $p < 0.001$) "response" (R0 2.5%, R1 7.5%, R2 35.1%; $p < 0.001$) and "organ dysfunction" (O0 3%, O1 3.2%, O2 25%; $p < 0.001$). Mortality in "predisposition" groups did not differ significantly in our population.

CONCLUSION. Expected differences in mortality in the PIRO categories were reproduced except for predisposing factors. In concordance to other publications the PIRO system reflects qualitative differences in individual courses of infections. Therefore it may lead to a better distinction of patients with sepsis and could help to differentiate responders for therapeutic options. More analysis for concrete parameters is necessary for assessing factors to establish a consented system for research projects.

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0941

ALTERATIONS IN URINARY ANION GAP IN CRITICALLY ILL PATIENTS WITH METABOLIC ACIDOSIS

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INTRODUCTION. The renal response to metabolic acidosis is the modification of urinary anion gap ($[GAP]_{urine} = [Na^+] + [K^+] - [Cl^-]$), that should become negative[1]. Our hypothesis was that the failure to increase the urinary excretion of $[Cl^-]$ might be a common manifestation of renal dysfunction in critically ill patients.

METHODS. 590 patients admitted to the ICU during a period of 16 months were screened. Only patients with simple metabolic acidosis were included. Exclusion criteria were associated acid-base disorders, use of diuretics, or creatinine > 1.7 mg%. Ten normal volunteers were also studied. On admission, arterial blood gases and arterial and urinary electrolytes were measured. Plasma and urine [AG] and differences between the modifications of [AG] and $[HCO_3^-]$ from normal values (Delta[AG]-Delta$[HCO_3^-]$) were calculated. Patients were grouped according to positive o negative $[AG]_{urine}$.

RESULTS. 98 patients were included. $[AG]_{urine}$ was negative in 12 patients (12%) and positive in 86 (88%). Patients with negative $[AG]_{urine}$ showed higher $[HCO_3^-]$, base excess [BE], $[AG]_{plasma}$, Delta[AG]-Delta$[HCO_3^-]$ and lower $[Cl^-]_{plasma}$.

TABLE 1

	Normal volunteers n = 10	Negative $[AG]_{urine}$ (n = 12)	Positive $[AG]_{urine}$ (n = 86)
pH	7.41 ± 0.03*	7.34 ± 0.02	7.33 ± 0.03
[bicarbonate] (mmol/l)	26 ± 1*	20 ± 2	18 ± 3*
[base excess] (mmol/l)	2 ± 1*	−5 ± 2	−7 ± 3*
$[AG]_{plasma}$ (mmol/l)	12 ± 1*	20 ± 6	17 ± 4*
Delta[AG]- Delta[bicarbonate] (mmol)/l	−1 ± 1*	1 ± 5	−3 ± 3*
$[Chloride]_{plasma}$ (mmol/l)	106 ± 2	105 ± 5	111 ± 3*

$p < 0.05$ vs. the other groups

CONCLUSION. Most patients showed an inadequate renal response, evidenced by positive $[AG]_{urine}$ and higher $[Cl^-]_{plasma}$. On the other hand, patients with negative $[AG]_{urine}$ had positive Delta[AG]-Delta$[HCO_3^-]$. This finding is usually considered indicator of associated metabolic alkalosis. Nevertheless, it might represent the normal renal response to simple metabolic acidosis.

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Poster Sessions
Acid base–Renal replacement therapy: 0940–0953

0940

ACIDBASE.ORG: ONLINE DECISION SUPPORT IN COMPLEX ACID-BASE DISORDERS USING THE STEWART APPROACH

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INTRODUCTION. The use of the quantitative approach to acid base disorders continues to increase in critical care medicine. Introduced in the 1980 s by the late Peter A Stewart (1), it has now evolved to be the method of choice. While the quantitative approach and the traditional Henderson-Hasselbalch method do not mathematically exclude one another, the Stewart approach may provide better mechanistic insight in complex acid-base disturbances. However, the approach may be cumbersome in daily practice because of its preceived complexity and required calculations. This is why we developed an online tool which may facilitate its use.

METHODS. We used a comination of HTML-, JavaScript- and PHP: Hypertext Preprocessor programming languages to create the software. In consists of several scripts that interact with a MySQL database. Both are hosted on a Linux server and are accessed via an Apache web server. The software is based on the Figge-Fencl modification of the Stewart approach (2). Users may reach the application at www.acidbase.org with any modern web browser. Users must enter acid-base, case description and chemical data. Cases can be saved anonymously for later review by the submitter and others. A tool is provided to run hypothetical scenarios by changing different physiological parameters. The application was tested using historical data from the authors hospital. For additional testing, the sites address was given to members of the CCM-L (critical care) and GASnet (anesthesiology) mailing lists.

RESULTS. The acidbase.org website now features the tool. Initial testing using historical and new clinical data lead to technical improvements in the scripts. Anesthesiologists and critical care physicians from the CCM-L and GASnet mailing lists that accessed the application using real patient data (n > 10) generally found it helpful, especially the simulation tool. The application has been online since January 2008. Without advertising, over 200 doctors worldwide have used the software generating a total of 8000 pageviews as of March 2008. Feedback by users is voluntary but already yielded over 10 very positive responses indicating a change in diagnostic and/or therapeutic strategies.

CONCLUSION. We have shown that is feasible to build an online software application that aids in the interpretation of complex acidbase disorders using the Stewart approach. In addition this tool enables the clinician to judge the impact of possible intervention by using simulation based on the entered case data. Initial experience seems positive. We will next set out to investigate the impact of exposure to this decision support tool on clinical patient management.

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0942

DOES HYPERCHLOREMIC METABOLIC ACIDOSIS CONTRIBUTE TO ACUTE KIDNEY INJURY IN CRITICALLY ILL PATIENTS?

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INTRODUCTION. Hyperchloremic metabolic acidosis (HMA) is a frequent occurrence in the critically ill. There is evidence to suggest that HMA impairs splanchnic perfusion (1) and has a detrimental effect on renal function (2). We hypothesised that the presence of HMA at ICU admission would predict the subsequent renal outcomes.

METHODS. We conducted a single centre, retrospective analysis of 718 patients with a length of stay of at least 3 days in a mixed medical and surgical ICU over a period of 2 years. The relationship between HMA and subsequent renal outcome was studied.

RESULTS. 81 patients (11.3%) had HMA at admission defined by Cl ≥ 110 and base deficit of < −5. There was no significant correlation between admission HMA and day 3 or day 5 glomerular filtration rate (GRF) or between admission HMA and change in GFR over the first 5 days of ICU stay. Admission HMA was not a predictor of day 3 or day 5 RIFLE score, of progression of RIFLE score over days 1–5, or of the requirement for renal replacement therapy at any time during ICU stay. Serum chloride alone was similarly not a predictor of the above measures.

CONCLUSION. Alhough HMA is suggested to have detrimental renal effects we could find no such association in a study involving over 700 patients.

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0943

IS STEWART'S APPROACH USEFUL IN EVALUATION OF ACID-BASE DISORDERS IN CRITICAL CARE PATIENTS?

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INTRODUCTION. Evaluation of metabolic acid-base disturbances based on the traditional analysis of dependent variables (pH, bicarbonate, BE) and anion gap is compared with Stewart's approach analysing the independent variables (SID, nonvolatile weak acids,PaCO2).

METHODS. Prospective observational study, in the critical care unit of a university hospital, during three months, including single measurements admission data of the patients (arterial blood samples for gases, Na + , K+ , Ca2+ , Mg2+ , Cl−, inorganic phosphate, albumin, lactate). Bicarbonate, base excess (BE), anion gap(AG), anion gap adjusted for albumin(AGa), Cl corrected for water excess/deficit, apparent and effective strong ion difference (SIDa and SIDe) and strong ion gap (SIG) were calculated.Respiratory disturbances were not analysed.

RESULTS. 121 patients were included. 114 patients present a metabolic acidosis, according with traditional analysis (bicarbonate, BE and AGa) .
Stewart's approach identified a metabolic acidosis in 117 patients (including 2 of the 3 patients having a normal bicarbonate, BE and AGa), a metabolic alkalosis in 2 patients and a normal status in 2 patients.
Hypoalbuminemia was present in 98 patients, hyperchloremia in 62patients and hyperlactatemia in 63 patients. Among these 63 cases of hyperlactatemia, 60 patients had a high SIG and 62 patients a high AGa.
The traditional approach failed to identify 4 cases of metabolic acidosis (2 patients are considered normal and 2 having an alkalosis). For these four patients, the short term evolution was toward acidosis(2), alkalosis(1) and unchanged (1). One of the 2 normal patients in Stewart's approach had a metabolic acidosis in the traditional approach.

TABLE 1

Metabolic acid-base status: number of patients	Stewart's approach Acidosis	Stewart's approach Alkalosis	Stewart's approach Normal	Total patients
Traditional approach Acidosis	113		1	114
Traditional approach Alkalosis	2	2		4
Traditional approach Normal	2		1	3
Total patients	117	2	2	121

CONCLUSION. Stewart's approach is close to traditional method associating the AGa in identifying the acid-base disorders but allows the detection of different and opposite participating mechanisms.

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0944

PROGNOSTIC VALUE OF UNMEASURED ANIONS IN CRITICALLY ILL PATIENTS

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INTRODUCTION. Disorders of acid-base equilibrium are common in critically ill patients. The Stewart methodology has been found to be useful in explaining these disorders, where conventional analysis was deficient. However, much uncertainty remains about the usefulness and clinical meaning of this new approach. The objectives of our study are to verify whether the identification of unmeasured anions using the Stewart methodology is related to the mortality in intensive care unit (ICU) and compare its prognostic value to the traditional acid-base variables such as lactate, standard base excess (SBE) and anion gap (AG).

METHODS. This is a prospective study with all the patients admitted in the ICU of Hospital de Clínicas in Porto Alegre, Brazil between February and May 2007. Sodium, potassium, calcium, magnesium, chloride, lactate, phosphorus, albumin, pH and arterial carbon dioxide were measured in all patients. Afterwards, bicarbonate, SBE, AG, anion gap corrected for albumin (AGcorr) and strong ion gap (SIG) were calculated. Unmeasured anions were identified if SIG $>$ 2 mEq/L. Patients who did not have the required tests for the proposed analysis were excluded.

RESULTS. 176 patients were included. Metabolic acidosis (SBE ≤ -5.0) was found in 103 (58.5%) patients. Unmeasured anions were present in 149 (84.7%) patients. There was no difference of lactate and AG among survivors and non-survivors. Non-survivor patients presented significantly AGcorr (20.8 vs. 18.7; $p = 0.013$), SIG (7.8 vs. 5.9; $p = 0.013$) and SBE (-8.6 vs. -5.7; $p = 0.005$) higher than survivors. However, for the discrimination of survivors and non-survivors only AGcorr and SIG presented an acceptable accuracy, with area under receiver operating characteristic curve (AUROC) of 0.62 (CI 95% 0.54 – 0.71) for both variables. AGcorr and SIG showed a very good self-correlation ($r2 = 0.84$; $p < 0.001$).

CONCLUSION. The identification of unmeasured anions, through either SIG or AGcorr calculation, discriminates survivors from non-survivors among critically ill patients more accurately than the traditional acid-base variables. Because of its simplicity and excellent correlation with the complex calculation of SIG, AGcorr must be used in clinic practices.

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0945

RETROSPECTIVE CASE STUDY OF METFORMIN-ASSOCIATED LACTIC ACIDOSIS IN ORIENTAL POPULATION

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INTRODUCTION. Metformin is an oral hypoglycaemic with proven benefit in diabetic patients. It is relatively safe. However, a potential complication is its rare association with lactic acidosis, a condition that has approximately 50 percent mortality rate from overseas data. Oriental data concerning this complication is limited. The objective of this study is to review the initial presentation, disease severity and outcomes of oriental patients, who were suffering from metformin-associated lactic acidosis (MALA)and required intensive care.

METHODS. This study was conducted as a single-arm observational case series review in a regional hospital in Hong Kong. It had been approved by the Hong Kong Hospital Authority - Research Ethics Committee. The clinical data of patients who were admitted to the Adult Intensive Care Unit of United Christian Hospital between 1-12-2004 and 1-12-2006 with diagnosis of metformin-associated lactic acidosis (blood pH $<$ 7.35;HCO3 $<$ 22 mmol/L;anion gap $>$ 14mmo/L;serum lactate $>$ 5 mmol/L and renal failure without other contributing causes of lactic acidosis)were retrieved from the Clinical Data and Reporting System and the Clinical Management System of the Hospital Authority. Clinical information will be analysed and presented by using descriptive statistics.

RESULTS. Nine cases were identified (3 males and 6 females) with mean age 67 $\pm$ 6 years old. Two patients had past medical history of renal impairment. All patients had been taken metformin for more than 6 months with mean dose 2.25 g $\pm$ 0.93 g per day. None had recent metformin dosage change. Majority had non-specific gastrointestinal symptoms (89%) and precipitating factors (78%). Sepsis was not uncommon (44%). Patients were seriously ill on admission to ICU (worst Cr 986umol/L, urea 51.5 mmol/L, K 7.7 mmol/L, lactate 23.7 mmol/L within first 24-h ICU admission). All patients received renal replacement therapy by continuous veno-venous haemofiltration. Seven out of 9 patients (78%) were given sodium bicarbonate infusion. But no significant changes of blood pH ($P = 0.055$) was noted after NaHCO3 infusion. Despite high APACHEII score (Mean 29.9 $\pm$ 5.7) and expected mortality rate (mean 67.5 $\pm$ 13.9), the observed 30-day mortality rate was 11%. No survivors required long-term dialysis.

CONCLUSION. Patients suffered from MALA usually presented with non- specific complaint and often had precipitating event. Sepsis should not be overlooked. The observed outcome seemed better than the outcome predicted by the severity score and non-oriental data. Management includes cessation of offending drug, fluid resuscitation, identify and treat the precipitating event, organ support when necessary. The role of sodium bicarbonate infusion is still debatable. Further large-scale study to understand underlying pathophysiology and optimize management is fruitful.

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0946

CONTINUOUS RENAL REPLACEMENT THERAPY WITH REGIONAL CITRATE ANTICOAGULATION IN PATIENTS WITH LIVER FAILURE

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INTRODUCTION. Regional citrate anticoagulation has been established as a safe alternative to heparin anticoagulation for continuous renal replacement therapy (CRRT). Since the metabolism of citrate is impaired in patients with liver failure it is unclear whether this therapeutic approach can be safely applied in this patient group as it may result in citrate intoxication with metabolic acidosis, decreased ionized calcium and increased total calcium.

METHODS. The study was designed as a prospective observational study. 24 critically ill patients (13 male, 11 female) with acute renal failure undergoing CRRT with regional citrate anticoagulation were included and assigned to two groups according to their bilirubin levels either above or below 3 mg/dl. All patients were treated with continuous venovenous hemodiafiltration (CVVHDF) with a CRRT device that is designed for citrate anticoagulation (Multi Filtrate, Fresenius Medical Care, Bad Homburg, Germany) using a high flux filter and a CVVHDF dose of 2 l/h. The filters were routinely changed after 72 h. 4% trisodium citrate solution was infused proximal to the extracorporeal circuit to obtain ionized calcium levels of 0.25 to 0.35 mmol/l for anticoagulation. Systemic calcium (1.7 mmol/l) infusion was targeted to maintain systemic ionized calcium from 1.12 to 1.20 mmol/l. The calcium levels and blood gases were measured every 4 h. Citrate therapy was discontinued when set goals in calcium levels and acid base metabolism could not be met or total calcium exceeded 3 mmol/l. We compared the ionized systemic calcium, the ionized calcium in the extracorporeal circuit (postfilter) and the demand of citrate and calcium between the two groups. Statistical analysis was performed using the Mann Whitney test.

RESULTS. The group with liver failure consisted of 8 patients with a mean bilirubin level of 8.8 mg/dl, the other group of 17 patients with a mean bilirubin level of 0.7 mg/dl. 98 filters were used in 60 episodes of therapy. In the group with liver failure, total calcium exceeded 3 mmol/l in one patient and in the group without liver failure, severe alkalosis with HCO3 levels over 40 mmol/l occurred in one patient requiring the termination of citrate therapy. No significant differences between the two groups were found in the levels of ionized systemic calcium and the calcium and citrate demands. Although the ionized postfilter calcium levels differed significantly, the respective 95% confidence interval was well within the targeted range of 0.25 to 0.35 mg/dl meaning the difference was not relevant.

CONCLUSION. With appropriate monitoring, regional citrate anticoagulation for CRRT is a safe therapy even in patients with liver failure.

0947

MONTHS OF SLED TREATMENTS: A SINGLE-CENTRE EXPERIENCE

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INTRODUCTION. Renal dysfunction in critical ill patients remains an important and independent marker of mortality. In the last few years a new dialysis method has emerged to substitute kidney function: Slow Extended Dialysis (SLED). This therapy combines the advantages of intermitent Hemodialysis (IHD) and Continuous Renal Replacement Treatment (CRRT). We show the experience with SLED in the last 17 months in our University Hospital Intensive Care Unit.

METHODS. We performed a retrospective study in patients who initiated SLED between October 2006 and March 2008 (17 months). We registered the following data for each patient: age, sex, severity of disease using the SAPS II score, mortality rate, co-morbidities, diagnostic group, causal factors, RIFLE classification, length of stay in the Intensive Care Unit (ICU) and renal outcome. SLED therapy consisted in a minimum of 6 h per treatment at least 6 times per week sessions, with dialyzed flows of 300 ml/min.

RESULTS. 72 patients initiated SLED in this period. 654 SLED treatments were done, representing an average of 9,08 treatments per patient. Mean patient age was 62 years, 62,5% were male. Surgical patients represented 29,2% (n = 21) of the group. Sepsis was the major cause of kidney injury (58,3%; n = 42 patients). The most prevalent co-morbid disease was hypertension; 44,4% (n = 32) had chronic kidney disease and 25% (n = 18) had end-stage renal disease (ESRD). All patients without previous ESRD started SLED in the failure stage of RIFLE classification. The ICU length of stay was 19,7 days (2–240 days). The initial SAPS II score was 57 with a predicted mortality of 61,9%. Twelve patients (16,67%) developed ESRD. The mortality rate was 40% (n = 29).

CONCLUSION. These results show that SLED constitute a safe renal replacement therapy despite its short duration and its lower intervention by ICU staff compared to CRRT. Its safety, effectiveness and low cost constitute a good alternative to "classic" dialysis strategies in ICU. The mortality rate in this study seems lower than predicted by SAPS II score. Prospective studies comparing different renal replacement modalities are needed and will be very helpful in the future to tailor renal replacement therapies in the Intensive Care Unit.

0948

EFFECTIVENESS OF EARLY HEMODIALYSIS WITH HIGH-FLUX MEMBRANES IN THE TREATMENT OF LIFE-THREATENING ALCOHOL INTOXICATIONS

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INTRODUCTION. Alcohol intoxication (methanol, ethanol and ethylene glycol) may result in metabolic acidosis with increased anion gap, increased serum osmolal gap, and neurologic abnormalities ranging from drunkenness to coma, and death. The mortality and morbidity rates remain very high despite intensive care therapy. The toxicity of methanol and ethylene glycol is clearly correlated to the degree of metabolic acidosis. The established treatment of severe methanol and ethylene glycol intoxication is ethanol administration and hemodialysis (HD). By inhibiting the main metabolic pathway of methanol and ethylene glycol (alcohol dehydrogenase), ethanol prevents the formation of major toxic metabolites (formic acid, glycolic acid and oxalic acid). Conventional HD can reduce serum methanol, ethanol and ethylene glycol and its metabolites rapidly, but high-flux membranes should be capable of removing more toxic per hour of HD.

METHODS. In this report, we describe 14 cases of life-threatening alcohol intoxication (11 methanol, 1 ethanol, and 2 ethylene glycol) who were treated successfully with supportive care, ethanol infusion (methanol and ethylene glycol), and early HD with a high-flux dialyser.

RESULTS. The median pH was 7.04 ± 0.06 (range 6.60–7.33), median bicarbonate 9.9 ± 1.9 mmol/l (range 1.4–25), and median base deficit 18.4 ± 2.6 mmol/l (range 2–33). The median anion gap was 29.1 ± 2.3 mmol/l (range 16–45) and the median osmolal gap was 119 ± 47 mOsm/l (range 16–402). On admission there was an excellent linear correlation between the serum toxic alcohol concentrations and the osmolal gaps ($R^2 = 0.98$, $p = 0.0006$). In all cases early HD corrected metabolic acidosis and osmolal abnormalities. The mortality was 7 % (1 from 14).

CONCLUSION. We conclude that pre-emptive HD should be performed in severe intoxications to remove both the parent compound and its metabolites. The HD prescription should include a large surface area dialyser with high-flux membrane, a blood flow rate in excess of 250 ml/min, a modified bicarbonate bath enriched with phosphorus and potassium, and a long time session. The phosphorus and potassium-enriched bicarbonate-based dialysis solution used in patients with normal phosphorus and potassium serum levels avoided HD-induced hypophosphatemia and hypopotassemia. HD as implemented in these cases is a safe and very effective approach to the management of alcohol poisoning.

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0949

ACUTE PERITONEAL DIALYSIS IN CHILDREN AFTER CONGENITAL HEART DISEASE SURGERY

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INTRODUCTION. Peritoneal dialysis (PD) is the renal replacement therapy (RRT) of choice in children with acute kidney injury (AKI) after congenital heart disease surgery. Advantages of PD over other RRT include better haemodinamic stability and no vascular access requirement. The aim of this study was to describe our experience in the treatment of AKI using PD following cardiac surgery and to investigate factors associated with poor survival.

METHODS. We retrospectively analysed 23 patients from January 2000 to March 2008 and collected demographic, renal function and intensive care course data.

RESULTS. The incidence of AKI treated with PD was 2,3% (23/998). Thirteen patients were male, mean age 29 ± 48,4 months (7 days to 165 months) and mean weight 9,1 ± 8,1 kg. Mean PRISM II score 19,3 ± 6 and 22% with RACHS score ≥ 4. The indications for PD initiation were oliguria (13 patients), anuria (9 patients) and acidosis (1 patient). The time between cardiac surgery and AKI was 4,8 ± 16,8 h and between AKI and PD initiation 12 ± 16,8 h. Patients were treated for a mean of 4,8 ± 3,8 days. In 18 patients the initial dwell volume was > 10 ml/kg and in 20 the dwell time > 20 minutes. The mean ultrafiltration rate was 23 ± 20 ml/kg/day and 13 patients needed hypertonic solutions. Two patients developed peritonitis and 1 patient mechanical dysfunction of PD catheter. Ten patients survived with complete recovery of renal function. Patients who died presented lower mean arterial pressure ($p = 0,02$) and urinary output ($p = 0,04$), longer bypass time ($p = 0,02$), length of hospital stay ($p = 0,03$) and time between AKI and PD initiation ($p = 0,03$).

CONCLUSION. We conclude that PD is a safe and efficacious RRT for the treatment of AKI in children undergoing cardiac surgery, and that early initiation of PD may have a favourable impact in the prognosis of patients.

0950

RENAL REPLACEMENT THERAPY IN CRITICALLY ILL PATIENTS

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INTRODUCTION. It has been suggested that continuous renal replacement therapy (CRRT) has several advantages over Intermitent Renal Replacement Therapy (IRRT) including better haemodynamic stability (blood pressure control and blood circulation), improved survival and greater likelihood of renal recovery. But in the last years Sustained low-efficiency daily dialysis (SLED) has been suggested as an alternative treatment for critically ill patients with kidney injury.
Objectives: Compare SLED with CRRT focusing on severity of illness and mortality rate.

METHODS. Observational, prospective, multicenter study (3 ICUs in two different Hospitals). During 1 year all patients who started RRT in 3 polyvalent ICUs were enrolled. We collected demographic data, severity score at admission and when started the treatment, type of modality chosen, criteria to initiate RRT, R.I.F.L.E criteria, mortality rate.

RESULTS. We enrolled 106 patients: 38 SLED (age –59 ± 16,4, SAPS II – 53,2 ± 15,6; SOFA—10,8 ± 5,4) and 68 with CRRT (age 60,3 ± 15,5, SAPS II—49,1 ± 15,2, SOFA—9,9 ± 3). Type of admission: medical – 41(31 CRRT, 10 SLED), surgical—48 (27 CRRT, 21 SLED), trauma—3 (2 CRRT, 1 SLED), liver transplant—14 (8 CRRT, 6 SLED). Criteria to initiate RRT-fluid overload (61, 7% CRRT and 76, 3% SLED), RIFLE criteria—failure (60, 3% CRRT, 60, 52% SLED). Creatinine when we started RRT: SLED—4,6 ± 2,7; CRRT - 3,5 ± 1,9. Haemodynamic instability: SLED - 47,4%; CRRT - 52,9%. Overall mortality rate 47,2% (SLED—31,6% and 55,9% CRRT).

CONCLUSION. In our study patients populations were similar but mortality rate were lower with SLED. In spite the small amount of patients enrolled we do not found any reason to choose CRRT in our patients when we can perform SLED with the same or even higher quality and with significantly lower cost.

0951

OUTCOME OF ACUTE RENAL FAILURE WITH AND WITHOUT RENAL REPLACEMENT THERAPY IN CRITICALLY ILL PATIENTS

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INTRODUCTION. Whether acute renal failure (ARF) is associated with increased mortality in intensive care unit (ICU) remains unclear. Results of available studies are confounded by the lack of a standard definition for ARF and clear indications for renal replacement therapy (RRT), and the many differences in baseline characteristics and in-ICU events (organ failures, sepsis) between patients with and those without ARF. Our aim was to accurately investigate the impact of ARF on ICU mortality by using recent consensus definition criteria and controlling for confounding factors. Particularly, we assessed the role of RRT.

METHODS. We performed a multicenter, prospective, cohort study. End stage renal disease, and decision to withhold or withdraw life-sustaining treatments were exclusion criteria. ARF was defined according to the RIFLE class F criteria. Patients with ARF were matched to controls by age, SAPS II, Mc Cabe class, admission category, center and period of inclusion. Multivariate conditional logistic regression was used to examine the association between ARF and ICU mortality. Results are presented as odds ratios (OR) and 95% confidence intervals (CI).

RESULTS. A total of 7142 patients were analyzed. ARF occurred in 2247 (31.5%) patients, of whom 382 (17%) received RRT. Crude ICU mortality was significantly higher in patients with than in those without ARF (31.6% vs. 10.2%, $p < 0.0001$). After matching and controlling for confounding factors, ARF remained associated with increased mortality (OR: 1.87, 95% CI: 1.57–2.26, $p < 0,0001$). This excess in mortality was observed both for ARF without RRT (OR: 1.78, 95% CI: 1.44–2.21, $p < 0,0001$) and for ARF with RRT (OR: 2.21, 95% CI: 1.50–3.25, $p < 0,0001$).

CONCLUSION. ARF is an independent risk factor for ICU mortality. The lack of beneficial effect of RRT needs further investigations.

0952

EFFECTIVE TREATMENT OF REFRACTORY HYPERCALCEMIA DUE TO PRIMARY HYPERPARATHYROIDISM BY CVVHD USING REGIONAL CITRATE ANTICOAGULATION - CASE REPORT

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INTRODUCTION. A 53 year old lady with a history of depression presented to the psychiatric outpatient unit of a tertiary hospital with worsening apathy and significant weight loss (6 kg) within the last 3 month. Her major complaints included bone and abdominal pain.

Initial investigations revealed drastically elevated total serum calcium (6,08 mmol/l) and the patient was immediately admitted to the medical ward. During the following 48 h serum calcium increased despite volume expansion and treatment with diuretics, calcitonin, zoledronic acid and the patient developed an acute kidney injury. Because of the development of severe sepsis associated with pancreatitis and a deteriorating mental state the patient had to be intubated and transferred to the medical intensive care unit of the university hospital of Innsbruck.
The CT-scan showed an adenoma of 3.3 × 3.5 x 6.1 cm next to right lobe of the thyroid gland, an enlarged liver and bilateral pulmonary infiltrates. Together with a highly elevate PTH (2217 ng/l) these results confirmed the diagnosis of primary hyperparathyroidism. At that time the patient was anuric.

METHODS. To enable resection of the adenoma under safe conditions normalization of serum calcium was required before surgery. First intermittent hemodialysis was initiated which reduced serum calcium during each treatment session but a rebound occurred within a few h. Consequently, we switched the patient to CVVHD using citrate anticoagulation with the intention to normalise serum calcium by constant chelation and elimination of calcium. Regional citrate anticoagulation was performed by infusing 4,0% tri-sodium citrate into the extracorporeal circuit using a calcium free dialysate solution with reduced sodium (133 mmol/l) and bicarbonate content (20 mmol/l) applying a dialysate flow of 2000 ml/h. Calcium substitution was reduced to fifty percent of the usually applied dose.

RESULTS. With this method we were able to normalize elevated serum calcium within 48 h. Surgery had to be deferred until pneumonia and sepsis resolved. Serum calcium was kept stable between 2.3 and 2.5 mmol/l with CVVHD over the entire period.
On day 14 after admission to the ICU the adenoma could be successfully removed. One month later the patient could be transferred back to the referring hospital already mobilized but still requiring intermittent hemodialysis, however, already gaining urine output.

CONCLUSION. This case demonstrates the ability of CVVHD with regional citrate anticoagulation to easily control severe hypercalcaemia without adverse events.

0953

TRENDS BUT NOT INDIVIDUAL VALUES OF CENTRAL VENOUS OXYGEN SATURATION AGREE WITH MIXED VENOUS OXYGEN SATURATION DURING HEMODIAFILTRATION

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INTRODUCTION. Patients with ARF related to sepsis requiring renal replacement therapy (RRT) have an excess of mortality and need a higher level of care owing to a higher requirement for diagnostic and therapeutic interventions. Early goal direct therapy (EGDT) has been shown safe and efficacious for patients with renal failure (ARF) resulting in reduction of both morbidity and mortality. This protocol includes resuscitation to goals of central venous pressure (CVP) between 8 and 10, mean arterial pressure (MAP) between 65 and 90 mmHg and central venous oximetry (ScvO2) greater than 70%. Regarding ScvO2, there is no study showing that it accurately reflects mixed venous oxygen saturation (SvO2) during renal replacement therapy. Of particular interest are the possible effects of blood flow rate and dialysate and replacement solution flow rate during dialysis in monitoring SvO2. The aim of this study is to compare simultaneous measurements of SvO2 and SvcO2 obtained from distal ports of pulmonary arterial catheter (PAC)and dialysis catheter in a patient with septic shock and ARF during hemodiafiltration.

METHODS. It was a prospective clinical trial comparing individual oxygen saturation value as wel as the trend of values from de superior vena cava obtained from dialysis catheter and from artery pulmonar obtained from PAC during hemodiafiltration.

RESULTS. Fifteen patients were evaluated during hemodiafiltration, 120 paired measurements of SvO2 and SvCO2 were collected.All the patients were on mechanical ventilation and vasopressor therapy. Mean Apache was 18. Mortality was 66%.
The mean blood flow rate was 152 ml/min, the mean dialysate rate was 1759 ml/h and the mean replacement solution rate was 500 ml/min.The mean value of SvO2 was 78,6 ± 1,2 and SvO2c was 79,4 ± 1,1($p = 0,003$). Regression analysis for the pooled measurements of SvCO2 and SvO2 showed a correlation R 0,52. In contrast, correlations between changes over time of SvO2 and SvCO2 values were clinically acceptable $R = 0,712$.

CONCLUSION. In this sample of patients, exact numeric values of SvO2 and SvCO2 during hemodiafiltration are not equivalent.However for clinical purposes, the trend of SvCO2 may be substituted for the trend of SvO2. A clinical trial using a dialysis catheter with continuous measurement of SvCO2 during hemodiafiltration of acute renal failure patients with severe sepsis and septic shock is still lacking.

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0954

ENDOTHELIN ANTAGONISM REVERSES PULMONARY BLOOD FLOW REDISTRIBUTION INDUCED BY INHALED NITRIC OXIDE

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INTRODUCTION. Pulmonary blood flow redistribution induced by inhaled nitric oxide (INO) can improve oxygenation. We previously hypothesized that this may be a composite effect of vasoconstriction in poorly ventilated lung units and vasodilation in well-aerated areas of the lung (1). The aim of this study was to further investigate whether endothelin-1 (ET-1), as a potential mediator of vasoconstrictive responses to INO, is involved in the pulmonary blood flow redistribution induced by INO. We hypothesized that a dual endothelin antagonist may blunt the blood flow redistribution induced by INO.

METHODS. In an animal model of endotoxin induced lung injury, we exposed 8 piglets (27 ± 1.9 kg) to 40 ppm INO and, subsequently infused the dual endothelin antagonist Tezosentan. Pulmonary blood flow distribution was assessed by single photon emission computed tomography (SPECT) in supine position in 5 of the 8 animals, (a) after lung injury was established, (b) with INO and (c) after Tezosentan infusion has been added to INO for 45 min. Oxygenation was assessed using PaO2/FiO2 ratio. ANOVA was used for hemodynamic comparisons and paired t-tests to compare between SPECT perfusion profiles.

