0352

EFFECT OF CSF FROM SUBARACHNOID HEMORRHAGE-PATIENTS WITH OR WITHOUT VASOSPASM ON ENDOTHELIN-1 SENSITIVITY AND PRODUCTION ON ISOLATED RAT BASILAR ARTERY

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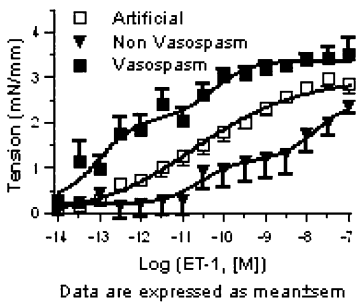
INTRODUCTION. After subarachnoid hemorrhage (SAH) the presence of breakdown blood products is considered the initial trigger of vasospasm; however the subsequent pathogenic mechanisms remain unclear. The aims of this study were to: 1) compare the response to endothelin-1 (ET1) on isolated cerebral vessel incubated for 24 hours with CSF collected from patients with or without vasospasm, and 2) quantify ET1 production during incubation with CSF.

METHODS. CSF was collected daily from patients with SAH and the occurrence of vasospasm was diagnosed by angiography. Rat basilar arteries were dissected and incubated with 5% of CSF from patients with or without vasospasm or artificial CSF. After 24 hours, the vessels were mounted on a wire myograph. The contractile response to ET1 was assessed and ET1 production was measured in the culture media of these incubated vessels.

RESULTS. The vessels incubated for 24 hours with CSF from SAH patients with vasospasm showed an enhanced contractile response to ET1 compare to patients without vasospasm or artificial CSF. Incubation with CSF from both types of SAH patients induced a biphasic dose-response curve, while artificial CSF resulted in a sigmoidal curve. The pEC50(1) and pEC50(2) of the dose response following incubation with CSF from vasospasm patients were significantly lower than non vasospasm indicating an increased sensitivity to ET1. Production of ET1 was significantly up-regulated in the arteries stimulated with CSF from vasospasm patients (1.87 $\pm$ 0.36 pg/ml) compared to vessels stimulated with CSF from patients without vasospasm or artificial CSF (0.88 $\pm$ 0.04 and 0.83 $\pm$ 0.17 pg/ml respectively; $p < 0.05$).



CONCLUSION. These results suggest that mediators specific to the CSF of patients with vasospasm alter the behaviour of normal cerebral vessels through modulation of the ET1 pathway.

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0353

RED BLOOD CELL TRANSFUSION AND CEREBRAL OXYGENATION IN PATIENTS WITH SEVERE TRAUMATIC BRAIN INJURY

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INTRODUCTION. To investigate the long-term influence of erythrocyte transfusion on cerebral oxygenation (PtiO2) in patients with severe traumatic brain injury.

METHODS. Prospective and observational study. Neurotrauma intensive care unit of trauma center level I. Sixty consecutive, hemodynamically stable patients with severe traumatic brain injury, pre-transfusion hemoglobin < 10 g/dL, non-bleeding and monitored through intracranial pressure and brain tissue partial oxygen pressure (PtiO2) catheters were included. All patients were transfused with 1–2 units of red blood cells.

RESULTS. Ten sets of variables (pre-transfusion, end of transfusion, and 1, 2, 3, 4, 5, 6, 12 and 24 hours after transfusion) were recorded, including: PtiO2, cerebral perfusion pressure (CPP), end-tidal CO2, peripheral oxygen saturation, temperature, hemoglobin, lactate and PaO2/FiO2 ratio. Transfusion was associated with an increase in PtiO2 during a 6-hour period, with a peak at 3 hours (26.2%; P = 0.0001) in 78.3% of the patients. No relationship was observed between PtiO2, CPP and hemoglobin increments. The relative increment in PtiO2 at hour 3 was only correlated with baseline PtiO2; r2 0.166; P = 0.001. All of the patients with basal PtiO2 < 15 mmHg showed an increment in PtiO2 versus 74.5% of patients with basal PtiO2 $\geq$ 15 mmHg (P < 0.01, hour 3).

CONCLUSION. Erythrocyte transfusion is associated with a variable and prolonged increment of cerebral tissue oxygenation in anemic patients with severe traumatic brain injury. Low baseline PtiO2 levels (< 15 mmHg) could define those patients who benefit the most from erythrocyte transfusion.

GRANT ACKNOWLEDGEMENT. Supported by Spanish Goverment founds (FIS) PI 04296.

0354

EFFECT OF OSMOTHERAPY WITH MANNITOL AND HYPERTONIC SALINE ON CEREBRAL OXYGENATION IN PATIENTS WITH SEVERE TRAUMATIC BRAIN INJURY AND REFRACTORY INTRACRANIAL HYPERTENSION

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INTRODUCTION. To analyze the effects on brain tissue oxygen pressure (PbtO2) of mannitol and hypertonic saline (HTS) in patients with severe traumatic brain injury (TBI) and refractory intracranial hypertension.

METHODS. Twelve consecutive patients with severe TBI (GCS $\leq$8), admitted to our Neuro-ICU, monitored with continuous PbtO2, and treated with mannitol (25%, 0.75 g/kg) and HTS (7.5%, 250 ml) for recurrent episodes of elevated intracranial pressure (ICP > 20 mm Hg), were retrospectively identified from a prospective observational database. PbtO2, ICP, mean arterial pressure (MAP), cerebral perfusion pressure (CPP), central venous pressure (CVP) and cardiac output, were recorded every 30 minutes for 120 minutes after osmotherapy.

RESULTS. A total of 42 episodes of intracranial hypertension, treated with mannitol (n = 28 boluses) and HTS (n = 14 boluses), were analyzed. Baseline PbtO2, ICP, CVP, cardiac output, MAP, and CPP were comparable. Mean CPP and MAP did not differ significantly at each time-point analyzed. HTS treatment was associated with a significant improvement of cerebral oxygenation in patients with severe TBI (Table 1). HTS was also associated with better ICP control and improved systemic hemodynamics.

TABLE 1

VARIABLE	MANNITOL (n=28)	HTS (n=14)	P VALUE
PbtO2 (mm Hg) baseline	28.6 $\pm$ 11.0	27.4 $\pm$ 13.7	0.77
30 min	27.7 $\pm$ 11.8	34.2 $\pm$ 17.6	0.18
60 min	26.0 $\pm$ 11.0	36.3 $\pm$ 17.1	0.04
120 min	26.9 $\pm$ 11.2	40.4 $\pm$ 17.4	0.007
ICP (mm Hg) baseline	28 $\pm$ 7	27 $\pm$ 8	0.73
30 min	20 $\pm$ 7	17 $\pm$ 7	0.20
60 min	21$\pm$ 9	15 $\pm$ 6	0.03
120 min	22 $\pm$ 7	15 $\pm$ 6	0.002
CVP (cm H2O)	6 $\pm$ 3	7 $\pm$ 5	0.20
30 min	6 $\pm$ 3	9 $\pm$ 6	0.08
60 min	5 $\pm$ 3	8 $\pm$ 4	0.04
120 min	5 $\pm$ 2	8 $\pm$ 5	0.04
CO (L/min) baseline	6.4 $\pm$ 1.3	6.4 $\pm$ 1.8	0.95
30 min	6.0 $\pm$ 1.0	7.6 $\pm$ 1.4	0.002
60 min	6.2 $\pm$ 1.2	7.7 $\pm$ 1.7	0.007
120 min	6.1 $\pm$ 1.1	7.5 $\pm$ 1.4	0.004

CONCLUSION. In patients with severe TBI and refractory intracranial hypertension, osmotherapy with hypertonic saline solutions is associated with a significant improvement of cerebral oxygenation and systemic hemodynamics.

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0355

CEREBRAL OXYGENATION IN SEVERE TRAUMATIC BRAIN INJURY AND STORAGE TIME OF TRANSFUSED BLOOD

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INTRODUCTION. Prolonged erythrocyte storage time might reduce the efficacy of transfusion. In this study, the effects of transfusion of erythrocytes with four different storage periods (< 10 days, n = 18; 10–14 days, n = 15; 15–19 days, n = 17; and > 19 days, n = 16 patients) on brain tissue oxygen tension (PtiO2) in stable male patients with severe traumatic brain injury, were investigated during a 24 hours follow-up period.

METHODS. Prospective, observational study carried out at Neurotrauma critical care unit of a University Hospital. Sixty-six male, non-bleeding, hemodynamically stable anemic patients (hemoglobin < 9.5 g/dL) with Glasgow Coma Scale < 9 were included. PtiO2, cerebral perfusion pressure, mean arterial pressure, intracranial pressure, peripheral oxygen saturation, CO2 pressure at the end of expiration and intracerebral temperature were recorded in all patients at baseline, immediately after the completion of transfusion and 1, 2, 3, 4, 5, 6, 12 and 24 hours post-transfusion.

RESULTS. All four groups were homogeneous with respect to multiple baseline variables, except for storage time of transfused erythrocytes (P < 0.0001). There was a significant short-lasting (3–4 hours) increase in PtiO2 values after transfusion of erythrocytes stored for < 10 days, 10–14 days, or 15–19 days, when compared to those at baseline. In contrast, no significant changes in PtiO2 were observed after transfusion of erythrocytes stored > 19 days. Not inter group differences were observed.