RESULTS. INO tended to improve oxygenation from 223 ± 85 mmHg during lung injury, to 316 ± 70 mmHg ($p = 0.07$). Oxygenation deteriorated again to 181 ± 38 mmHg ($p = 0.01$) similar to pre INO levels by the subsequent infusion of Tezosentan. Mean pulmonary artery pressure increased with lung injury from 19 ± 1.7 mmHg to 38 ± 6 mmHg ($p = 0.01$), and decreased with INO to 29 ± 5 mmHg. The addition of Tezosentan led mean pulmonary artery pressure to 24 ± 4 mmHg. SPECT data demonstrated that pulmonary blood flow redistribution induced by INO was abolished after 45 min of Tezosentan infusion. (Gravitational plane $p < 0.001$; Horizontal plane $p < 0.001$). Pulmonary blood flow shifts were more accentuated in the dependent to non-dependent direction than in the horizontal plane.

CONCLUSION. Our findings further support the hypothesis, that a vasoconstrictive ET-1 mechanism may have an important role in the oxygenation response to INO. We conclude that the mechanism of action of INO in this acute lung injury model consists of two distinct mechanisms, one being vasodilation by INO in ventilated lung regions, the other being vasoconstriction mediated by ET-1 in non-ventilated regions.

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0955

EARLY AND LATE EFFECTS OF EXOGENOUS SURFACTANT ADMINISTRATION IN UNILATERAL ACID-INDUCED LUNG INJURY

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INTRODUCTION. Acid aspiration, a common cause of ALI/ARDS, is associated with a severe deterioration of gas exchange and lung mechanics as well as with endogenous surfactant impairment. We evaluated the effects of surfactant replacement in a previously characterized (1) murine model of unilateral acid-induced lung injury, with a spontaneous fibrotic evolution, after the acute essudative phase, of the injured lung region.

METHODS. We instilled 1.5 ml/kg BW of 0.1 M HCl in the right bronchus of anesthetized mice. Six h after injury, mice were randomised to receive in the injured lung, a single bolus of porcine surfactant (80 mg/kg; Curosurf®; Chiesi Farmaceutici, Parma, Italy) or sterile saline (0.9% NaCl, control group). After the injury- and the treatment-procedures, mice were mechanically ventilated (Vt 8–10 ml kg-1 BW, RR 130 min-1, and PEEP of 2.5 cmH2O) for 10 min, then kept in an oxygenated chamber until full awakening. Specific compliance of the respiratory system and blood gas analysis were assessed both in acute (24 hrs from injury) and in late (2 weeks) phase, whereas Broncho-Alveolar Lavage (BAL) was performed only at 24 hrs.

RESULTS. In acute phase, surfactant instillation decreased neutrophilic influx in BAL, since the differential white blood cell count showed a significantly reduced percentage of PMN in surfactant treated group compared to control (45% vs. 68%) ($p < 0.05$). Moreover oxygenation was significantly better (PaO2 78 ± 11 mmHg) in surfactant treated group than in the control group (64 ± 14 mmHg) ($p < 0,05$); no effect was present in late phase (respectively,127 ± 24 mmHg and 137 ± 22 mmHg). The surfactant treated group showed a significantly better respiratory system compliance at both at 24 h and at 2 weeks, when compared to control groups ($p < 0.05$).

TABLE 1 RESPIRATORY SYSTEM COMPLIANCE

	NaCl 24 h (n = 7)	Surfactant 24 h (n = 7)	NaCl 2 weeks (n = 11)	Surfactant 2 weeks (n = 11)
Resp compliance (ml/cmH2O)/Kg	1.1 ± 0.1	1.3 ± 0.2*	1.6 ± 0.1	1.8 ± 0.3*

**p<0.05 vs. NaCl group*

CONCLUSION. Our preliminary results show that surfactant replacement with an instillation six h after injury resulted in reduced neutrophilic influx in BAL fluid, better oxygenation and improved lung mechanics in the acute phase (24 h). Moreover in late phase (2 weeks) surfactant treatment determined an improvement of respiratory system compliance, suggesting a reduction of the fibrotic process.

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0956

INHALED MILRINONE IN ADULT RESPIRATORY DISTRESS SYNDROME

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INTRODUCTION. Despite advances in mechanical ventilation, treatment of severe refractory hypoxemia has remained one of the greatest challenges in intensive care. Inhaled nitric oxide (NO) is commonly used for the treatment of refractory hypoxemia in acute respiratory distress syndrome (ARDS). However, it has never been shown to decrease mortality, has substantial cost and has potential side effects. Prostacyclin analogues have also been used in small trials. The phosphodiesterase inhibitor milrinone is a potent pulmonary vasodilator that has been used with success as an inhaled therapy for pulmonary hypertension and therefore is a potential alternative to actual treatment. We designed a prospective pilot study in ARDS patients, comparing inhaled nitric oxide with epoprostenol and inhaled milrinone.

METHODS. In our academic 24-bed medico-surgical intensive care unit, patients were screened for the study from March 2006 to January 2008. Adult patients were enrolled after informed consent was obtained if they had refractory hypoxemic failure meeting standard ARDS criteria and had a Swan-Ganz catheter. We randomly and sequentially nebulized NO (at 20 ppm) and eproprostenol (10ug/ml) and thereafter nebulized milrinone (1 mg/ml) alone and in association with NO. After 20 minutes of nebulisation for each drugs, a 30 minutes pause was allowed. The following parameters were measured after each step: systemic and pulmonary pressures, cardiac output, blood gaz. The following parameters were calculated: peripheral and pulmonary vascular resistances (SVR et PVR), PVR/SVR Ratio, transpulmonary gradient, PaO2/FiO2, shunt and oxygenation Index. All results are express in median(IQR).

RESULTS. During the study period, 14 patients were enrolled: 12 men and 2 women with a mean age of 56.0 ± 17.4 years. Their APACHE II score was 22 ± 5. All ARDS were from pulmonary cause and pneumonia (n = 9) was the leading diagnosis. The mean baseline PaO2/FiO2 ratio was 138 ± 40. We observed a PaO2 increase of 6.9(15.6), 6.0(17.1), 6.0(14.3) and 6.4(18.6) mmHg respectively using NO, epoprostenol, milrinone and combination of NO and milrinone. We also observed an improvement in the iPVR in the four groups: −29.5(180.4), −61.3(199.5), −9.5(92.4) and −26.1(94.0) dyne/sec/cm-5 respectively with NO, epoprostenol, milrinone and combination of NO and milrinone. The difference in iPVR responses observed between the NO and the other groups did not reach statistical significance.

CONCLUSION. Inhaled milrinone improved oxygenation and decreased PVR in this ARDS cohort. Further studies need to be done in larger and various ICU population of ARDS patients and effects of repeated doses need to be assessed.

0957

CLERANCE PROFILE OF AN EXPERIMENTAL PULMONARY EDEMA PRODUCED BY SALINE SOLUTION INSTILLATION WHEN THERE EXISTS A PREVIOUS LUNG INJURY

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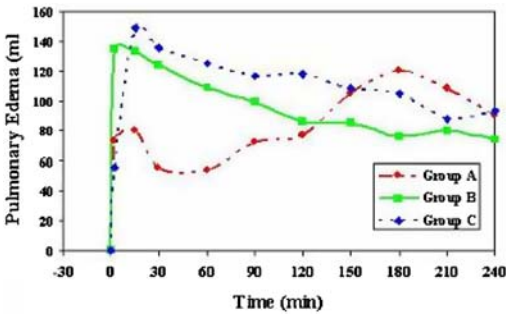
INTRODUCTION. To analize the clearance profile of pulmonary edema provoked by saline solution instillation after induction of a lung injury by oleic acid infussion.

METHODS. Experimental study in which three groups of pigs (weight 31 ± 3 kg) where assigned to different methods of experimental pulmonary edema (PE). Group A (n = 8): lesional-PE produced by oleic acid iv infussion (0.1 ml/kg). Group B (n = 10): PE by saline solution tracheal instillation (4 ml/kg). Group C (n = 7): oleic acid iv infussion (0.1 ml/kg) followed by saline solution tracheal instillation (4 ml/kg). Anesthetized and under mechanical ventilation for 4 h. PE clearance profile registered by measurement of extravascular lung water by thermodilution (PiCCO®, Pulsion, Germany) every 30 minutes. Mann-Whitney test for cuantitative variables was used and a $p < 0.05$ was considered significative.

RESULTS. PE clearance profile in group A differs from that observed in groups B and C, showing increase in the last 2 h. In group B, a continuous clearence was noted with 24 ml/h rate in the first 2 h, and 6 ml/h in the second part of the experiment. In group C, althoug the clearance rate was stable (12–16 ml/h), total clearance was similar as observed in group B. There were not found significative differences between groups B and C in any measurement.



CONCLUSION. Clearance profile of PE produced by saline solution instillation over a lung injury model is similar than the one due only to saline solution.

GRANT ACKNOWLEDGEMENT. F.I.S. 06/1097.

0958

RESPIRATORY DIALYSIS. A NEW THERAPY FOR CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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INTRODUCTION. Chronic Obstructive Pulmonary Disease (COPD) is predicted to be the third leading cause of death in the United States by 2020. Approximately 125,000 people die yearly from acute exacerbations of the disease. Once intubation and mechanical ventilation become necessary the death rate increases. To avoid the need for ventilator use we have developed a new device (the Hemolung), which is an integrated pump/oxygenator that functions at low blood flow rates (300–500 mL/min) equivalent to those used in renal dialysis. The small priming volume (190 ml), reduced membrane surface area (0.5 m2), and use of a percutaneously inserted dual lumen venous catheter (15 Fr) to provide blood inflow and outflow make the entire system suitable for repetitive use in patients with hypercapnic acute respiratory failure. We report here 7-day animal data stressing the hemocompatibility and gas exchange capabilities of the device.

METHODS. The venous catheter was inserted into the right exterior jugular vein of 7 adult sheep and connected to the saline-primed Hemolung circuit. Hollow fiber membranes were coated with siloxane and heparin to prevent plasma wetting and to increase biocompatibility. Animals were minimally anticoagulated with heparin (ACT 150). Blood flow, CO2 exchange, blood gases and key hematological parameters were measured over 7 days. Necropsy was performed on termination.

RESULTS. Removal of CO2 (normalized to a pCO2 of 45 mmHg) remained steady over 7 days averaging 66 ± 13 mL/min at blood flows of 350–400 mL/min. As venous PCO2 rose or fell so did the level of CO2 removal. One animal was terminated after 3 days due to accidental disconnection of a blood tube. No plasma wetting was noted over the 7 days. Two devices were replaced after 4 days due to bearing malfunction, however, the animals suffered no permanent side effects from this intervention. Hematocrit remained stable in all animals and no blood products were required. Initial platelet counts dropped to 241,000/uL ± 84,000 by the second day, but recovered to baseline values on day 4 and remained stable. Necropsy showed no signs of thromboembolism or organ damage.

CONCLUSION. A simple alternative to mechanical ventilation for patients with COPD and hypercapnic respiratory failure has been successfully tested in animals. Human trials are planned for 2008 to determine what role "respiratory dialysis" will have in this patient population.

0959

VENTILATOR-INDUCED LUNG INJURY AMONG MAMMALS: A UNIFYING HYPOTHESIS

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INTRODUCTION. To investigate the mechanisms of ventilator-induced lung injury (VILI), many mammals have been employed in experimental models comparing the effects of different ventilatory settings. Despite the solidity of the data, a high variability of the time course and the severity of VILI have been observed among different models. Inspiratory airway pressures, tidal volume (VT) per body weight (bw), and more recently, alveolar stress (transpulmonary pressure, PL) and strain (delivered VT on the lung resting volume) have been considered as possible predictors of VILI. Our aim was to find, by a retrospective analysis of the available literature, a unifying relationship between ventilatory settings and time of achievement of a preterminal lung injury.

METHODS. A medline research was performed. Articles in which healthy animals were aggressively ventilated until death or the achievement of preterminal lung injury were selected. Criteria for preterminal injury were $PaO2 < 50$ mmHg, $PaO2/FiO2 < 150$, reduction of functional residual capacity (FRC) > 50% of baseline, increase of respiratory system elastance > 150% of baseline. VILI group included terminal-injured, control group (CG) non-terminal injured animals. Mean values of VT/bw, peak/plateau inspiratory pressure, positive end-expiratory pressure (PEEP) and time of ventilation were analyzed. Alveolar strain was computed as the ratio between end inspiratory-lung volume (VT + PEEP-volume) and FRC. PEEP-inflated volume was calculated by using respiratory system compliance (Crs). When Crs and FRC were not measured, they were estimated from physiological studies on each species. PL was estimated from values of peak/plateau airway pressure and data on the partitioned respiratory mechanics.

RESULTS. Sixteen articles were selected, including 6 different species (sheep, pigs, dogs, rabbits, rats, mice). Time of achievement of lung injury was markedly variable among different studies, ranging from 18 to 2784 minutes. Duration of ventilation was highly correlated with alveolar strain according to an exponential decay function: $y = y0 + a*\exp(-b*x)$ ($r2 = 0.84$, $p < 0.01$). Of note, most of the values of CG animals appeared to be leftward and downward-shifted as compared to the VILI group. No such relationship was found between other parameters and time. When duration of ventilation was normalized on alveolar strain applied, large animals showed a greater resistance to VILI as compared to small species (610 [260/1838] vs. 17 [4/59] min. – median[25/75%], $p < 0.01$).

CONCLUSION. From this preliminary and retrospective analysis, alveolar strain appears to have a key role for a better comprehension of VILI among mammals. A higher susceptibility to VILI may be typical of small animals.

0960

PULMONARY FUNCTION AND EXPIRATORY FLOW LIMITATION IN PATIENTS WITH ACUTE CERVICAL CORD INJURY

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INTRODUCTION. Patients with spinal cord injuries can develop alterations of respiratory mechanics responsible of infective complications, which represents the most important cause of increased mortality and morbidity. The most relevant alteration of respiratory mechanics is the reduction of functional residual capacity (FRC). The latter can be responsible of a reduction of the expiratory flow able to provoke the development of expiratory flow limitation (EFL). The clinical consequences are the inability to cough and the cyclic opening/closure of the peripheral airways responsible of a chronic lung inflammation. Aim of our study was to evaluate whether the FRC reduction could lead to EFL.

METHODS. 31 consecutive patients with spinal cord injury at C4-C5 level were studied (age: 38 ± 18y; weight: 70 ± 13Kg; days from trauma: 66 ± 46). The following data were recorded, both seated and supine: 1) parameters from pulmonary function test, such as inspiratory capacity (IC), FEV1, FEV1/FVC 2) EFL by the NEP test, which is based on the application at the airways opening of a negative pressure of 3 cmH2O 4) difference between the expiratory flow during tidal ventilation and the expiratory flow of the ensuing breath (NEP test) at 50% of the expired volume (DELTA V').

RESULTS. The main result of our study is that 32% of the patients developed EFL in supine position, while this percentage is only 7% in seated position. Moreover, the presence of EFL was statistically related to the age of the patients (32 ± 16 years without EFL VS 60 ± 12 years with EFL). Interestingly, the DELTA V' was markedly reduced in supine (0.16 ± 0.12 l/s) than in seated position (0.28 ± 0.16 l/s). Both values were much lower than those of normal subjects (> 0.7 l/s, personal observation). On the contrary, patients in supine position showed better spirometric parameters.

CONCLUSION. The clinical implications of the reduction of the expiratory flow are a) the inefficacy of the cough to clean the secretions and b) a chronic lung inflammation due to the presence of EFL. Indeed the FEV1/FVC ratio was 0.60 ± 17 in seated position, value that implies the presence of obstructive lung disease even in very young patients. Hence, although the patients with spinal cord injuries exhibited a better spirometric parameters in supine position, the need of avoiding the pro-inflammatory mechanisms due to reduction of expiratory flow, implies the maintenance of these patients in semirecumbent position.

0961

ABSOLUTE ELECTRICAL IMPEDANCE TOMOGRAPHY (EIT) DURING SINGLE LUNG VENTILATION

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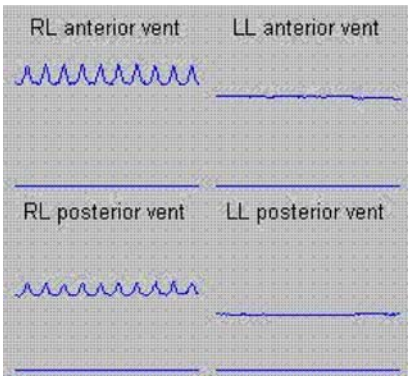
INTRODUCTION. With our improved lung volume algorithm we aimed to evaluate the ability of Absolute EIT to detect and quantify changes in individual lung ventilation.

METHODS. We studied 8 patients undergoing oesophagogastrectomy using the 8 electrode Mk3.5 Sheffield EIT system in the anaesthetic room before surgery. This uses 8 stick-on electrodes evenly spaced around the thorax, 5 cm above the level of the xiphoid process. For an oesophagogastrectomy the patient is intubated with a double-lumen endotracheal tube to allow independent lung ventilation. EIT recordings were taken during bilateral lung ventilation Vt 800 ml. Each lung was then individually ventilated with volumes of Vt 400, 300 and 200 ml, with the opposite lumen of the double-lumen endotracheal tube open to air.

RESULTS. Examination of lung air volume graphs produced by EIT of the 4 lung quadrants (fig) showed that EIT recognised bilateral and single lung ventilation in all cases (100%). Analysis of the contralateral lung during single lung ventilation revealed a small antiphase waveform, suggesting compression of the non-ventilated lung by the ventilated side. Bilateral lung ventilation tidal volume calculations by EIT were accurate to 19.0% (mean percentage error). Single lung ventilation tidal volume calculations were accurate to 19.4% for the left lung, and 21.9% for the right.



CONCLUSION. Absolute EIT can identify unilateral lung ventilation. EIT is now able to calculate tidal ventilation lung volumes during unilateral and bilateral ventilation with a mean percentage error of close to 20%. Research is ongoing to improve the performance of EIT as a bedside monitor capable of indicating individual lung behaviour in mechanically ventilated patients on the ICU.

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0962

PRONE POSITION GUIDED BY LUNG ULTRASOUND IN ARDS PATIENTS; THE TIME COURSE RESPONSE OF OXYGENATION IMPROVEMENT

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INTRODUCTION. Prone position may improve oxygenation and the outcome of patients with severe ARDS. Oxygenation improvement with prone position is related to the etiology of the ARDS (pulmonary or extrapulmonary), the onset (early or late) and the time the patients remain in the prone position. Lung ultrasound may provide valuable information on lung consolidation or lung collapsed areas at the dependent parts of the lung, susceptible to expand with prone position.

METHODS. During a 4 year- period, all ARDS patients ($PaO2/FiO2 < 150$) prospectively turned prone for 24 h based on clinical and lung ultrasound criteria of lower lobes consolidation or atelectasis. The ventilatory settings for all patients included plateau pressures less than 30 cm H2O and PEEP of 5–20 cmH2O. Gas exchange data and lung mechanics were evaluated in the supine position and after turned prone, every hour for the first 3 h, every 6 h for the remaining 24 h and after turning in the supine position. The time course response of the gas exchange improvement was correlated with the time of the onset of ARDS. The cause of death (pulmonary or non-pulmonary) was noted. ANOVA was used for statistical analysis ($p < 0{,}05$).

RESULTS. 42 patients (30 M and 12 F) with ARDS (14 of extrapulmonary and 28 of pulmonary etiology), with a mean age of 41 years (min 17, max 74) included in the study. The onset of the ARDS was 3,7 days (min 1 day, max 14 days) and their initial PaO2/FiO2 and PaCO2 in the supine position were 85 ± 41 and 45 ± 11 mmHg, respectively. All patients increased substantially their PaO2/FiO2 and decreased their PaCO2 after 24 h in the prone position [to 220 ± 90 and 39 ± 6 mmHg ($p < 0.01$)], compared to the supine position. Lung compliance did not change significantly from the supine to prone position (from 33 ± 12 to 36 ± 11 ml/cmH2O) but significantly improved when turned supine again (from 33 ± 12 to 37 ± 12). No relationship was found between the onset of ARDS or the etiology (pulmonary or extrapulmonary) and the time course improvement of PaO2/FiO2. Oxygenation continued to improve overtime in prone position and in some patients recruitment of lung units was observed after 16 h after they had turned prone. Mortality of the entire group of patients was 32%, but the mortality attributed to the ARDS was 20%.

CONCLUSION. Lung ultrasound may identify ARDS patients susceptible to improve their gas exchange by prone position. Response to prone position may be delayed as much as 16 h. Prone position may improve survival in patients with severe ARDS.

0963

CONTINUOUS LATERAL ROTATION THERAPY AND DEAD SPACE VENTILATION

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INTRODUCTION. In order to minimize dead space ventilation, adjustment of breathing frequency and tidal volume may be necessary. Also reduction of anatomical dead space, by means of reducing ventilatory tube length, is favourable for the artificial ventilation of ICU patients. Not yet investigated is the possibility of improvement of blood flow to unperfused alveoli. In this way physiological dead space could be reduced. We investigated the effect of a continuous lateral rotation bed on dead space ventilation compared to routine manual turning.

METHODS. 21 consecutive patients were investigated. 9 patients were treated with continuous lateral rotation therapy (CLRT) and 12 patients received standard care. In the standard care group the patients were turned in the lateral position each 4 h manually on a TOTAL CARE® bed (Hillrom®). Lateral rotation was performed as lateral as possible. In the CLRT group the patients were turned every 20 minutes automatically as lateral as possible on a SpO2-RT bed (Hillrom®). PaCO2, PeCO2, minute volume were recorded before start of treatment ($t = 0$) and after 24 h ($t = 24$). Dead space ventilation was calculated as: Vd/Vt = (PaCO2 – PeCO2)/PaCO2. The difference of Vd/Vt of the two time points was used for calculation. A nonparametric Mann-Whitney U test was used for analysing differences between the two groups. A significance level of < 0.05 was considered significant.

RESULTS. Dead space ventilation on $t = 0$ in the control group was 0.17 ± 0.11 vs. 0.29 ± 0.28 in the CLRT group; not statistically different. However after 24 h the Vd/Vt was 0.11 ± 0.08 in the standard treated group and 0.28 ± 0.14 in the CLRT group ($p < 0.005$). The differences between $t = 24$ and $t = 0$ in the both groups did not differ significantly, control group -0.07 ± 0.14, CLRT group 0.01 ± 0.14.

CONCLUSION. Dead space was not significantly reduced after CLRT treatment when compared to standard rotation every four h. When 24 h after treatment, dead space in both groups were studied, dead space was significantly higher in the CLRT group. CLRT seemed to have a worse effect on dead space. The number of patients studied was small. Further study is warranted.

0964

CONTINUOUS LATERAL ROTATION THERAPY IMPROVES STATIC LUNG COMPLIANCE

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INTRODUCTION. Positional therapy is of particular importance in the treatment of ICU patients. Not only for the prevention of decubitus, but also for the prevention of ventilator associated pneumonia and atelectatic lung disease. We investigated the role of a new continuous lateral rotation treatment (CLRT) bed, on static lung compliance.

METHODS. After approval of the study protocol by the ethical committee, 21 patients were examined. Patients were randomised for standard therapy ($n = 12$) or CLRT ($n = 9$) by means of a SpO2-RTTM bed (Hillrom ®). In the standard therapy group, patients were manually rotated every 4 h as lateral as possible. In the CLRT group, patients were rotated automatically with the use of a self-inflating mattress, every 20 minutes. All patients suffered from ARDS and were pressure controlled ventilated with the use of a Servo 300(A)® and Servo-i ® ventilator (Maquet). Static lung compliance was measured on the ventilator. Static compliance was measured before therapy and 4, 8, 16, 24 h after start of therapy. Delta-static compliance was calculated as the difference of static compliance on the different time points minus pre-treatment values for the individual patients. Non parametric Kruskal-Wallis test was used to analyse the differences in both treatment groups. A significance level of < 0.05 was considered as significant.

RESULTS. When the 2 treatment groups were compared, CLRT treatment was superior on time point 4 h ($p = 0.002$), 8 h ($p = 0.03$) and 16 h ($p = 0.04$) when compared to baseline.

TABLE 1 INCREASE IN STATIC LUNG COMPLIANCE

Standard therapy mean	SD	CLRT mean	SD
−3,08	4,83	6,33	7,3
−1,42	6,32	6,00	8,79
−1,00	6,66	5,89	10,19
−0,67	10,69	7,33	8,28

CONCLUSION. We demonstrated an improvement in static lung compliance with CLRT in ventilated patients. The number of studied patients in this study was small. The improvement seemed to disappear after 24 h. Unfortunately we did not do any further measurements. Further study is necessary to investigate the cause of this improvement in lung compliance.

0965

EARLY GAS EXCHANGE AFTER PRONE POSITIONING AND CLINICAL OUTCOME IN PATIENTS WITH SEVERE ACUTE RESPIRATORY DISTRESS SYNDROME

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INTRODUCTION. Ventilating patients with acute respiratory distress syndrome (ARDS) in the prone position has been shown to improved arterial oxygenation, but various studies showed the debatable results regarding on the predictor of outcome according to gas exchange patterns after the prone position in ARDS. Moreover, there has been few clinical data on the early gas exchange and clinical outcome in ARDS patients with the prolonged prone position. We evaluated the early gas exchange and clinical outcome in severe ARDS patients, who underwent prolonged prone positioning.

METHODS. This retrospective study was performed from 1 January 2000 to 31 July 2006. We studied adult patients who were diagnosed as severe ARDS and placed in prone positioning for $\geq$ 12 h in the medical intensive care unit (ICU) until the positioning change from prone to supine because of the improved ($PaO2/FiO2 \geq 200$ or $FiO2 < 0.5$, and improved chest radiographic finding) or worsen (with no improvement of gas exchange by the prone positioning) patients' clinical status. All clinical data and gas exchange variables before and after the prone position were collected. Severe ARDS was defined as $PaO2/FiO2 \leq 150$ with a positive end-expiratory pressure of at least 8 cm H2O, bilateral chest radiograph infiltrate, and the absence of clinical evidence of cardiac failure. The "PaO2 responders" and "PaCO2 responders" were those patients who increased the PaO2/FiO2 more than 20 mmHg and decreased the $PaCO2 \geq 1$ mmHg at first 8–12 h after the prone position, respectively. Primary end-point was 28-day mortality.

RESULTS. A total 96 patients (mean age 60.1 ± 15.6, 75% men) were enrolled. Their mean admission SAPS (Simplified Acute Physiology Score) II score was 42.2 ± 13.9, and the mean length of ICU and hospital stay were 21.7 ± 18.5 and 35.2 ± 32.8 days, respectively. The 28-day mortality rate after ICU admission was 56.3%. At entry into the study, there was no difference in clinical data between survivors and nonsurvivors on day 28. After prone positioning, the PaO2 responders were 62.5%, and associated with an improved 28-day outcome compared with nonresponders by analyzing Kaplan Meier survival estimates ($p < 0.05$ by the log-rank test). The PaCO2 responders were 53.1%, but not associated with 28-day outcome. A Cox proportional hazards model demonstrated that the PaO2 responders (95% CI 0.297–0.970, $p < 0.05$) and serum creatinine on prone position day (95% CI 1.039–1.878, $p < 0.05$) was the important independent predictor of the 28-day mortality.

CONCLUSION. The PaO2 responders after prone positioning with lower serum creatinine on prone position day would be a good prognostic factor in severe ARDS with prolonged prone positioning.

0966

RESPIRATORY MUSCLES IMPAIRMENT IN PATIENTS WITH ACUTE CERVICAL SPINAL CORD INJURY

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INTRODUCTION. Spinal cord injury is still a big medical challenge. It is well known that patients with partial or complete transection at or below the fourth cervical cord segment exhibit weakness and spastic paralysis below the level of the lesion. This impairs the respiratory muscle function so that the ability to cough and to clear the airways from bronchial secretions is reduced. The stasis of bronchial secretions may predispose to the development of pulmonary infections which are the primary cause of death in those patients. Aim of this study is to investigate inspiratory and expiratory muscles function in patients with injury level at C4-C5.

METHODS. 31 consecutive patients with spinal cord injury at C4-C5 level were studied (age 38 ± 18y; weight: 70 ± 13Kg; days from trauma: 66 ± 46). The following data were recorded, both seated and supine: (1) maximum inspiratory pressure (MIP) as the maximal force developed against an occluded airway (2) maximum expiratory pressure (MEP), (3) P0.1 as index of neuromuscular respiratory drive 4) inspiratory resistance.

RESULTS. The main result of our study was that MIP and MEP are markedly reduced in both positions. MIP was reduced of about 60% (% normal value) in supine position (44 ± 15 cmH2O) and this value was even lower in seated position (37 ± 15 cmH2O); the reduction of MEP is quite constant both in supine (24 ± 11 cmH2O) and in seated position (22 ± 12 cmH2O) and proportionally bigger than the reduction of MIP (85% of the normal value). Furthermore P0.1 and inspiratory resistance exhibited a huge increase compared to normal (316 and 236%, respectively).

CONCLUSION. The huge reduction of MEP indicates an important impairment of expiratory muscle function which can be associated with a reduction of the efficacy of the cough. The stasis of secretions in the airways not only implies a predisposition to pulmonary infection, but can further increases flow airway resistances, that are higher in tetraplegic patients owing to the reduction of functional residual capacity (FRC). To the increased inspiratory resistance corresponds an increased work for the inspiratory muscles that could not always be performed because of the reduction of MIP. The latter is better in supine position due to diaphragm muscle fibers which operates on a more favorable portion of their length-tension curve. However, the higher decrease of FRC in this position implies a reduction of expiratory flow and a cyclic opening/closure of the peripheral airways which are responsible of a chronic lung inflammation. The latter could be avoided by keeping these patients in semirecumbent position.

Poster Sessions
Acute kidney injury: 0967–0980

0967

IMPACT OF THE DEVELOPMENT OF ACUTE KIDNEY INJURY (AKI) ON OUTCOME OF PATIENTS WITH SEVERE SEPSIS AND SEPTIC SHOCK - RESULTS FROM THE VISEP TRIAL

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INTRODUCTION. Acute kidney injury (AKI) has been shown to be associated with a worse outcome in critically ill patients and patients with severe sepsis. However, results of these studies are hardly comparable, since different definitions for AKI were used. Recently, a new consensus definition of AKI was proposed (Metha et al. Crit Care 2007; 11(2)). This definition uses a fixed time interval (48 h) in which AKI may develop. Aim of our study was to investigate the new definition and the impact of AKI according to this definition on outcome in a large cohort of patients with severe sepsis and septic shock.

METHODS. Data from the multicentric VISEP trial (Brunkhorst et al. NEJM 2008; 358: 125–39) were analyzed for the first 48 hrs after enrolment of patients. Complete data on the new AKI definitions were available in 521/537 of patients. AKI was defined as an increase in serum creatinine from baseline of more than or equal to 0.3 mg/dl, a percentage increase in serum creatinine of more than or equal to 50%, or a reduction in urine output of less than 0.5 ml/kg per hour for more than six h. Patients were divided into the AKI group and the non-AKI group.

RESULTS. 227/521 (44%) patients were classified as AKI and 294/521 (56%) as non-AKI. Patients with AKI were older, had a higher APACHE II score, higher lactate levels and a lower platelet count. Mean arterial pressure (MAP) and CrP levels were not different (Table 1). 28- and 90-day mortality and mean SOFA scores were significantly higher in patients with AKI. Length of stay (LOS) in the ICU was not different (Table 2). After multivariate logistic regression, AKI remained a significant risk factor for 28-day mortality (OR: 3.058; CI: 1.938–4.824; $p < 0.001$) and 90-day mortality (OR: 2.853; CI: 1.894–4.295; $p < 0.001$), and organ dysfunction.

TABLE 1 BASELINE CHARACTERISTICS OF PATIENTS WITH AND WITHOUT AKI (MEDIAN AND INTERQUARTILER)

	Age (years)	APACHE II points	Creatinine (mmol/l)	Lactate (mmol/l)	platelets (G/l)	MAP (mmHg)	CrP (mg/dl)
AKI	69 (60–76)	21 (17–26)	1.6 (1.0–2.3)	2.8 (1.7–5.0)	146 (94–230)	74 (67–83)	200 (128–290)
non-AKI	65 (55–74)	18 (14–22)	1.1 (0.8–1.8)	2.0 (1.3–3.4)	199 (130–274)	76 (68–85)	199 (126–286)
p-value	0.014	<0.001	<0.001	<0.001	<0.001	0.148	0.799

TABLE 2 MORTALITY AND MORBIDITY IN PATIENTS WITH AND WITHOUT AKI (PERCENTAGES; MEDIAN INTERQUARTILER)

	28-day mortality	90-day mortality	Mean SOFA score	ICU-LOS
AKI	41%	54%	9.1 (6.4–11.6)	18 (7–32)
non-AKI	14%	25%	6.0 (4.4–7.9)	13 (8–26)
p-value	<0.001	<0.001	<0.001	0.220

CONCLUSION. The new AKI criteria are useful to predict outcome in a well defined cohort of patients with severe sepsis and septic shock. AKI occurs in almost half of these patients and has a tremendous impact on 28-day and 90-day mortality.

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0968

CORRELATION BETWEEN ACUTE KIDNEY INJURY CLASSIFICATION AND OUTCOME

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INTRODUCTION. The Acute Kidney Injury (AKI) Network proposed a new classification for AKI distinguishing between 3 grades of severity (AKI I, AKI II and AKI III) based on changes in serum creatinine and whether renal replacement therapy was initiated. The aim of this study was to validate the criteria in a large ICU population and to evaluate the impact of AKI in the context of other risk factors.