CONCLUSION. Transfusion of erythrocytes increased cerebral oxygenation in patients with severe traumatic brain injury, except in those transfused with erythrocytes stored for more than 19 days.

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0356

500ML OF BLOOD LOSS DOES NOT DECREASE NON INVASIVE TISSUE OXYGEN SATURATION (STO2) MEASURED BY NEAR INFRARED SPECTROSCOPY IN HEALTHY ADULTS

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INTRODUCTION. In the past, non-invasive tissue oxygenation (StO2) measurement by near infrared spectroscopy (NIRS) and iatrogenic ischemic stress test (IIST) has been used to detect under-perfusion in shock patients, mainly in ICU. IIST has not been performed in a prospective controlled setting with a standardized blood loss. Therefore to investigate if blood loss of 500ml is leading in healthy blood donors to detectable changes by NIRS.

METHODS. Prospective evaluation of 20 healthy female blood donors (500ml, ca.10% of circulating blood volume) with a body weight between 50 and 65kg. StO2 was continuously measured on the thenar eminence with InSpectra® (Model 650, Hutchinson Technology, Minn.USA). From the StO2 values and the tissue hemoglobin index (THI) HbO2 was calculated. Blood pressure, StO2 and HbO2 values at the beginning and immediately after blood donation(BD) were calculated. The ischemic stress test was performed by occluding the brachial artery by a sphygmomanometer cuff inflated 50mmHg over systolic blood pressure for 3 minutes. Pre- defined variables were calculated out of the recorded StO2 and HbO2 values. To detect a difference in variable before and after blood donation, the non-parametric Wilcoxon matched-pairs signed-ranks test was used.

RESULTS. Median age was 30.5 yrs (range 19–62), median body weight 58 kg (range 50–65). There was a significant decrease in systolic blood pressure (BP) from 121.8 ± 9.9 (mean ± SD) to 112.8 ± 10.7 ($p < 0{,}0001$).
However variables measured by NIRS did not change significantly: StO2 79.3 ± 5.0% to 78.6 ± 5.3% (p = 0.35); HbO2 1067.5 ± 162.8 to 1056.8 ± 176.6; (p = 0,44). Variables measured after ISST did not change significantly, too: StO2 slope of recovery 3.0 ± 0.8%/sec to 3.1 ± 0.6%/sec (p = 0,26); HbO2 slope of recovery 59.2 ± 17.9/sec to 61.6 ± 13.6/sec (p = 0.6); delta StO2 13.7 ± 3.1% to 14.6 ± 4.1% (p = 0.4). There was a trend in delta HbO2 429.5 ± 153.9 to 468.5 ± 129.0 (p = 0.058). The study was underpowered to show a possible significant change.

CONCLUSION. Although systolic blood pressure decreased significantly after blood donation of 500ml, StO2 did not show any significant change in baseline. Furthermore, there were no significant changes after ischemic stress tests. Only HbO2 increased nearly significantly after blood donation. In order to understand the physiological background of these findings, more systematic research is needed.

0358

OFF HOUR ADMISSION TO THE INTENSIVE CARE IS NOT ASSOCIATED WITH INCREASED MORTALITY

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INTRODUCTION. Off hour admission to the ICU has been associated with increased as well as with decreased mortality. We evaluated whether ICU admission during off hours affects hospital mortality.

METHODS. All 3 ICUs are mixed surgical/medical intensivist led units in non-academic teaching hospitals. Intensivists are available 24/7 and intensivists on duty have no obligations outside the ICU. During daytime the intensivist is available at the bedside in the ICU and rounds are made at least twice daily. During off hours the intensivist is generally not present in the hospital, but is available within 15 minutes. Off hours were defined as the period between 10 PM and 8 AM during weekdays and between 6 PM and 9 AM in the weekend. All patients fulfilling APACHE II criteria (age>15, no burns, no cardiac surgery, LOS>8 hrs) admitted in 2004–2007 were included. A standardised dataset for calculation of APACHE II and SAPS II scores including standardised mortality ratios (SMR) was prospectively collected.

RESULTS. A total of 6725 patients were admitted in the study period. Table 1 shows that off hours patients are sicker than daytime patients. Hospital mortality is higher in off hour patients, but SMR is not significantly different (Table 2). In logistic regression analysis off hour admission is not an independent risk factor for increased mortality (Table 2).

TABLE 1 PATIENTS

	Daytime	Off hours	p
Number of patients	4553	2172	
Mean age (SD)	65.9 (15.3)	63.5 (18.0)	<0.001
Mean APACHE II (SD)	16.3 (8.6)	17.9 (9.0)	<0.001
Mean SAPS II	35.7 (18.3)	40.6 (18.2)	<0.001

TABLE 2 HOSPITAL MORTALITY

	Daytime	Off hours	Crude OR (95% CI)	Adjusted OR (95% CI)*
Hospital mortality	767 (16.8%)	469 (21.6%)	1.36 (1.20–1.55)	1.13 (0.97–1.31)
APACHE II SMR(95% CI)	0.65 (0.60–0.71)	0.68 (0.61–0.75)		
SAPS II SMR (95% CI)	0.68 (0.63–0.74)	0.69 (0.62–0.76)		

**including age and APACHE II expected mortality in the model*

CONCLUSION. Off hour admission to the ICU is associated with increased mortality. This is seems to be explained though by higher illness severity in patients who were admitted off hours.

Oral Presentations
ICU admission: 0357–0362

0357

ARE "OFF HOURS" ICU ADMISSION ASSOCIATED WITH HIGHER MORTALITY?

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INTRODUCTION. Staffing levels in acute care hospitals tend to be lower during evening, night, weekend and holyday shifts (referred to as 'off hours') even in intensive care units (UCI's). Only sparse data are available on the relationship between time of admission and mortality, with the few published reports yielding contraction results.We sought to determine whether ICU mortality rates differ according to the time of admission: day or "off-hours".

METHODS. Retrospective cohort study on patients admitted to our mixed ICU from December 2001 to November 2007. For each admission, age, sex, category of admission, date and hour of admission, SAPS II, ICU and hospital lengths of stay and ICU and hospital mortalities were recorded. Patients were grouped according to their day and time of admission in weekday day shifts and off hours (from 8:30pm to 8:29am for night shifts and from Friday 8:30pm to Monday 8:29am for weekends) and compared using univariable and multivariable analyses. The main outcome measure was in-hospital mortality.

RESULTS. Of the 1031 patients admitted during the study period, 775 (75%) were admitted within the "off hours" period (34% over night and 41% during weekend). No significant difference was found, between both groups, regarding age, gender and SAPS II score. Regarding category of admission a great proportion of trauma patients were admitted "off hours" (34% vs 24%, p=0.01). Comparing the group admitted during daytime and 'off-hours' no significant difference was found regarding ICU mortality (28% vs 29%, p=0.662) or hospital mortality (33% vs 34%, p=0.715). In a logistic regression model with ICU mortality as end point, adjusted to age, gender, SAPS II, category of admission and ICU admission time, for patients admitted during daytime we found an OR =0.886 (95% CI =0.620−1.265).

CONCLUSION. Admission in ICU is more common during "off hours". The results of the few studies that examined the effect of the time of admission on outcome were contradictory probably reflecting the different organizations in the care of critical ill patients and type of ICU. In our unit, there is a consultant on site 24h/day, every day and the nurse-to-patient ratio is at least 1:2. As long as adequate staffing is maintained, and necessary diagnostic and therapeutic modalities are available, weekend and night admission should not be associated with differences in patients outcome.

0359

THE EFFECT ON IN-HOSPITAL MORTALITY OF DELAYED ADMISSION TO CRITICAL CARE

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INTRODUCTION. In the United Kingdom there is evidence of insufficient critical care facilities (1) which leads to delays in intensive care unit admission (2) and inter-hospital transfers. Critically ill patients are at increased risk of morbidity and mortality during transport (3) and therefore, wherever possible, in our institution we use theatre recovery as a critical care overflow facility until an internal bed becomes available. An audit in our institution in 2007 showed an increased mortality for patients cared for in recovery compared with those admitted directly to critical care(4). However, this did not take into account illness severity.

METHODS. Patients admitted indirectly to critical care via theatre recovery over a two year period from April 2006 – March 2008 were identified. Their APACHE II score, hospital outcome and predicted mortality were compared with those patients admitted directly to ICU.

RESULTS.

TABLE 1

Year	Source of admission	Number	Mortality %	Mean APACHE II	Predicted Mortality %	P value Chi square
2006/07	Recovery	68	43	14.5	27.5	0.012
2006/07	Direct	757	30.1	16.7	32.8	0.12
2007/08	Recovery	55	30.1	14.6	26.4	0.44
2007/08	Direct	805	25	16.1	30.2	0.002

CONCLUSION. Patients admitted to critical care via the recovery overflow facility have a higher mortality than those admitted directly. They also have a higher mortality than those patients transferred between UK ICUs (hospital mortality 26%/mean APACHE II 16.3/predicted mortality 31.5%)(5). This cannot be explained by illness severity. More ICU beds should be made available and care levels increased in recovery. Early patient transfers should be considered in the absence of an immediately available critical care bed.

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0360

RECOGNITION OF THE DETERIORATING PATIENT REDUCES UNPLANNED ADMISSIONS TO THE INTENSIVE CARE UNIT

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INTRODUCTION. Unplanned intensive care unit (ICU) admissions from the ward are often triggered by the failure to recognize and appropriately manage deteriorating patients. This is evidenced by delays in admission to the ICU (1), unexpected referrals to intensive care and unexpected deaths often being preceded by significant physiological disturbances (2). The ability to detect early deterioration in patients allows early appropriate intervention. Early intervention can reduce unplanned admissions to the ICU and unexpected deaths (3). The aim of the project was to reduce the number of unplanned ICU admissions by introducing an intervention onto four wards which included: - The implementation of a new education program "COMPASS", the introduction of a new observation chart and the use of a track and trigger system.

METHODS. A four month prospective, controlled, before and after intervention trial in four wards at a district and tertiary hospital was undertaken. The ethics committee waived the need for consent. Demographic data collected on all admissions included: age, gender, and admission diagnosis. Outcome data included: frequency of observations, unplanned ICU admissions, cardiac arrests, medical emergency team reviews and hospital outcome.

RESULTS. There were a similar number of ward admissions for the two periods (1196 and 996 respectively). The frequency of vital sign measurement increased for respiratory rate (2.7 to 4.7 per day, $p < 0.0001$) and arterial oxygen saturation (4.3 to 6.8 per day, p=0.02). There was a decrease in unplanned ICU admissions (21 to 5, p=0.005) and cardiac arrests (4 to 0, p=0.03). Medical emergency team reviews increased from 27 to 51 ($p < 0.001$) and the number of hospital deaths decreased from 35 to 16 (2.9% to 1.6% of all first admissions, p=0.05).

CONCLUSION. A three pronged approach to the recognition of the deteriorating patient increases their detection and appears to reduce the number of unplanned admissions to ICU. This simple intervention has the potential to improve patient outcome.

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0361

THE INCLUSION OF PULSE OXIMETRY AS A COMPONENT OF AN EARLY WARNING SCORE IMPROVES ITS ABILITY TO PREDICT MORTALITY FOLLOWING A CARDIAC ARREST CALL OR UNPLANNED INTENSIVE CARE UNIT (ICU) ADMISSION

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INTRODUCTION. It is well recognised that ward based early warning score systems can be used to predict outcome (1). In 2007 the UK's National Institute for Health and Clinical Excellence (NICE) recommended (2) that physiological scoring systems should include the following variables: heart rate (HR), systolic blood pressure (BP), respiratory rate (RR), temperature (T), assessment of consciousness level (Alert, Verbal response, Pain response, Unresponsive – AVPU) and oxygen saturation (SpO2). The aim was to assess several published scoring systems against our existing Modified Early Warning Score (MEWS) which includes HR, BP, T, RR, AVPU and urine output (UO).

METHODS. For a period of 3 months from January to April 2008 physiological data were collected for all unplanned ICU (uICU) admissions and cardiac arrest (CA) calls in our institution. Up to 24 hours of physiological parameters prior to the event and the documented MEWS were taken from ward observation charts and collated on a database. The maximum pre-event value for each patient was then compared to corrected MEWS (recalculated from documented physiology), PMEWS (HR, BP, RR, T, AVPU, SpO2), NMEWS (HR, BP, RR, T, AVPU, SpO2, FiO2) and SEWS (HR, BP, RR, T, AVPU, SpO2, UO).

RESULTS. Hospital discharge data were available on 86 patients (overall mortality 45.3%) with 44 CA calls (mortality 54.5%) and 42 uICU admissions (mortality 38.5%). Results are reported as median (IQR) and P values from Mann Whitney test. Receiver Operating Characteristic (ROC) curve areas were different among the scoring systems with the best prediction being those containing a SpO2 score.

TABLE 1

	Alive	Dead	P	ROC Area	95% CI
Documented MEWS	4 (2–6)	4.5 (2–8)	0.094	0.62	0.49 to 0.74
Corrected MEWS	3 (1–5)	4 (2–6)	0.175	0.60	0.46 to 0.73
PMEWS	3 (2–6)	6 (3–7.5)	0.003	0.71	0.59 to 0.83
NMEWS	5 (2–7)	6.5 (4–9)	0.022	0.66	0.53 to 0.79
SEWS	3 (1–4.5)	5 (2.5–7)	0.008	0.69	0.56 to 0.81

CONCLUSION. The addition of SpO2 to early warning score systems improve their ability to predict hospital discharge mortality following a cardiac arrest call or unplanned ICU admission. Further work is ongoing regarding defining appropriate weightings for each sub-group.

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0362

THE CHARACTERISTICS OF PATIENTS RECEIVING A REPEAT MEDICAL EMERGENCY TEAM ACTIVATION

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INTRODUCTION. Several studies have evaluated epidemiological characteristics of patients receiving a Medical Emergency Team (MET) call. However, no published data is available on patients receiving more than one MET call (2nd MET call patients) and how they differ from those with a single activation. This study aims to analyze the epidemiology of these 2nd MET call patients.

METHODS. A retrospective observational study carried out in a single tertiary care Australian teaching hospital. We retrieved information about patient demographics, reasons for the MET call, procedures performed by the MET and the outcome of the MET patients during the hospital stay. For 2nd MET call patients, we referred to their characteristics presented at the 1st MET activation. The Ethics committee of the hospital waived the need for informed consent.
For statistical analysis we used SPSS version 13.0 for Windows. Data are given as mean (and median) ± standard deviation (SD) for continuous variables or as percentage for categorical variables. Chi-square, Wilcoxon Sum Rank or Mann-Whitney U tests were used as indicated to compare different subgroups, $p < 0.05$ was considered statistically significant.

RESULTS. We analyzed 2237 MET calls activated in 1667 patients during the period 16 August 2005 - 15 August 2007. Three hundred eighty-two patients (22.9%) received more than 1 MET call and up to 13 times during the hospital stay (mean 2.53 calls, median 2). Table 1 summarizes our major epidemiological findings for the entire population as well as the two subgroups of single and 2nd MET call patients. The mean age of the study group was 69.8 years (±16.8), mean length of stay (LOS) 23 days (±34.4), 55.4% of the patients were men and 46% were post-surgical. The MET instituted Not For Resuscitation (NFR) orders in 12.5% of the patients reviewed and 212 unplanned Intensive Care Unit (ICU) admissions occurred during the study period. Overall, in-hospital mortality was 34.3%. Single MET call patients tend to already have an existing NFR order compared to 2nd MET call patients. Second MET call patients were more likely to be surgical and dysrhythmias were a more common trigger. They also had a 50% longer LOS and a 30% increase in mortality.

TABLE 1 EPIDEMIOLOGICAL AND OUTCOME CHARACTERISTICS OF OVERALL POPULATION, SINGLE AND 2ND MET

	Overall	Single MET call group	2nd MET call group	p value
Age*	69.8 (74) ± 16.8	69.5 (74) ± 17.1	70.5 (74) ± 15.5	0.287
Sex (male)	923/1667 (55.4%)	715/1287 (55.6%)	208/380 (54.7%)	0.778
Surgical	766/1667 (46%)	560/1287 (43.5%)	206/380 (54.2%)	< 0.001
NFR before	377/1667 (22.6%)	305/1287 (23.7%)	72/380 (18.9%)	0.052
NFR after	209/1667 (12.5%)	168/1287 (13.1%)	41/380 (10.8%)	0.242
Unplanned ICU admission	212/1667 (12.7%)	171/1287 (13.3%)	41/380 (10.8%)	0.199
LOS*	23 (15) ± 34.4	20.5 (13) ± 34.3	31.7 (22) ± 33.2	< 0.001
Hospital mortality	571/166 (34.3%)	409/1287 (31.8%)	162/380 (42.6%)	< 0.001

**For continuous variables mean (median) ± Standard Deviation are given*

CONCLUSION. Patients requiring a 2nd MET call have a higher in-hospital mortality and longer LOS compared to those receiving only a single activation Delayed institution of NFR orders could be one of the possible reasons for this difference.

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Molecular mechanisms of acute lung injury: 0363–0368

0363

ACUTE LUNG INJURY: APOPTOSIS IN EFFECTOR AND TARGET CELLS OF THE UPPER AND LOWER AIRWAY COMPARTMENT UPON ENDOTOXIN AND HYPOXIA-INDUCED INJURY

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INTRODUCTION. Apoptosis has been considered as an underlying mechanism in acute lung injury (ALI) and acute respiratory distress syndrome (ARDS). Endotoxin-induced injury is an experimental in vitro and in vivo model closely resembling ALI and ARDS. Previous studies show that hypoxia can exert a pro-inflammatory effect on the lung, and might be an essential co-factor for ALI/ARDS. Therefore, apoptosis was determined in effector cells (alveolar macrophages, AM and neutrophils) and target cells (tracheobronchial and alveolar epithelial cells) of the respiratory compartment, measuring caspase-3 activity upon endotoxin- and hypoxia-induced injury.

METHODS. Rat alveolar epithelial cells (AEC), rat primary tracheobronchial epithelial cells (TBEC) (1), AM and neutrophils were placed in a hypoxic incubator with 5% oxygen for 4 hours, control cells were left at 21% oxygen. Some cells were stimulated with lipopolysaccharide (LPS, 20 ug/ml) for 4 hours. Camptothecin was used as a positive control for induction of apoptosis. To determine apoptosis rate, Caspase-3 activity was measured by the proteolytic cleavage of the fluorogenic caspase-3 substrate Ac-Asp-Glu-Val-Asp-AMC. ANOVA was performed to assess the statistical significance of differences. P values < 0.05 were considered significant.