METHODS. Using the Riyadh Intensive Care Program database we applied the AKI classification to 22,303 adult patients admitted to 22 Intensive care units (ICUs) in United Kingdom and Germany between 1989 – 1999 who stayed in ICU for $\geq$ 24 h and did not have end-stage dialysis dependent renal failure before admission to ICU.

RESULTS. Multivariate analysis confirmed that AKI I and AKI III were independent risk factor for ICU mortality [Odds ratio (OR) 1.21 for AKI I, OR 1.01 for AKI II, OR 2.11 for AKI III]. Other independent risk factors for ICU mortality were age (OR 1.02), SOFA score on admission to ICU (OR 1.03), APACHE II score on admission to ICU (OR 1.09), presence of pre-existing end-stage chronic illness (OR 1.13), admission after emergency surgery (OR 1.99), mechanical ventilation (OR 2.64), maximum number of failed organ systems (OR 2.65) and non-surgical admission (OR 2.79). AKI II and RRT were not independently associated with increased ICU mortality.

TABLE 1

	No AKI n=13,491	AKI I n=4,307	AKI II n=1,493	AKI III n=3,012
Mean age	60.4	62.5	60.5	61.1
Median APACHE II on admission to ICU	13	16	17	21
Median SOFA score on admission to ICU	5	6	7	9
Maximum organ failure on admission to ICU	1	1	2	2
Mechanical ventilation	57.2%	78.1%	82.2%	87.2%
ICU mortality	9.3%	20.97%	24.9%	49.0%
Hospital mortality	15.9%	29.3%	34.7%	57.5%

Practice of RRT was very variable between different centers. Without using RRT as a criterion for AKI, 5.2% of patients with AKI III would have been classified as AKI II, 5.3% as AKI I and 13.1% would not have fulfilled the criteria for any AKI category.

CONCLUSION. The AKI classification as proposed by the AKI network correlated with ICU outcome. However, without clear guidelines for the management of RRT, using RRT as a criterion for AKI III may have a confounding effect on the predictive power of the classification system as a whole.

0969

EARLY MORTALITY AFTER CARDIAC SURGERY DUE TO ACUTE RENAL FAILURE: RIFLE WITHIN 7 DAYS OR SERUM CREATININE CHANGES WITHIN 48 HOURS?

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INTRODUCTION. We demonstrated recently that a minimal change in the serum creatinine concentration within 48 hrs (ΔCrea) after cardiothoracic surgery was associated with increased mortality within 30 days. In this investigation, we analyzed whether relative changes, as in the RIFLE classification within 7 days, confer a different prognostic potential(1).

METHODS. Based on data from 4118 consecutive patients in the University Hospital Vienna, we attributed patients to the RIFLE criteria within 7 days and to ΔCrea groups within 48 h and 30 day mortality were calculated.

RESULTS. Based on RIFLE within 7 days, acute kidney injury occurred in 323 (8%). RIFLE did not differentiate as good as ΔCrea – classification between the lowest risk group (ΔCrea-; containing 2242 patients; 54% of all patients), and groups with increased mortality. Application of RIFLE resulted in a very large reference group (3795 patients; 92%) with 3% mortality rate as compared with only 2% mortality in the reference group ΔCrea – (table).

TABLE 1

Total n:4118	ΔCreatinine				RIFLE-Mortality
	GroupΔ–: 199 (5%)	GroupΔ-: 2242 (54%)	GroupΔ+: 1477 (36%)	GroupΔ++: 200 (5%)	
RIFLE					
R-None:3795 (92%)	197 (5.2%)	2205 (58%)	1361 (36%)	32 (0.8%)	116 (3%)
R-Risk:203 (5%)	2 (1%)	26 (13%)	73 (36%)	102 (50%)	49 (24%)
R-Injury:78 (2%)	0	6 (1.7%)	33 (42%)	39 (50%)	30 (38%)
R-Failure:42 (1%)	0	5 (12%)	10 (24%)	27 (64%)	17 (40%)
ΔCrea Mortality	16 (8%)	47 (2%)	84 (5.7%)	65 (32.5%)	n:212

CONCLUSION. In the studied cardiac surgical population, RIFLE criteria misclassified a large number of patients whereas ΔCrea-Groups identified a higher proportion of patients with poor prognosis. ΔCrea-definition has the appeal of simplicity and enhanced accuracy in predicting mortality when compared with consensus definitions.

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0970

END STAGE RENAL FAILURE PATIENTS ADMITTED TO ICU HAVE A BETTER PROGNOSIS THAN ICU PATIENTS WITH SEVERE ACUTE KIDNEY INJURY

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INTRODUCTION. Patients with end stage dialysis dependent renal failure (ESRF) and patients with severe acute kidney injury (AKI) are characterised by loss of renal function per se as well as significant associated comorbidities. The aim of our study was to compare the outcome of ESRF patients admitted to ICU with that of ICU patients with severe AKI and to identify confounding factors.

METHODS. Retrospective analysis of The Riyadh Intensive Care Program database which contains demographic and daily physiologic data of 41,972 adult ICU patients admitted to 22 ICUs in United Kingdom and Germany between 1989–1999. Severe AKI was defined according to the AKI classification by the AKI network (serum creatinine $\geq$ 354 µmol/L, treatment with renal replacement therapy (RRT) or rise in serum creatinine by > 300% from baseline).

RESULTS. In patients with severe AKI and ESRF, mortality rose with increasing number of associated organ failure. In a multivariate analysis, independent risk factors for ICU mortality were mechanical ventilation [Odds ratio (OR) 3.05], maximum number of failed organs (OR 2.58), non-surgical admission (OR 1.59), emergency surgery (OR 1.39), APACHE II score on admission to ICU (OR 1.05) and age (OR 1.02). RRT was not independently associated with ICU mortality.

TABLE 1

	Severe AKI without RRT n=1,177	Severe AKI with RRT n=1,836	ESRF n=797
Mean age	62.6	60.1	55.3
Number of failed organs on admission to ICU	1	2	0
Maximum organ failure in ICU (excluding renal failure)	1	2	0
Mechanical ventilation	80.5%	91.4%	60.9%
Cardiac surgery	8.8%	12.9%	11.4%
ICU mortality	41.5%	53.8%	20.8%
Hospital mortality	51.5%	61.4%	34.5%
Days in ICU [median]	7	10	2

CONCLUSION. ESRF patients admitted to ICU had a better outcome than ICU patients with advanced AKI, mainly due to differences in co-morbid risk factors and age.

0971

NEW ONSET ACUTE KIDNEY INJURY IN A MULTIDISCIPLINARY INTENSIVE CARE UNIT: A PROSPECTIVE OBSERVATIONAL STUDY

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INTRODUCTION. AKI is associated with high mortality and morbidity in the ICU. There is limited data on AKI in ICU from India. Hence we evaluated the incidence and predictors of new onset Acute Kidney Injury (AKI) developing in intensive care unit (ICU) and to assess its impact on mortality.

METHODS. This study was performed from June 2007 to Mar 2008. All patients with ICU length of stay (LOS) more than 48 hrs and who fulfilled study criteria were included. AKI was classified and diagnosed according to RIFLE CRITERIA. Primary outcome analysed was hospital mortality. Statistical analysis was done using Chi-square test or Fisher's exact test, Student's t-tests and multivariate logistic regression.

RESULTS. Of 1250 ICU admissions during study period, 615 patients met study criteria. AKI occurred in 184 [29.9%] patients. As per the RIFLE criteria our patients fell into the following category—Risk [63.04%], Injury [6.52%] and Failure [30.43%]. Renal function improved in 55.17% of Risk group, 58.33% of Injury group and in 12.5% of Failure group. Mortality in AKI and those without AKI (NON AKI) were 57.6% and 24.1% ($p < 0.05$) respectively. 17.93% of AKI patients underwent Renal Replacement Therapy (RRT) and mortality in this sub group was 87.87% (compared to 70.19% in non RRT group, $p = 0.049$). AKI significantly increased ICU LOS (8.1 ± 5.3 vs. 5.29 ± 3.9 days, $p < 0.001$) and duration of ventilation (6.65 ± 5.4vs 3.1 ± 4.1 days, $p < 0.001$). In AKI group non survivors had higher APACHE II (12.37 ± 4.9 vs. 8.85 ± 3, $P < 0.001$), SOFA (8.19 ± 2.9 vs. 5 ± 2 $p < 0.001$), incidence of sepsis (49.4% vs. 11.8% $p < 0.001$) and lower pH (7.27 ± 0.1 vs. 7.31 ± 0.1 $p < 0.003$) and PF ratio (223 ± 49 vs. 239 ± 35 $p < 0.014$) when compared with survivors. Sepsis (OR 5.6), vasopressors (OR 2) and comorbid conditions (OR 2.13) were risk factors for AKI on multivariate analysis.

TABLE 1 PREDICTORS FOR NEW ONSET AKI BY UNIVARIATE ANALYSIS

	AKI	NONAKI	P value
APACHE 2 (mean ± sd)	10.8 ± 4.6	8.42 ± 4.2	0.001
SOFA (mean ± sd)	6.88 ± 3.02	5.5 ± 2.4	0.001
Vasopressors/Inotropes (%)	92	8	0.001
Sepsis (%)	78	22.5	0.001
Blood products (mean ± sd)	1.35 ± 3.4	0.62 ± 1.9	0.001
Heart Rate (mean ± sd)	117 ± 14	107 ± 14	0.001
Mean arterial pressure (mean ± sd)	77 ± 9	81 ± 7	0.001
pH (mean ± sd)	7.29 ± 0.1	7.34 ± 0.08	0.001
PF ratio (mean ± sd)	230 ± 44	241 ± 44	0.004
Lactate (mean ± sd)	3.47 ± 1.71	2.8 ± 1.1	0.001

p<0.05 significant

CONCLUSION. Nearly one third of patients in our study group developed new onset AKI which was associated with increased mortality and morbidity.

0972

RISK OF RECEIVING RENAL REPLACEMENT THERAPY IN SEPSIS BY CHARACTERISTICS AT ADMISSION TO INTENSIVE CARE

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INTRODUCTION. Patients in the Intensive Care Unit (ICU) with sepsis are at risk of Acute Kidney Injury (AKI). A proportion of these patients will receive Renal Replacement Therapy (RRT). We sought to describe the risk of receiving RRT in sepsis, and identify those factors (present at admission to intensive care) associated with that risk.

METHODS. We analysed data from the Intensive Care National Audit & Research Centre Case Mix Programme (Version 3.0). All patients with a diagnosis of sepsis or severe sepsis but without a history of chronic renal failure were included. Patients were classified as receiving RRT if they haemodialysed/haemofiltered on one or more days. Regression analysis was performed on acute physiology, chronic health, and demographic characteristics.

RESULTS. 6695 patients were identified with sepsis of which 3354 (50.1%) met the criteria for AKI[1], and 1152 (17.2%) patients received RRT. The odds for receiving RRT are increased for males (OR 1.3 (1.1–1.5), and Black or Asian ethnicity ($P = 0.030$), but fall as age increases above 40 years ($P < 0.001$). Admission type (emergency surgery or medical) was not associated with RRT ($P = 0.21$). Acute physiology parameters are described in Table (below).

TABLE 1

Acute kidney injury	Risk/Stage 1	Injury/Stage 2	Failure/Stage 3
- OR (95%CI)	**2.3** (1.8–3.1)	**3.0** (2.3–4.0)	**5.7** (4.0–7.9)
Urine Output (24 hrs)	1000–1999 mls	500–999 mls	≤500 mls
- OR (95%CI)	**2.2** (1.2–4.0)	**4.3** (2.3–8.1)	**8.2** (4.4–15.4)
Lung Injury (P:F)	-	ALI (200–300 mmHg)	ARDS (≤200 mmHg)
- OR (95%CI)		**2.2** (1.2–4.2)	**3.2** (1.8–6.0)
Mean Arterial Press	-	50–69 mmHg	≤50 mmHg
- OR (95%CI)		**1.2** (1.0–1.4)	**1.0** (0.8–1.3)
Serum Lactate	2.0–3.9 (mmol/l)	4.0–5.9 (mmol/l)	6.0–7.9 (mmol/l)
- OR (95% CI)	**1.3** (1.0–1.5)	**1.4** (1.1–1.9)	**2.0** (1.4–2.8)

Acute Physiology and associated Odds Ratios for RRT during ICU admission

CONCLUSION. Almost one in six septic patients receive RRT. Severity of shock was not associated with RRT. However, renal (creatinine, urine output) and non-renal factors (lactate, P:F ratio, age, ethnicity) can be identified which are associated with the use of RRT. These admission factors may allow prospective identification of patients likely to receive RRT, which may be relevant from a research and clinical standpoint.

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0973

CAUSES AND OUTCOME OF ICU ADMISSIONS OF RENAL TRANSPLANT RECIPIENTS

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INTRODUCTION. Increased long-term graft survival and life-long immunosuppression expose renal transplant recipients (RTR) to an increased risk of life-threatening complications. The aim of our study was to analyze the incidence, causes and outcome of RTR-ICU admissions.

METHODS. Retrospective analysis of all consecutive RTR admitted between January 2004 and December 2007 in a Medical ICU of a University Hospital.

RESULTS. Ninety cases (83 patients, mean aged: 57 ± 14 years, SAPS II: 41 ± 15), at 55 ± 71 months after renal transplantation, were analyzed. From 2004 to 2007, the incidence of ICU admissions increased from 14‰ to 54‰ ($p < 0.05$). A high prevalence of co-morbidities was observed: hypertension (83%), diabetes (37%) and coronary artery disease (27%). The four main reasons for ICU admission were: acute respiratory failure (42 %), acute circulatory failure (29%), coma (9%) and acute renal failure (8%). Sepsis was present at admission in 76% and associated with pulmonary infection in 48 % and with urinary infection in 28%. The three main causes of acute respiratory failure were: bacterial pneumonia (34%), pneumocystis pneumonia (32%) and cardiogenic pulmonary oedema (24%). Fifty percent of the micro-organisms isolated in bacterial pneumonias were resistant to empirical antibiotherapy. Seventy three percent of the patients suffering from respiratory failure required mechanical ventilation. Non invasive ventilation (NIV) was used initially in 46% of the patients ($n = 13$). In 7/13 patients NIV failed and patients required intubation. Eighty eight percent of the patients admitted for acute circulatory failure ($n = 26$) suffered from septic shock. Pyelonephritis and intra-abdominal sepsis were diagnosed respectively in 43 and 26%. Acute renal failure was present at admission and/or during ICU stay in 67% of the cases. Acute renal failure needed renal replacement therapy in 70% of them. Median ICU and hospital length of stay were respectively 5 [2–48] and 20 [2–208] days. ICU and hospital mortality was 19 and 24%. Acute respiratory failure was associated with a 34% hospital mortality rate and pneumocystis pneumonia with a 58% hospital mortality.

CONCLUSION. From 2004 to 2007 an increased incidence of medical ICU admission of RTR was observed in our institution. Acute respiratory failure was the leading cause of admission and was associated with a poor prognosis. Due to the high incidence of pneumocystis pneumonia and resistant micro-organisms in pulmonary infections a microbiological pulmonary analysis was always required. The high incidence of pneumocystis pneumonia pleads for prophylaxis. The high incidence of NIV failure raises concerns about its use in RTR presented for respiratory failure.

0974

INCIDENCE OF CONTRAST-INDUCED NEPHROPATHY IN INTENSIVE CARE PATIENTS UNDERGOING CONTRAST-ENHANCED CT STUDIES

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INTRODUCTION. Contrast Induced Nepropathy (CIN) is a potentially avoidable morbidity in critically ill patients who require Computerised Tomography (CT) scanning. Kidney injury is a common problem in critically ill patients and carries a significant cost burden and increases length of stay. Our aim was to identify the incidence and consequences of CIN in our Intensive Care Unit (ICU)over a one year period.

METHODS. All 312 ICU patients admitted between 1/6/06 and 31/5/07 were included for a retrospective analysis. We identified those had undergone CT scans and noted if they had received contrast for the procedure, analysed any change in renal function over 96 h following CT, and identified those who met the definition for CIN, and any patients who subsequently required dialysis.

RESULTS. Of the 312 admissions 87 (28%)underwent CT. A total of 135 CTs were performed: 79 contrast-enhanced scans,44 plain scans,12 missing data. The incidence of Acute Kidney Failure requiring dialysis over for all the 312 admissions was 17%.

TABLE 1 CHANGE IN RENAL FUNCTION IN PATIENTS UNDERGOING CT

	Contrast n=79	No Contrast n=44
25% increase in Creatinine (no significant difference)	11 (14%)	6 (14%)
No 25% increase in Creatinine (no significant difference)	65 (82%)	37 (84%)
Died in interim	3 (4%)	1 (2%)
Required Dialysis in ICU	8 (10%)	1(2%)
Required Dialysis post ICU	2(3%)	0

Chi-squared = 0.014 with 1 deg. freedom. 2 tailed p=0.9053

CONCLUSION. We identified an incidence of CIN of 14%, however there is no difference between the incidence of deterioration in renal function to the accepted criteria of CIN in patients undergoing CT in our unit whether they received contrast or not. Some of the patients who develop CIN required ongoing renal support following their ICU admission. We identified a group of patients who may benefit from therapeutic manoevers to prevent CIN.

0975

SEVERITY OF ACUTE KIDNEY INJURY AND OUTCOME IN SEPSIS

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INTRODUCTION. Acute Renal Failure in Intensive Care Unit (ICU) patients has recently been classified by international consensus into stages of Acute Kidney Injury (AKI).[1,2] Hospital mortality among general ICU patients appears to be associated with increasing severity of AKI.[3] We have examined the relationship between AKI and Hospital Mortality among patients with sepsis.

METHODS. We analysed data from the Intensive Care National Audit & Research Centre (ICNARC) Case Mix Programme (Version 3.0). All patients with a diagnosis of sepsis or severe sepsis but without a history of chronic renal failure were included. Baseline creatinine was not available and hence was estimated by the Modification of Diet in Renal Disease (MDRD) equation as recommended.[1] Patients were classified according to their highest creatinine within 24 h of ICU admission into Stage 1/"Risk", Stage 2/"Injury", Stage 3/ "Failure".

RESULTS. 6695 patients with sepsis were identified from 34 111 admissions in the ICNARC V3.0 database of which 3354 (50.1%) met the criteria for AKI and 1596 (47.6%) of these died within hospital. Hospital mortality by AKI Stage is presented in Table 1 (below). Acute Kidney Injury was associated with age (Odds Ratio (OR) 1.41 (95% CI 1.37–1.46) per 10 year increase), male sex (OR 1.16 (1.04–1.29)), APACHE II score (OR 1.07 (1.06–1.08) per point), and ICNARC Physiology score (OR 1.06 (1.05–1.07) per point). Cardiovascular (OR 2.1 (1.9–2.4)), Haematological (OR (2.6 (2.2–3.0) but not Respiratory (OR 1.1 (1.0–1.3)) Organ Dysfunction were associated with AKI.

TABLE 1

	No AKI	Stage 1/Risk	Stage 2/Injury	Stage 3/Failure
Number (%)	3341(49.9)	1337 (20.0)	958 (14.3)	1059 (15.8)
Male Sex (%)	1739 (52.1)	780 (58.3)	514 (53.7)	562 (53.1)
Age	58.0 (18.8)	66.6 (15.5)	68.7 (14.1)	67.4 (14.0)
APACHE II	16.7 (6.1)	20.1 (6.7)	23.4 (6.8)	25.4 (7.2)
ICNARC Score	17.8 (8.0)	24.4 (9.1)	29.4 (9.7)	30.1 (9.3)
Hospital Mortality %, (95% CI)	28.5 (26.9–30.1)	44.0 (41.3–46.8)	58.2 (55.0–61.4)	53.4 (50.3–56.5)

Data presented as Mean (Standard Deviation) unless otherwise specified

CONCLUSION. Hospital mortality in sepsis is markedly increased among patients with AKI. Previous studies have demonstrated increased mortality by AKI stage in unselected (septic and non-septic) populations using either admission or 'worst' creatinine.[3] However, mortality does not increase progressively with AKI stage when classified using admission creatinine in this septic population.

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0976

OUTCOMES FROM ACUTE KIDNEY INJURY IN A MULTIDISCIPLINARY INTENSIVE CARE UNIT

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INTRODUCTION. Acute Kidney Injury (AKI) is an independent predictor of mortality in the critically ill (1). We conducted this prospective study to look at the incidence of and outcomes from AKI in our multidisciplinary intensive care unit.

METHODS. We prospectively studied all patients with acute renal failure admitted to our unit during a 4 month period between August and November 2007. Patients were classified according to the RIFLE criteria (2). The APACHE II score was used to assess baseline severity of illness. Other data collected included ventilation days, ICU days, days on renal replacement therapy (RRT) and ICU survival.

RESULTS. There were 75 patients who had AKI by the RIFLE criteria out of 502 admissions during the study period (14.9%). Fourteen patients were at "Risk", 23 had "Injury" and 38 were in "Failure" by the RIFLE classification of AKI. Twenty one patients underwent RRT. Sixteen patients underwent Slow Low Efficiency Daily Dialysis (SLEDD) for 6 to 8 h at a time, 4 patients underwent conventional haemodialysis for 4 h at a time and one patient underwent continuous veno-venous haemodiafiltration. Fifty two (69.3%) patients survived. Out of the 21 patients who underwent RRT, there were 15 (71.4%) survivors. Mean duration of RRT was 7.9 $\pm$ 5.4 days. Mean APACHE II score of all patients was 20.3 $\pm$ 8.9. Eighteen patients (24%) required mechanical ventilation; the mean duration of mechanical ventilation in these patients was 6.7 $\pm$ 5.9 days. On multiple logistic regression analysis, increasing APACHE II score was related to increased mortality (odds ratio: 1.16, 95% confidence interval: 1.07 to 1.27 $p < 0.0005$). Increased severity of AKI by the RIFLE criteria was not associated with increased mortality (odds ratio: 0.86, 95% confidence interval: 0.42–1.76, $p = 0.68$).

CONCLUSION. AKI was common in our multidisciplinary intensive care unit, and carried a significant mortality. SLEDD was the most commonly employed modality of RRT. Increasing APACHE II score was related to increased mortality. However, worsening kidney injury by the RIFLE criteria did not predict increased mortality.

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0977

ACUTE KIDNEY INJURY (AKI) FOLLOWING CARDIAC SURGERY

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INTRODUCTION. Acute kidney injury (AKI) is a recognized complication of cardiac surgery. For this group the mortality range is 10–83% depending on the different series, using different criteria for diagnosis and classification of AKI. Mortality exceeds 50% when AKI is associated MODS or dialysis. The Acute Dialysis Quality Initiative (ADQI) proposed consensus-based classification criteria for AKI based of incremental changes in maximum serum creatinine or hourly urine output. The AKI classification is defined by the RIFLE acronym: Risk, Injury, Failure (severity stages), Loss and End-stage Kidney disease (prognostic stages). This study analyzed the incidence of AKI in a cohort of patients following cardiac surgery, the RIFLE categories, the association with mortality, length of stay and DRG-based costs.

METHODS. We have carried out a retrospective cohort study of 1552 patients undergoing cardiac surgery with cardiopulmonary bypass, admitted to our ICU in the period from 2000 to 2006. We analysed the incidence of AKI, in base of RIFLE classification, lenght of stay, mortality and associated costs. Patients with preoperative dialysis, cardiac surgery without cardiopulmonary bypass and the RIFLE categories loss and end-stage renal disease were excluded. The difference between the highest creatinine in ICU and baseline creatinine defined AKI ICU. We use score APACHE II to determine the severity. Cuantitative variables were studied with T Student, cualitative variables with Chi-square test and logistic regression for statistical significants results. Costs were calculated using DRGs.

RESULTS. We analyzed 1552 patients finding AKI at 20.1% of them (11.5% risk, 34.5% injury and 4.1% failure). The APACHE II score was higher in the patients with AKI. We are observed mortality of 10%, (3,8% in ICU and 6,2% hospital mortality). The mortality increased correlated with the severity of AKI determined by RIFLE stages just as the length of stay (LOS). Kaplan-Meier survival curves according to RIFLE classification were done.

TABLE 1 APACHE II, ICU/HOSPITAL LOS AND ICU/HOSPITAL MORTALITY ACCORDING TO AKI STAGE.

	N	APACHE II	ICU LOS (days)	HOSPITAL LOS (days)	ICU MORTALITY	HOSPITAL MORTALITY
NO AKI	1263 (79,9%)	10 (8–13)	1,67	26,60	15/1243 (1,2%)	34/1229 (2,8%)
AKI RISK	181 (11,5%)	15 (12–18)	3,51	34,31	10/171 (14.1%)	17/164 (10,4%)
AKI INJURY	72 (4,6%)	15 (12–18)	7,08	37,74	16/56 (28,6%)	21/51 (41,2%)
AKI FAILURE	64 (4,1%)	15 (12–18)	12,17	38,86	19/45 (42,2%)	24/40 (60%)

CONCLUSION. RIFLE classification identifies correctly AKI syndrome, including slight and moderate forms. This study showed a strong association of this three stages of AKI with mortality, length of stay and costs, that increases with the severity of RIFLE stage.

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0978

PROGNOSIS OF PATIENTS WITH SEVERE ACUTE KIDNEY INJURY IN ICU DEPENDS ON THE NUMBER AND TYPES OF ASSOCIATED ORGAN FAILURE

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INTRODUCTION. The outcome of patients with acute kidney injury (AKI) depends on several factors, including associated organ failure. The aim of our study was to evaluate whether the specific types of failed organ systems also affected prognosis.

METHODS. Retrospective analysis of The Riyadh Intensive Care Program database which contains demographic and daily physiologic and treatment data of 41,972 adult patients admitted to 22 ICUs in United Kingdom and Germany between 1989–1999. AKI was defined according to the AKI classification as proposed by the AKI network which distinguishes between 3 different grades of AKI.

RESULTS. 39.5% of patients had AKI (AKI I 19.3%, AKI II 6.7%, AKI III 13.5%). Associated organ failure (OF) was more common in patients with more severe AKI (Table 1). ICU mortality was higher in patients with more associated organ failure (Table 2).
Associated respiratory failure, alone or in combination, was the most common associated organ failure in patients with AKI (incidence 65%, ICU mortality 39.5%), followed by cardiovascular failure (incidence 43.2%, ICU mortality 48.6%). Associated liver failure occurred in only 4.3% patients with AKI but the associated ICU mortality was 73%. Associated neurological failure occurred in 13.6% of patients with an ICU mortality of 60.9%.

TABLE 1

Incidence of maximum associated OF	No AKI	AKI I	AKI II	AKI III
No OF	42.6%	19.7%	9.1%	7.5%
1 OF	39.7%	41.7%	38.7%	24.1%
2 OF	14.4%	28.7%	37.2%	37.3%
3 OF	2.7%	8.2%	11.7%	20.6%
>3 OF	0.5%	1.7%	3.2%	10.5%

TABLE 2

ICU mortality	No AKI	AKI I	AKI II	AKI III
No OF	1.7%	3.4%	2.9%	7.6%
1 OF	7.6%	11.6%	12.3%	27.1%
2 OF	26.5%	34.2%	31.3%	50.9%
3 OF	49.3%	53.7%	50.3%	67.3%
>3 OF	75%	71.6%	72.9%	86.1%

CONCLUSION. The number and specific types of organ failures are major modifiers of prognosis of patients with all the three degrees of AKI.

0979

ACUTE KIDNEY INJURY IN CRITICALLY ILL PATIENTS REDUCES THE HEPATIC METABOLISM OF DRUGS VIA THE CYTOCHROME P450 3A ENZYMES: A PILOT STUDY

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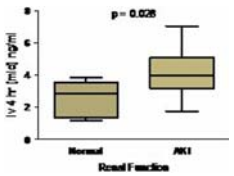
INTRODUCTION. The cytochrome P450 3A enzyme system (CYP3A) plays a significant role in drug metabolism. Studies suggest that chronic renal failure impairs hepatic CYP3A drug metabolism, an effect not reversed by haemodialysis. Midazolam may be used as an in-vivo probe of CYP3A activity. The impact of acute kidney injury (AKI) on hepatic drug metabolism is untested. This pilot study demonstrates an effect of AKI on midazolam metabolism in critically ill patients.

METHODS. Patients admitted to the adult intensive care unit were excluded if they had received a benzodiazepine in the previous 24 h, were diagnosed with acute or chronic hepatic failure, were pregnant or were receiving major CYP3A inhibitors. 1 mg midazolam (i.v.) was given time 0 and serum collected at 4 h. Serum midazolam concentration was determined by mass spectrometry (HPLC/MS/MS). AKI was defined by an acute change in the eGFR prior to entry into the study. The estimated glomerular filtration rate (eGFR) was determined using the modified diet in renal disease (MDRD) equation.

RESULTS. 16 patients (10 male). Age 75(53–87). Median APACHE 18. Patients were separated into two groups; normal renal function, (8 pts) or those with AKI. Median (IQR) 4 hr midazolam concentrations were 2.86 (1.5–3.5) ng/ml and 3.97 (3.18–5.07) ng/ml respectively and differed significantly (t-test) $p = 0.028$.



CONCLUSION. This pilot study suggests that in the critically ill patient, AKI causes a reduction in the metabolism of midazolam by the CYP3A enzymes. A bigger, more comprehensive study needs to take place to confirm these findings and also investigate the relative importance of AKI on CYP3A activity in critically ill patients.

0980

ICU: HOW TO EVALUATE THE RENAL FUNCTION IN THE CRITICAL SEPTIC PATIENT?

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INTRODUCTION. An estimate of Glomerular Filtration Rate (GFR) has not been validated in critical patient, and a "gold standard" method is not always available in the ICU. The aim of this study was to compare between 5 evaluation parameters of renal function in critical septic patients: Creatinine (Cr), Blood Urea Nitrogen (BUN), Cockroft-Gault (CG), 4-variable (MDRD) and 6-variable (MDRD2) "Modification of Diet in Renal Disease" formula.

METHODS. This study was carried out on 72 critical septic patients (P), 40% with septic shock (28P), 54 men (75%), average age 51 ± 21 yrs, average APACHE II and SAPS II of 16.3 and 59.6 respectively. Reference methods (RM) for comparison: 1 - Cr Clearance (CLcr); 2 - Average between CLcr and BUN clearance (CLcr_bun). Acute Renal Failure (ARF) defined as GFR < 60 ml/m/1.73m2. P with serum (s) Cr above 2 mg/dl on hospital admission were excluded.

RESULTS. Average GFR: 116.7, 107.1, 100.2, 90.1 and 80.6 ml/m/1.73m2 respectively to CLcr, CG, MDRD, MDRD2 and CLcr_bun. The sensibility to ARF diagnosis was 11, 33, 22 and 35% respectively to Cr(s), CG, MDRD, MDRD2, with RM 1 (CLcr); and 30, 40, 50 and 50% respectively with RM2 (CLcr_bun). Cr(s) specificity was 100%. The Cr and BUN amount in the 24-h urine in P with/without ARF was 67.5/161.7 g and 571.9/1468.5 g for CLcr ($p < 0.05$); 90.6/185.9 g and 955/1625.9 g for CLcr_bun ($p < 0.05$). Correlation (r) between BUNs, CG, MDRD, MDRD2 and CLcr was 0.42/0.45/0.32/0.38 and between those and CLcr_bun was 0.47/0.49/0.40/0.46. Correlation did not exist when GFR was above 90 ml/m/1.73 m2. To the 3 GFR estimate methods (CG, MDRD, MDRD2) Bland-Altman analysis showed a precision (standard deviation) of 53/57/55 ml/m/1.73m2 related to CLcr, and 40/42/47 ml/m/1.73m2 related to CLcr_bun; The mean difference (bias) ranged from −10 to −27 ml/m/1.73 m2 (CLcr) and from 9 to 26 ml/m/1.73 m2 (CLcr_bun); the Area Under the Curve to Crs, BUNs, CG, MDRD MDRD2 was 0.65/0.71/0.76/0.76/0.80 (CLcr) and 0.63/0.72/0.77/0.76/0.81 (CLcr_bun), respectively.

CONCLUSION. MDRD2 showed the best sensibility to ARF diagnosis (35–50%). The 3 GFR estimate methods (CG, MDRD, and MDRD2) are moderately correlated to 2 reference methods, namely the pairs CG/CLcr_bun and MDRD2/CLcr_bun. Bias, precision and agreement limits are far from ideal, but the performance seemed better with MDRD2 and CLcr_bun. Generally MDRD2 formula appears to be the best GFR estimate for critical septic P.

Poster Sessions
Management of cardiac failure: 0981–0990

0981

PRE-TREATMENT WITH TRANS-NASAL COOLING FOR THE INDUCTION OF THERAPEUTIC HYPOTHERMIA IN PATIENTS WITH CARDIAC ARREST LEADS TO A SIGNIFICANT FASTER ACHIEVEMENT OF TARGET TEMPERATURE DURING SYSTEMIC COOLING

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INTRODUCTION. In industrialized countries out-of-hospital sudden cardiac death (SCD) is a frequent cause of death and occurs in 375,000–500,000 citizens per year in Europe. Survival rates remain low, despite increasing efforts in intensive care. Clinical and experimental investigations have demonstrated improved neurological outcome following the treatment with therapeutic mild hypothermia after successful resuscitation. Following the publication of controlled studies, therapeutic hypothermia moved into the topical international guidelines. Time course, duration to achieve target temperature and control of temperature are important factors that influence patient's outcome. Recent investigations in animal models showed improved neurological short-term outcome after an accelerated cooling time. In the pre-hospital setting, immediate cooling is difficult to realize. For immediate induction of therapeutic hypothermia we tested a new trans-nasal cooling device after cardiac arrest and compared this new method with our standard cooling procedures.