RESULTS. Apoptosis rate of AM was increased by 75% ($p < 0.05$) under stimulation with LPS, while hypoxia did not affect caspase-3 activity. Neutrophils, however, showed a decreased apoptosis rate of 39% upon hypoxia ($p < 0.05$). However, LPS did not change caspase-3 activity. TBEC experienced an enhanced caspase-3 activity upon LPS stimulation (increase of 121%, $p < 0.05$) with no change under hypoxia. Similar results were found in AEC with a LPS-induced increase of apoptosis rate of 45% ($p < 0.05$) and an unaffected caspase-3 activity under hypoxia.

CONCLUSION. Our data demonstrate that the three cell types from the upper and lower respiratory compartment AEC and TBEC as well as AM show the same pattern of apoptosis upon exposure to hypoxia and endotoxin. The apoptotic answer of neutrophils, however, is different. Our results support findings with increased apoptosis rate in pulmonary cells (2). The functional implications of these inflammatory answers have further to be analyzed.

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0364

DECREASED VENTILATOR-INDUCED LUNG INJURY IN MATRIX METALLOPROTEINASE-8 DEFICIENT MICE

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INTRODUCTION. Matrix metalloproteinases (MMP) modulate extra cellular matrix turnover and cytokine processing after different injuries. MMP-8 is released by neutrophils at the sites of inflammation. We hypothesized that MMP-8 could play a relevant role in ventilator-induced lung injury (VILI).

METHODS. Mice lacking MMP-8 (*Mmp8*$^{-/-}$) and their wild type counterparts were ventilated for 2 hours using low (peak 15 cmH_2O, PEEP 2 cmH_2O) or high (25 cmH_2O, PEEP 0 cmH_2O) pressures. Lung injury was assessed by gas exchange, wet/dry weight ratio, histology and protein content, cells and myeloperoxidase activity in bronchoalveolar lavage fluid (BALF). Levels of MMP-2, -8 and -9 were measured by gelatin zymography and western blotting. Collagen, cyto and chemokines (IL1eta, IFNgamma, IL-4, IL-10, MIP-2 and LIX) were measured in lung tissue and BALF. Data are given as mean±SD. Variables were compared using a two-way ANOVA, with a significance level of 0.05.

RESULTS. MMP-8 increased in lung tissue and BALF in wild type mice after high pressure ventilation. *Mmp8*$^{-/-}$ mice were more resistant to VILI than their counterparts (Table 1). There were no differences in lung collagen, MMP-2 or -9 between genotypes. Absence of MMP-8 was related to lower levels of IFNgamma and LIX in basal conditions. After injurious ventilation, there was a dampened increase in MIP-2 with significant increases in IL-4 and IL-10 in knockout mice, suggesting a shift to an anti-inflammatory response.

TABLE 1 MEASUREMENTS OF LUNG INJURY. MPO: MYELOPEROXIDASE; PIP: PEAK INSPIRATORY PRESSURE.

	Mmp8$^{+/+}$ *PIP 15*	*Mmp8*$^{-/-}$ *PIP 15*	*Mmp8*$^{+/+}$ *PIP 25*	*Mmp8*$^{-/-}$ *PIP 25*
PaO_2/FiO2	408±59	386±46	290±49#	345±60*
Wet/Dry weight	4.10±0.75	4.48±0.24	6.00±0.69#	5.12±0.96*
Histological score	0.67±0.82	0.75±0.53	3.1±1.24#	1.44±0.73*
BALF proteins	6.3±2.1	5.1±0.9	36.3±12.1#	21.8±11.2*
BALF cells	0.6±0.2	0.6±0.2	2.5±1.3#	0.9±0.5*
BALF MPO	4.0±3.0	1.6±1.3	7.6±2.3#	2.3±1.0*

*# $p < 0.05$ vs PIP 15; * $p < 0.05$ vs $Mmp8^{+/+}$*

CONCLUSION. MMP-8 promotes lung inflammation after high pressure ventilation. Absence of this enzyme results in an anti-inflammatory response that protects against VILI.

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0365

PHOSPHOINOSITIDE-3 KINASE GAMMA REQUIRED FOR LPS-INDUCED TRANSEPITHELIAL NEUTROPHIL TRAFFICKING IN THE LUNG

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INTRODUCTION. In acute lung injury (ALI), excessive recruitment of polymorphonuclear leukocytes (PMNs) to the lung aggravates pulmonary inflammation and promotes organ failure. Phosphoinositide 3-kinase \gamma (PI3K\gamma) is a critical mediator of directional cell movement and has been implicated as an attractive target in experimental ALI. Here, we sought to characterize the role of PI3K\gamma in mediating the different steps of PMN trafficking in the lung. In addition, the contribution of endothelial and leukocytic PI3K\-gamma was studied in bone marrow chimeras.

METHODS. In wildtype and for PI3K\gamma gene-deficient mice (PI3K\gamma-/-), ALI was induced by inhalation of LPS. PMN accumulation in the different compartments of the lung (intravascular space, interstitium, alveolar space) was determined by flow cytometry. Chimeric mice were created by transfer of bone marrow between wildtype and PI3K\-gamma-/- mice. We evaluated the small molecule PI3K\gamma inhibitor AS-605240 for its efficiency to block PMN transmigration in vivo and in vitro. LPS-induced microvascular permeability was determined by the extravasation of Evans blue.

RESULTS. LPS-induced PMN adhesion to the pulmonary endothelium and transendothelial migration into the lung interstitium was enhanced in PI3K\gamma gene-deficient (PI3K\-gamma-/-) mice. However, transepithelial migration into the alveolar space was reduced in these mice significantly. When irradiated PI3K\gamma-/- mice were reconstituted with bone marrow from wildtype mice, migratory activity into the alveolar space was restored only partially, suggesting a proinflammatory role for endothelial PI3K\gamma. A small molecule PI3K\gamma inhibitor reduced chemokine-induced PMN migration in vitro when PMNs but not when endothelial cells were treated. The inhibitor also reduced LPS-induced PMN migration in vivo but did not affect pulmonary microvascular permeability.

CONCLUSION. We conclude that PI3K\gamma is required for transepithelial but not for transendothelial migration in LPS-induced lung injury. Pharmacologic inhibition of PI3K\-gamma activity preferably on hematopoietic cells may be effective at curbing inflammatory lung tissue damage.

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0366

RECOMBINANT HUMAN DNASE REDUCES DURATION OF VENTILATION IN NON-SURGICAL BUT NOT IN SURGICAL MECHANICALLY VENTILATED INTENSIVE CARE PATIENTS

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INTRODUCTION. RhDNase is an established part in the treatment of children with cystic fibrosis [1] and in children following cardiac surgery rhDNAse reduced duration of ventilation [2]. The aim of this study was to investigate whether rhDNase is able to reduce the duration of ventilation in adult mechanically ventilated intensive care patients.

METHODS. A double-blind, placebo-controlled, randomised, multi-centre national trial was conducted after approval of local ethics committees. Patients were stratified in a surgical and a non-surgical group. The trial was started within 48h after start of mechanical ventilation and was terminated when weaning was successful or after 21 days. Patients in the treatment group received 2,5ml of rhDNase endotracheally twice a day. Patients in the placebo group received normal saline.

RESULTS. In this study, 123 surgical and 162 non-surgical patients were included. Characteristics like gender, weight, APACHE score, chronic pre-existing diseases and prevalence of COPD were distributed equally in both groups. In non-surgical patients more smokers were randomized to the rhDNase group and patients in the NaCl group had a lower GCS score. Acute burn patients were randomized to the rhDNase group only. In the rhDNase group, 12 patients (2 surgical) died versus 16 (4 surgical) in the placebo group. In surviving surgical patients median duration of ventilation was 16.6 days (CI 11.5 to 21days) in the rhDNase and 11.7 days (CI 8.4 to 15.6 days, p=0.39) in the placebo group. In surviving non-surgical patients median duration of ventilation was 7.8 days (CI 6 to 9.3 days) in the rhDNase and 12.6 days (CI 7.9 to 16.9 days; p=0.038) in the placebo group. Pulmonary function parameters like oxygenation index, peak pressure and compliance and SOFA and CPIS scores did not differ. Cost-effectiveness analysis showed, that 9 days of treatment with rhDNase migth save 2,9 days on the ventilator which might save EUR 3000 in the treatment of an average non-surgical ICU patient.

CONCLUSION. In adult non-surgical intensive care patients, rhDNase significantly shortens the duration of ventilation. This effect is not seen in surgical patients. Particulary patients with pneumonia respond favourably to the treatment with rhDNase.