METHODS. A total of 66 patients were examined after successful resuscitation. In 15 patients a new trans-nasal cooling device to induce therapeutic hypothermia was used. Retrospective data of 51 patients served as historic control group. After admission in the cath lab of the university hospital of Freiburg, initial temperature, course of temperature reduction and duration of cooling to achieve target temperature were documented. After admission to the ICU, both groups were immediately connected to an endovascular cooling device and were cooled to a target temperature of 33°C (bladder or rectal temperature).

RESULTS. The average temperature at admission did not differ in the historic control group compared to the trans-nasal cooling group (35.7 ± 0.8°C vs. 35.4 ± 1°C, p = n.s.). In the control group 41 patients (80%) were cooled in a combined method with an initial 4°C cold saline infusion followed by endovascular cooling. In 10 patients (20%) only endovascular cooling was performed. In patients first treated with cold saline be, target temperature could be reached significantly faster (−38%) than with endovascular cooling alone (125 ± 85 vs. 203 ± 84 min; p = 0.03). Pre-treatment with the trans-nasal device showed a cosimilar decrease of systemic temperature after the start of endovascular cooling (−32%) compared to the combined method (138 ± 96 vs. 125 ± 85 min; p = n.s.). In the group treated with trans-nasal cooling, target temperature in the brain, measured via tympanic temperature, was reached in 74 ± 44 min without any documented severe device-related adverse events.

CONCLUSION. Pre-treatment with trans-nasal cooling or cold saline infusion for the induction of therapeutic hypothermia in patients with cardiac arrest leads to a significantly faster achievement of target temperature during systemic cooling. The combined methods are feasible and offer the possibility for immediate introduction and realization of mild hypothermia in the field. Pre-hospital cooling could be beneficial for these critical ill patients, but definitive studies have not yet been completed.

GRANT ACKNOWLEDGEMENT. Industry sponsored trail.

0982

A COMPARISON OF FENOLDOPAM VS. SODIUM NITROPRUSSIDE FOR BLOOD PRESSURE CONTROL DURING SURGICAL EXCISION OF THE PHEOCHROMOCYTOMA

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INTRODUCTION. We compared the antihypertensive efficacy of Fenoldopam vs. Sodium Nitroprusside on opposing excessive release of catecholamines during surgical manipulation of the adrenal mass.

METHODS. We enrolled 18 patients (10 F and 8 M), mean age 64 ± 10 years, ASA II/III, undergoing unilateral adrenalectomy by laparoscopic. The patients were divided in a random into two groups : SNP GROUP (n = 9) and FNP GROUP (n = 9). SNP GROUP has raised intraoperative blood pressure and received a Sodium Nitroprusside infusion at 3 mcg/kg/min in increments of 0,15 mcg/kg/min as needed. The intraoperative rise of blood pressure in FNP GROUP was controlled by intravenous infusion of Fenoldopam at 0,2 mcg/kg/min. The Fenoldopam dose was rapidly increased to 0,4 mcg/kg/min and was stopped just before tumor excision. Monitoring consisted of a radial artery cannula for blood pressure control just before general anesthesia, at induction, at intubation, during tumor manipulation, after infusion of one of two therapeutic options and at the end of surgery. Side effects and perioperative urine output were evaluated. Renal blood flow, creatinine clearance and sodium excretion were measured postoperatively.

RESULTS. In both groups we observed maximum increase of MAP during surgical manipulation (+25% of baseline) . Reducing MAP after drug infusion was more fast in SNP GROUP. The SNP GROUP has shown metabolic acidosis and abnormal ventilation related thiocyanide toxicity . The FNP GROUP resulted devoid of side effects . Also diuresis was higher in FNP GROUP than SNP GROUP (100 ml/h vs. 80 ml/h in SNP GROUP). In the postoperative period renal blood flow and creatinine clearance were lower in SNP GROUP and were higher in FNP GROUP. The FNP GROUP has shown an increase in natriuresis.

CONCLUSION. The two antihypertensive agents are equivalent in controlling and maintaining intraoperative blood pressure. Sodium Nitroprusside is somewhat quicker, but Fenoldopam is much easier to titrate, has limited side effects (and no thiocyanide toxicity) and offers a very favourable renal protection in patients undergoing surgical excision of the pheochromocytoma.

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0983

OUTCOME OF POST-RESUSCITATION CARDIOGENIC SHOCK PATIENTS IS NOT IMPROVED BY LEVOSIMENDAN THERAPY

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INTRODUCTION. Calcium sensitizer levosimendan enhances myocardial contractility which could be advantageous in patients with myocardial ischemia requiring inotropic support. During three years 3852 patients with high risk acute coronary syndrome (ACS) underwent percutaneous coronary intervention (PCI) in our department. In 106 cases ACS was complicated with cardiogenic shock (mean age: 68.6 ± 1.2), moreover in 26 cases patients had to be resuscitated (CPR). Short and long term effects of levosimendan on cardiac functions and on survival of cardiogenic shock and post CPR patients were analyzed.

METHODS. Levosimendan was administrated in 39 of 106 cases as add-on therapy for patients with impaired left ventricular function, by extensive wall motion abnormality and by high blood cardiac enzyme concentration. Levosimendan therapy was started in most cases on the second or third day and applied 6 h long as continuous infusion (0.1 microg/kg/min).
The mean time spent in the primary cardiac care center (in hospital time) was 6.0 ± 0.4 days, and the whole follow-up was 204.6 ± 29.9 days long.

RESULTS. In the post CPR patient group there was no significant difference in survival according to levosimendan treatment during short term (36.5% vs. 40.0%, $p = 0.790$) and during long term follow-up (15.6% vs. 15.0%, $p = 0.754$). On the other hand, by not resuscitated patients survival rates were significantly higher in the levosimendan treated patient group during short term (84.4% vs. 57.9%, $p < 0.001$) and during long term (47.3% vs. 23.0%, $p < 0.001$) follow-up.
Time interval between the onset of myocardial infarction and PCI did not influence the effect of levosimendan on short and long term mortality.

CONCLUSION. In summary, levosimendan may improve cardiac function and decrease short term and even long term mortality in cardiogenic shock patients independently of time interval of myocardial infarction. This positive effect of levosimendan may be abolished by post CPR patients.

0984

PLATELET ADP RECEPTOR BLOCKING EFFECT OF HIGH DOSE CLOPIDOGREL IN PATIENTS WITH ACUTE CORONARY SYNDROME

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INTRODUCTION. A large degree of evidence suggests that a 300 mg loading dose of Clopidogrel may not be sufficient to inhibit platelet reactivity leading to a significant proportion of morbidity and mortality in patients with acute coronary syndrome. The aim of our study is to determine the effect of high dose clopidogrel(900 mg) on platelets ADP receptors compared to the conventional 300 mg dose.

METHODS. Thirty patients admitted with acute coronary syndrome were included in this study. Fifteen patients received 300 mg and 15 received 900 mg after admission. Routine clinical and laboratory evaluation was done. The degree of inhibition of ADP receptors was mwasured by platelet aggregometry after giving the loading dose by 12h, 24 h, 48 h, 3 days, 5 days and one week.

RESULTS. The 900 mg loading dose caused a greater inhibition of platelets ADP receptors at all time intervals as compared to the 300 mg dose ($P < 0.005$). It was associated as well with a lower incidence of cardiac complications and a better 30 day outcome than the 300 mg dose ($P < 0.005$). Patients who received the high loading dose showed a higher percent of ECG normalization compared with the lower dose group (76.6% vs. 33.3%) ($P < 0.005$).The high dose clopidogrel was associated with higher incidence of bleeding events; however they were minor and had no effect on the mortality and morbidity ($P < 0.005$).

CONCLUSION. The high loading dose of 900 mg clopidogrel causes a more significant inhibition of platelet aggregation than the conventional 300 mg dose. It is associated as well with lower cardiac complications and a better 30 day motality and morbidity in patients with acute coronary syndrome.

0985

FIBRINOLITIC THERAPY IN PULMONARY EMBOLISM. CLINICAL EXPERIENCE IN A GENERAL INTENSIVE CARE UNIT

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INTRODUCTION. Pulmonary embolism (PE) is the most serious complication of deep venous thrombosis (DVT) and presents a broad clinical spectrum which difficults diagnosis. In the last decade the aplication of new diagnostic tools, like computed tomography (CT), and the use of new therapies such as thrombolytic therapy (TT), have both changed the clinical management. The objective of our study was to analyse factors related with the severity of PE and identify those patients with PE who would benefit from TT.

METHODS. In a prospective and observational study from 2000 to 2008, we studied 78 patients ($n = 78$) with PE who were admitted in our general intensive care unit(ICU)(third level universitary hospital). Mean age was 55,6 ± 17 years; 44 were men; APACHEII 15 ± 2. Only 13% were surgery patients and 8% were trauma patients. At admission they had presented: 95% dispnea, 47% chest pain, 42% deep venous thrombosis signs and 34% syncope. 54% presented shock. Mean heart rate 108 ± 25 bpm, mean PaO2/FiO2 215 ± 9, mean pCO2 29 ± 15 mmHg, mean lactate 3,76 ± 3,3 mmol/L; D-dimer test > 1000 ug/L in 71%, positive troponin I (> 0,2 ug/L) 51%. EKG and torax X-ray showed classical PE signs in 60% and 30% respectively. Ecocardiography was practiced in 53% of patients with evidence of right ventricle failure in 70% of patients. CT was practiced in 70% of our patients (59% were reported as massive). Anticoagulation was initiated in 97% of our patients. 61,8% were on standard heparin and 38,2% were on low molecular heparin. TT was practiced on 43%. Sistemic TT 60% and 40% local TT. 42% required mecanical ventilation, 61% were on inotropic-vasopressor drugs. DVT was diagnosed in 52% and 16% of our patients required venous cava filter.

RESULTS. 28 day mortality rate was 27%. The most common complication was bleeding (17 episodies: 6 digestive, 4 lung, 2 brain, 1 hemorragic shock, and 4 others) but not statiscally significant relationship was found between bleeding and TT. Statistical analysis showed that the mortality predictor factors were metabolic acidosis pH < 7,31 ($p < 0,04$), leucocitosis > 15000x10.9/L ($p < 0,023$), renal dysfunction with creatinine > 160 umol/L ($p < 0,037$), and hypotension with mean arterial pressure < 65 mmHg ($p < 0,02$). TT improved outcome in massive PE (PE with hemodynamic inestability) but statiscal significance in mortality rate with TT ($p < 0,029$) was only found in patients with both clinical massive PE and massive radiologic PE confirmed by CT.

CONCLUSION. Patients with both massive clinical PE and massive radiologic PE (confirmed by CT) benefit from TT with statiscally significant higher survival rate. CT could play an important role on TT indication but further studies are needed to confirm our findings.

0986

PROGNISTIC ROLE OF PREOPERATIVE ECHOCARDIOGRAPHY IN PATIENTS WITH ISCHEMIC OR NON-ISCHEMIC DILATED CARDIOMYOPATHY UNDERGOING MITRAL VALVE SURGERY

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INTRODUCTION. Today mitral valve surgery (MVS) is considered a valid alternative surgical treatment for patients with ischemic or non-ischemic dilated cardiomyopathy because of shortage of donors which strongly limited heart transplantation. In this particular field, preoperative echocardiography plays an important role both in the scheduling of candidate and in the prognosis assessment. Our study was aimed to better depict this role.

METHODS. From January 1990 to October 2004, 195 patients were submitted to MVS by a single surgeon (AMC); 130 out of them were ischemic and 65 were non-ischemic. Average NYHA class at the admission was 3.3 ± 0.6. Left ventricle ejection fraction (EF), end-diastolic (EDV) and end-systolic volume (ESV), MR grade were 29 ± 5%, 135 ± 42 ml/m2, 88 ± 34 ml/m2 and 3.3 ± 0.7, respectively. Right ventricular function was assessed by means of tricuspid annular plane systolic excursion (TAPSE): 15.2 ± 5.1 mm. The outcome was defined as 5-year survival (1st month included). The follow up ended on February 2007 and was 100% completed.

RESULTS. MV repair was achieved in 154 (79%) cases whereas MV replacement in 41 (21%). Early Median follow up of survivors was 51 months (29–216). Forty-eight patients died during the follow up with a median follow up of 7.5 months; 12 out of them within the first postoperative period Five-year actuarial survival was 77.5 ± 4.5%. Cox analysis is reported in the table.

TABLE 1

Cox analysis	Survival HR - p
EF (%)	0.9–0.001
LVEDV (ml/m2)	1.1–0.035
LVESV (ml/m2)	1.1–0.026
TAPSE (mm)	0.7–0.001

EF = ejection fraction, LVEDV = left ventricular end-diastolic volume, LVESV = left ve

CONCLUSION. Both left and right ventricular function as well as left ventricular volume should accurately evaluated in preoperative assessment of patients with dilated cardiomyopathy undergoing mitral valve surgery. In case of more dilated ventricles with poorer LV function, the indication to MVS should be carefully evaluated. The right ventricular function has to be necessarily assessed in all cases.

GRANT ACKNOWLEDGEMENT. SIAARTI.

0987

A RANDOMISED CONTROLLED TRIAL OF LEVOSIMENDAN VERSUS ENOXIMONE IN CARDIOGENIC SHOCK: A PILOT STUDY

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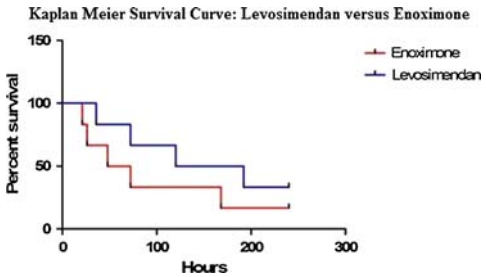
INTRODUCTION. Acute decompensated cardiogenic shock (ADCS) causes substantial morbidity and mortality. Levosimendan is a novel pharmacological agent that exerts positive inotropic effects in a calcium dependant manner independent of beta-adrenergic receptors. Despite a large volume of evidence in ADCS, no work has compared Levosimendan to Enoximone. [1]

METHODS. A double blind randomised pilot study was conducted in a mixed surgical/medical Critical Care Unit. Within 24 h of presenting in ADCS, patients were commenced on a 24 h infusion of levosimendan or enoximone. 12 patients were recruited, 6 per group. Cardiovascular parameters were measured at time 0, 30 mins, 1, 4, 6 and 24 h, along with baseline demographics and survival outcomes.

RESULTS. The groups were well matched for age, sex and illness severity. In each group, 5 patients completed the 24 h infusion, with 1 patient in each group withdrawn due to clinical deterioration suspected to be due to the trial drug. In both groups, the mean increase of Cardiac Index at 6 h was 37% (Enoximone) and 38% (Levosimendan).There were no significant differences between the groups for other cardiovascular parameters. Similarly, there were no survival differences (Fig 1).



CONCLUSION. Levosimendan could be considered as an alternative to standard pharmacological agents in ADCS. It appears to be as well tolerated as Enoximone.

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0988

PRIOR HISTORY OF HEART FAILURE IS A STRONGER PROGNOSTIC MARKER THAN CARDIAC TROPONINS IN AN INTENSIVE CARE UNIT SETTING

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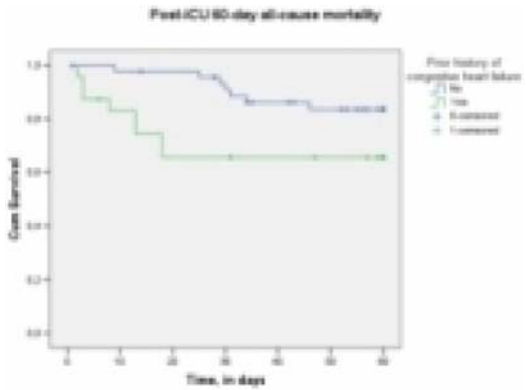
INTRODUCTION. Heart failure (HF) is associated with worse outcomes in intensive coronary care units, as high troponin I (TNI) levels. We sought to analyze the impact of prior HF and TNI elevation in patients admitted in a medical intensive care unit (ICU).

METHODS. A total of 111 consecutively patients admitted in a single medical ICU were studied. We excluded all admissions primarily due to decompensated HF. Two groups were formed: A – with prior HF history; B – no HF history. A 60-day follow-up was conducted and Kaplan-Meier analysis performed.

RESULTS. Group A patients were significantly older (71.2 years vs. 55.2 years, $p < 0.001$) and had higher Acute Physiology and Chronic Health Evaluation (APACHE II) scores (18.0 vs. 15.4, $p = 0.083$). There was also more frequently prior history of chronic obstructive lung disease (odds-ratio (OR) 6.4, $p = 0.001$), stroke (OR 3.6, $p = 0.041$), hypertension (OR 4.4, $p = 0.001$), diabetes (3.7, $p = 0.038$) and atrial fibrillation (OR 9.9, $p < 0.001$). Regarding admission laboratory parameters, group A patients had higher BNP (849.8 vs. 286.9 ng/mL, $p = 0.020$), platelet count (266.1 vs. 201.8, $p = 0.044$), glycemia (154.9 vs. 121.1 mg/dL, $p = 0.02$), kalemia (4.2 vs. 3.8 mmol/l, $p = 0.012$) and lower PO2 (73.2 vs. 106.5 mmHg, $p = 0.0$) under mechanical ventilation. There was a trend towards admission TNI being also higher on these patients (1.90 vs. 0.73 ng/mL, $p = 0.230$), but did not predict in-hospital or post-discharge survival. On admission echocardiography, group A patients had larger left atria (48.4 vs. 36.7 mm, $p = 0.01$) and lower left ventricular ejection fraction (34.1 vs. 43.4%, $p = 0.01$). No differences were found regarding in-hospital mortality (25.0% vs. 26.8%, $p = 0.845$), but after discharge, group A patients had a significantly higher 30-day mortality (33.3% vs. 8.5%, Log-Rank $p = 0.040$).



CONCLUSION. Although none of our study patients was admitted with a formal diagnosis of decompensated HF, among critically ill patients, prior HF history (but not TNI elevation) was a strong determinant of post-discharge mortality. As one-third of these patients died during the first month, special care should be given to this population, especially shortly after discharge.

0989

MULTICENTRE RANDOMIZED CONTROL TRIAL OF A COMPUTERIZED CIRCULATORY GUIDANCE SYSTEM IN POST OPERATIVE CARDIAC SURGICAL PATIENTS: NAV-1 STUDY

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INTRODUCTION. Navigator is an innovative, computerized circulatory guidance system to aid delivery of targeted CO and MAP. It is based on three fundamental determinants of circulatory variables which guide therapeutic interventions: volume state, heart performance, and resistance(ref) . The study's primary objective was to measure the impact of Navigator on the attainment and maintenance of physician determined MAP and CO targets.

METHODS. This prospective, open, controlled study was conducted in post cardiac surgery patients receiving 1:1 nursing care, in seven Australian tertiary ICUs. Following admission to the ICU, patients were randomized by centralized telephone system to receive either: clinical guidance using Navigator or standard hemodynamic care. Patients remained connected to Navigator until CO monitoring was ceased by the medical team. CO was measured continuously (Edwards, Vigilance PAC) in both groups. The Navigator system provided guidance to staff for patients in the treatment arm in the intervention period but not the control group. The primary endpoint of the study was a measure of the difference between the targeted values and the actual values for CO and MAP averaged over the study period – the Average Standardized Distance (ASD). The lower the ASD, the better the therapeutic control.

RESULTS. 112 patients were randomized. Primary outcome data was available for 105 patients (57 Nav; 48 Control). The mean ASD for the treatment group was 1.73 and the control group 1.95, an improvement in control in the treatment group of 11.5% (95% CI − 4.5% to +27.5%, $p = 0.157$). The lowest ASD recorded in the total population was 0.89. The treatment effect was stronger in the early period of monitoring: ASD for the first 15 h was 1.65 in the treatment arm and 1.93 in the control arm, an improvement of 14.3% ($p = 0.064$) and was significant when adjusted for differences between centers 16.3% ($p = 0.049$). In the first 15 h, the proportion of time CO and MAP readings were in the target range was 39.5% in the treatment arm and 32.5% in the control arm (improvement: 21.5%, $p = 0.064$). SOFA scores, atrial fibrillation, and serious adverse event rates were not different between the groups. There were no device failures. There was one death (treatment arm).

CONCLUSION. We have demonstrated in a multi-centre post-operative cardiac patient group that continuous automatic therapeutic guidance is possible and Navigator-guided hemodynamic control is the same or better than standard care, with post hoc evidence of superiority. Navigator-guided hemodynamic control was safe.

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0990

HEMODYNAMIC INSTABILITY ACCOMPANYING PULMONARY ENDARTERECTOMY FOR CHRONIC THROMBOEMBOLIC PULMONARY HYPERTENSION IS ASSOCIATED WITH HIGHER ARTERIAL CONCENTRATIONS OF INTERLEUKIN-6 AND INTERLEUKIN-8

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INTRODUCTION. Pulmonary endarterectomy (PEA) is an effective treatment for chronic thromboembolic pulmonary hypertension (CTEPH). The perioperative course is frequently complicated by profound systemic vasodilatation that is sometimes resistant to vasopressor therapy. The present study tested the hypothesis that systemic inflammatory response, as determined by circulating cytokine levels, may contribute to the difficulty of controlling arterial blood pressure after PEA.

METHODS. The prospective cohort study on 36 patients with CTEPH (22 males and 14 females, mean age being 56.5 ± 11.9 year.). Their mean pulmonary artery pressure was 58 mm Hg. All the tested patients underwent PEA using cardiopulmonary bypass (CPB) and deep hypothermic circulatory arrest (DHCA). Plasma concentrations of tumor necrosis factor-\alpha (TNF\alpha), interleukin (IL)-1\beta, IL-6 and IL-8 were measured repeatedly in arterial blood samples drawn before operation, after sternotomy, after the last DHCA, after separation from CPB, and 12, 18, 24, 36 and 48 h after the end of surgery. Inflammatory parameters were compared with the vasopressor support and hemodynamic parameters - mean pulmonary arterial pressure (mPAP), mean pressure in the main pulmonary artery, cardiac index (CI), ejection fraction, and pulmonary vascular resistance (PVR).

RESULTS. TNF\alpha, IL-1\beta, IL-6 and IL-8 increased after PEA and reached a maximum within 0–12 h after the end of surgery. After PEA operation, there was a considerable improvement of hemodynamic parameters including mPAP, CI and PVR. There was a significant correlation between norepinephrine support and IL-6 plasma concentrations at the end of surgery ($k = 0.742$) and 12 h after the end of surgery ($k = 0{,}801$) as well as between norepinephrine support and IL-8 concentrations 12 h after the end of surgery ($k = 0{,}782$). Patients requiring dobutamine support postoperatively considering the low CI revealed significantly higher maximum arterial levels of IL-6 and IL-8.

CONCLUSION. Hemodynamic instability after PEA has been associated with higher postoperative plasma concentrations of IL-6 and IL-8. Positive correlation between inflammatory cytokines and vasopressor support is in conformity with a thesis that cytokine activation may be among neurohumoral factors responsible for the systemic vasoplegia in CTEPH patients after undergoing PEA.

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Poster Sessions
Severe infections II: 0991–1001

0991

INCREMENTAL POWER OF PROCALCITONIN FOR THE EARLY DIAGNOSIS OF INFECTIVE ENDOCARDITIS

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INTRODUCTION. Infective endocarditis (IE) causes problems in the diagnosis because of its variable clinical presence. Procalcitonin (PCT) is a new marker of severe infection. The aim of our study was to evaluate the usefulness of serum PCT to diagnose patients (pts) with IE.

METHODS. We conducted a prospective study in 38 patients admitted to our hospital with the suspicion of IE. IE was confirmed in 18 pts based on the Duke criteria. 20pts with bacteremia (non-IE) and 20 healthy controls were studied PCT levels were measured on the day of admission.

RESULTS. Procalcitonin was significantly higher in pts with IE (7,62 ng/ml) than in those with other final diagnoses (0,62 ng/ml) $p < 0,001$.
The median values of PCT were higher in cases with IE and non-IE related to gram negative bacteria than those related to gram positive ($P < 0,04$). Using ROC curve the optimum concentration of PCT for the calculation of positive and negative predictive accuracy was 3 ng/ml. With this cut off, the sensitivity of PCT was 78%.
Its specificity 92%.
Its negative predictive value 95%
Its positive predictive value 75%
The sensitivity of PCT in comparison to C-Reactive Protein was found to be lower (78% vs. 88%) but its specificity was determined to be higher (92% vs. 72%.

CONCLUSION. Procalcitonin may be a valuable diagnostic marker for infective endocarditis, in addition to the major criteria for its high specificity and negative predictive value.

0992

GUIDELINE FOR HAND HYGIENE: CLEAN HANDS ARE SAFER

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INTRODUCTION. Infections related with sanitary attention in developed countries affect about 5–10% of hospitalized patients. These infections acquired in hospitals increase the morbility of the illness itself. When it comes to critical patients, at least 25% acquire one or more of these infections. There is a substancial evidence that hand-washing reduces the incidence of health care-associated infections and hygiene is a basic action for ensuring patient safety, is the best method to prevent the transference of microorganisms between staff and patients, and also between patients to patients in hospitals. This effectiviness of reducing the dispersion of microorganisms depends on three fundamental factors: 1. The occasion,2. The product used,3. The hand-washing tecknique. The main problem of hand hygiene does not depend on obtaining good products.

METHODS. During 2006, we formed a multidisciplinary team composed of a doctor, a nurse and an intensive care auxiliary nurse. We reviewed bibliography and CDC recommendations. After that, we elaborated a guideline for hand hygiene, in which we described different types of hand-washing, different handrubs, glove use and the presentation of alcohol-based handrubs to improve hand disinfection.During this period we observed that personnel didn't comply with the guidelines. Before training personnel, we did an observational, prospective and descriptive study during two months at the intensive care unit. We evaluated hand-washing in all staff in contact with patients. Afterwards we compared it to results after theoretic and practical training. We first trained our intensive care unit and then the other departaments. The theoretic training consisted of a video recorded by ourselves at the intensive care unit, which contained concepts about hand hygiene, handrubs and glove use. After that we divided the class into groups and practiced with them the different types of hand hygiene and use of alcohol-based handrubs, correct procedures were evaluated by use of an ultraviolet lamp. All participants received written guidelines and tip sheet, after training, we installed dispensers for hand hygiene and we continuously remind the staff to wash their hands in hospital and health centers in our area.

RESULTS. We did a second evaluation in our unit six months after the training. Results showed a 35% hand hygiene adherence, if there was a big improvement immediately after the training, it slowly disappeared.Due to this, we have decide to do frequent refreshment training.

CONCLUSION. If we want to improve, it is necesary frequent refreshment training.
Our situation is similar to other hospitals.

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0993

EICOSANOIDS AS RISK AND PROGNOSTIC FACTORS FOR ACUTE RESPIRATORY DISTRESS SYDROME IN SEPSIS PATIENTS

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INTRODUCTION. Although a number of studies have reported elevated level of eicosanoids in acute lung injury with sepsis, the possibility that eicosanoids may act as risk and prognostic factors for sepsis patients who develop acute respiratory distress syndrome(ARDS) remains poorly studied. To clarify this aspect, we measured the levels of eicosanoids and used logistic regression analyses and receiver operating characteristic(ROC) curves to investigate whether eicosanoids could act as risk and prognostic factors for sepsis patients who develop ARDS.

METHODS. We conducted a case–control study comparing 13 sepsis patients with ARDS and 23 sepsis patients without ARDS. The plasma levels of leukotriene B4 (LTB4), 6-keto-prostaglandin F1α(6-keto-PGF1α) and thromboxane B2(TXB2) were measured by radioimmunoassays as substitutes for the plasma levels of PGI2 and TXA2, which are unstable.

RESULTS. The levels of eicosanoids in sepsis patients with ARDS were significantly higher than those in sepsis patients without ARDS. Logistic regression analyses revealed that LTB4 was the only risk factor for sepsis patients with ARDS (odds ratio, 1.10; $P = 0.02$). The area under the ROC curve values for all eicosanoids were significantly greater than 0.5 ($P < 0.001$), and the likelihood value for the TXB2 levels was higher than those of the other eicosanoids.

CONCLUSION. We conclude that LTB4 may be an important risk factor for sepsis patients with ARDS, while TXA2 may be an important prognostic factor for sepsis patients with ARDS.

0994

POST BURN ITCH

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INTRODUCTION. Burn injury, whether limited or widespread, frequently leads to long-lasting physical, aesthetic, functional, psychological, and social consequences. One of these is the problem of post burn itch. This would have been as old as the burn itself however it was first focused in 1988 when, Gordon wrote "Burn-related pruritus is a serious problem that often receives little attention, even though it continues to aggravate burn patients during their rehabilitation1. At the same time; Bell, et al., added, "No succinctly defined method of treatment for post burn itch is found in the literature2. Still we know very little about the exact mechanism of post burn itch that can be attributed to the complex nature of the injured skin and the nerves of the skin3-,9, but it must also be emphasized that very little research have so far been done on this subject.

METHODS. A total of 80 patients were included in the study, and equally divided into 2 groups. Group A received oral antihistamines with topical Ibuprofen while Group B received olive oil massage followed by wearing of compressive garments. The demographic data and initial assessment of the severity of itch on linear descriptive scale was made by the research team; while subsequent data for the entire study period was obtained by the attending burn clinician who was blind to the allocated regimen. Results were analyzed using computer statistical software SPSS®.

RESULTS. Group A included 40 patients with 23 males and 17 females having mean age of 28.13 (SD $\pm$ 13.03) and mean body surface area affected 15.387% (SD $\pm$ 5.408) and mean itch scale of 5.500 (SD $\pm$ 2.219). Group B comprised of 40 patients with 21 males & 19 females with a mean age of 29.38 (SD $\pm$ 14.35) with mean affected body surface area of 16.150% (SD $\pm$ 5.555) and mean itch scale of 5.350 (SD $\pm$ 1.762). The main outcome measure was the improvement in burn itch. The results after 12 weeks of treatment for both groups showed a remarkable improvement in Group B when compared to Group A (p-value 0.000 and 0.365, respectively).

CONCLUSION. The non-pharmacological measures are superior to the pharmacologic measure with respect to their clinical efficacy and their improvement shows highly significant after 4 weeks of treatment.

0995

INFECTIONS IN A SURGICAL INTENSIVE CARE UNIT OF A UNIVERSITY HOSPITAL IN GREECE

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INTRODUCTION. Our aim was the evaluation of clinical and microbiological features of patients developing ICU-acquired infection in our Surgical Intensive Care Unit (SICU) and the identification of predictors of infection acquisition and infection-related mortality.

METHODS. Prospective study of all patients hospitalized in our SICU from 2002 to 2004. Patients with ICU-acquired infection were compared with those without infection to identify predisposing factors for infection. Comparison between patients with infection that survived and those that died was performed to identify predictive factors of mortality. Only variables occurring before infection were analyzed as possible risk factors for infection while all variables were used for infection-associated mortality.

RESULTS. Among 683 consecutive patients, 123 (18%) developed 241 infections (48.3 infections/1000 patient-days). Mean age of these patients was 66.7 ± 3.8 years, APACHE II score on SICU admission 18.2 ± 2.4, and SOFA score on the day of infection 8.8 ± 2 (women: 51.2%). Infections were: bloodstream (36.1%), ventilator associated pneumonia (VAP: 25.3%; 20.3/1000 ventilator-days), surgical site (18.7%), central venous catheter (10.4%; 7.1/1000 central venous catheter-days), and urinary tract infection (9.5%; 4.6/1000 urinary catheter-days). Most common organisms were: Acinetobacter baumannii (20.3%), Pseudomonas aeruginosa (15.7%), Candida albicans (13.2%), Enterococcus faecalis (10.4%), Klebsiella pneumoniae (9.2%), Enterococcus faecium (7.9%), and Staphylococcus aureus (6.7%). High resistance to the majority of antibiotics was identified. Complication and mortality rate was 58.5% and 39%, respectively. Multivariate analysis identified APACHE II ($p = 0.01$, OR: 4.63, 95% CI: 2.685–5.261), acute peritonitis as the underlying hospital admission diagnosis ($p = 0.03$, OR: 1.85, 95% CI: 1.029–3.253), acute pancreatitis ($p = 0.02$, OR: 2.27, 95% CI: 1.046–3.753), aminoglycoside use before infection ($p = 0.03$, OR: 2.84, 95% CI: 1.061–5.137), and mechanical ventilation ($p = 0.01$, OR: 3.26, 95% CI: 2.427–6.148) as predictors for infection development. Moreover, age ($p = 0.03$, OR: 1.16, 95% CI: 1.014–1.328), APACHE II on SICU admission ($p = 0.02$, OR: 2.53, 95% CI: 1.768–3.412), SOFA score on infection day ($p = 0.02$, OR: 2.88, 95% CI: 1.849–4.017), and VAP ($p = 0.03$, OR: 1.32, 95% CI: 1.037–1.849) were identified as predictors of infection-associated mortality.

CONCLUSION. Infections are an important problem in SICUs due to high rate, multi-resistance, morbidity, and mortality. Recognition of clinical and microbiological features of these patients and identification of the risk factors for infection development and infection-related mortality are essential for prevention and treatment.