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0367

INHIBITION OF ACUTE LUNG INJURY BY DEXMEDETOMIDINE

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INTRODUCTION. Acute lung injury (ALI) and the more severe acute respiratory distress syndrome (ARDS) are life threatening conditions characterized by inflammation of lung parenchyma and vascular leakage leading to impaired gas exchange and hypoxemia. The triggering mechanisms for ARDS/ALI are not completely understood, and current treatments provide supportive care rather than target specific mechanisms that have a definitive effect upon outcome. A recent study revealed a protective effect of dexmedetomidine in a rat model of sepsis, demonstrating a decrease in mortality and inflammatory response (1). With this in mind, we investigated the effect of dexmedetomidine on lung edema formation and albumin permeability in an airway endotoxin model of ALI.

METHODS. Mice were divided into four groups: no lung injury/no treatment (control), lung injury/no treatment (LPS/saline), no lung injury/ dexmedetomidine treatment (saline/Dex), and lung injury/dexmedetomidine treatment (LPS/Dex). Under general anesthesia, the subclavian vein was cannulated after which the mouse was allowed to recover for approximately 60 minutes. The mice were subsequently placed in a closed chamber and exposed to nebulized normal saline (no injury) or 10 mg of LPS in saline solution for 60 minutes to induce an inflammatory response. After an additional 60 minutes, mice were given an IV bolus injection of saline or Dex (10 ug/kg) followed by a constant infsuion (10 ug/kg/hr) for 2 hrs. Mice were also injected with 125I-labeled albumin 60 min prior to euthanasia under general anesthesia at which time blood and lung tissue were collected for determination of extravascular lung water (ELW) content, lung edema formation (wet/dry weight ratio), and albumin permeability.

RESULTS. Exposure of mice to nebulized LPS increased ELW from 15.5 ± 4.0 ul to 40.5 ± 5.5 ul ($P<0.05$) following LPS exposure, whereas ELW in mice treated with Dex was significantly reduced (26.9 ± 4.5 ul) and not different from control or Dex treatment alone (17.8 ± 3.1 ul). In addition, LPS-induced increase in the lung W/D ratio (16% increase over control; $P<0.05$) was prevented by Dex treatment. Lastly, exposure of mice to nebulized LPS increased vascular albumin permeability from 5.2 ± 0.6 to 6.6 ± 0.8%, whereas treatment with Dex 2 hrs after the onset of LPS exposure tended to block the permeability increase (5.5 ± 0.8% in lungs exposed to Dex alone vs. 5.7 ± 0.7% in LPS/Dex group) though this effect did not reach statistical significance.

CONCLUSION. In conclusion, treatment with dexmedetomidine after induction of lung injury by LPS significantly decreased extravascular water accumulation in the lung, thereby attenuating edema formation. 125I-albumin permeability may also be reduced. These data suggest that dexmedetomidine can block LPS-induced acute lung injury in mice and thus may be the sedative of choice for patients with ALI or ARDS in the critical care setting.

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0368

MECHANISMS BY WHICH ETHANOL INGESTION PREDISPOSES TO ACUTE LUNG INJURY (ALI)

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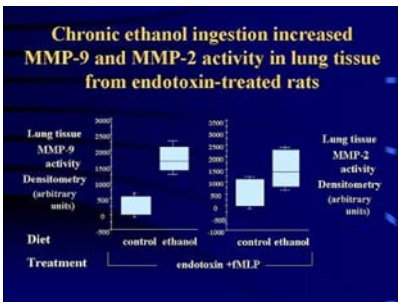
INTRODUCTION. The chronic effects of ethanol abuse on the lung are not known. Recently chronic alcohol abuse was shown to increase the incidence and mortality from ALI in patients with sepsis. We postulated that ethanol ingestion via glutathion depletion and derangement of the interstitial matrix predisposes to ALI.

METHODS. Endotoxin-primed (2mg/kg IP, 2 hrs prior to isolation), ex vivo perfused lungs isolated from ethanol-fed and control rats. Vascular and alveolar protein permeability in vivo: 131I and 125I-albumin flux into the vascularspace or alveolar epithelium. Alveolar type II cell barrier function in vitro: % of 14C-inulin leak.

Apical sodium channel function in vitro: % of membrane patches with cation channel activity.

The lung tissue and lung lavage fluid were prepared and assayed for MMP-9 and MMP-2 activity.

RESULTS. Ethanol ingestion increased acute edema formation in lungs isolated from endotoxemic rats. there was decreased plasma and lung tissue levels of reduced glutathione (GSH) and surfactant secretion. Matrix metalloproteinases (MMP) activity was increased due to activation of latent enzymes along with elevations in the 7-S fragment of type IV collagen in the lung lavage fluid.In addition there was increased bi-directional protein permeability across the alveolar epithelium in vivo. As a compensatory response there was increased alveolar epithelial transcellular sodium transport in vitro.



CONCLUSION. Chronic alcohol abuse decreases tissue glutathione levels and predisposes to ALI.

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0369

ENERGY SUPPLY LEVEL CORRELATES WITH ICU MORTALITY: A MULTICENTRE STUDY IN A COHORT OF 1209 PATIENTS

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INTRODUCTION. Early vs. late start of nutrition is associated with improved clinical outcome in ICU patients. The level of energy supply on clinical outcome remains unclear.

METHODS. 1209 ICU patients with ICU LOS >4 days from the DIVI (Deutsche Interdisziplinare Vereinigung fur Intensiv- und Notfallmedizin) database containing 3548 patients recruited in 14 ICUs at 9 German university hospitals, were evaluated with respect to the effect of early vs. late enteral and/or parenteral energy supply (providing 1500 kcal or more in the first 3 days), on SOFA Score, mortality, sepsis and acute kidney failure identified by ICD 10 classification.

RESULTS. 583 early and 626 late energy supply receiving patients aged 60.0±17.2 vs. 61.2±17.7 yr (mean±SD, p=0.25), 367M/215F vs. 393/231 (p=0.98), SOFA 9.1±4.2 vs. 9.1±3.9 (p=0.96) were evaluated. With the exception of a reduced occurrence of acute kidney failure, there was no positive effect of early energy supply during the first 3 days on ICU and hospital mortality and sepsis incidence. Provision of >1500 kcal, apart from separate parenteral glucose, was associated with reduced sepsis incidence (p=0.56), acute kidney failure (p=0.04), ICU (13.4 vs. 18.6%, p=0.026) and hospital mortality (18.7 vs. 24.2%, p=0.035). Increasing energy from 800 to 1300 kcal (Table) was correlated (R=0.99, p=0.0001) with the Odds Ratio for ICU mortality, which suggests a positive effect of early energy supply corresponding to an increasing reduction in mortality from 2 to 6%, respectively.

TABLE 1 LEVEL OF ENERGY SUPPLY AND CLINICAL OUTCOME

kcal for 3 first days	Early: Mortality / Survival (%mortality)	Late: Mortality / Survival (%mortality)	Odds Ratio
800	97/510 (16.0%),N=607	108/494 (17.9%),N=602	1.149
900	86/485 (15.1%),N=571	119/519 (18.7%),N=638	1.293
1100	70/425 (14.1%),N=495	135/579 (18.9%),N=714	1.416*
1200	63/400 (13.6%),N=463	142/604 (19.0%),N=746	1.492**
1300	57/382 (13.0%),N=439	148/622 (19.2%),N=770	1.601***

**p=0.03, **p=0.014, ***p=0.005, Chi2-test; early vs. late*

CONCLUSION. Early (3 first days) energy supply, intravenous glucose not counted, is associated with lower mortality and morbidity in ICU patients. The level of early energy supply (800–1300kcal), apart from separate parenteral glucose, is linearly correlated with ICU mortality risk.

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0370

NEGATIVE ENERGY BALANCE IS ASSOCIATED WITH INFECTIOUS COMPLICATIONS AFTER SUBARACHNOID HEMORRHAGE

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INTRODUCTION. Aneurysmal subarachnoid hemorrhage (SAH) patients are frequently hypermetabolic and at high risk for development of medical complications. This study examined the relationship between energy balance and complications following SAH.

METHODS. Prospective observational study conducted in fifty eight consecutive SAH patients aged 58 (range: 26 – 86, 38 (66%) women) who were fed only via enteral nutrition (EN) during the first seven days after hemorrhage between October 2005 and October 2007. We recorded demographic data, time to initiation of EN, energy intake from EN, resting energy expenditure (REE)(measured by indirect calorimetry) and in - hospital complications over 14 days. Energy balance (EB) was calculated as the difference between REE and caloric intake. Fever was defined as core body temperatures > 38.3 C and hyperglycemia as blood glucose levels > 11 mmol/L. EB data is expressed as mean +/- SD and compared between groups by t test. Cumulative EB was compared to the frequency of infectious and non infectious complications with a Spearman's correlation coefficient. Linear regression was conducted to determine whether EB was correlated with the frequency of specific post-SAH complications.

RESULTS. Median time to feeding was 1 day post bleed (range: 0 – 5). Daily target caloric intake was estimated at 27.5 +/- 3.1 kcal/kg/day and the amount delivered was 14.2 +/- 5.1 kcal/kg/day. EN accounted for 67% of the caloric intake, with propofol and dextrose infusions accounting for 23% and 10% respectively. Cumulative average EB for the first seven days post bleeding was −116.5 +/- 53.0 kcal / kg. A greater average negative EB was associated with urinary tract infections (−134.2 +/- 32.8 kcal/kg v. −106.2 +/- 52.0 kcal/kg v. P = 0.04), sepsis (−152.2 +/- 25.0 kcal/kg v. −110.2 +/- 48.2 kcal/kg, P = 0.03), pneumonia (−128.6 +/- 36.2 kcal/kg v. −97.7 +/- 56.0 kcal/kg, P = 0.02), hyperglycemia (−120.3 +/- 42.1 kcal/kg v. −74.0 +/- 40.2 kcal/kg, P = 0.04), and fever (−126.6 +/- 40.9 kcal/kg v. −94.2 +/- 55.4 kcal/kg, P = 0.03). The average negative EB during the first seven days after SAH correlated with the total number of infectious complications (r = 0.53, P <0.001), but not non infectious complications (r = 0.21, P = 0.13). After adjusting for Hunt Hess score, fever, hyperglycemia, and anemia, the cumulative number of infectious complications was predicted by average negative EB in the first seven days post bleed (P = 0.01).

CONCLUSION. A greater negative energy balance is associated with an increased risk of infectious complications after SAH. Future studies need to better understand the impact negative EB has upon outcome after SAH.

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0371

HYPOGLYCEMIA COUNTERREGULATORY RESPONSE IN CRITICALLY ILL PATIENTS

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INTRODUCTION. The application of Intensive Insulin Therapy (IIT) in critically ill patients resulted in an increase of the incidence of hypoglycemia in the ICU. With the similar IIT treatment regimen, the incidence of hypoglycemia was higher in septic patients compared to postsurgical non-septic patients. Hypoglycemia in septic patients can also occur without insulin treatment. Little is known about the counterregulatory hormonal response to hypoglycemia in critically ill patients. The aim of this study was to investigate if the counterregulatory response to hypoglycemia in septic patients is blunted compared to postsurgical non-septic patients. This could be an important factor in spontaneous hypoglycemia and the higher incidence of hypoglycemia in septic patients while treated with IIT.

METHODS. Prospective, observational study in adult ICU patients with severe sepsis or septic shock and a first hypoglycemia versus postoperative non-septic ICU patients with a first hypoglycemia. Blood samples for measurement of the counterregulatory hormones (glucagon, epinephrine, cortisol and growth hormone) were taken directly after the first severe hypoglycemia (blood glucose level < 3.0 mmol/l, a level below wich a significant increase in the counterregulatory hormone levels is expected). Directly thereafter the hypoglycemia was corrected. All patients were treated according to an adjusted IIT regimen aiming at blood glucose levels between 4.5–8.0 mmol/l. Student-t-test was performed for data analysis.

RESULTS. The counterregulatory hormone response to the first hypoglycemic event was measured in 4 non-septic post-cardiosurgical and 8 severe septic patients. The plasma glucagon response to a severe hypoglycemic event was lower in the severe septic compared to the non-septic post-cardiosurgical patients (mean 79±17 ng/l versus 168±46 ng/l, p < 0.05). Growth hormone response was 3.6±1.3 ng/l in the septic group compared to 12.3±6.0 ng/l in the non-septic group, p=0.08). Cortisol and the catecholamine responses were not significantly different between the two groups.

CONCLUSION. The counterregulatory response to hypoglycemia in septic patients is blunted compared to postsurgical non-septic patients. These findings support the need for more frequent blood glucose measurements during IIT in septic ICU patients, in order to reduce the incidence of hypoglycemia during IIT.

0372

PATIENTS WITH HYPERGLYCAEMIA DURING CRITICAL ILLNESS ARE AT INCREASED RISK OF DEVELOPING DIABETES

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INTRODUCTION. Hyperglycaemia occurring in a non-diabetic patient is a known complication of critical illness, in diseases such as sepsis, acute coronary syndromes and other conditions in intensive care. Its origin is in the acute stress response, in most part mediated by stress hormones such as adrenalin and cortisol, which increase gluconeogenesis and glicogenolysis, probably by increased insulin resistance. Yet, some non-diabetic patients with critical illness do and some do not develop hyperglycaemia. We have hypothesised that patients who have hyperglycaemia have impaired glucose control mechanisms and are at increased risk of developing type 2 diabetes mellitus in the period after ICU discharge.

METHODS. We included adult patients discharged alive from the hospital after being treated in the medical ICU during the time of 3 years (2000–2002). For better congruence, only patients with sepsis and acute coronary syndrome were selected. Patients whose venous blood glucose during the ICU stay never exceeded 7.7 mmol/l formed the normoglycaemia group, while the patients who had hyperglycaemia (venous blood glucose > 7.7 mmol/l) on at least two occasions formed the hyperglycaemia group. Patients with only one hyperglycaemic episode were excluded from the study. Patients with terminal illness or those receiving corticosteroids were excluded. Absence of diabetes was confirmed before discharge. Follow-up time was at least five years.

RESULTS. There were 331 patients with selected diagnoses discharged alive willing to participate and with no terminal illness, 168 formed the normoglycaemia group and 90 patients were left in the hyperglycaemia group after excluding newly diagnosed diabetes and patients on corticosteroids. In the normoglycaemia group 115 patients finished follow-up: 95 remained normoglycaemic, 16 developed impaired glucose tolerance (IGT) or increased fasting glucose (IFG), while 4 developed type 2 diabetes. In the hyperglycaemia group 51 patients finished follow-up: 29 remained normoglycaemic, 14 developed IGT or IFG, 8 developed type 2 diabetes. For patients with critical care hyperglycaemia, relative risk for development of IGT or IFG was 2.26 (95% CI 1.21−4.22) and for development of type 2 diabetes 5.35 (95% CI 1.71−16-72).

CONCLUSION. Our results show that patients with critical care hyperglycaemia are at increased risk of developing impaired glucose control or type 2 diabetes mellitus in the 5 years follow-up period. This supports the theory that this is a group of patients with latent endocrine disorder manifesting initially during the critical illness and developing to a manifest disorder later. Critical care hyperglycaemia should be considered a risk factor for diabetes.

0373

REDUCED ARGININE PRODUCTION AND INCREASED ARGINASE ACTIVITY ARE INDEPENDENT OF THE CAUSE OF SEPSIS

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INTRODUCTION. During sepsis plasma arginine (Arg) levels are hypothesized to be reduced, while whole body arginase activity is increased and de novo arginine production is reduced. It has been suggested, that the abnormalities in arginine metabolism during sepsis are related to the origin of the sepsis. Equally, mortality of sepsis is dependent on its cause. Aim: To study arginine metabolism and arginase activity during surgical and non-surgical sepsis.

METHODS. 25 ICU patients were studied: 12 with severe sepsis/septic shock (surgical sepsis) within 48h of diagnosis after surgery, 6 with severe sepsis due to pneumonia (non-surgical sepsis), and 7 non-septic ICU controls; 16 age-matched healthy subjects served as controls. Arg metabolism was studied using primed-continuous infusion of stable isotopes of arginine, citrulline and urea, and subsequent measurement of arterial amino acid concentrations and tracer-tracee ratios. De novo Arg production is the Cit to Arg conversion and whole body arginase activity was measured as Arg to Urea conversion. None of the patients received blood transfusions. Statistical analysis by 2-way ANOVA with Bonferroni correction between groups; data are means ± SEM.

RESULTS. Plasma arginine concentration was similarly reduced in septic patients with surgical cause compared to non-surgical. Also, whole-body arginine production was similar between surgical and non-surgical sepsis. Whole-body arginine de novo synthesis was reduced both in surgical and non-surgical sepsis, while arginase activity was increased in both groups compared to ICU controls and healthy subjects.

CONCLUSION. In septic patients, plasma arginine levels are reduced early during sepsis. This appears to be related to the increased plasma arginase activity and reduced de novo arginine production. However, these observations are not related to the origin of the sepsis.

0374

GROWTH HORMONE SECRETION PATTERN IN ACUTE AND PROLONGED CRITICAL ILLNESS AFTER MULTIPLE TRAUMA

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INTRODUCTION. Acute and prolonged phase of critical illness represent different neuroendocrine milieus. According to animal models [1], anterior pituitary dysfunction, particularly flat growth hormone (GH) secretion pattern may contribute to muscle wasting syndrome during protracted critical illness. In this human study we ask, whether GH secretion pattern differs in presence/absence of traumatic brain injury (TBI) and how it changes in time.

METHODS. Subjects: Multiple trauma patients expected to require at least 2 weeks of ICU care, with (n=12) and without (n=8) TBI defined as GCS<8 on the scene and intracranial pathology on CT. Male=17, Female=3, aged 40+−16 years, BMI 27+−4 kg.m-2, ISS=39+−14, APACHE II 24+−8. We excluded patients with diabetes insipidus or direct trauma of hypothalamus/pituitary. Design: Arterial blood was sampled every 30 min from 22:00 to 06:30 on day 4 and 17 of their ICU stay and GH was sampled using RIA. As a measure of GH secretion we use basal level, number and amplitude of pulses (derived manually from individual GH vs. time plots), and area under the GH curve. For these experiments, we used control groups from a previously publihed study [2]. Mann-Whitney or Wilcoxon tests are used for comparisons, as appropriate.

RESULTS. During acute illness (day 4) patients without TBI tend to secrete more GH than those with TBI (median AUC 74 vs. 130 mIU/l, p=.46), because GH pulses tend to have higher amplitude (p=.13), but there is no difference in No of pulses (p=.52). During acute-to-protracted transition (i.e. from day 4 to 17), we did not observe any significant change in GH secretion pattern (see Table), but the overall amount of GH secreted tend to decrease in patients without TBI (p=.098).