0996

IS C-REACTIVE PROTEIN A GOOD PROGNOSTIC MARKER IN SEPTIC PATIENTS?

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INTRODUCTION. Sepsis, in particular nosocomial sepsis, is an increasingly common cause of morbidity and mortality, particularly among critically ill patients. The speed and appropriateness of therapy administered in the initial h after severe sepsis develops is likely to influence the outcome. Several circulating bioactive molecules have been proposed as useful markers of the presence, severity and clinical course of sepsis. Many studies have shown that C-Reactive Protein (CRP) is a good marker of infection, however there are some controversies about its use as a prognostic marker in sepsis. The aim of this study was to evaluate CRP as prognostic marker of sepsis.

METHODS. During a 14 month period, we prospectively included all the patients admitted to an Intensive Care Unit who were ≥ 18 years old and stayed for at least 48 h ($N = 260$). Patients were categorised for sepsis according to the ACCP/SCCM Consensus Conference criteria. Acute Physiology and Chronic Health Evaluation II (APACHE II), Simplified Acute Physiology Score II (SAPS II) and sequential organ failure assessment (SOFA) scores, CRP, white cell count (WCC) and body temperature were determined. Data of the day of sepsis diagnosis was entered in the analysis. A subgroup of patients with documented sepsis was analyzed.

RESULTS. One hundred and fifty eight consecutive patients (mean age 59 years, 98 men, ICU mortality 34 %) were studied. The area under the curves (AUC) of the receiver operating characteristics curves of APACHE II, SAPS II, SOFA, CRP, WCC and body temperature as prognostic markers were 0.75 (95% confidence interval (CI): 0.666–0.833), 0.821 (95% CI: 0.748–0.893), 0.8 (95% CI: 0.723–0.876), 0.55 (95% CI: 0.454–0.647), 0.456 (95% CI: 0.352–0.561), 0.482 (95% CI: 0.382–0.583), respectively. The AUC of SAPS II was significantly higher than the other studied variables ($p < 0.05$) with the exception of SOFA. The mortality rate of septic patients with CRP < 10, 10–20, 20–30, 30–40 and > 40 mg/dl was 20%, 34%, 30.8%, 42.3% and 39.1%, respectively ($p = 0.703$). In the subgroup of patients with documented sepsis ($N = 76$) there were also no differences between survivors and nonsurvivors in what regards CRP levels, WBC, temperature and APACHE II score. Only the SAPS and SOFA score were significantly higher in nonsurvivors.

CONCLUSION. Our results demonstrate that despite CRP being a sensitive marker of sepsis, it poorly predicts the outcome in terms of survival. The complexity of sepsis requires new perspectives to allow an integrated understanding of the intricate interactions occurring during the disease process. Future studies of biomarkers in sepsis involving larger patient population are needed.

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ISOLATION OF ACINETOBACTER SPECIES IN CRITICALLY ILL PATIENTS

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INTRODUCTION. Acinetobacter spp are frequently the etiologic agent of nosocomial infections. An infection caused by this bacterium is more common in patients with severe underlying diseases, and after multiple courses of antibiotic treatment.

METHODS. A 2-year retrospective observational study conducted in the open ICU of a tertiary care hospital at Mumbai, India. Patients admitted to the intensive care unit for more than 2 weeks and developing signs of systemic infection were subjected to tracheal secretion, blood and other relevant cultures. Patients whose cultures were positive for acinetobacter species were included in the study. The incidence of isolation at different sites, risk factors and mortality were assessed from the data.

RESULTS. From Feb 2006 to Jan 2008, Acinetobacter spp. was isolated from different sites in 123 critically ill patients. The mean incidence of isolation was 17/1000 admissions.
The incidence of isolation was highest in tracheal secretion (73.98%). 13% of cultures were positive from the blood while, as 17.07% of cultures were positive from multiple sites. The main risk factors for isolation of acinetobecter were malignancy (32.5%) and neurological diseases requiring prolonged ventilation (17.88%). Crude mortality was 40%.

TABLE 1 SITES OF ISOLATION OF ACINETOBACTER SPECIES

Site of isolation	No. of patients	Percentage
Tracheal Secretion	91	73.98
Blood	16	13
Indwelling Catheters	16	13
Swabs	11	8.94
BAL	03	2.4
CSF	02	1.6
Multiple sites	21	17.07

TABLE 2 RISK FACTORS ASSOCIATED WITH ACINETOBACTER

Risk Factors	No. of patients	Percentage
Malignancy	40	32.5
Neurological disorders requiring prolonged mechanical ventilation	22	17.88
End-stage renal disease (ESRD)	10	8.13
GI sepsis/Pancreatitis	10	8.13
Chronic Liver Disease (CLD)	05	4.06
Others	36	29.26

CONCLUSION. Acinteobacter is a common nosocomial cause of infection in critically ill patients admitted to Intensive Care Unit of our hospital. The main underlying risk factor is immuno-suppression due to various causes as well as prolonged ventilation. If not promptly recognized and adequately treatment, mortality remains high.

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PNEUMONIA DOES NOT AFFECT MORTALITY IN PATIENTS WITH TRAUMATIC BRAIN INJURY (TBI)

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INTRODUCTION. Pneumonia is an important cause of ITU morbidity and mortality, mainly after TBI. Recognized patients with TBI and pneumonia makes possible premature interventions at ITU. Aim: To determine factors that influence mortality in patients who are affected by TBI and pneumonia.

METHODS. We did a retrospective research study and thirty critical ill patients admitted to the ITU with severe TBI diagnosis. Investigated risk factors included age, APACHE II score, SOFA score, antibiotic used, adequate antimicrobial therapy (defined based on bacterial susceptibility from microbiologic information), CPIS > 6 after 72 days of treatment, PaO2/FIO2, microorganisms isolated from throat swabs at admission (Any aerobic Gram-negative bacilli concentration, E coli, and MRSA. MSSA and C albicans > 10(5) cfu/ml), and microorganisms grew from endotracheal aspirates when pneumonia was suspected on clinical grounds (new chest X-ray infiltrate, together with at less two of the following: fever; leukocytosis and purulent tracheal secretion). Microbiological confirmation of pneumonia was defined by in endotracheal aspirates > 10(5) cfu/ml. Statistics analysis of data (mean and standard deviation, ± 2) were performed, chi2 and independent t test were used. SPSS 10 was used and $p < 0,05$ was statistically significant.

RESULTS. Death was the outcome variable that was studied. Of 30 patients, Their average age was 43 ± 17.2 y. APACHE II score 17.6 ± 6.7, SOFA score 8.7 ± 1.9, ITU days stay 10.4 + 7.4, days on mechanical ventilation 8.4 ± 6.3, Glasgow score 6.27 ± 1.5, PaO2/FIO2 268 + 60, initial CPIS 5.92 ± 1.9. The overall mortality rate was 40%. S. Viridans were isolated on 30%, Klebsiella P 13.3% and MSSA 13.3% on the group of samples taken from throat. Moreover, S. Viridans were isolated on 16.6%, Klebsiella P 16.6% and MSSA 40%. On samples taken from endotracheal aspirates (EA). Patients were empirically treated with Ceftriaxone-Clindamicin 50%, and without any antibiotic 50%. Statistics analysis showed that APACHE II score, Glasgow score, and ITU stay were significantly different on the group of death.

TABLE 1 MORTALITY RISK FACTORS DIFFERENCES BETWEEN GROUPS)

Variable	Death/Yes	Death/Not	p
Antibiotic used (%)	66.7	33.3	0.003
Non Antibiotic used (%)	15.4	84.6	0.016
Adequate antimicrobial therapy (%)	52.6	47.4	0.063
CPIS >6 (%)	25	75	0.38
S Viridans from throat (%)	44.4	55.6	0.74
S Viridans from EA (%)	60	40	0.31
MSSA from EA (%)	41.7	58.3	0.87
SOFA	9	8.5	0.45
APACHE II	21.1	14.9	0.006
Glasgow	5.42	6.83	0.010

CONCLUSION. This finding provides better knowledge of the pathophysiology of pneumonia in patients under TBI. Lung infections and inadequate treatment with antibiotic were not risk of death. Results demonstrated a significant dominance of variables affected by trauma such us acute changes on APACHE II, and causes of low Glasgow. Therefore, the effort should be focus on low GCS prevention before ER.

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0999

THE IMPACT OF BLEEDING RISKS INCLUDING THROMBOCYTOPENIA AND COAGULATION ABNORMALITIES OF A PROACTIVE BOWEL MANAGEMENT SYSTEM

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INTRODUCTION. We have recently shown that a proactive bowel management with aid of the Zassi/Hollister Bowel Management System (BMS) represents an economical and clinically advantageous practice for the fecal management of burn patients unable to effectively defecate independently or with assistance (1). A question that has been queried often, but not definitely answered is whether or not patients with bleeding complications, including platelet and coagulation abnormalities, could have bleeding diathesis potentially associated with a proactive BMS on insertion and while it remains in place? We undertook a retrospective subanalysis of complicated burn/wound intensive care (ICU) patients who had a proactive BMS in place. Based on anecdotal evidence from our larger study population and ongoing data bases, we believed that the incidence would be predictably low (Null Hypothesis).

METHODS. A retrospective analysis of our previous population of patients evaluated with a proactive BMS, all with complicated burns/wounds, were included in the initial evaluation. Sixty-nine patients met the criteria to be included in the study. Their records were queried for coagulation and thrombocytopenia abnormalities at BMS insertion and all subsequent events while the apparatus was in place, until removal. If gastrointestinal (GI) complications were documented, they were reviewed extensively for association with the proactive BMS.

RESULTS. Sixty-nine patients, 48 males, 21 females, mean age 50.8 years (range 19–87), with a mean TBSA of 30.5% (range 0–80) and a mean length of stay of 47.5 days (7–208) were evaluated. Thrombocytopenia was documented either at insertion or while the BMS was in place a mean of 10.7d (range 0–46d). Prothrombin (PT), Partial Thromboplastin (PTT) and/or Fibrinogen was abnormal during insertion or while the BMS was dwelling for a mean of 13.7d (range 0–113). Sixty-three patients (92.7%) at high risk for bleeding problems did not experience any bleeding or GI complications. Five patients (7.3%) had documented GI abnormalities; however, only one (1.4%) could be directly related to the BMS. This patient had a simple rectal ulceration, topically treated, with rapid resolution.

CONCLUSION. The Zassi/Hollister proactive bowel management system has previously been proven to be cost-effective and provide overall reduction in infectious complications and breakdown in complicated burns. The current findings reveal that the placement of this proactive BMS in complicated ICU patients is safe, even in the setting of continued risks of bleeding due to coagulation and/or thrombocytopenia abnormalities. The implications of this data are far-reaching and would suggest that other patient populations at risk for multi-organ dysfunction could safely undergo proactive BMS placement. Future research should include these and other groups of patients in larger, multicenter evaluations, in the hope that we can continue to improve the already monumental task of nursing care for burns and other critically ill patients.

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IMPACT OF LABORATORY ABNORMALITIES ON OUTCOMES OF COMMUNITY ACQUIRED BACTEREMIA ADMITTED TO THE ICU

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INTRODUCTION. Laboratory abnormalities are frequent, but non-specific, during sepsis. Several papers have emphasized on the impact of some biomarkers on the outcomes of infected patients. The study was designed to investigate the potential role of abnormal laboratory findings on the prognosis of adult patients admitted to ICU with the diagnosis of community acquired bacteremia.

METHODS. The study included 49 patients admitted to the ICU during a four-years period. Retrospective chart review recorded admission's value of platelets and WBC numbers, pH, CO2 arterial pressure, bicarbonates, cratinin, ASAT, ALAT, glucose and proteins serum levels. For each of the criteria studied, the mortality rate was assessed and compared to the overall mortality.

RESULTS. The overall mortality rate was 34.7% in this study. Thrombocytopenia (< 150 000/mm3), increased creatinin (> 150 µmol/L) and ASAT (> 80 IU/L) serum level, hypoprotidemia (< 60 g/L), leucocytosis (> 12 000/mm3) and acidemia (pH < 7.36) are the most common abnormalities. These were found in 36, 24, 19, 21, 18 and 18 patients respectively. However, bicarbonates serum level under 15 mmol/L was found only in 7 patients. ASAT serum level over 120 IU/L was found in eight patients. The mortality rates for each of these abnormalities were: thrombocytopenia (63.8%), increased creatinin (37.5%), ALAT (62.5%) and ASAT (52.6%) serum level, hypoprotidemia (47.6%) leucocytosis (66.7%) and acidemia (44%).

CONCLUSION. Abnormal laboratory findings are frequent during community acquired bacteremia. Thrombocytopenia, leucocytosis and elevated ALAT serum levels at admission were associated with higher mortality rates in adult patients with community acquired bacteremia. Acute renal injury did not impact the prognosis of our patients.

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NOSOCOMIAL INFECTION IN PATIENTS WITH EXTERNAL VENTRICULAR DERIVATION SYSTEM

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INTRODUCTION. To know the ICU' population that need external ventricular device (EVD), the incidence of EVD and the infection rate (IR).

METHODS. Prospective study performed through out 3 months per year during 2 consecutive years (2006 and 2007) using the methodology and database of the ENVIN-HELICS study. The characteristics of patients with EVD are analysed. IR are shown per 100 patients and per 1000 days of ICU' stay. In addition to the infections usually monitored, there were several of them specifically studied: VAP (ventilator associated pneumonia, urine infection related to urinary catheter (UC), and primary and vascular catheter related bacteremia (PB +CB).

RESULTS. 424 (1,75%) out of 24.137 evaluated patients had a EVD. Mean age: 55 years. APACHE II score: 18,1 (7,0). The cause for admission (the primary illness on admission) was (%): coronary 1,5; medical 60; elective surgery 29,4 and trauma 8,9. Immune system alterations: 10,8%. Extrinsic risk factors: mechanical ventilation (MV) 82,7 %:, central venous catheter (CVC): 95,9%. UC: 97,1%. Total parenteral nutrition (TPN): 11,2%. Emergency surgery: 28,6%. Antibiotics prescribed before admission: 25,2%, and into the ICU: 76,1%. IR related with EVD, mean ICU stay and mortality are shown in table. In addition to the 270 device related infections, another 178 infections were reported related to other focus, including 68 of the CNS (104 infections x 100 pts). Infections caused sepsis in 53,7%, severe sepsis in 21,4% and septic shock in 4%. The micro organisms involved were: GP 27,5%, BGN 79,4%, fungi 21,5%. Colonization-infection was reported in 4,7% by MRSA, in 8,5% by Acinetobacter, in 5,2% by P aeruginosa, and in 3,3% of the patients by BLEE.

TABLE 1

	ICU-Acq Inf % pat	ID $^{0</S}$	VAP % pt	UTI % pat	PB+CRB %pat	LOS days	Mortality %
ALL	14,2	19,6	6,1	14,1	3,8	7,5	10
EVD	63,1	36	31,3	16,9	12,5	17,6	27,5

CONCLUSION. Patients with EVD were less than 2% of the total admissions in the ICU. They were younger than the average, with predominance of the medical aetiology. They had long stay, high instrumentation and high nosocomial IR.

GRANT ACKNOWLEDGEMENT. Aventis.

Poster Sessions
Microcirculation and prognosis: 1002–1015

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NEAR-INFRARED SPECTROSCOPY MICROCIRCULATION ASSESSMENT IN SEPTIC PATIENTS: A PILOT STUDY

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INTRODUCTION. Microcirculatory derangements drive to situations of dysoxia and to acute organ dysfunction in critical ill patients. The development of new techniques to determine tissue oxygenation, such as the near-infrared spectroscopy (NIRS) is a non invasive way to infer the grade of alteration in microcirculation. Our hypothesis is to determine whether NIRS technique allows to recognize alterations in the muscular tissue saturation of oxygen (StO2) in the critical care patients. Our objective is to determine the utility of NIRS in the evaluation of StO2 in critical care settings.

METHODS. Observational, prospective and controlled study conducted in a twenty-two bed, university hospital Intensive Care Unit (ICU). Reference values were obtained from StO2 measurements by NIRS in healthy volunteers in the forearm zone. These measurements were compared with those obtained in critical patients. Basal measurements at admission in ICU and during the first 48 h were obtained, as well as conventional hemodynamic indexes. Mortality was considered as the main outcome. Continuous variables are expressed as mean ± sd. Student's t-test was used to compare data. Statistical significance was defined as $p < 0.05$.

RESULTS. Reference values were obtained from 20 healthy volunteers. Nine patients with sepsis or septic shock were included to the study. Significant differences between healthy volunteers and critical ill patients were observed in forearm StO2 determinations (68.79 ± 4.27 vs. 51.67 ± 13.30, $p < 0.001$). Almost 70% of the patients included died. Comparing survivors vs. non-survivors, significant differences were observed in StO2 baseline at admission (65.6 ± 11.3 vs. 44.6 ± 7.4, $p = 0.01$) and in the following determinations obtained (12 h 67.3 ± 3.8 vs. 51 ± 8.9, $p = 0.02$; 24 h 67 ± 3 vs. 52.3 ± 9.3, $p = 0.03$ and 48 h 64 ± 5.6 vs. 49.8 ± 5.4, $p = 0.02$). No differences were observed in hemodynamic data. Pulmonary artery catheter showed no differences except for systemic vascular resistance index (SVRI) at 24 h of admission (1814.6 ± 418.6 vs. 1242.3 ± 214, $p = 0.02$). Major doses of norepinephrine were used in non-survivors patients (24 h 0.12 ± 0.21 vs. 0.86 ± 0.50, $p = 0.05$). Differences were observed in base deficit (24 h 2.3 ± 4.46 vs. 10.9 ± 2.06, $p < 0.01$) and arterial pH (24 h 7.39 ± 0.05 vs. 7.23 ± 0.10, $p = 0.04$).

CONCLUSION. Early StO2 determination by NIRS in the forearm region is a predictor of outcome, outperforming conventional hemodynamic data.

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THENAR OXYGEN SATURATION MEASURED BY NEAR-INFRARED SPECTROSCOPY: A MORTALITY PREDICTOR IN SEPTIC PATIENTS

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INTRODUCTION. Tissue hypoperfusion, defined as elevated lactate and/or low central venous oxygen saturation (ScvO2), is associated with increased mortality in septic patients, also in those patients presenting without hypotension. Inclusion of these markers of tissue oxygenation in resuscitation algorithms has improved patients outcome (1). These measurements require repeated blood withdrawal and/or central venous catheter placement. A rapid and non-invasive measure of tissue oxygenation would be useful. Near-infrared spectroscopy (NIRS) allows the measurement of tissue oxygen saturation (StO2) at skeletal muscle. In a previous study, our group demonstrated a good correlation between StO2 and ScvO2 in patients with severe sepsis and septic shock with normalized blood pressure (BP), and found that StO2 values below 75% predict low ScvO2 with high specificity (2). The objective of the present study was to analyze whether StO2 below 75% is useful as mortality predictor in patients with severe sepsis or septic shock with normalized BP.

METHODS. Prospective observational study. Patients admitted to the ICU in the early phase of severe sepsis and septic shock, after normalization of blood pressure with fluids and/or vasoactive drugs. We recorded demographic data, severity score (SAPS III), hemodynamic data, hemoglobin (Hb), blood lactate, as well as ScvO2 and StO2 measured simultaneously on inclusion. Mann-Whitney test was used to compare groups on categorical variables, and Fisher's exact test for continuous variables.

RESULTS. 41 patients were included. No differences in age, SAPS III, Hb, mean arterial pressure and lactate were found between survivors and non-survivors. Non-survivors showed lower StO2 and ScvO2 values than survivors, but they did not reach statistical significance (p 0.06). When analyzing a StO2 cut-off value of 75%, there were statistical differences between survivors and non-survivors (p 0.013; Table 1). A StO2 value below 75% predicts mortality with a sensitivity of 0.53, and a specificity of 0.93.

TABLE 1

StO2	survivors	non-survivors
>75%	21 (51%)	8 (20%)
<75%	3 (7%)	9 (22%)

CONCLUSION. In patients with severe sepsis and septic shock with restored BP values, StO2 < 75% is associated with increased mortality. Thus, StO2 can be used as a rapid, non-invasive measure of severity in septic patients. Future studies may clarify the role of StO2 as an endpoint for resuscitation in severe sepsis and septic shock.

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EFFECTS OF ACTIVATED PROTEIN C ON MICROCIRCULATION ASSESSED BY NEAR INFRARED SPECTROSCOPY

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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. Activated protein C (APC) is an anti-thrombotic and anti-inflammatory agent used as an adjuvant therapy of patients with septic shock. One previous study showed an improved sublingual microperfusion with APC (1).

OBJECTIVE. To examine if APC was able to affect microcirculation assessed by NIRS parameters in septic shock patients.

METHODS. We included 11 patients with septic shock and at least two organs failures considered for administration of APC and 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.
Mean arterial pressure (MAP), cardiac index (CI), central venous oxygen saturation ($ScvO_2$), dose of norepinephrine (NE) and StO_2 measurements were performed before and 4 h after starting APC infusion (24 µg/kg/h). We also collected MAP, StO_2 and StO_2 re-ascension slope in 15 healthy volunteers.

RESULTS. In healthy volunteers the MAP was 89 mmHg (68–101), StO_2 was 82% (75–90) and re-ascension slope was 2.29%/s (1.46–3.36).
APC increased StO_2 from 77 (65–90) to 82% (67–92) ($p < 0.05$) and the re-ascension slope from 1.5 (0.62–3.35) to 1.9 %/s (0.84–3.00) ($p < 0.05$). APC decreased the NE dose from 2.5 (0.5–9.5) to 2 mg/h (0.5–8.0) ($p < 0.05$). The other studied parameters were not changed by APC: PAM from 80 (73–87) to 86 mmHg (71–111), CI from 3.2 (1.0–5.3) to 3.0 L/min/m^2 (1.3–5.3) and $ScvO_2$ from 72 (50–81) to 70% (55–81).

CONCLUSION. In septic shock patients with at least two organs failures, the APC infusion resulted in an increase in StO_2 and in the StO_2 re-ascension slope (4 h after starting the infusion) despite the absence of any change in CI and MAP. This suggests a proper effect of APC on the thenar muscle microcirculation.

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REFLECTANCE SPECTROPHOTOMETRY: A NOVEL DIAGNOSTIC APPROACH TO ASSESS INTESTINAL MUCOSAL OXYGENATION IN PATIENTS WITH MESENTERIC ISCHEMIA

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INTRODUCTION. Definitive diagnosis of mesenteric ischemia usually requires invasive testing, e.g., splanchnic angiography. However, angiographic findings frequently are not conclusive and do not correlate with clinical symptoms. The aim of the study was to evaluate the potential of reflectance spectrophotometry to assess non-invasively oxygenation in splanchnic mucosa (µHbO2) for the detection of clinical important mesenteric ischemia.

METHODS. Five patients presenting with hitherto unexplained abdominal pain and/or weight loss were enrolled consecutively in a pilot study. µHbO2 was assessed in the upper gastrointestinal (GIT) tract to diagnose and grade mesenteric ischemia preoperatively, as well as during and after revascularization; the values were compared to clinical, angiographic and endoscopic findings.

RESULTS. In 4 patients µHbO2 was $\leq 60\%$ at least in some parts of the GIT before revascularization and increased to values $> 60\%$ after surgical therapy. These results correlated well with the disappearance of clinical symptoms of mesenteric ischemia. The 5th patients did not undergo revascularization because he presented with clinically not clear cut findings and showed only in 1 of 5 measuring sites µHbO2 $< 60\%$.

CONCLUSION. We suggest that µHbO2 values $> 60\%$ probably represent the cut-off point of physiologic µHbO2 as values below this range were associated with clinical symptoms of mesenteric ischemia. Moreover, µHbO2 values but not endoscopic findings correlated with clinical signs of mesenteric ischemia. We suggest that reflectance spectrophotometry has the potential to serve as an appropriate additional assessment tool for diagnosing and grading intestinal ischemia, and may be useful to identify the indication of surgical revascularization.

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MICROCIRCULATORY ALTERATIONS IN SUBLINGUAL AND INTESTINAL MUCOSA DURING HYPEROXIA IN PIGS

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INTRODUCTION. Pathophysiological effects of hyperoxia such as breath depression, acute hyperoxic lung injury, atelectasis induction or cardiac output decrease have been investigated in details many times. Effect of normobaric hyperoxia on intestinal microcirculation was intensively investigated last years with some evidence of positive effects on micovascular flow index (MFI) and functional capillary density (FCD) especially in model of I/R injury (1). The goal of this study was to evaluate changes in FCD and MFI of sublingual and ileal mucosa induced by short-term hyperoxia and to compare changes in FCD of sublingual and intestinal microcirculation revealed by Sidestream dark-field imaging (SDF).

METHODS. Microcirculatory network of sublingual mucosa and of terminal ileum was visualized via an ileostomy by SDF imaging in 8 anesthetized pigs. Four sequences of microcirculatory status from sublingual and intestinal mucosa were recorded on-line at baseline conditions, after surgical preparation and stabilization (FiO2 0,40), immediately after preceeding 15 min hyperoxia (FiO2 1,0) and 60 minutes after the end of hyperoxia(hyperoxia group, $n = 4$). The same measurements were performed in control group, $n = 4$, with constant FiO2 0,40 throughout the study. Macrohemodynamic values were recorded continuously, microcirculatory parameters were analyzed off-line.

RESULTS. No difference has been detected between the groups at the baseline. There was statistically significant increase ($p < 0{,}001$) of FCD and MFI in the ileal mucosa after 15 minutes of hyperoxia in contrast to sublingual area where significant decrease in FCD was observed and MFI remained unchanged ($p < 0.01$). These changes were not observed in control group. Thus, no correlation between FCD values from sublingual and ileal mucosa was detected in terms of hyperoxia. Microcirculatory effects of hyperoxia were still significant 60 minutes after the hyperoxia was finished.

CONCLUSION. We have demonstrated positive effect of short-term hyperoxia with 100% oxygen on intestinal microcirculation in healthy anesthetized mechanically ventilated pigs. These findings correspond with previous studies assuming redistribution of cardiac output into the splanchnic region and attenuation of inflammatory pathways with maintainig microcirculation patent. Positive effect of supplemental oxygen on tissue oxygen tension in healthy and anastomotic colon was described previously, this effect was not reached using aditional krystalloid fluid. Trends and values obtained from ileal mucosa does not correspond with those obtained from sublingual mucosa, where decrease in FCD is propably due to oxygen induced vasoconstriction.

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MICROVASCULAR DYSFUNCTION IN TRAUMA HEMORRHAGIC SHOCK: ASSESSMENT WITH NEAR INFRARED SPECTROSCOPY DURING OCCLUSION TESTS

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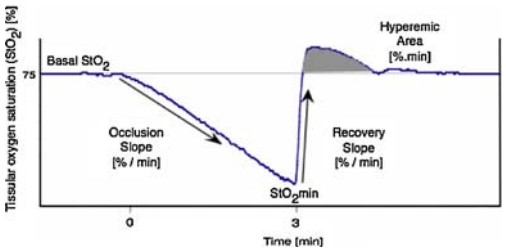
INTRODUCTION. The aim of this study was to assess microvascular dysfunction in trauma hemorrhagic shock (HS) patients by recording near-infrared spectroscopy (NIRS) signal during arterial occlusion tests.

METHODS. After approval from our local IRB, trauma patients with HS were included in this prospective study. As soon as hemodynamic stabilization was obtained, NIRS-derived StO2 signals (InSpectra®, Hutchinson, USA) were recorded on the thenar eminence during 3 min brachial artery occlusion (Figure). The same trial was applied in ten healthy volunteers. Demographic, hemodynamic data, SAPSII and ISS scores were gathered. Data are median [IQR] are were analyzed with Mann-Whitney and Spearman tests.

RESULTS. Nineteen HS patients aged 32 [23–56], SAPS II : 43 [32–63], ISS : 34 [24–44] were included after hemodynamic stabilization : MAP : 75 [62–78] mmHg.
NIRS-derived values neither correlated with hemodynamic data nor with clinical scores. Occlusion and recovery slopes differed between HS patients and volunteers (Table 1).

TABLE 1 NIRS-DERIVED STO2 VALUES DURING OCCLUSION TESTS IN HEMORRHAGIC SHOCK AND VOLUNTEERS

	Hemorrhagic shock n = 19	Healthy volunteers n = 10	P value
Basal StO2, %	80 [71–84]	81 [77–85]	NS
Occlusion slope, %/min	7 [7–10]	11 [10–12]	0.039
StO2 min, %	45 [38–56]	47 [38–50]	NS
Recovery slope, %/min	79 [54–142]	208 [204–219]	0.0003
Hyperemic area, %.min	15 [9–21]	16 [11–21]	NS



CONCLUSION. Reduced occlusion and recovery slopes in trauma HS patients compared to healthy volunteers may reflect reduced oxygen consumption and impaired capillary recruitment respectively. Further patients are needed to confirm those results and study the time frame of this microvascular dysfunction.

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CONSEQUENCES OF HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY ON SYSTEMIC AND TISSUE PERFUSION (THENAR EMINENCE): DURING GENERAL ANAESTHESIA ASSOCIATED OR NOT WITH THORACIC EPIDURAL ANAESTHESIA

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INTRODUCTION. Hyperthermic intraperitoneal chemotherapy (HIPEC), associated with cytoreductive surgery is the only therapy prolonging survival for patients with peritoneal carcinomatosis. Objective: To evaluate the impact of transient acute hyperthermia on systemic hemodynamic and micro-oxygenation of thenar eminence under general anaesthesia (GA) alone or associated with thoracic epidural anaesthesia (TEA).

METHODS. 20 patients (nov 2006-dec 2007), ASA1 or 2, 9F/11 M, 53 y.o. (20–68), with peritoneal carcinomatosis. GA alone (n = 13) or associated to TEA (n = 7, T8-T9, ropivacaïne 2 mg/ml + sufentanyl 0. 5mcg/ml) settled before induction. Monitoring included: invasive blood pressure (BP, radial artery), BIS (30–40, Astect Medical System®), oesophageal temperature (Tyco Healthcare®), continuous central SvO2 measurement (Edwards Lifesciences®), cardiac output (CO, Doppler TE, Doptek®). Muscle haemoglobin saturation measurements (StO2, thenar eminence, non blocking area) by NIRS (Hutchinson®) and during occlusion test. Timing of measurements: viscerolysis, chemohyperthermia (HIPEC, oxaliplatin, 30 min, 42°C), end of the procedure. Statistics: non parametric tests.

RESULTS. Procedure duration: 11 h (7–14) with a large fluid loading (15.5 ml/kg/h, range 7.1–28) with crystalloids (1/3 0.9% saline, 2/3 ringer lactate), comparable in both anaesthesia techniques. 3 patients required norepinephrine infusion. Hyperthermia: 1) under GA, BP, CO, ScvO2 or StO2 did not change;2) under GA + TEA, pre-hyperthermia CO tended to be higher than in GA (median TEA = 8.0 vs. GA = 6.6 L/min, p = 0.08); TEA modified the response to hyperthermia with PB decrease ($p < 0.05$) without change in CO (intense vasodilatation) but with more reflex tachycardia (80 to 98 b/min, $p < 0.05$). This sympathetic stimulation targeted the area unblocked by TEA (thenar eminence). The decrease of StO2 during arterial occlusion with TEA (median −0.30 to −0.45 %/sec, $p < 0.05$) versus GA (−0.37 to −0.41 %/sec, NS) was faster (oxygen demand). The StO2 reperfusion slope (vascular reserve)did not differ between GA and TEA. In the TEA group, the more rapid was the drop of occlusion slope (rapid ischemia), the more rapid the reperfusion slope (vascular recruitment) (regression R = 0.67, Spearman test p = 0.04).

CONCLUSION. Before hyperthermia, TEA + GA induced hyperkinetic syndrome. Only in TEA + GA, hyperthermia induced a large vasodilatation that mainly concerns the unblocked area, as suggested by the remarkable rapid ischemia during arterial occlusion, which determined the vascular recruitment during reperfusion. The benefit of TEA associated with GA compared to GA alone remains to be demonstrated in postoperative period especially for inflammatory parameters.

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MILD LACTIC ACIDOSIS AND HYPERCHLORAEMIC ACIDOSIS DURING THE SECOND 24 HOURS OF CRITICAL CARE ARE BOTH ASSOCIATED WITH INCREASED MORTALITY

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INTRODUCTION. Lactic Acidosis[1] and decreased lactate clearance in early critical care[2] have been demonstrated to be prognostic of increased mortality from critical illness. Fluid resuscitation that aims to avoid lactic acidosis may create a hyperchloraemic metabolic acidosis but its impact on outcome is controversial[3].

METHODS. This is a cohort analysis of a prospectively collected observational database on all-comers to a single mixed ICU. We evaluated the prognostic value (on ICU mortality) of the maximum chloride (Cl) and maximum lactate levels in the 2nd 24 hrs of their stay.

RESULTS. 1760 of the 2847 consecutive patients admitted over a four year period (Oct 2002- Oct 2006) had blood lactate and acid-base profile measured and recorded on day two. When the worst lactate recorded in the second 24 h is just ≥ 2 there is an increased risk of ICU death (vs. < 2: RR 2.82, 95% CI 2.37–3.86). Furthermore poor lactate clearance within the first 24 h of treatment is an indicator of adverse outcome (Day 1 minimum lactate ≥ 2 vs. < 2: Mortality 46.63 vs. 19.77%, OR 3.53, 95% CI 2.56 – 4.85). Any chloride level > 115 on day 2 indicates an increased risk of death (vs. Cl < 115: RR 1.8, 95% CI 1.52–2.13). Although there was no correlation between peak day 2 [Cl] and lactate (r = 0.09), as a confounder, there was a 0.5 higher mean lactate in the high Cl group (2.47 vs. 1.98, 95% CI 0.3 – 0.7).