TABLE 1 GH SECRETION PATTERN

Units: mIU/l	Day 4 Pt. with TBI (n=12)	Day 4 Pt. without TBI (n=8)	Day 17 Pt. with TBI (n=10)	Day 17 Pt. without TBI (n=8)
Basal level	2 (1–7)	4 (2–9)	2 (1–5)	2 (1–3)
No of pulses/night	2 (0–3)	2.5 (2–3)	3 (0–4)	2.5 (1.5–3)
Avrg. pulse amplitude	4 (3–8)	9 (6–16)	6 (3–8)	6 (5–9)
Summ of GH secreted	74 (28–197)	130 (79–258)	73 (31–197)	70 (47–105)

Data presented as median (interquartile range)

CONCLUSION. In contrast with a previous animal study [1], we did not demonstrate any significant differences in GH secretion pattern between acute and protracted critical illness in humans after multiple trauma. TBI seem to impair GH secretion capacity only during the acute phase.

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Oral Presentations
Septic shock: 0375–0380

0375

BACTERIAL GENOMA DETECTION AT EARLY STAGE OF SEPTIC SHOCK: A FEASIBILITY STUDY

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INTRODUCTION. Early microbiological documentation is a key point for adapted antibiotherapy in patients sustaining a septic shock. This is not consistently possible to achieve using conventional bacteriological methods which require a substantial delay to obtain final results and have a fairly high rate of false negative results. Molecular biology using nucleic acid based techniques may provide an earlier and better identification of the pathogen. We conducted a prospective study to compare the results of conventional microbiology with those obtained from molecular biology at the early stage of septic shock.

METHODS. Patients admitted to our medical-surgical intensive care unit with a high clinical suspicion of septic shock during daytime were studied. Blood sample and oriented biological sample(s) (urine, tracheal aspirate, CSF, etc…) were obtained. Conventional microbiological assessment and molecular tests based on bacterial DNA identification (Staphylococcus aureus [S.a], methicillin-resistant Staphylococcus aureus [MRSA], Pseudomonas aeruginosa [P.a], Streptococcus pneumoniae [S.p], Enterobacteraceae [Ent.]) in normally biological sterile fluids and in serum were performed using real-time PCR (SmartCycler®, Cepheid). A universal bacterial DNA sequence identification was also performed followed by DNA sequencer analysis for species identification.

RESULTS. Two patients with positive candidemia were excluded from this feasibility study and 28 patients were studied (age [mean ± SD]: 57±18 years, APACHE II score: 23±7). Septic shock was of pulmonary (n=12), abdominal (n=5), urinary (n=8), cutaneous (n=2) or meningeal (n=1) origin. A bacteremia was documented in 7 patients. Of them, molecular serum analysis was in agreement with conventional bacteriology in 3 patients. At least one pathogen was identified using conventional microbiological assessment in other biological samples in 13 patients (Table). Of them, 11 had concordant molecular analysis. In addition, PCR analysis allowed the identification of at least one pathogen in the biological samples obtained from 2 patients with undocumented sepsis using the conventional microbiological approach.

TABLE 1

	S.a	SAMR	P.a	S.p	Ent.
Conventional microbiology (n)*	2	1	3	2	7
PCR analysis (n)*	2	1	2	4	9

**: 1 biological sample may be positive for several pathogens*

CONCLUSION. In this pilot study, we showed that bacterial DNA identification in biological samples other than blood is feasible at the early phase of septic shock. The molecular approach promises to provide early identification of the causative pathogen in either blood or biological normally sterile fluids. Further studies are needed to define the field of use of this promising technique on clinical grounds.

0376

SEARCHING THE SURVIVING SEPSIS CAMPAIGN DATABASE FOR AVOIDABLE DEATHS

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INTRODUCTION. Recently it has been estimated that in the Netherlands yearly about 1700 deaths in hospitalised patients could prevented by timely, accurate, diagnosis and adequate medical care. The surviving sepsis campaign (SSC) is an international campaign aiming at a reduction in mortality with 25% in 5 years time. In March 2007 the SSC guidelines were introduced in the ICU, ER and the departments of Internal Medicine and Surgery of our hospital.

METHODS. Retrospective analysis of prospectively obtained data from the SSC database a large non-academic teaching hospital.

RESULTS. Hundred and thirty two patients (age 65 ± 1,3 mean ± s.e.m., 65% male) were included. 72 patients (55%) were admitted to the ICU, 60 patients (45%) were treated in the wards. Thirty four (27%) patients did not survive, 12 of these patients were not admitted to the ICU because of limits on escalation of treatment (LOT). Twenty two patients were admitted to the ICU. Nineteen died in the ICU, cause of death multiorgan failure (n=15) and withdrawal of futile treatment (n=4). Three patients died after transfer from the ICU to the ward (all three with LOT).

Compliance to the resuscitation bundle in the deceased patients was > 80%. In 31 patients blood cultures were taken. Blood cultures were positive in only five. In 15 patients a primary pulmonary focus was suspected however, in only one a suitable sputum specimen was obtained (Streptococcus Pneumoniae, n=1). Seven patients were thought to have a urinary tract infection, in six urinary cultures were taken (E.Coli, n=1; Klebsiella Pneumoniae, n=1). An abdominal focus was suspected in twelve patients, urine cultures were taken in six. In three patients the same microorganism was found in the blood and urinary culture (E.Coli (2), Klebsiella Pneumoniae). Microbiological data to narrow the antibiotic regimen were only available in a limited number of patients.

CONCLUSION. Compliance to the SSC bundles was excellent, but more microbiological samples of suspected sources of infection should be obtained. Many patients who died in our SSC cohort had limits on escalation of treatment and cannot be counted as preventable deaths. Detailed analysis of cause of death detects flaws in the diagnostic and therapeutic process and should be used to improve this process.

0377

SEPTIC SHOCK DUE TO ICU-ACQUIRED CANDIDEMIA; A FATAL CONDITION?

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INTRODUCTION. Bloodstream infection caused by Candida spp. is becoming increasingly prevalent in ICU patients and it carries a high morbidity and mortality. Although progress has been made in the management of sepsis, limited data are available addressing the outcome of fungal septic shock.

This study was performed to assess the outcomes of patients who developed septic shock due to ICU acquired candidemia.

METHODS. The medical records of patients who had at least one episode of Candidemia developed after their ICU admission over a five year span were reviewed. Case patients were defined as individuals who had at least one positive blood culture for Candida species collected > 48 h after ICU admission who developed septic shock within 48hr of the positive blood culture. Patients with endocarditis were excluded. Results are expressed as means ± SD.

RESULTS. There were 83 episodes of candidemia (1.55/1000 patient days). Eighteen patients met shock criteria and were included in the study. Patients were female (55%), age 61.2 ± 13.4 years, and had an APACHE II score of 26.8 ± 8.8. Main species causing candidemia were, C. glabrata (61%) C. albicans (33%) and C. lusitaniae (6%). Hospital and ICU length of stay were 27.3 ± 21.8 and 19.0 ± 17.0. days, respectively. Candidemia developed 8.4 ± 13.2 days after ICU admission. Most patients had non-neutropenic immunesuppression, eight (44%) were on corticosteroid treatment, 6 (33%) were colonized (4 combined urine and sputum, 2 sputum), 10 (55%) patients were on parenteral nutrition and all patients were on antibiotics at the time of candidemia. Clearance of fungemia (n=7) occurred 7.1 ± 7.4 days after the initiation of treatment. The majority of patients (67%) required at least 2 vasopressor agents to keep blood pressure at goal. Mortality was 89%.

CONCLUSION. Prevalence of ICU-acquired candidemia was high in our cohort. The limited size of our sample precludes assessing whether non-albicans spp are associated with different outcomes, although they were the more prevalent species in patients with shock. Development of fungal septic shock, regardless of the species, is associated with a nearly fatal outcome.

0378

COMPARISON OF PROCALCITONIN AND C-REACTIVE PROTEIN FOR DIFFERENTIATION BETWEEN SYSTEMIC INFLAMMATORY RESPONSE SYNDROME, SEPSIS AND SEPTIC SHOCK

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INTRODUCTION. Numerous clinical studies have shown that early diagnosis of sepsis and adequate antibiotics therapy during the first six hours after development of sepsis are essential to the outcome of therapy and survival of the septic patients. Procalcitonin is the most sensitive early laboratory marker of sepsis.

METHODS. The prospective study included thirty- three critically ill patients that were hospitalized in Intensive Care Unit with suspicion on infection. The American College of Chest Physicians/ Society of Critical Care Medicine Consensus Conference definition of sepsis was used to identify patients with systemic inflammatory response syndrome (SIRS), sepsis or septic shock. Sequential organ failure assessment (SOFA) score was used to describe the sequence of complications and the severity of organ dysfunction in critically ill patients. Patients were split into three groups on the basis of clinical, laboratory and bacteriological findings: SIRS group; sepsis group and septic shock group. The level of Pct and CRP in differential diagnosis of SIRS, sepsis and septic shock was analyzed. Data are presented as means±standard deviation (SD) and in percentage values in addition to absolute numbers. To compare two independent samples, an unpaired t-test was used, and the chi-square test to compare proportions. Among the Pct, CRP and SOFA score, linear (Pearson,s) correlation and the regression formula were calculated (y= a+ bx). Statistical significance was accepted at $p < 0,05$.