TABLE 1 DAY 2 PEAK LACTATE (MMOL/L)

	< 2 (n = 1091)	≥ 2 (n = 669)	OR[a]/Mean difference[b] (95% CI)
ICU Mortality	13.93%	39.31%	[a]4 (3.16–5.04)
Lactate (mean) mmol/l	1.1	3.79	[b]2.69 (2.53–2.89)
Base deficit (mean)	1.8	4.8	[b]3 (2.47–3.53)
Age (mean) years	63	63.8	

TABLE 2 DAY 2 PEAK CHLORIDE (MMOL/L)

	< 115 (n = 1142)	≥ 115 (n = 561)	OR[a]/Mean Difference[b] (95% CI)
ICU Mortality	18.74%	33.69%	[a]2.2 (1.75–2.77)
Chloride (mean)	109.3	119.1	[b]10.2 (9.8–10.6)
Base Deficit (mean)	1.7	6.3	[b]4.9 (4.37–5.43)
Albumin (mean) g/l	24	18	[b]6 (5.3–6.7)
Peak Sodium (mean) mmol/l	139	144	[b]5 (4.5–5.49)

CONCLUSION. An apparently mild peak lactate of just ≥ 2 at any point in the second twenty four h of stay confers a profound survival implication. Also failure to clear serum lactate to below 2 in the first 24 h, and (albeit for some confounders) a maximal day 2 [Cl] of ≥ 115 are associated with a significant increase in mortality. Therefore, a mild lactic acidosis and hyperchloraemic acidosis in the second twenty four h are both prognostic indicators of mortality in critically ill patients.

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1010

DOES RED BLOOD CELL TRANSFUSION IMPROVE TISSUE OXYGENATION IN CRITICALLY ILL PATIENTS?

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INTRODUCTION. Red blood cell (RBC) transfusions are commonly used in critically ill patients. A number of factors that can determine oxygen availability to the cells may not be reliably assessed from global hemodynamic measures. Near infrared spectroscopy (NIRS) has been proposed to assess tissue metabolism and oxygenation. We proposed to study the effect of RBC transfusion on muscle tissue metabolism and oxygenation using the NIRS in hemodynamically stable critically ill patients.

METHODS. Hemodynamically stable ICU patients with anemia requiring RBC transfusions were included. Thenar muscle oxygenation (StO2) and tissue hemoglobin index (THI) were continuously measured using NIRS (InSpectraTM Model 325, Hutchinson Technology Inc, Hutchinson, MN) before, during and after upper limb ischemia induced by a rapid pneumatic cuff inflation around the upper arm. The rate of StO2 desaturation during the arterial occlusion (desaturation rate; %/min) and the StO2 reperfusion rate immediately after the arterial occlusion (reperfusion rate; %/sec) were calculated. These different NIRS variables were collected before and after RBC transfusion.

RESULTS. We studied 11 septic (3 with and 8 without shock) and 20 non-septic (12 patients after major surgery and 8 medical patients). RBC transfusion increased hemoglobin concentrations in both groups. The NIRS variables were comparable in both groups before and after transfusions.

TABLE 1

	Septic patients Before	Septic patients After	Non-septic patients Before	Non-septic patients After
StO2 (%)	86 ± 9	85 ± 9	83 ± 10	86 ± 8
THI	15 ± 5	14 ± 5	14 ± 3	13 ± 3
Desaturation rate (%/min)	−23 ± 14	−28 ± 25	−19 ± 9,4	−22 ± 8
Reperfusion rate (%/sec)	3,5 ± 2,1	3,0 ± 2,6	3,0 ± 1,6	3,4 ± 1,6
Hemoglobin (g/dl)	7,3 ± 0,9	8,1 ± 1,5	7,2 ± 0,6	8,2 ± 0,7

CONCLUSION. RBC transfusion does not influence muscle metabolism and oxygenation in hemodynamically stable anemic critically ill patients.

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POSTOPERATIVE SUBLINGUAL MICROCIRCULATION IS SPECIFICALLY IMPAIRED IN PATIENTS UNDERGOING ESOPHAGECTOMY BUT CAN BE RESTORED WITH DOBUTAMINE

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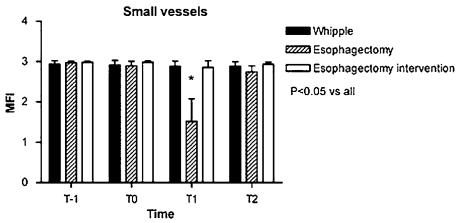
INTRODUCTION. Esophagectomy with gastric tube reconstruction is the surgical treatment for patients with esophageal cancer and is associated with high morbidity and mortality rates. Complications of these operations are leakage and stenosis of the distal anastomosis, which may be due to compromised local microvascular blood flow. We have shown that the sublingual microvascular perfusion is impaired on the first day after esophagectomy and therefore the aim of this study was to determine if this impairment also occured after Whipple pancreas resection, and if these changes could be prevented with dobutamine.

METHODS. We included a total of 30 patients in this study. We randomized the 20 esophagectomy patients over 2 groups: an intervention and a control group. The intervention group received dobutamine 2–3 mcg/kg/min directly postoperative until the second day after surgery whereas the control group did not. On the day before surgery (T-1), the day of surgery (T0), and two days after surgery (T1, T2) hemodynamic data were collected and the sublingual microcirculation was analyzed using a Sidestream dark-field (SDF) imager. Similar measurements were performed in 10 patients undergoing a Whipple pancreas resection. SDF data was analyzed according to the semi-quantitative analysis described by Boerma et al.1 and expressed as Microvascular Flow Index (MFI).

RESULTS. The results are presented in the figure.



CONCLUSION. Sublingual microvascular perfusion is significantly reduced on the first day following esophagectomy, whereas not after Whipple pancreas resection, and the administration of dobutamine prevented this decrease.

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QUANTIFICATION OF SUBLINGUAL MICROCIRCULATORY ALTERATIONS

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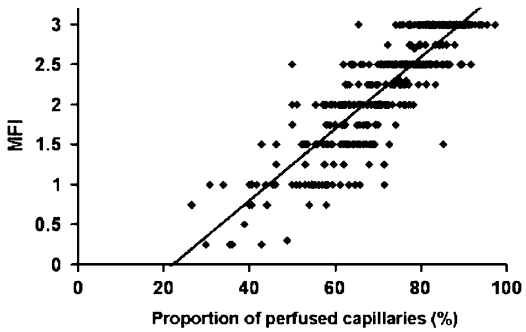
INTRODUCTION. Microvascular alterations can be visualized at the bedside but quantification remains challenging. In the sublingual region, two semi-quantitative scores are used: Proportion of perfused vessels and the Mean Flow Index (MFI). We compared the scores in patients with severe sepsis.

METHODS. Using Sidestream Dark-Field imaging (Microvision Medical, Amsterdam, Netherlands) we evaluated the sublingual microcirculation in 43 patients with severe sepsis. At each evaluation, 5 sequences of 20 s each were recorded. An investigator blinded to the patient's clinical course and sequence order calculated the scores for each image, focusing on vessels less than 20 μm in diameter. Perfused vessel density was calculated as the proportion of perfused vessels crossing 3 vertical and 3 horizontal lines. For the MFI score, the image was divided into 4 quadrants and the predominant flow type in each quadrant assessed (0 = absent, 1 = intermittent, 2 = sluggish, 3 = normal); the values of these 4 quadrants were then averaged. Linear regression was used to evaluate the relationship between the scores.

RESULTS. We evaluated 490 video sequences. Globally there was good correlation between the scores (MFI = 0.0447 x – 0.974; $R^2 = 0.75$, $p < 0.001$)(Figure 1). However, there was great variability, as an MFI of 3 (normal) was associated with perfusion ranging from 70 (markedly abnormal) to 98% (normal).



CONCLUSION. Although related, the 2 scores are not equivalent. Measuring the proportion of perfused vessels allows a more precise evaluation of the microcirculation.

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THE PROGNOSTIC VALUE OF SUBLINGUAL PCO2 IN PATIENTS WITH SEVERE SEPSIS

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INTRODUCTION. Effective resuscitation is considered as a critical component of sepsis management. Despite adequate resuscitation, microcirculatory alterations may persist and be associated with a poorer outcome. Sublingual capnometry has been proposed to track microcirculatory alterations. We tested the hypothesis that sublingual PCO2 (PslCO2) can remain elevated following resuscitation in some patients and that this is associated with a worse outcome.

METHODS. We included 30 patients admitted in the ICU with early severe sepsis treated according to the Surviving Sepsis Campaign guidelines. Central venous oxygen saturation (ScvO2) and PslCO2 were simultaneously measured every hour, during the first 6 h of resuscitation. PslCO2 was measured using a microelectrode CO2 sensor (Capnoprobe SL Model 2000 Sensor, Optical Sensor Inc, MN, USA). PslCO2gap was calculated as the difference between PslCO2 and arterial PCO2. ScvO2 was measured in blood samples drawn from a central venous catheter.

RESULTS. Of the 30 patients, (APACHE score: 23 ± 7), 15 had signs of shock. Mortality rate was 43% (13/30). There was no difference between survivors and non-survivors in the use of vasopressors (8/17 vs. 7/13) and the amount of fluids during the first 6 h of resuscitation (3.0 ± 1.2 L vs. 3.1 ± 1.1 L). The time course of ScvO2 was similar in survivors and non-survivors, but the time course of PslCO2gap differed (*ANOVA: $p < 0.005$): PslCO2gap decreased over time in survivors but not in non-survivors (Table; data are presented as median and interquartile ranges).

TABLE 1

	Baseline	2 hrs	4hrs	6 hrs
ScvO2 (%) Survivors	68 (58–75)	72 (60–75)	70 (68–77)	72 (68 – 78)
ScvO2 (%) Non-survivors	64 (57–70)	66 (59–71)	70 (65–72)	72 (67–74)
PslCO2gap (mmHg); Survivors	18 (13–20)	12 (10–17)*	10 (5–12)*	10 (7–15)*
PslCO2gap (mmHg); Non-survivors	24 (17–36)	27 (21–32)	22 (16–31)	20 (16–33)

CONCLUSION. Despite seemingly adequate early resuscitation, the persistence of high PslCO2gap is associated with a worse outcome. Sublingual capnometry could be used to identify and further resuscitate patients with persistent microcirculatory alterations.

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TISSUE OXYGEN TENSIONS IN A RODENT MODEL OF CONTROLLED HAEMORRHAGE AND RESUSCITATION

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INTRODUCTION. High flow, high concentration oxygen therapy is given ubiquitously as part of the standard ABC resuscitation strategy in shocked patients. However, we recently reported that hyperoxia during uncontrolled haemorrhage was detrimental compared with normoxia, causing reduced blood flow and increased hyperlactataemia (1). We sought to determine haemodynamics and tissue oxygen tension (an index of the local O_2 supply/demand balance) in various organ beds in a rodent model of controlled haemorrhage followed by resuscitation in either room air (21% O_2) or 100% O_2.

METHODS. Under isoflurane anaesthesia, male Wistar rats underwent left common carotid and right jugular venous cannulation for blood sampling/BP monitoring and fluid/blood administration, respectively. Ultrasonic flow probes measured blood flow in the descending aorta. Tissue PO_2 (tPO_2) was determined using Oxylite probes (Oxford Optronix, UK) placed in thigh muscle, liver, renal cortex and within the bladder lumen. After 30 mins stabilisation, rats were subjected to a 30 ml/kg haemorrhage (40% estimated circulatory volume). After a 30 minute period of shock, shed blood was re-infused ± hyperoxia (100% O_2).

RESULTS. Data shown as mean (± SE). n = 4/group, $^{*}p < 0.05$ comparing normoxia and hyperoxia, $^{\#}p < 0.05$ compared to baseline. B = baseline, S = shock, R = resuscitation. Statistics were performed using a RM two-way ANOVA and post-hoc Tukey's test.

Group	MAP (mmHg)	Global DO2 (l/min)	Muscle tPO2 (kPa)	Bladder tPO2 (kPa)	Liver tPO2 (kPa)	Kidney tPO2 (kPa)	Lactate (mmol/l)
21% O_2:B	89 (3)	6.0 (1.2)	4.6 (0.3)	8.6 (0.3)	2.7 (1.0)	1.7 (0.4)	1.4 (0.2)
21% O_2:S	49 (4)$^{\#}$	1.9 (0.6)$^{\#}$	3.6 (0.4)$^{\#}$	7.3 (1.4)	0.1 (0.1)$^{\#}$	1.3 (0.4)	6.4 (0.4)$^{\#}$
21% O_2:R	102 (4)$^{\#}$	5.4 (0.2)	5.4 (0.2)	9.5 (1.0)	3.3 (1.1)	2.9 (0.7)	2.1 (0.2)
100% O_2:B	91 (3)	5.5 (0.7)	5.6 (1.7)	8.3 (0.6)	2.4 (0.8)	1.1 (0.2)	1.4 (0.0)
100% O_2:S	50 (3)$^{\#}$	1.8 (0.3)$^{\#}$	2.9 (0.1))$^{\#}$	6.5 (1.8)	0.0 (0.0)$^{\#}$	0.9 (0.3)	7.5 (0.5)$^{\#}$
100% O_2:R	121 (6)$^{*\#}$	3.7 (0.4)$^{*\#}$	14.9 (1.7)$^{*\#}$	26.7 (0.0)$^{*\#}$	6.9 (0.9)$^{*\#}$	11.5 (3.9)$^{*\#}$	2.2 (0.5)

CONCLUSION. Controlled haemorrhage caused variable decreases in tPO_2 responses across the organ beds measured, with liver the most severely affected. Resuscitation with 100% O_2 had a profound vasoconstrictor effect resulting in decreased global oxygen delivery. While this did not appear to compromise tissue oxygenation or lactate levels in this short-term model, the utility of high flow, high concentration O_2 as a beneficial therapeutic intervention during haemorrhagic shock is questionable.

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

1015

EFFECTS OF HYPOXIC HYPOXIA AND SYSTEMIC HYPOPERFUSION ON EX VIVO SPLANCHNIC VASCULAR REACTIVITY

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INTRODUCTION. Low cardiac output and severe hypoxemia states are frequently treated with vasoactive drugs. The interaction between cardiovascular adaptations and drug effects in these situations has been explored only insufficiently. The aims of this study were 1) to investigate the hepato-splanchnic blood flow adaptations in a model of low systemic blood flow vs. low oxygen content and 2) to test afterwards the in-vitro vascular reactivity of gut- and liver-supplying vessels to vasoconstricting and vasodilating drugs.

METHODS. We studied 24 anesthetized and mechanically ventilated pigs randomized to cardiac tamponade (CT, n = 8), hypoxia (HH, n = 8) and control (C, n = 8). In CT, cardiac output was reduced in 6-hr steps to reach 50, 40 and 30 ml.kg-1.min-1. In HH, FiO2 was reduced in 6 hrs to reach a PaO2 of 50–60 mmHg, and then at 12 hrs to < 50 mmHg. The lowest levels were maintained until 24 hrs. At the end of the animal experiment, vascular samples from hepatic (HA) and superior mesenteric arteries (SMA) were analyzed by the tissue bath method. Contractility was assessed using norepinephrine (dose-response curve), and relaxation using adenosine and sodium nitroprusside (percent of peak contraction, baseline 100 ± 0%). Dose-response curves were constructed for norepinephrine, sodium nitroprusside (SNP) and adenosine. Variables were compared using one-way and repeated measures ANOVA. Jejunum motility data from the same animals are presented in another abstract.

RESULTS. Cardiac output decreased in CT from 77 ± 14 to 44 ± 12 ml/kg/min, increased in HH from 75 ± 15 to 113 ± 26 ml/kg/min, and did not change in controls (time-group interaction; p = 0.001). Superior mesenteric artery blood flow decreased by 30 ± 5% in CT and remained unchanged in HH (p = 0.04), while hepatic artery blood flow decreased by 11 ± 15% in CT and increased by 103 ± 52% in HH and by 50 ± 26% in controls (p = 0.09). In-vitro norepinephrine maximal contraction was similar in all groups. SNP-induced relaxation was 64 ± 26%, 61 ± 30% and 47 ± 23% in CT, HH and C, respectively, in the hepatic artery (p = 0.002) and 69 ± 19%, 62 ± 22% and 51 ± 32% in CT, HH and C, respectively, in the SMA (p < 0.001). Maximal adenosine relaxation was 20 ± 22%, 28 ± 17% and 30 ± 25%, in CT, HH and C, respectively (hepatic artery, NS), and 24 ± 23%, 14 ± 19% and 8 ± 15% in CT, HH and C, respectively (SMA, p < 0.001).

CONCLUSION. Both CT and HH were associated with increased fractional hepatic arterial perfusion, whereas for SMA, this was only the case in CT. In SMA, maximal relaxation in response to both SNP and adenosine was increased, whereas in the hepatic artery this was only the case for SNP. Neither CT nor HH modified the maximal contraction to norepinephine. Whether the in-vitro findings have implications for the administration of vasodilating drugs in vivo should be tested in further experiments.

GRANT ACKNOWLEDGEMENT. Supported by grant 3200BO/102268 from the Swiss National Fund and from Novartis grant.

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THE LOCATION AND TIMING OF EXTUBATION IN PAEDIATRIC CARDIAC SURGICAL PATIENTS – CAN WE SAFELY MOVE OUT OF PICU?

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INTRODUCTION. To identify location and timing of extubation in cardiac surgical patients admitted to PICU.
Fast track extubation is defined as extubation in theatre/on arrival to PICU.
Early extubation is defined as extubation within 4 h.

METHODS. Inclusion criteria: Patients extubated post-cardiac surgery between 26 June 2006 and 19 March 2008 admitted to PICU.
Data was collected for patient characteristics; length of time ventilated; extubation failure within 48 hrs; failure reason.

RESULTS. 414 patients were eligible for inclusion. Data was missing for 30 patients (7.25%), leaving 384 patients for analysis.
Patients 'fast tracked' = 87 (22.7%).
297 patients (77.34%) were extubated on PICU, of which 28 patients (9.43%) underwent 'early extubation'. Median length of time ventilated for remaining patients = 2 days (IQR 0.5 – 6).
Twenty-four patients failed extubation (6.25%), of which 5 patients had been fast tracked. Median length of time ventilated prior to extubation failure = 4 days (IQR 2.15–6.75). Reasons for failure: airway 10 patients (41.7%); respiratory failure 9 patients (37.5%); cardiac failure 3 patient (12.5%); accidental extubation 1 (4.2%); bleeding 1 (4.2%).

CONCLUSION. 3 in 10 cardiac surgical cases are being extubated at the end of the operation or immediately on PICU admission. Data analysis suggests near optimum use of fast track extubation following cardiac surgery, implying appropriate assessment by Anaesthetic/PICU team. The low extubation failure rate in this group provides evidence to support redirecting postoperative care to high-dependency areas. Avoiding lengthy stays on PICU would reduce patient and parental stress. In addition, this may have the potential to reduce in-patient stay and enable higher throughput in cardiac department and reduce waiting lists. Continued audit would further support this conclusion.

Poster Sessions
Perioperative lung injury: 1016–1029

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PREOPERATIVE PULMONARY VASOREACTIVITY IN CTEPH PATIENTS UNDERGOING PEA

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INTRODUCTION. Aim of the study was to analyze the relationship between preoperative response to inhaled Nitric Oxide (iNO) in Chronic thromboembolic Pulmonary Hypertension (CTEPH) patients and the outcome of pulmonary endarterectomy (PEA).

METHODS. Nineteen consecutive CTEPH patients, in whom spiral CT excluded a distal pattern, underwent 2 right heart catheterizations: preoperatively to assess basal hemodynamics and response to iNO and postoperatively to assess outcome of PEA.

RESULTS. At basal hemodynamic assessment, Cardiac Output (CO) was 4.3 ± 1.6 l/min, mean Pulmonary Artery Pressure (mPAP) 45 ± 14 mmHg and Pulmonary Vascular Resistance 826 ± 371 dynes*s*cm-5. Inhaled NO decrease mPAP to 37 ± 10 (−18%) and PVR to 707 ± 304 (−15%). Four patients (21%) were high responders to iNO and 15 patients (79%) were low responders according to a PVR decrease ≥ or < 200 dynes*s*cm-5, respectively. High responders had also higher basal PVR (1213 ± 222 vs. 723 ± 335; p < 0.01) but not significantly higher PVR during NO inhalation (839 ± 167 vs. 672 ± 327) than low responders. PEA decreased mPAP to 25 ± 8 (−44%), PVR to 248 ± 103 (−63%) and increased CO to 5.4 ± 2.0 (+26%). The 4 high responders had worse PEA outcomes: 1 patient experienced severe postoperative pulmonary hypertension and right heart failure, required ECMO and finally died 4 days after the operation; in the other 3 high responders, mean postoperative PVR was significantly higher than that observed in low responders (370 ± 97 vs. 223 ± 87; p < 0.005).

CONCLUSION. In CTEPH patients, a preoperative high response to NO inhalation may suggest that a significant portion of pulmonary vascular resistances is not correctable by pulmonary endarterectomy.

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PRO- AND ANTI-INFLAMMATORY RESPONSE IN ICU PATIENTS REQUIRING PARENTERAL NUTRITION: COMPARISON OF A FISH OIL CONTAINING NEW LIPID EMULSION (SMOFLIPID®) WITH AN OLIVE AND SOYBEAN BASED LIPID EMULSION

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INTRODUCTION. Lipid emulsions are an essential part of parenteral nutrition (PN), both as a part of energy supply, and as a source of essential fatty acids. It has been shown that the fatty acid composition of cell membranes is influenced by the fatty acid profile of dietary lipids, and may therefore be responsible for modulation of immune response (1). The aim of this study was to assess the effects of a new lipid emulsion based on soybean oil, medium-chain triglycerides (MCT), olive and fish oil (SMOFlipid®) compared with a lipid emulsion based on olive and soybean oil (ClinOleic®) on the inflammatory response in postoperative intensive care unit (ICU) patients.

METHODS. A prospective randomised study. After approval of the ethical committee, 44 postoperative surgical patients with an indication for PN were included in this study. Non-protein calories were given as 60% glucose and 40% lipids. The total energy intake per day was 25 kcal/kg body weights. Sedation regimen was standardised, propofol (lipid emulsion as a carrier) was avoided. Patients were thus allocated to one of two nutritional regimens: Group A (n = 22) received SMOFlipid® 20% (SMOF group), group B (n = 22) a lipid emulsion based on olive and soybean oil (ClinOleic® 20%, control group). PN including lipids were given for 5 postoperative days. Interleucin-6- (IL-6), tumor tecrosis factor-alpha- (TNF-α), leukotriene B5 (LTB5), and soluble E-selectin-levels (sE-selectin) were measured before the start of infusion (d0), at day 2 (d2) and day 5 (d5) after the start of administration. The significance level was defined at p < 0.05.

RESULTS. There were no significant differences between the two groups in the pro-inflammatory response at d0 and d2, but at d5 significantly lower IL-6- (SMOF group (A): 73 ± 58 vs. control group (B): 123 ± 107 pg/ml),TNF-α- (A: 15 ± 8 vs. B: 23 ± 13 pg/ml), and sE-selectin-concentrations (A: 22 ± 14 vs. B: 33 ± 21 ng/ml) were observed in the SMOF group, compared to the control group. The anti-inflammatory response objectified by measuring LTB5 showed significant higher LTB5-levels at d2 (A: 618 ± 525 vs. B: 340 ± 218 pg/ml) and d5 (A: 782 ± 591 vs. B: 371 ± 248 pg/ml) in the SMOF group.

CONCLUSION. The administration of SMOFlipid® within a parenteral nutrition regimen led at the final study day (d5) of the nutrition regimen to a significantly reduced pro-inflammatory response and at d2 and d5 a significantly increased anti-inflammatory response compared with a lipid emulsion based on olive and soybean oil.

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GRANT ACKNOWLEDGEMENT. The study was granted in parts by Fresenius-Kabi, Germany.

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FAT EMBOLISM SYNDROME AS RARE COMPLICATION OF DERMOLIPECTOMY

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INTRODUCTION. Fat embolism syndrome (FES) is a multi-organ dysfunction (MODS) frequently a triad of lung, brain and skin dysfunction due to fat emboli. FES commonly occurs in trauma patients with long bone fractures, after intramedullary nailing of long bones, however occasionally cases in patients with pancreatitis, burns and on parental nutrition and very rarely after liposuction or dermolipectomy are reported. With increasing popularity of cosmetic surgeries, the number of patient undergoing body sculpture surgery is increased and up to 8% of the deaths are blamed to FES. FES can easily be confused with MODS due to other etiologies, hence it is essential that critical care physicians are aware of this entity.

METHODS. Case report - A 46-years-old female suffering from hypertension, diabetes mellitus and pendulous abdomen, underwent dermolipectomy and abdominoplasty. On the 2nd postoperative day, she complained of shortness of breath and drowsiness.

RESULTS. Her O2 saturation dropped to 69% and required intubation. Pulmonary embolism (PE) was suspected. Chest X-ray and spiral CT chest showed no evidence of PE, but bilateral basal lung collapse and consolidation. She was tachycardic (120 to 130/min), febrile (39.5°C), oliguric for 8 h and showed signs of ARDS. By day 5, her chest improved, but she was stuporous and remained in this state for almost 18 days. MRI showed periventricular scattered white matter hyperintense lesions on T2 weighted images (Fig.). Septic work-up was negative and FES was suspected. By day 23, her neurological status started to improve; she was weaned off the ventilator and could be discharged from ICU. She made a complete neurological recovery and was discharged from the hospital on day 80.

CONCLUSION. FES post-dermolipectomy is a rare but life-threatening condition. The lack of specific diagnostic test might complicate and delay the diagnosis.

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REDUCING RISK WITH THORACIC EPIDURAL ANALGESIA IN CRITICAL CARE

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INTRODUCTION. Thoracic Epidural Analgesia (TEA) can be safe and effective for providing perioperative analgesia but is not without risk. Inadvertent intravenous administration of bupivacaine may induce changes to cardiac rhythm and contractility [(1)]. We have prospectively evaluated the safety of commercially prepared levobupivacaine (a potentially less cardiotoxic local anaesthetic) since its introduction in June 2003.

METHODS. A multidisciplinary medication safety initiative (MSI) grouped was formed to review current practice in the critical care environment including; reported TEA-related adverse events, the variety of opioid and local anaesthetic presentations, clinical storage, prescribing practices, initiation of the infusion, infusion devices and staff education.

RESULTS. Only two distinct presentations of infusates are identified on the pre-printed prescription and available in our institution. Drug dilution errors (2001 n = 2, 2002 n = 1) have not been reported since the introduction of levobupivacaine. The adverse incident rate for epidural analgesia has fallen from 7 reports in 2001 (43% amber rating indicating significant patient impact using NPSA criteria [(2)]), 6 reports in 2006 to 3 reports in 2007 (no patients experiencing any significant impact). Storage was revised with the sole opioid infusate relocated to a dedicated cupboard. A competency based programme for all clinical staff was initiated with the need for annual updates identified. All medication-related adverse events are disseminated quarterly to all staff.

CONCLUSION. Identifying and managing risks related to TEA can reduce the incidence and severity of adverse events. A multi-disciplinary approach can improve documentation, storage and administration.

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NATRIURETIC PEPTIDES AND C REACTIVE PROTEIN AS EARLY MARKERS OF CARDIAC OVERLOAD AND INFLAMATION AFTER PULMONARY RESECTION

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INTRODUCTION. Despite being well studied molecules, little is known about the utilities of brain natriuretic peptides(BNP) and C- Reactive Protein (CRP) as biological markers of right cardiac overload and inflammation in thoracic surgery. The aim of this study is to find out the patterns and activity of such these molecules after large pulmonary resection (lobectomy or pneumonectomy).

METHODS. Prospective and observational study including 32 consecutive patients. We measured sequentially changes in plasma Pro-BNP levels using quimioluminiscence technics (HELECSYS 2010, Hitachi. Japan) and CRP levels, before and just after pulmonary resection and also 6,24,48 and 72 h after surgery.
Statistical analysis: Friedman test. Statistically significant $p < 0.05$.

RESULTS. Patients 32. Lobectomy:19. Pneumonectomy:13 (Right:5; Left:8).
Age: 65,4 ± 9,8; Male: 30 (93,8%); APACHE II: 7,1 ± 3; Smoke:27 (84,3%); COPD:7 (21,8%); Hypertension:8 (25%); FEV1: 2277,1 ± 609,5 ml;VC: 3356,6 ± 3340 ml; 77,4 ± 18,5; Time of surgery: 186,21 ± 42,7 minutes; time of anesthesia: 231,1 ± 48,6 minutes, epidural analgesia: 12 (37,5%); paravertebral analgesia: 18 (56,3%); PaO2/FiO2 postoperatory: 313,2 ± 92,6 mmHg; PaCO2 postoperatory: 42,5 ± 6,4; MAP postoperatory: 90,5 ± 16,2 mmHg;hemoglobyne: 12,04 ± 1,7 g/ml.
PRO BNP pre:140,7 ± 141,4; T0:148,2 ± 174,7; T6:181,6 ± 156,1; T24:404 ± 395,1; T48:574,3 ± 685,3; T72:829,5 ± 1057,1 $p < 0,001$.
CRP Pre:51,7 ± 72,6; T0:31,2 ± 44,6; T6:44,7 ± 37,4; T24: 120,9 ± 39,7; T48: 182,1 ± 65,5; T72:151,3 ± 59 $p < 0,001$

CONCLUSION. We observed a remarkable elevation of both, proBNP and CRP since 24 h after surgery. Plasma proBNP concentrations showed the highest increase at 72 h, possibly owing to increased right ventricular wall stress as a result of an increment of pulmonary vascular resistance. An inflammatory level peak (CRP) was found 48 h after surgery. Largest studies are necessary to analyse correlation between right ventricular function and inflammation with proBNP and CRP levels in such patients. It may be a potential predictor for both, prognostic and postoperatory complications.

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NONINVASIVE VENTILATION FOR ACUTE RESPIRATORY FAILURE AFTER LUNG RESECTION

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INTRODUCTION. A single prospective randomised study (1)found that, in selected patients with acute respiratory failure (ARF) following lung resection, Noninvasive Ventilation (NIV) decreases the need for endotracheal mechanical ventilation (ETMV) and improves clinical outcome.

METHODS. We prospectively evaluated NIV use for ARF after lung resection during a 4-year period in the setting of a medical and a surgical ICU of a university hospital. We documented demographics, initial clinical characteristics and clinical outcomes. NIV failure was defined as the need for tracheal intubation.

RESULTS. Among 690 patients at risk of severe complications following lung resection,113 (16.3%) experienced ARF, which was initially supported by NIV in 89 (78.7%), including 59 with hypoxemic ARF (66.3%) and 30 with hypercapnic ARF (33.7%). The overall success rate of NIV was 85.3% (76/89). In-ICU mortality was 6.7% (6/89). The mortality rate following NIV failure was 46.1%. Predictive factors of NIV failure in univariate analysis were age ($p = 0.046$), previous cardiac comorbidities ($p = 0.0075$), postoperative pneumonia ($p = 0.0016$), admission in the surgical ICU ($p = 0.034$), no initial response to NIV ($p < 0.0001$) and occurrence of non infectious complications ($p = 0.037$). Only two independent factors were significantly associated with NIV failure in multivariate analysis: cardiac comorbidities (odds ratio, 0.066; 95% confidence interval, 0.008–0.557; $p = 0.015$) and no initial response to NIV (odds ratio, 0.008; 95% confidence interval, 0.001–0.092; $p < 0.0001$).

CONCLUSION. this prospective survey confirms the feasibility and efficacy of NIV in ARF following lung resection.

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CORRELATION BETWEEN HAEMODYNAMIC AND MICROCIRCULATION PARAMETERS OBTAINED WITH NEAR INFRARED SPECTROSCOPY IN CARDIAC SURGERY PATIENTS

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INTRODUCTION. The purpose of this study was to compare microcirculation parameters, as assessed by the non-invasive method of Near Infrared Spectroscopy (NIRS), with haemodynamic indices, evaluated by right catheterization. The peripheral microcirculation of cardiac surgery patients is post-operatively altered as a result of the extracorporeal circulation, the anaesthesia and the hypothermia they undergo during surgery. A non-invasive monitoring technique of the peripheral microcirculation would be very useful in aiding post-operative monitoring and in helping ensure adequate tissue perfusion in these patients.

METHODS. We studied 10 cardiac surgery patients (8 males, 2 females, 59 ± 17 years) during the immediate postoperative period. All patients had undergone extracorporeal circulation and were treated with inotropic and/or vasopressor agents (7 norepinephrine, 6 dobutamine, 2 adrenaline, 3 levosimendan). A Swan-Ganz catheter was used to assess the haemodynamic parameters. Tissue oxygen saturation (StO2%) of the thenar and masseter muscles was obtained with the help of In Spectra Model 325 Near-Infrared Spectrometer (NIRS). The brachial artery occlusion technique was utilized to better assess the endothelial function, with the calculation of the oxygen consumption rate, the reperfusion rate and the vascular reactivity.

RESULTS. The haemodynamic parameters of our patients were: MAP 73 ± 15 mmHg, CVP 8 ± 4 mmHg, PCWP 12 ± 5 mmHg, MPAP 26 ± 6 mmHg, CI 2.6 ± 0.7 L/min/m2, SVR 1161 ± 317 dyne x s/cm5, PVR 279 ± 146 dyne x s/cm5, HR 104 ± 11 bpm, Hb 10.7 ± 1.7 g/dl, lactate 3.5 ± 2.4 mg/dl. We found a significant correlation between cardiac index and reperfusion rate ($r = 0.39$, $P = 0.016$), as well as with vascular reactivity ($r = -0.39$, $P = 0.027$). CI also correlated significantly with masseter StO2 values ($r = 0.64$, $P = 0.001$). We also found a significant correlation between masseter StO2 values and SvO2 ($r = 0.53$, $P = 0.011$), as well as with ScvO2 ($r = 0.52$, $P = 0.014$).

CONCLUSION. By utilizing the occlusion technique with NIRS technology we found a correlation of NIRS derived parameters and haemodynamic indices. As adequacy of tissue oxygenation and not simple maintenance of "ideal pressures" is the physiologic role of haemodynamic monitoring, the potential introduction of a non-invasive method to post-operative cardiac surgery monitoring could help ensure the optimization of patient management.

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AN INCREASE OF HIGH MOBILITY GROUP BOX-1 LEVEL DURING CARDIAC SURGERY USING CARDIOPULMONARY BYPASS

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INTRODUCTION. High mobility group box 1 (HMGB 1) is a well known proinflammatory cytokine that initially described as DNA binding protein responsible for transcriptional events and gene expression. Further investigation focused HMGB 1 as a late appearing inflammatory mediator that persist for longer duration after initiation of inflammatory response. Previous studies have shown that cardiac surgery with cardiopulmonary bypass (CPB) triggers release of proinflammatory cytokines and provokes inflammatory response. The present study was designed to investigate the changes in serum HMGB-1 levels in cardiac surgery using cardiopulmonary bypass (CPB).

METHODS. Eighteen cardiac valvular disease patients were included in our study; AVR8, MVR6, MVR + CABG1, MVP3. Study protocol was approved by research committee of our university. HMGB-1 levels were measured before surgery (immediately after tracheal intubation,T1), 1 hr. after start of CPB(T2), 1 hr. after removal of CPB(T3), 1 hr. after ICU admission (T4), ICU day-2(T5), ICU day-3(T6). Simultaneously, hemodynamic variables, required doses of catecholamines, serum lactate concentrations and other laboratory data were recorded. Repeated measure ANOVA was used to analyze the changes in Tl-T6 values and values at T2-T6 were compared with T1 value (Dunnet's test).

RESULTS. Serum HMGB-1 at T1 was 5.99 ± 2.4. It significantly increased at T2 (16.76 ± 9.16, $P < 0.01$) and gradually decreased at T3(9.71 ± 6.11), T4(6.51 ± 2.86), T5(4.98 ± 1.57) and at T6(5.54 ± 1.97) while IL-6, white blood cell count (WBC), C-reactive protein(CRP) elevated postoperatively. Patients' postoperative course was uneventful and all patients discharged from ICU within 3 days.

CONCLUSION. 1. Serum HMGB-1 level increased transiently during cardiac surgery using cardiopulmonary bypass.
2. Patients' postoperative course was uneventful in spite of high HMGB-1 level during cardiac surgery.
3. This is the first report showing an increase in serum HMGB-1 level during cardiac surgery.
4. High HMGB-1 level might be due to the combination of an increased HMGB-1 release from ischemic organs and a decreased HMGB-1 elimination during CPB.

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CRITICAL CARE OUTCOME FOLLOWING RUPTURE OESOPHAGUS

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INTRODUCTION. Rupture oesophagus is a thoracic surgical emergency with significant morbidity and mortality [1]. We present our experience in managing these patients in a tertiary care cardiothoracic critical care unit.

METHODS. We conducted a retrospective clinical review of patients who were admitted to the Cardio thoracic intensive care unit following rupture oesophagus over a period of last five years (2002–2007).

RESULTS. We had 24 admissions following isolated rupture oesophagus to our critical care unit. Out of which 71% were males, 29% females. The median age was 64 years (range 22–82). The aetiology was spontaneous (Boerhaave's syndrome) in 87.5% and iatrogenic in 12.5%. The diagnosis was established early (< 24 hrs) in 71% and delayed (> 24 hrs) in 29 %. 19 patients (83.3%) were admitted to ITU preoperatively and all 24 (100 %) were admitted postoperatively.
In preoperative admission group, 63.0% had shock requiring ionotropes and 42.0 % required ventilation. Primary surgical repair was done in 74.4 %, a 2-stage repair in 8% and conservative management in 16.6%. Postoperatively, 71% were electively ventilated and nearly half of them (47%) were extubated within first 24 hrs. Mean ITU length of stay was 12 days (range 1- 45) and mean hospital stay was 35 days (range 11–86). Over all in hospital mortality was 16.6%.
In 75% of the non-survivors, there was a delay in diagnosis (> 24 hrs) along with shock needing ionotropes on initial admission and they also required preoperative mechanical ventilation.
Positive bacteriology was obtained in more than 50 % of patients (Gram Negatives) from one or more specimens and fungal organisms in 41.5%. All the non-survivors had yeasts from one or more specimens.

CONCLUSION. Our review confirms the early diagnosis and management is crucial for successful outcome in patients with rupture oesophagus. However, shock on admission and need for preoperative ventilation by them selves are not indicative of poor outcome. Microbiological surveillance and aggressive management of bacterial and fungal infection are crucial for improving outcomes. Our mortality figures are marginally lower than other centres [1, 2], possibly because of higher volume and also early critical care interventions.

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INCIDENCE OF CO MORBIDITIES IN PATIENTS UNDERGOING SINGLE SITTING BILATERAL TOTAL KNEE REPLACEMENT (BTKR) SURGERY AND ASSOCIATION OF AGE WITH POSTOPERATIVE COMPLICATIONS

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INTRODUCTION. With increasing affluence and changing lifestyles chronic diseases are becoming increasingly common in the Indian subcontinent. There is dearth of data regarding the incidence of co morbidities and postoperative complications in patients undergoing single sitting Bilateral Total Knee Replacement (BTKR) Surgery in the Indian scenario.So we planned to study.

1. Incidence of co morbidities in patients undergoing BTKR.
2. To determine the relationship of age with postoperative complications.

METHODS. Retrospective study of 565 consecutive patients admitted to 6 Bedded Joint Replacement ICU undergoing single sitting BTKR between May 2006 to Feb 2008. Patients were divided into 2 groups: Age > 70 and Age < 70yrs. Patients were monitored for postoperative complications including bleeding, transfusion of blood products, transfusion related complications, postoperative myocardial ischemia, pulmonary embolism, length of ICU stay.

RESULTS. 1. Age > 70 yrs comprised 37.3% (n = 210/565) of the total patients.
2. Cardiovascular disease was the most common co morbidity seen in 86.6% (n = 489) of patients with 73.3% (n = 414) hypertensive, 6.66% (n = 39) coronary artery disease and 4.44% (n = 25) rheumatic heart disease and obesity was the second most common 35.5% (n = 200). Other comorbid conditions were diabetes mellitus and bronchial asthma in 13.3% (n = 75) each, hypothyroidism 10.6% (n = 61), depression 9.3% (n = 52), nephropathy 6.6% (n = 37), anaemia 4 % (n = 22) and dyslipidemias 2.6%(n = 14).

TABLE 1

Complications	Age>70	Age<70	p value
Postoperative bleeding	895	795	<0.05
Blood transfusions	1.78 units	0.82 units	<0.05
Tranfusion related complications	7%	nil	<0.05
Length of icu stay	68.5 h	46.5 h	<0.05
Postoperative myocardial ischemia	14.2%	nil	<0.05
Postoperative pulmonary embolism	7.2%	nil	<0.05

CONCLUSION. 1. Patients undergoing single sitting BTKR have significant co morbid conditions demanding ICU care in the postoperative period.
2. Increasing age is associated with higher incidence of postoperative complications and morbidity.

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WHAT IS THE ADEQUATE TIMING FOR EXTUBATION MAXILOFACIAL SURGERY?

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INTRODUCTION. We usually consider delaying the extubation of maxillofacial surgery more than other postoperative, because of the anatomy of face and neck, the inflammatory response after surgery and the length of surgical procedure. Our objective is to detect complications in a cohort of patients after maxillofacial surgery trying to relate with early or late extubation.

METHODS. Observational, prospective study of a cohort of 104 patients after maxillofacial surgery and admitted in our ICU between February 200 to March 2008. We analyzed demographic and clinic variables, preoperative situation, surgical risk (measured with American Anestesiology Scale risk), difficult to intubation, length of surgery, complications in ICU and time under mechanical ventilation and complications due to extubation moment. We considered early extubation before than 6 h after admitted in ICU. Dates are shown as mean and standard desviation or percentages and absolute number. We used SPSS package for the statistical analysis.

RESULTS. We collected 104 patients (59,6% male). Mean age 52,6 ± 18,9 years, urgent surgery 5,8%(6), Lengh of surgery 4,41 ± 1,5 h, difficult expected intubation 26,1% (24) and mehanical ventilation in ICU 8,64 ± 11,8 h. We registered complicatios in 13 patients (12,5%), most frequents respiratory (5,8%), hemodynamic (2,9%) or combinations. One patient died and 4 patients were reoperated. 38 patients were intubated six or more h and this group had more rate of complications than the group extubated prior to 6 h. ($p = 0,02$) 3,78 IC95% (1,16–12,31). ASA risk and difficult expectation to intubate were not associated with more complication. Univariate analysis showed that cervical ganglionic drainage was associated with more complications after extubation. ($p = 0,012$. 4,4 IC95% 1,2–13,1). Multivariate analysis reported as predictors of more rate of complications: Extubation after 6 h in ICU($p = 0,049$. 3,3 IC95% (1–11,2)) and tumoral surgery which needs cervical ganglionic drainage ($p = 0,032$. 3,6 IC95% (1,1–12,1)).

CONCLUSION. Premature tracheal extubation can be hazardous in this surgery due to oedema and haemorrage and the proximity to the airway. We usually leave intubated more time to patients who are difficult to intubate after a surgical procedure. In spite of a not very high rate of complications (12,5%), our study revealed that delayed extubation and cervical ganglionic drainage are associated with more complications and rate of reintubation.

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SAFE USE OF ANESTHESIA BREATHING CIRCUITS IN COMBINATION WITH (CHANGED) AIRWAY SYSTEM (HME) FILTER FOR 7 DAYS

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INTRODUCTION. Purpose: Use of airway system filters (ASF) in anaesthesia and the possibility for a prolongated operation time of the breathing circuit system (BCS) is controversial with the consequence of still lacking recommendations. To clarify one part of this dilemma we investigated the contamination risk of BCS, protected by an HME-F, for either 1, 2, 5 and 7d in a clinical setting.

METHODS. METHODS: In a prospective longitudinal clinical survey, the inner and outer surface contamination of BCS were monitored and compared with the bioburden of the ASF by the respiratory pathogenic patient flora. Sample swabs were taken from trachea and the tip of the tubus, both inner sides of the ASF, condensation water from the BCS, the outer surface of the BCS and the anesthesia bag. The consequences for the costs of this prolonged use up to 7 d of the BCS were calculated.

RESULTS. RESULTS. Neither germs of the physiological flora nor the colonizing pathogens of the oropharynx of the operated patients were transmitted through the filters. No organisms were cultivatet from the condensation water or in the ventilator. In opposite, all anesthesia bags surfaces were highly contaminated.

CONCLUSION. CONCLUSION. The HME-F protects the BCS as well as the ventilator from the respiratory flora of the patient, allowing to use the BCS for more than one patient and extend the change interval up to 7d, which proved to be cost effective. In order to minimize cross infections, the external surface of the BCS as well as the anaesthesia bag must be disinfected after each patient.

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POSTPNEUMONECTOMY SYNDROME; DESCRIPTION OF A CASE AND REVIEW OF THE LITERATURE

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INTRODUCTION. Postpneumonectomy syndrome (PPS), is defined as an airway obstruction due to heart and mediastinal shift and rotation, after pneumonectomy left or right.

METHODS. A 64-year-old male with 45 pack-years was evaluated for arthropathy. After a positive Mantoux skin test chest x-ray revealed a right central tumor. Pulmonary function studies showed FEV1 2,96L (91% predicted) and FEV1/VC 0,55. PET-CT showed a PET positive lesion apical in the right inferior lobe and a positive lymph node. Bronchoscopy, mediastinoscopy and EUS were tumor-negative. Right-sided pneumonectomy was performed for squamous cell bronchuscarcinoma T1N0M0, stage IA. After surgery he developed ARDS, followed by stump leakage for which revision was performed. Intercurrent airway infections were treated with antibiotics. Despite this, the patient had major problems weaning from the ventilator. CT scan showed compression atelectasis of the left inferior lobe, reason to consider the possibility of PPS. Despite absence of mediastinal shift, surgery was performed 4 months later to implant expandable prosthesis in the pleural cavity. In spite of this intervention, weaning from the ventilator was hampered by muscle weakness and swallowing difficulties leading to recurrent aspiration.

RESULTS. PPS is a rare complication of pneumonectomy. Jansen et al. reported one case in a series of 640 pneumonectomies (incidence 0,2%) and just over 20 cases are reported in literature. Clinical symptoms are progressive dyspnoe, cough, inspiratory stridor, recurrent pneumonia and bronchiectasis. In reported cases the symptoms developed 5 months to 35 years after pneumonectomy. In all described patients a shift of the heart and mediastinum towards the side of the pneumectomy, causing bronchial obstruction, was found. As PPS can lead to respiratory insufficiency and death this diagnosis should be considered in every postpneumonectomy patient presenting with corresponding symptoms. Confirmation of the clinical diagnosis PPS is accomplished with CT-scan and bronchoscopy, showing a shift of heart and mediastinum towards the pneumectomy-side with hyperinflation of the contralateral lung, stretching of the distal trachea and left main bronchus and lobair bronchus. The stretched airways can be compressed by pulmonary arteries, aorta and spine leading to tracheabroncho-malacia. Current surgical treatment consists of mediastinum repositioning and implantation of expandable prostheses with an additional role for airway stenting.

CONCLUSION. PPS, although rare, may have contributed to the weaning problems in this patient and should be considered after pneumonectomy.

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TOTAL CORTISOL LEVELS AND THE DIAGNOSIS OF ADRENAL INSUFFICIENCY IN SEVERE COMMUNITY-ACQUIRED PNEUMONIA: IMPACT ON OUTCOMES AND DISEASE SEVERITY

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INTRODUCTION. Cortisol levels are of prognostic value in patients with community-acquired pneumonia (CAP). However, the predictive value of total cortisol (TC) and of the frequency and impact of adrenal insufficiency (AI) in severe CAP remains to be thoroughly evaluated.

METHODS. The main objective was to investigate the predictive value of baseline and post-ACTH (250mcg) TC levels at ICU admission in patients with severe CAP in a prospective cohort study of patients with severe CAP admitted to the ICU. TC at baseline and after ACTH test, C-reactive protein, D-dimer, clinical variables, SOFA, APACHE II and the CURB-65 score were measured. The major outcome measures were hospital mortality and disease severity.

RESULTS. Seventy-two patients with age 71 (52.5–83.7), APACHE II 14 (11–17), PaO2/FiO2 267 (240–312) were evaluated. Twenty-three patients (31.9%) had septic shock at presentation, SOFA at admission was 4 (3–6) points and 20 (27.8%) patients required invasive mechanical ventilation. Hospital lenght of stay was 10 (7–18.5) days and 12 (16.7%) patients died during hospital stay. Corticosteroids were administered in 33 (45%) patients for a mean period of 3 (3–5) days and the mean dose was 60 mg of methylprednisolone. Total cortisol levels were 18.1 (14.4–26.7) mcg/dL and delta cortisol after 250mcg ACTH was 19 (12.8–27)mcg/dL. Baseline TC, increased with increasing severity of CAP according to the CURB-65, APACHE II and SOFA ($P < 0.05$). Using the criteria of Annane et al (2002) AI was diagnosed in 29 (40.8%) patients. TC levels in non-survivors were significantly higher than in survivors. Significant correlations were observed (in linear regression) amongTC and D-dimer and TC and APACHE II ($r2 = 0.20$ and 0.24, $p < 0.0001$ respectively). There was also correlation of TC and SOFA at day 1 ($r = 0.48$, $p = 0.01$). In univariate analysis, TC, CURB-65 and APACHE II, but not the presence of AI, were predictors of death. The discriminative ability of TC [Area under ROC curve = 0.77(95%CI, 0.65–0.90)] for in-hospital mortality was better than those of usually employed severity predictors as APACHE II, CURB-65, D-dimer or C-reactive protein. In ROC curve analysis, the best cutoff for TC was 25.7mcg/dL.

CONCLUSION. Baseline TC levels are better predictors of severity and outcome in severe CAP than routinely measured laboratory parameters or scores as APACHE II, SOFA and CURB-65. In patients with severe CAP requiring ICU admission, the presence of AI does not have a significant impact on survival.

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ATTITUDES AND PERCEPTIONS IMPEDING INFLUENZA VACCINE UPTAKE AMONG HEALTH CARE WORKERS AT A SINGLE CENTRE POST SARS

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INTRODUCTION. Health Care Workers (HCWs) are at risk of occupational exposures to influenza and infected HCWs may become potential vectors in the nosocomial transmission of influenza(1). Influenza vaccinnation is effective in preventing influenza infection for hospital-based HCWs(2). Since 2004, and after SARS, the hospital campus has initiated a influenza vaccination program, at no cost, to all HCWs. Despite the availability of this program,the take up rate is a low 58%.
We aim to explore the perceptions and decision making factors towards vaccination amongst HCWs at our centre.

METHODS. The study was approved by Singapore General Hospital ethics committee. All employees except doctors were asked to participate in the survey. Employees were asked for signed consent before the survey was administered. Statistical analysis was performed with JMP 7.

RESULTS. 436 completed questionnaires out of a total of 668 employees were gathered. 59% of the cohort were nurses, 41% were outpatient staff. 89.2% of respondents were female and the median age group was between 21 to 30 years old. 75% of this cohort did participate in the last vaccination program with 78% agreeing that HCWs should be vaccinated but only 30% feel it is ethically wrong for HCWs not to do so. The strongest reason for vaccination was for protection against a possible flu pandemic (73%) followed by the wish to protect our patients (15%) and the main reasons for opting out was due to forgetfulness or inconvenience (37%), fear of needles or side effects (21%) and the notion that it was ineffective (20%). Only one respondent was unaware that it was available in campus and free of charge. 53% of respondents developed side effects post vaccination, the most common was Flu-like symptoms (21.8%); post vaccination 8.3% surveyed required medical leave. Surprising, 36% of staff would be willing to pay to receive vaccination and the majority would not comply if told to do so by superiors. 76% believe vaccination to be effective and prevents deaths in high risk individuals; however 22.2% believed flu vaccination to have serious adverse effects. 95% was aware of Ministry of Health's recommendation for vaccination. Interestingly, 90% was either neutral or pro legislation to mandate vaccination amongst HCWs, the majority believing that the program would be more effective if there was 100% take up rate. For the time being, most felt that vaccination campaigns are effective.

CONCLUSION. If the reasons for refusing vaccination can be addressed, the vaccination program can be more effective with higher take up rates.

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REMIFENTANIL WITHDRAWAL AND SUBSEQUENT INTENSIVE CARE UNIT-ACQUIRED INFECTIONS

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INTRODUCTION. A recent animal study suggested that morphine withdrawal lowers host defense to enteric bacteria resulting in higher rates of infection [1]. We hypothesized that remifentanil withdrawal would be associated with higher rates of intensive care unit (ICU)-acquired infections.

METHODS. Prospective observational cohort study performed in a 30-bed ICU during a 12-month period. All patients requiring intubation, mechanical ventilation, and sedation for > 3d were eligible. Patients who died before sedation withdrawal were excluded. Sedation was based on a written protocol including remifentanil with or without midazolam. The bedside nurse adjusted sedative infusion according to physician's prescription. Ramsay score was used to evaluate consciousness. Incidence rate of ICU-acquired infections was compared between the period of 96 h preceding remifentanil withdrawal and that of 96 h following remifentanil withdrawal. McNemar's test and Wilcoxon test were used to compare categorical and continuous variables, respectively.

RESULTS. 266 consecutive patients were included (mean ± sd or %): age 57 ± 17, male gender 66%, SAPS II 50 ± 18, duration of mechanical ventilation 23 ± 22d, length of ICU stay 30 ± 28d, ICU-mortality 30%. Rate of patients with ICU-acquired infection was significantly higher during the 96 h following remifentanil withdrawal than the 96 h preceding remifentanil withdrawal (23 vs. 8%, $p < 0.001$), as well as rate of patients with ventilator-associated pneumonia (10 vs. 3%, $p = 0.004$) and ICU-acquired bacteremia (6 vs. 1.5%, $p = 0.012$). Incidence rate of ICU-acquired infection was significantly higher during the 96 h following remifentanil withdrawal than the 96 h preceding remifentanil withdrawal (94 vs. 29/1000 ICU-days, $p < 0.001$), including incidence rates of ventilator-associated pneumonia (32 vs. 8/1000 mechanical ventilation-days, $p < 0.001$) and ICU-acquired bacteremia (18 vs. 6.5/1000 ICU-days, $p < 0.001$). In addition, incidence rate of ICU-acquired infection was significantly higher during the 96 h following remifentanil withdrawal than all ICU stay (94 vs. 40/1000 ICU-days, $p < 0.001$).

CONCLUSION. Remifentanil withdrawal is associated with higher rates of ICU-acquired infections, including ventilator-associated pneumonia and ICU-acquired bacteremia.

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NEBULIZED ANTITHROMBIN ATTENUATES BACTERIAL OUTGROWTH IN EXPERIMENTAL STREPTOCOCCUS PNEUMONIAE PNEUMONIA IN RATS

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INTRODUCTION. Pulmonary coagulopathy is a hallmark of pneumonia and is important for its pathogenesis. Natural inhibitors of coagulation, such as activated protein C (APC) and antithrombin (AT), may exert lung–protective effects via anticoagulant and anti–inflammatory pathways. Systemic administration of anticoagulants increases the risk of bleeding; local treatment may allow for higher treatment dosages and increased local efficacy while reducing the risk of bleeding.

METHODS. We investigated effects of local administration through nebulization of APC and AT in male Sprague–Dawley rats with Streptococcus pneumoniae (SP)– or Pseudomonas aeruginosa (PA)–pneumonia. Rats were intratracheally challenged with either S. pneumoniae or P. aeruginosa, and randomized to local treatment with normal saline, recombinant human APC (5 mg/kg) 30 minutes before induction of pneumonia and was repeated every six h. Human plasma–derived AT (500 IU/kg) was repeated after 24 h because of its longer pharmaceutical half life. Non–infected rats served as controls. Rats were sacrificed at 16 h (PA-pneumonia) or 40 h (SP pneumonia) after the bacterial challenge, for bronchoalveolar lavage. Data are presented as means (SD). Statistical analysis by one-way analysis of variance and Kruskal-Wallis test combined with Dunnett's or Dunn's method where appropriate.

RESULTS. Both SP– and PA–pneumonia resulted in pulmonary thrombin generation, as reflected by a rise in thrombin–antithrombin complex (TATc)–levels (9.13 ± 0.75 [SP] and 5.83 ± 0.76 [PA] vs. 0.45 ± 0.21 [control], $P < 0.01$ and $P < 0.01$, respectively). While nebulized APC or AT had no systemic effects, they attenuated the local rise in TATc–levels (SP–pneumonia: 3.60 ± 0.62 [APC] and 4.57 ± 0.56 [AT) vs. 9.13 ± 0.75 [saline], $P < 0.01$ and $P < 0.01$, respectively; PA–pneumonia: 1.36 ± 0.41 [APC] and 3.64 ± 0.88 [AT) vs. 5.83 ± 0.76 [saline], $P < 0.01$ and $P < 0.01$, respectively). Bacterial outgrowth of SP was attenuated in after AT treatment ($P < .05$) but not after APC treatment.

CONCLUSION. Local treatment with APC or AT impairs pulmonary activation of coagulation in pneumonia; nebulized AT attenuates outgrowth of SP.

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CHARACTHERISTICS OF HIV-INFECTED PATIENTS ADMITTED IN A SPECIALIZED ICU IN BRAZIL

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INTRODUCTION. HAART led to a great decline in lethality of HIV infected patients. ICU admission rates of this population are however increasing in many areas. It is important to elucidate their characteristics and prognosis. We evaluated the reasons for admission and prognosis factors of HIV infected patients on an infectious diseases ICU of a middle income country.

METHODS. We conducted an observational study of all HIV infected patients admitted on our ICU between 07/01/2006 and 12/31/2007, collecting data regarding age, gender, reason for admission, time since AIDS defining condition and CD4 count, besides length of ICU stay, opportunistic infection at admission and sepsis during ICU stay. Clinical severity was evaluated by expanded SAPS II and SOFA scores on the first 24 and 72 h of admission. Multivariate analysis examined organ dysfunctions independently related with length of stay and lethality.

RESULTS. Ninety-one HIV-infected patients were included with a lethality rate of 37% (predicted mortality of 44% by SAPS II). Age mean was 41.5 years with a predominance of male gender (74%). CD4 count was lower than 100/mm3 in 71% of patients. Respiratory (31%) and neurological (22%) diseases, besides sepsis (23%), were the most frequent reasons for admission. Many admissions were motivated by non-infectious causes (27%), mainly metabolic and cardiovascular. Higher SAPS II and SOFA scores were highly associated with death ($p < 0.0001$). These scores had good performance in predicting death, as analyzed by area under ROC curves: SAPS II exp 0.78 (0.68–0.88); 1st day SOFA 0.80 (0.71–0.89); 3rd day SOFA 0.83 (0.73–0.93). Sepsis, but not infection or last recorded CD4 count, was statistically related with lethality. Combined renal and hematological dysfunctions was independently associated with lethality and respiratory or cardiovascular dysfunctions were associated with prolonged length of stay.

CONCLUSION. One quarter of ICU admissions were motivated by non-infectious causes. SOFA and expanded SAPS II were useful tools for prognosis evaluation in this population. Sepsis and combined renal and hematological dysfunctions were associated with higher lethality and respiratory or cardiovascular dysfunctions were associated with a prolonged ICU stay.

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ELEVATED EXTRAVASCULAR LUNG WATER INDEX AS A SIGN OF SEPTIC PROGRESSION IN BURNED PATIENTS

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INTRODUCTION. Sepsis and the developing multiple organ failure (MOF) are the major cause of mortality in burned patients. It needs early diagnosis and specific treatment. The early detection of sepsis is difficult due to systemic inflammatory response syndrome (SIRS), which can develop without detectable infection [1]. It has been proven that inhalation injury and fluid resuscitation do not influence extravascular lung water index (EVLWI) [2]. Data in the literature suggest that elevated EVLWI may be a sign of the developing bacterial sepsis in burned patients [3]. The aim of our retrospective study was to analyse EVLWI regarding presence of infection, sepsis and mortality. The correlation between serum procalcitonin (PCT) level and EVLWI has also been studied.

METHODS. Daily data from 38 patients admitted with burn injury (Total Body Surface Area > 15%) were analysed (laboratory parameters and thermodilution monitoring). The day when microbiological samples were taken due to suspected developing bacterial infection was determined as day 0, the onset point of infection and /or sepsis. Data collected three days before and after onset of sepsis were studied. Patients were divided into survivors and non-survivors according to the outcome. Laboratory parameters were sorted into two groups using EVLWI, with a cut-off point of 8 ml kg-1. Correlations between variables were analyzed with the Spearman test and variables were compared with repeated measure ANOVA.

RESULTS. EVLWI significantly correlated with PCT ($r = 0{,}556$; $p < 0.001$), Baltimore Sepsis Scale (BSS) ($r = 0{,}275$; $p < 0.01$), Intrathoracic Blood Volume Index (ITBVI) ($r = 0.334$; $p < 0.001$) and Positive End Expiratory Pressure (PEEP) ($r = 0.211$; $p < 0.05$). Cardiac Index (CI), ITBVI, PEEP, PCT and BSS were significantly higher in the high-EVLWI group ($p < 0{,}05$). EVLWI showed a marked elevation on day -1 in both groups ($p < 0.05$) compared to day -3. Elevated PCT level was first detected ($p < 0.05$) on day 0 in both groups. PCT started to normalise both in the survivor and non-survivor groups after administration of antibiotics (i.e. after day 0) but its level still remained elevated on day +3 in non-survivors. In contrast to PCT, EVLWI remained in higher range or further increased among non-survivors on day +3 ($p < 0.01$) but no significant difference could be found in the survivors on day +3 compared to the value measured on day -3.

CONCLUSION. Our data suggest that EVLWI may be an early warning sign of developing bacterial infection and its continuously increased level may predict poor prognosis in burned patients.

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FAVOURABLE OUTCOMES FOR HIV INFECTED PATIENTS IN THE ICU: A RETROSPECTIVE COHORT STUDY

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INTRODUCTION. The morbidity and mortality of HIV-infected patients admitted to the ICU has improved significantly. Many ascribe this improvement to the increased use of highly active retroviral therapy (HAART) (1,2) whereas others have found it has no influence on outcome (3). The aim of this study was to describe the demographics and outcomes for HIV infected patients admitted to a London Teaching Hospital Intensive Care Unit.

METHODS. The clinical information system of our ICU was interrogated to identify all HIV-infected patients treated between 2002–6. Standard demographic data, reason for ICU admission, severity of illness scores, use of HAART, ICU and hospital length of stay (LOS) and mortality were recorded.

RESULTS. 106 (61male:45female) HIV-infected patients had 113 patient episodes. ICU mortality was 22.1% and hospital mortality 25.9%, with median ICU and hospital LoS of 5 and 16 days respectively. Mortality for known HIV patients was 28% and that of newly diagnosed patients 16% (Table 1). Admissions for HIV related illnesses were associated with a higher mortality than those for non-HIV related illnesses (29% vs. 10%, $P < 0.05$). Admission diagnoses were mainly HIV related with associated mortalities as shown in Table 2.

TABLE 1

	N (%)	HIV rel adm N (%)	Mean APACHE 2 (sd)	Mean SOFA (sd)	ICU Mort N (%)	Hosp Mort N (%)
Known HIV	87 (82)	57 (66)	22 (7.3)	7.1 (3.3)	20 (23)	24 (28)
+ive HAART	57 (54)	37 (64)	22 (7.2)	6.8 (3.6)	13 (23)	16 (28)
-ive HAART	30 (28)	20 (71)	21.2 (7.6)	7.2 (2.8)	7 (23)	8 (27)
New HIV Diag	19 (18)	19 (100)	19.9 (5.5)	6.6 (4.4)	3 (16)	3 (16)

TABLE 2 PRESENTATION

	N (%)	New HIV Diagnosis (N)	HAART (N)	No HAART (N)	ICU Mort N (%)	Hosp Mort N (%)
Respiratory	31 (27)	12	13	6	9 (29)	10 (32)
Sepsis	22 (19)	1	18	3	5 (23)	7 (32)
Neurological	21 (19)	4	9	8	5 (24)	5 (29)
Toxicology	14 (12)	0	8	6	2 (14)	2 (14)
Other	25 (22)	2	17	6	2 (8)	2 (8)

CONCLUSION. In line with recent studies (1,2,3) mortality rates in our cohort of HIV-infected patients are similar to those of the general ICU population. Unlike recent reports (4), the most common presentations are HIV related. New HIV diagnosis also has a better outcome in our cohort, as do those patients admitted for non-HIV related illness.

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VENTRICULOSTOMY-RELATED INFECTION (VRI) AFTER SUBARACHNOÏD HEMORRHAGE (SAH) : DIAGNOSTIC CRITERIA AND RISK FACTORS

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INTRODUCTION. Interpretation of pleïocytosis in the context of SAH is often difficult because of the presence of blood in the CSF. The aim of the study was to evaluate classical diagnostic criteria of meningitis for patients needing an external ventriculostomy drain (EVD) after SAH.

METHODS. Inclusion criteria : All consecutive patients admitted to our ICU for SAH and needing an EVD between 2005 and 2007. Collection of all CSF values available. CSF samples were obtained if there was a clinical suspicion of VRI (fever > 38°C and (or) altered consciousness). Proved VRI (PVRI) was defined when there was a positive culture of CSF, and suspected VRI (SVRI) when culture was negative but treatment was prescribed > 5 days by the attending physician. Sensibility, specificity, positive and negative predictive values were obtained for the following variables and their association : CSF WBC > 100/mm3 and PMN > 50%, CSF WBC/RBC > 1/500, hypoglycorachia defined as glycorachia (G).

RESULTS. Among 169 SAH, 54 needed an EVD (32%). Their WFNS score was 4 ± 1, Fischer 4 ± 1, GCS 9 ± 4. Among the 54 patients, 223 CSF were analysed, 7 PVRI (13%) and 8 SVRI (15%) were identified. Staphylococcus was found in 71% and a gram negative bacteria in 29% of PVRI. Diagnostic criteria of VRI for the 223 CSF are summarized in Table 1. The univariate analysis identified an EVD > 20 days (47% vs. 21%), a co-infection (67% vs. 37%) and the number of CSF withdrawn during ICU stay (10 ± 5 vs. 6 ± 5) as significant factors associated with VRI ($p < 0{,}05$ for PVRI + SVRI vs. non VRI respectively), whereas physiological scores, surgery and number of EVD placed were not. By multivariate analysis, among the 3 significant variables tested, none was independently associated with VRI.

TABLE 1 DIAGNOSTIC CRITERIA OF PVRI (AND OF PVRI+SVRI)

	Se PVRI (PVRI+SVRI)	Spe PVRI (PVRI+SVRI)	PPV PVRI (PVRI+SVRI)	NPV PVRI (PVRI+SVRI)
WBC>100/mm3 +PNN>50%	100% (100%)	66% (66%)	9% (17%)	100% (100%)
WBC>100/mm3 +PNN>50% +WBC/RBC>1/500	100% (100%)	73% (73%)	11% (21%)	100% (100%)
WBC>100/mm3 +PNN>50% +WBC/RBC>1/500 +HYPOG	67% (64%)	95% (95%)	31% (50%)	99% (97%)

CONCLUSION. Usual criteria for meningitis diagnosis had very low PPV for VRI diagnosis in SHA patients, although their absence could eliminate the diagnosis in 99% cases. Hypoglycorachia was absent in 33% of PVRI. In addition, given the low size of the study, none of the classical risk factors for VRI was found in our population.

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TIME TO POSITIVITY AS A PREDICTOR FOR LENGTH OF STAY IN INTENSIVE CARE

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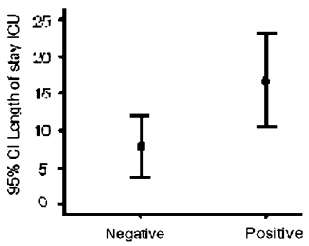
INTRODUCTION. Inadequate antibiotic therapy predicts poor outcome from sepsis, but there is no simple test of adequacy. We suggest that a time-to-positivity assay (Tpos) might act as a surrogate for antimicrobial activity and predict outcome from sepsis in ICU.[1] We conducted a prospective trial to test this hypothesis.

METHODS. In this phase II exploratory study 47 sequential ICU patients with onset of sepsis who had not had antibiotics for > 3 days were recruited. Sepsis was defined as evidence of infection plus ≥ 3 criteria for SIRS. Sera taken at 24 h post empiric antibiotics were inoculated into culture bottles containing standardised bacteria, incubated in an automated system and time to positivity noted. The primary clinical endpoint was days in ICU. We also looked at 28 day survival.

RESULTS. 48.9% were female with an average age of 59.7yrs. Cultures that are negative at 5d incubation indicate adequate antimicrobial therapy; cultures that become positive in < 5d indicate inadequate therapy. The median SOFA scores on day 1 in the negative group was 9 and in the positive group 10($p > 0.05$).There was no statistical association between Tpos1 and 28 day survival($p > 0.05$): consequently, the area under the ROC curve was 55.9% (SE = 9.4%) and sensitivity 50%, specificity 65% for a cutoff of 9 h.Figure 1 shows the length of stay in ICU was significantly predicted by time for Tpos1 ($p < 0.05$).The group where it remained negative at 5 days (ie indicating *adequate* antimicrobial therapy) were more likely to have a shorter stay in ICU (median 7.8d vs. 14.4d).



CONCLUSION. These data show that patients whose Tpos1 remains negative are more likely to leave ICU early. The data also show that if Tpos1 has not become positive after 9 h the patient may do worse. At this point a change in therapy could be considered.

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LIPOPOLYSACCHARIDE INDUCES ALTERATIONS IN LUNG EPITHELIAL CELLS INDIRECTLY THROUGH MACROPHAGES

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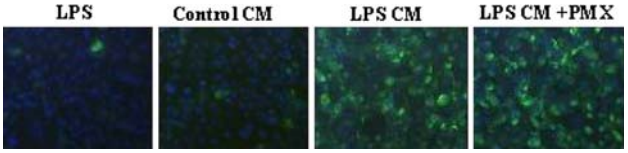
INTRODUCTION. In vivo, lipopolysaccharide (LPS) induces lung injury, causing inflammation, alveolar-capillary leak and epithelial cell death. In contrast to this observation, several in vitro studies have shown pulmonary epithelial cells to be hyporesponsive to LPS stimulation. A possible explanation is that in vivo alveolar macrophages act as a first line of defense to infections, thereby regulating the epithelial response to LPS; however the mechanisms and effects of interaction remain unclear. Therefore, the aim of this study is to further understand and characterize the pulmonary epithelial response to LPS through macrophages. It is hypothesized that the effects of LPS on lung epithelial cells occurs indirectly through the mediators released by activated macrophages.

METHODS. THP1 differentiated macrophages were stimulated with LPS or vehicle and the resulting conditioned media (CM) was subsequently used to stimulate pulmonary epithelial A549 cells. Additionally, polymyxin B (PMX-B) was added to LPS CM prior to A549 cell stimulation to bind and sequester residual LPS. Epithelial cells were also stimulated with LPS alone. After 24 hrs, the epithelial production of IL1b, VEGF, and TNFa (ELISA) and the surface expression of ICAM-1 (IF) were determined.

RESULTS. LPS (10ug/ml or 100ug/ml) and control CM had no direct effects on A549 cells compared to the vehicle. Incubation with LPS stimulated macrophage CM resulted in increased production of IL1b (27.45 $\pm$ 0.94 pg/ml) and VEGF (1085 $\pm$ 121 pg/ml) versus control CM (0 and 584 $\pm$ 36 pg/ml respectively). TNFa, which is not produced by A549 cells, in the LPS CM was reduced by 75% following incubation with A549 cells, suggesting internalization of this molecule by pulmonary epithelial cells. Additionally, there was an up-regulation of ICAM-1 surface expression (representative figure below) by LPS CM versus controls. All observed effects were unaltered by the presence of PMX-B.



CONCLUSION. Inflammatory mediator production and adhesion molecule expression of A549 cells can be induced by LPS indirectly through macrophages. Furthermore, LPS sequestration did not alter this response, implying LPS does not enhance the effects of the macrophage mediators. By understanding these cellular mechanisms involved in LPS-induced pulmonary injury novel therapeutic strategies to prevent acute lung injury can be developed.

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CLINICAL CLUES IN MANAGEMENT OF ACUTE ENCEPHALITIS IN INTENSIVE CARE UNIT

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INTRODUCTION. Encepahlitis occur infrequently and often is difficult to confirm the etiologic agent. The potential for death and neurologic damage makes them important to study all characteristics clinical and biological characteristics registered from the patients.

METHODS. A retrospective study was performed for all persons hospitalized between 2004 – 2006 in Clinic of Infectious Diseases (Iasi) with acute encephalitis. Clinical characteristics, laboratory findings and therapeutic possibilities were obtained.

RESULTS. 106 patients were found. Prodrome or frequent concurrent symptoms at onset consisted of: fever (64,7%), altered level of consciousness (63%), headache (34,5%), gastrointestinal symptoms (31,8%), seizures (24,8%). The clinical profiles founded were: signs of meningeal irritation (36,2%), trouble of conciousness (44,8%), extrapyramidal syndrom (15,5%), paresis of cranial nervs (15,5%), cerrebelar syndrom (13,8%). The frequent abnormal neuroimaging was diffuse cerebral edema (19%). CSF WBC counts median, protein and glucose level median were normal. Identified infectious etiologies were Coxackie virus and measles causing subacute sclerosing panencephalitis. Agreed therapeutical possibilities were: Ampicillin, Acyclovir, measures to control elevated intracranial pressure, dexamethasone and isoprinosine. Conclusions—Diversity of clinical and etiologic characteristics of encephalitis contributes to the difficulty in the diagnosis, management and treatment of this severe syndrome. From 106 cases we found etiologic agent in two cases.

CONCLUSION. Encephalitis remains a significant health problem with tremendous importance especially in children.The diagnosis of acute and atypical neurological disorders must include also the point of view from infectious diseases practitioner.

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RENAL FAILURE AND ICU-ACQUIRED INFECTION

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INTRODUCTION. The widespread use of SOFA score to describe the severity of organ dysfunction or failure in ICU-patients prompted us to use it to prospectively investigate the relationship between renal failure (RF) and ICU-acquired infection (IAI).

METHODS. Assessment of daily SOFA score in 2422 patients hospitalized in a 26-bed general ICU of a university hospital during 4 years (2004–2007). RF was defined by a renal SOFA score of 3 or 4. Each episode of infection was recorded and sepsis severity was defined according to the ACCP-SCCM consensus conference guidelines.

RESULTS. Among 1557 patients without infection on admission (IOA), (62.9% were male, median age was 68 (54–77), SAPS II score 36.3 $\pm$ 13.4; 20.9% came for medical reasons, 42.1% from scheduled surgery, 21.5 % from unscheduled surgery and 15.5% were trauma patients), the median ICU length of stay (LOS) was 6 days (4–12) and hospital mortality was 18.4%. Among these, 215 (13.8%) had a RF either on admission (n = 122) or occurring before any IAI (n = 93). 79 (36.7%) developed an IAI and 28 a septic shock (13%). Among the 1342 patients without RF, 352 (26.2%) developed an IAI infection and 76 (5.7%) a septic shock. There were 37 new episodes of RF possibly related to the IAI. Therefore the proportion of RF related to IAI was only 14.7% (37/352).
The same proportion was observed for the 865 patients with IOA (63.9% were male, median age was 65 (53–75), SAPS II score 43.1 $\pm$ 14.8; 48.0% were medical patients, 14.9% had scheduled surgery, 30.3% had unscheduled surgery and 6.8% were trauma patients) with an ICU LOS of 10 days (5–18) and a hospital mortality of 33.5%. Among the 247 patients with RF occurring before any IAI either on admission (n = 160) or soon after (n = 87), there were 97 patients (39.3%) who developed an IAI with 45 septic shock (18.2%). Among the 618 patients without early RF, 164 (26.5%) developed an IAI with 49 septic shock (5.7%) There were 35 new episodes of RF possibly related to IAI leading to a proportion of 12.4% (35/282). Whether the patient has IOA or not, RF occurrence increases the incidence of IAI and septic shock in the ICU in a statistically significant manner ($p < 0.05$).

CONCLUSION. 1) RF related to IAI represent a minority of cases (72/534 = 13.5%). 2) RF appears to be a risk factor for infection and for the development of septic shock.

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EXTRARENAL DEPURATION AS A RISK FACTOR FOR INFECTION IN THE CRITICALLY ILL PATIENT

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INTRODUCTION. Renal failure in severely ill patients is one of the mean markers of gravity. Objective: To assess the characteristics and infection rate (IR) of ICU patients requiring extra renal depuration (DER).

METHODS. Prospective study performed through out 3 months per year during 2 consecutive years (2006 and 2007) using the methodology and database of the ENVIN-HELICS study. IR are shown per 100 patients and per 1000 days of ICU' stay. The following parameters were surveyed: Ventilator associated pneumonia (VAP), urine infection related to urinary catheter (UC), primary and catheter related bacteremia (PB +CB) and any other kind of bacteremia.

RESULTS. 947 (3,9%) out of 24137 patients required DER. Mean age: 62,2 years. APACHE II score: 24,3 (8,4). Immune system alterations. 26,2%. Extrinsic risk factors: mechanical ventilation (MV) 75,7%, central venous catheter (CVC): 96,2%. UC: 90,88%. Total parenteral nutrition (TPN): 64,7%. Emergency surgery: 28,6%. Antibiotics prescribed before admission: 52,1%, and into the ICU: 84,5%.
Device related IR, mean ICU stay and mortality are shown in table. In addition to the 532 infections controlled by the ENVIN study, another 359 were reported related to other focus (94 infections x 100 patients). Infections caused sepsis in 36,2%, severe sepsis in 18,7% and septic shock in 25%. The micro organisms involved were: GP 28,8%, BGN 51,9%, fungi 18,5% and others 0,8%. Multirresistent infections: colonization-infection by MRSA was reported (was present) in 4,7%, by Acinetobacter in 8,5%, by P aeruginosa in 5,2% and by BLEE in 3,3% of the patients.

TABLE 1

	ICU-Acq Inf % pat	ID $^0/_{00}$	VAP % pt	UTI % pat	PB+CRB %pat	LOS days	Mortality %
ALL	14,2	19,6	6,1	14,1	3,8	7,5	10
ERD	56,1	32,3	23,1	24,2	14,2	17,3	46,5

CONCLUSION. Patients with DER are less than 4% of the total admissions in the ICU. Nonetheless they consume many resources due to the long stay and mortality. Their IR is higher than the overall IR in the ICU and this could be explained by the associated extrinsic and intrinsic risk factors.

GRANT ACKNOWLEDGEMENT. Aventis.

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THE EFFECT OF DANAPAROID SODIUM COMBINED WITH ANTITHROMBIN FOR THE PATIENTS WITH SYSTEMIC INFLAMMATORY RESPONSE SYNDROME (SIRS) ASSOCIATED COAGULOPATHY (SAC)

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INTRODUCTION. Introduction: Danaparoid sodium (DA) is a low molecular weight heparinoid with a mean molecular weight of 6000 daltons. It consists of mainly of heparin sulfate, and high–affinity fraction of heparin sulfate inhibits factor Xa by catalyzing its binding to antithrombin (AT).
In animal experiment,DA was proved to have both anticoagulant and anti-inflammatory activities.
The aim of this study was to investigate the potential benefits of combination therapy using DA with AT compared with the use of AT alone for the patients with SAC.

METHODS. METHODS: The subjects were 22 patients with SAC in our ICU. The patients were divided into two groups, including the AT group: intravenous (iv) administration of 1500 units of AT alone and the AT + DA group: iv administration of the same dose of AT and 2500 units of DA for three days. We measured WBC, CRP, the platelet counts, the values of AT, fibrinogen, FDP, % PT before, 1 and 3 days after the administration of these medicines. Furthermore we examined the changes in scores of APACHE II, SOFA, SIRS, DIC in this study. All data are expressed as mean ± SD.

RESULTS. APACHE II and SIRS scores were decreased significantly in the both groups. SOFA and DIC scores before administration of medicine were significantly high compared with the AT group and significantly decreased at 3 days after the administration in the AT + DA group. The platelet counts decreased significantly in the AT + DA group. The ATIII values increased significantly in the both groups. The FDP values before the administration were significant high in the AT + DA group compared with the AT group and decreased markedly in the AT + DA group. We did not observe significant change of fibrinogen in the both groups. We observed significant increase of % PT only in the AT group.

CONCLUSION. The combination therapy of using danaparoid with antithrombin could reduce SOFA and DIC scores. This therapy may have the potential benefit to improve coagulation abnormalities for the patients with SAC reducing FDP.

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Poster Sessions
Practices at the end of life: 1044–1052

1044

PATIENT OR FAMILY CONTROLLED PALLIATIVE SEDATION IN TERMINAL CANCER

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INTRODUCTION. Terminal cancer patients (pts) experience distressing symptoms (1). Patient/Family-Controlled Sedation(PFCS) with midazolam has not been described before.

METHODS. A prospective protocol was established and a singe sedative was used. Inclusion criteria were severe pain (VAS > 7), age > 18, written pt or family consent, continuous presence of a competent adult at bedside and limited life expectancy, based on a PPI > 7(2)(table1). Midazolam was administered IV in a Pt Control Analgesia mode. The dose was adjusted to pt comfort and the pump was activated as-needed by the pt or a first degree relative. Sedation was rated as: 1) awake 2) arousable to voice 3) arousable to light pain or 4) unarousable. Family satisfaction was rated as: 1) good, 2) fair, 3) poor, or 4) unacceptable.

RESULTS. PFCS was applied in 7 pts in a 3-years period. Respiratory distress, when present, improved. Death occurred 1–6 days after PFCS started; Median sedation score was in the range 1–3 based on three measurements/day (Table 2). Pt demographics, family satisfaction and daily midazolam use are summarized in Table 1.

TABLE 1 PATIENT CHARACTERISTICS, MIDAZOLAM DOSE AND FAMILY SATISFACTION

Case/ Age/ Sex	Main Tumor	Main Symptom	PPI	Satisfaction G=good, F=fair	Mean Midazolam dose (mg/day)	Analgesic Regimen
1/ 38,M	Gastric	Pa, dys, ag	9	G	17	Fe 100 + Mo 80
2/ 24,M	Kidney	Pa, dys, ag	10	G	34	Fe 75 + Mo 100
3/ 64,F	Colon	Pa, ag	9	G	12	Fe 75 + Mo 40
4/ 55,M	Pancreas	Pa, dys	9	F	20	Fe 150 + Mo 60
5/ 73,F	Pancreas	Pa, ag	10	G	15	Fe 50 + Mo 30
6/ 40,M	Gastric	Pa, ag	8	G	40	Fe 150 + Mo 40
7/ 64,F	Lung	Pa, ag	8	G	25	Epidural

Fe=Fentanyl (TTS, mcg/h), Mo=Morphine (IV, mg/day), dys=dyspnea, pa=pain, ag=agitation

TABLE 2 MEDIAN SEDATION SCORE

Case	Day 1	Day 2	Day 3	Day 4	Day 5	Day6
1	3	3	2	death		
2	3	1	death			
3	3	death				
4	3	3	3	death		
5	3	3	2	death		
6	1	2	2	3	3	death
7	2	2	2	3	2	3

CONCLUSION. Patient/Family-Controlled Sedation with Midazolam is very effective in providing comfort in terminal cancer pts, by allowing titration of sedation to individual pt need.

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DOES NON INVASIVE VENTILATION IMPROVE QUALITY OF END-OF-LIFE CARE IN PATIENTS WITH HEART FAILURE?

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INTRODUCTION. End stage heart failure (NYHA class IV) is associated with frequent and prolonged admissions in the hospital. It has been shown that non invasive ventilatory support (continuous positive airway pressure-CPAP and bi-level airway pressure-BiPAP) improves clinical parameters and alleviates breathlessness in these patients. The aim of our study was to assess the role of non invasive ventilation (NIV) in end-of-life care of critically ill patients with end stage heart failure.

METHODS. The study was carried out in the Cardiology Department of a District General Hospital in cooperation with the Intensive Care Unit. Patients with acute respiratory failure in the context of refractory heart failure (functional capacity IV) were enrolled. None was suitable for heart transplantation due to malignancy, multiple organ failure, diabetes or age > 75 years. Standard medical treatment was initially offered to all of them (oxygen, diuretics, digoxin, angiotensin converting enzyme inhibitors, b-blockers, levosimendan, inotropic agents and morphine). NIV was implemented additionally to conventional treatment in order to relieve patients' distress. Dyspnea intensity was assessed independently by two physicians on a 3 hourly basis. The assessment was based on a scale, ranging from 0 to 2 (0 = no effect, 1 = medium improvement, 2 = maximum improvement).

RESULTS. 24 patients were included. The mean age was 69 years and 16 were males. In relevance to dyspnea the score was 1 for 14 patients (58.33%) and 2 for 2 patients (8.33%). No response was noted in 8 cases (33.33%). 20/24 patients died within 24–36 h since application of NIV. In 4 cases significant improvement was documented and ICU supervision was no longer necessary.

CONCLUSION. The majority of critically ill patients with end stage heart failure in our study manifested symptomatic response to NIV. The indication for applying NIV was not therapeutic. Our objective was to palliate patients' agony and provide better end-of-life care.

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CARE UNTIL THE END OF LIFE: REVIEW OF SEDATION AND ANALGESIA IN PATIENTS 24 HOURS BEFORE DEATH

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INTRODUCTION. Among the recommendations for end-of-life care, one of the most important methods of comfort is analgesia and sedation. In a hostile and painful environment as intensive care units, the concern with the reduction of the suffering must be present from the admission of the patient and during through the entire hospitalization. In this work we analyze the prescribed analgesics and sedatives in patients who progressed to death.

METHODS. We retrospectively analyzed the prescriptions of patients who died in the year 2007 with more than 24 h of hospitalization, in a general ICU with 23 beds. We collected patients informations about age, length of stay and the presence of regular analgesics and sedatives prescription within 24 h preceding the death.

RESULTS. There were 1043 admissions and 139 patient deaths. Twenty-five patients were excluded because died before the first 24 h. The mean age was 65.34 years (SD 18.23), with an average length of hospitalization of 13.49 days (SD 12.5). In the select group, 63 patients (55.26%) were in regular use of analgesics within 24 h preceding death and 67 patients were receiving sedatives (58.77%). Seventy-two patients (63.16%) used or analgesia or sedation, and 48 patients (42.11%) received both. A research previously conducted about end of life care with the physicians group (n = 21), none was favorable of the suspension of sedatives or analgesics. In the group of nurses (n = 39) 12.82% agree with the suspension of analgesia (n = 5) and 17.97% of sedation (n = 7).

CONCLUSION. An approach with quality must ensure routine sedation and analgesia of all hospitalized patients, regardless of their prognosis. The speech of maintaining such care, even when death is inevitable, needs to be checked daily since the start of hospitalization. Our goal is that all of our patients receive comfort, and not just a piece, as shown in this study.

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CAUSES OF DEATH AND INCIDENCE OF WITHDRAWAL OF LIFE-SUSTAINING TREATMENT IN A DUTCH ICU

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INTRODUCTION. Withholding and withdrawal of life sustaining treatment is common in the intensive care unit (ICU), but little is known about the type of patients in which treatment is withdrawn. The objective of this study was to evaluate the causes of death, and the incidence of withdrawal of treatment in patients who died in the ICU.

METHODS. A retrospective observational, single centre study in the mixed ICU of a university hospital. All patients admitted to the ICU between November 1, 2006, and October 31, 2007 were included. Age, sex, length of stay, APACHE II score and diagnosis, and SOFA-score were collected for all subjects. Additional data on cause of death and withdrawal of treatment were collected for patients who died in the ICU. Data were extracted from our patient data management system, electronic patient dossier, and handwritten medical charts.

RESULTS. Of the 1,353 patients admitted to the ICU, 218 patients (16.1%) died. Severe and irreversible central nervous system failure was the most frequent cause of death (41.5%), followed by multiple organ failure, accounting for 38.7% of the deaths. Life sustaining treatment was withdrawn in 83.7% of the cases. Almost all patients who died of central nervous system failure, died after withdrawal of therapy.

CONCLUSION. Central nervous system failure is the leading cause of death, closely followed by multiple organ failure. In 83.7% of patients who died in the ICU, life-sustaining treatment is withdrawn.

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MODE OF CARE STRATEGY AT END-OF-LIFE: A 12-MONTH ANALYSIS OF DATA FROM A CENTRAL LONDON INTENSIVE CARE UNIT

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INTRODUCTION. There is little published data in the UK examining the detailed epidemiology of end-of-life management in the critical care setting. Specifically, the distribution of treatment strategy at time of death has not been reported. In this study we examined end-of-life care strategies in 267 patients, who died on the general ICU at a single London teaching hospital between March 1st, 2007 and February 29th, 2008.

METHODS. The study was conducted in the ICU of a large central London teaching hospital (30 critical care beds), accepting general medical, surgical and neurosurgical patients with an established, nurse-led, end-of-life care plan. A prospective definition of five modes of death was made: 'Dead-on-arrival'; 'Death on full support'; 'treatment limitation'; 'treatment withdrawal'; or 'admission for end-of-life care only'. Analysis of patient notes and definition of treatment strategy at death was performed within a month of death to determine the predominant treatment strategy at death. Records were further examined to categorize the primary basis for treatment withdrawal or limitation if this had occurred. Categorization was performed by case record review by an independent ICU physician and checked and agreed with the primary ICU consultant (responsible for the patient at time of death) and nursing/paramedical team at a monthly multidisciplinary meeting.

RESULTS. 5 patients were dead on arrival (4 fixed-dilated pupils > 1 hour). 14 patients were admitted for the sole purpose of providing end-of-life care in an intensive care environment. In 16 additional patients, the consensus of the reviewing clinicians was that (in retrospect) ICU admission had been unequivocally inappropriate, although this latter group were not excluded from the analysis. Treatment withdrawal occurred in 98 patients; treatment limitation occurred in 115 patients and treatment failure (with death on escalating or maximal support) occurred in 35 patients. The primary reason for treatment limitation or withdrawal was underlying diagnosis in 126 (59.2%); pathophysiological futility in 70 (32.9%); patient request in 11 (5.2%) and subjective (age or quality of life prior to acute illness) in 6 (2.8%). No advanced directives were available for any unconscious patient.

CONCLUSION. Most patients who died in the ICU had treatment limitation or withdrawal. The commonest justification for treatment limitation/withdrawal was futility related to the underlying diagnosis rather than from extremes of pathophysiology or subjective criteria such as age. Interestingly, 14 cases were admitted with the sole purpose of providing end-of-life care.

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COMMUNICATION WITH RELATIVES OR VISITORS OF ICU PATIENTS - REALISTIC GOALS

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INTRODUCTION. Effective communication with the relatives or visitors of critically ill patients is essential for clinical, ethical and legal reasons, and provides relatives with an insight into the patients' diagnosis, current condition, management plan and likely outcome. This allows family to feel part of the management and reduces fears and anxieties which arise due to misunderstandings.

METHODS. We conducted a prospective audit over 6 months at our ICU department. Next of kins of 76 patients admitted were questioned using a pre-prepared questionnaire based on "Proposed standard or target for best practice" with regards to "Communication with relatives or visitors of ICU patients" as described by the Royal College of Anaesthetists audit recipe book.

RESULTS. 1. 40% of relatives were acknowledged by the ICU nurses within 2 minutes.
2. 36% were given information within 15 minutes of arrival and 24% within 15–30 minutes.
3. 50% were interviewed by the ICU doctor in less than 30 minutes and 20% had no interview at all.
4. On 32% of days there were formal interviews with doctors; 24% of whom were consultants.
5. 98% of the time the interviews were documented in patient notes and the consistency between medical and nursing notes were 46%. Nurses documentation towards the end of their shift and incomplete information were the main reasons for the inconsistency. Essential information were however consistent.

CONCLUSION. Inspite of the observed results being significantly less than the 100% targets set by the Royal College, a similar survey in our ICU department (in 2006) showed that 92% of relatives were satisfied with the overall level of communication. Following the results of our audit we conducted a telephone survey of 70 ICU departments across UK, questioning a senior member of the nursing staff. The results showed only 10% were aware of the national guidelines; 26% acknowledged relatives within 2 minutes of their arrival into the ICU; 10% see them within 15 minutes of arrival of the patient; 24% have a daily formal interview with a doctor; 6% said relatives are seen by a consultant daily; and 100% said all communication is documented in case notes.
If proposed guidelines were strictly adhered to the satisfaction of relatives would likely be significantly higher than our survey results however the reality is that ICU departments are frequently unpredictable and busy. Common reasons for failure to reach these targets are, insufficient medical or nursing staff available to talk to relatives, preoccupation of staff with emergencies and family being unable to travel to the hospital. We contend that the proposed standards are unrealistic given the busy and unpredictable nature of the intensive care environment. We suggest that overall satisfaction is ultimately the best measure to evaluate communication between health care staff and relatives of critically ill patients.

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WITHDRAWING AND WITHHOLDING LIFE SUSTAINING TREATMENTS: DECISION MAKING AND APPLICATION: A TWO-YEARS STUDY

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INTRODUCTION. Decisions of withdrawing and withholding of life sustaining treatments are made during a weekly meeting so called "ethical meeting", during which a report is systematically written. Since april 2005, french law has defined conditions under which such type of decision can be made. We analyzed how our decision-making process matched the law, and what were the modalities of application of such decisions.

METHODS. This retrospective study was performed within our 15-beds intensive care unit. We analysed the patient files and ethical meeting reports from 2005 and 2006: 52 items were collected, including the number and qualification of participants to the meeting, whether an external practitioner had given advice, the implication of the family, the modalities of application.

RESULTS. 1137 patients were admitted in the study period: 280 died (23.8%) and 94 withdrawing or withholding life sustaining treatments (WWLST) were decided (8% of admissions). Patient with WWLST tended to be elderly (61 mean age vs. 55.5) and more severe (SAPS 56.9 vs. 46)as compared with overall patients. The average delay between admission and ethical meeting was 12.9 days; the idea of WWLST appeared in the file in 37.2% of cases, on average 2 days before the decision. Patients will were expressed in 26.6% of cases, by the patient himself in 56% of cases. Relatives were known in 97% of cases, 76% of which had given their opinion. On average, 5.5 people were present in ethical meetings. External practitioners have been contacted 42 times = 44.7% of cases . 87.2% of families accepted the decision, one family refused, others did not give their opinion. 42 withdrawing decisions: a sedation protocol has been used for 54.7% of patients; 29 terminal extubations have been performed (= 69% of cases). Death occurred on average 2.2 days later. 56 withholding decisions: death occurred on average 7.1 days later. 74 of the 94 patients died (78.7% of WWLST, 26.4% of all dead patients) and 20 survived (21.2% of WWLST). The family was present during death in 52.7% of cases.

CONCLUSION. A WWLST decision is made on average once a week, more often in older patients, and those whose SAPS is 25% higher than the average. These weekly ethical meetings implying all persons in charge of the patient are important events in the life of the unit. Reaching a consensus may delay the moment of the decision. The fact that more than one for five of these patients leaves the unit alive proves that nothing is done to accelerate their death. Advice from an external practitioner often remains difficult to obtain, but this is improving with time.

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A COMPARATIVE PROFILE OF FAMILY MEMBER NEEDS OF ICU PATIENTS BASED ON THE SEVERITY OF ILLNESS

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INTRODUCTION. We have earlier elucidated the immediate needs of family members of patients admitted to the Intensive care units (ICU). We sought to conduct a comparative analysis of the needs among family members of patients on the basis of the severity of the illness.

METHODS. We conducted a multi-center prospective questionnaire based study. All patients admitted to the ICU of the three Fortis Hospitals (tertiary care multi-specialty hospitals) in the North India (Noida, Vasant Kunj & Faridabad) for at least 72 h were included. The nearest relative of each patient were administered an Indian customized version of the modified Molter's questionnaire, also known as the Critical Care family Needs Inventory. The total number of domains (namely Information, Comfort, Support, Assurance, and Proximity), the total number of questions ($n = 45$) as well as the choice of responses (1: 'not important' to 4: 'very important') were as in the original questionnaire. The responses were converted into a binomial variable by merging 1&2 as one category and 3&4 as another category. The frequency of each response was then compared between the groups formed on the basis of APACHE II score (with a cut-off of 10) and need of mechanical ventilation.

RESULTS. A total of 268 patients were included (Noida: $n = 104$, 38.8%; VK: $n = 84$, 31.3%; Faridabad: $n = 80$, 29.9%). Overall Information was the most frequent felt need followed by Comfort, Proximity, Assurance and Support. However, relative of patients with higher APACHE II score were more likely to have Assurance needs ('A14': 94.5% vs. 81.3%, OR, 95% CI: 4.1, 1.6–10.2, $P < 0.001$; A28: 75.2% vs. 62.2%, OR, 95% CI: 1.8, 1.1–3.2, $P = 0.033$) and Information needs (I39: 91.7% vs. 81.4%, OR, 95% CI: 2.5, 1.1–5.6, $P = 0.02$; I4: 73.6% vs. 60.9%, OR, 95% CI: 1.79, 1.04–3.06, $P = 0.035$). Further, relative of patients who were being mechanically ventilated also had higher Assurance needs (A25: 60.9% vs.40.5%, OR, 95% CI: 1.17, 1.03–1.33, $P = 0.014$).

CONCLUSION. Family members of ICU patients with higher severity of critical illnesses, as indicated by APACHE II score and need of mechanical ventilation, are more likely to have needs related to Assurance and Information.

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SUPPORT OF THE FAMILY IN THE INTENSIVE CARE UNIT: A NATIONAL SURVEY

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INTRODUCTION. It could be argued that the structure of an intensive care unit (ICU) is designed to suit the functions of the medical and allied professions. Within such a framework, it is important that we also recognise the needs of the patient's family. Guidelines for support of the family in the patient-centred intensive care unit have recently been published. [1]

METHODS. Part A: We circulated a post-discharge questionnaire to the next of kin of patients discharged from our ICU during the month of October 2007. Part B: A telephone survey was also conducted in order to ascertain arrangements for family support across all of the ICUs in Northern Ireland.

RESULTS. Part A: Out of 29 discharges 27 responses were obtained. 96% of respondents felt that the visiting arrangements suited them. Despite a time limited visiting policy, 67% of respondents were able to visit out of h. 96% of respondents felt the waiting area met their needs. 93% felt that their questions were listened to and answered all of the time. 85% felt that they had the opportunity to participate in decision making. Part B: All 9 ICUs in Northern Ireland were contacted. A 100% response rate was obtained. 4 units did not have a designated family waiting room. 7 units did not have a designated family discussion room. 1 unit allowed 24 h unrestricted visitation. 8 units had a restricted visiting h policy ranging from 4 to 8 h. 5 units placed an age restriction on visitation (age 16).

CONCLUSION. Restricted visiting policies are in place in ICUs across Northern Ireland. Despite a restricted visiting policy in our ICU 67% of respondents were able to visit out of h. This indicates a degree of flexibility with regard to visitation on a case by case basis. A number of ICUs across Northern Ireland have neither a designated waiting area for families nor a designated discussion room. This contravenes nationally accepted guidelines for minimum standards for intensive care units.[2] A majority of units in Northern Ireland use age 16 as the threshold age for visitation to the ICU. Attitudes of both healthcare staff and relatives to age restriction on visitation to the ICU should be assessed.

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