RESULTS. In the group of 33 critically ill patients there were 10 with SIRS, 15 with sepsis and 8 with septic shock. Pct and CRP levels were higher in patients with sepsis and septic shock, although correlation with SOFA score was weak for CRP(0,47 in septic patients, p>0,05). CRP levels were near their maximum already during lower SOFA scores, whereas correlation of the Pct level and SOFA score was 0,98 in infected patients. In patients with SIRS, Pct (CRP) concentrations were 0,40ng/ml (116mg/l), in patients with sepsis 4,6 ng/ml (150mg/l) and 18,6ng/ml (182mg/l) in septic shock. The kinetics of both parameters were also different, and Pct concentrations reacted more quickly than CRP.

CONCLUSION. Results of the study have shown that Pct is a more accurate diagnostic parameter for differentiating SIRS and sepsis, and therefore daily determinations of Pct may be helpful in the follow up of critically ill patients.

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0379

PREDICTIVE FACTORS OF RENAL REPLACEMENT THERAPY IN PATIENTS WITH SEVERE SEPSIS OR SEPTIC SHOCK

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INTRODUCTION. Acute renal failure (ARF) is associated with a poor outcome in patients with severe sepsis or septic shock (1). We looked for the predictive factors of acute renal failure requiring renal replacement therapy (RRT) in a data base of 445 patients with severe sepsis or septic shock.

METHODS. All patients with chronic renal failure needing dialysis were excluded from the study from the database of 445 patients who had participated in an observational study on severe sepsis in 15 ICUs during 2006. We studied the morphological parameters, organ dysfunction at admission, the plasma creatinine level at admission, and the quantity of fluid resuscitation and the type of fluid during the first 24 hours. These parameters were entered into a univariate and multivariate analysis with logistic regression analysis. The results are presented in real value, percentage or median value (5th and 95th percentile), depending on the studied parameter. $P < 0.05$ is significant.

RESULTS. 423 patients were screened for the study, 113 (27%) of them needed RRT. The comparison of the patients with and without RRT is shown in the Table. In the multivariate analysis including all significant variables, male sex (OR=2.045 [1.154-3.625]), oliguria (OR=2.665 [1.575–4.510]), red blood cell transfusion (OR=2.349 [1.39–3.969]) and a plasma creatinine level >113 µMol/l (OR=3.406 [1.988–5.936] were associated with a risk of RRT (validity of the model verified by a Hosmer and Lemeshow test, p = 0,6). However, the type of fluid infused did not influence the need for RRT(p = 0.83).

TABLE 1 COMPARISON BETWEEN PATIENTS WITH RRT AND WITHOUT RRT

	RRT (113)	Without RRT (310)	p
age (years)	68 [36–88]	66 [32–84]	0.09
Women	31 (28%)	113 (37%)	0.09
IGS II	70 (62%)	43 [23–75]	<0.01
Initial oliguria	70 (62%)	113 (36%)	< 0.01
Initial plasma creatinine (µMol/l)	168 [58–456]	102 [42–314]	< 0.01
Shock	86 (76%)	222 (72%)	0.36
Fluid resuscitation at 24 h (ml)	3000 [500–7000]	2500 [800–7500]	0.04
Crystalloids (ml)	2800 [500–7000]	2500 [500–7500]	0.14
Hydroxyethyl starch (ml)	1500 [500–2800]	1000 [500–3000]	0.09
Albumine (ml)	400 [200–1300]	400 [200–1500]	0.78
Transfusion	71 (63%)	132 (43%)	< 0.01

CONCLUSION. Initial oliguria, the baseline plasma creatinine level and the sex are associated with ARF requiring RRT in patients with severe sepsis. However, the type of fluid infused doesn't seem to influence the occurrence of ARF.

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0380

PROCALCITONIN AND C-REACTIVE PROTEIN AS MARKERS FOR INFECTION AND MORTALITY IN PATIENTS WITH SEVERE SEPSIS AND SEPTIC SHOCK

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INTRODUCTION. Procalcitonin (PCT) is used as a marker to differentiate sepsis from other non-infectious causes of the systemic inflammatory response syndrome (SIRS). C-reactive protein (CRP) is also used as a marker for sepsis and severity of disease. The Surviving Sepsis Campaign (SSC) has been developed to improve the management, diagnosis, and treatment of sepsis. In March 2007 the SSC guidelines were introduced in the ICU and the departments of Internal Medicine and Surgery of our hospital. We studied the clinical application of PCT and CRP plasma concentrations in the detection of severe sepsis /septic shock and the assessment of severity of disease.

METHODS. Prospective observation study in patients admitted to the departments of internal medicine, surgery and the ICU of a large non-academic teaching hospital who were enrolled in the SSC. PCT and CRP plasma levels were determined at inclusion (0) and 24 hour (24) after inclusion in de SSC registration. Patients were classified according to outcome (hospital discharge / mortality), presence of infection confirmed by microbiological culture and PCT / CPR levels. Data were analyzed using non-parametric statistical methods (Pearson Chi-Square and Kruskal-Wallis test).

RESULTS. Hundred and thirty two patients (age 65 ± 1,3 mean ± s.e.m., 65% male) were included. 72 (55%) were admitted to the ICU, 60 patients (45%) were treated in the wards. Infection was confirmed by cultures in 50% of patients. There was no difference in PCT (0/24) between patients with and without microbiological culture proven infection. Fifty percent of patients were classified as severe sepsis and 50% as septic shock. Overall hospital mortality was 27% and there was no difference in PCT(0/24) and CRP (0/24) between survivors and non-survivors.

CONCLUSION. PCT does not differentiate patients with culture confirmed infection and severe sepsis/septic shock from patients with severe SIRS and suspected but no proven infection. PCT and CRP are no indicators of outcome in patients with severe sepsis and septic shock.

0383

END OF LIFE DECISIONS IN AN INDIAN ICU

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INTRODUCTION. Limitation of life support in Indian ICUs is less frequently practiced as compared to that in the West. This may be attributable to lack of physician awareness, appropriate legislation and social factors. There is a paucity of data on end of life care in Indian patients.

METHODS. Retrospective chart review of all patients who expired during the period from May 2006 till December 2007. Data collected included age, gender, disease category, comorbidities, mechanical ventilation days, length of stay in ICU and hospital, APACHE IV, premorbid functional status and End of Life decisions. Interventions, antibiotic (carbapenems), vasopressor and diagnostic studies performed within 3 days of death were also collected. EOL decisions were taken on the lines of ISCCM recommendations.
Setting: A 12 bed Medical – Surgical ICU in a tertiary care centre in India.

RESULTS. There were 830 admissions of which 88 (10.6%) expired. The study population was divided into 2 groups – Full Support (FS) and Support Limitation (EOL). The population was further subdivided into: young (female $\leq$ 59 years and male $\leq$ 64 years) and elderly (female $\geq$ 60 years and male $\geq$ 65 years). FS group comprised of 33 (73.3%) males & 12 (26.7%) females and 26 (60%), 17 (39.5%) respectively in the EOL group (NS). 19 (42.2%) & 26 (57.8%) were young and elderly in the FS group and 26 (60.4%) & 17 (39.5%) in the EOL group (NS). The primary organ involvement was: respiratory system 16 (35.6%), sepsis 7 (15.6%), neurological 5 (11.1%), renal 2 (4.4%) & cardiac 1 (2.2%) in the FS group and 26 60.4%), 10 (23.2%), 6 (13.9%), 0, 0 & 3 (6.97%) respectively in the EOL group (NS). Co morbidities were 37 (82.2%) in the FS group and 41 (95.3%) in the EOL group ($p = 0.05$).Mean APACHE IV was 80.8 in the FS group and & 77.34 in the EOL group (NS).The mean LOS in the ICU was 7.3 in the FS group and 15.4 in the EOL group ($p = 0.02$).Functional status in the FS group were: 25 (55.5%) independent, 17 (37.7%) partially dependent & 3 (6.6%) fully dependent and in the EOL group: 12 (27.9%), 20 (46.5%) and 11 (25.6%) respectively (NS). Interventions were done in 44 (97.7%) in FS group and 29 (67.4%) (NS). Antibiotic change to carbapenems in 14 (31.1%) in the FS group and 5 (11.6%) in the EOL group ($p = 0.02$). Vasopressors were added in 9 (20%) in FS group and 1 (2.3%) in the EOL group ($p = 0.01$).Diagnostic studies were performed in 28 (62.2%) in the FS group and 7 (16.3%) in the EOL group ($p = 0.00$)The End of Life decisions taken were taken in 43 (48.8%). Death was preceded by DNR (do not resuscitate) 15 (34%), WH (with holding of therapy) 25 (58.1%) and WD (withdrawal of therapy) 3 (7%).

CONCLUSION. End of life decisions preceded 49% of deaths. These decisions led to a reduction in aggressive interventions immediately prior to death as compared to full support decisions. However, limitation of therapy did not reduce the ICU length of stay.

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Oral Presentations
Cultural variations at the end-of-life: 0381–0386

0381

ATTITUDES OF INTENSIVE CARE PHYSICIANS TOWARD END-OF-LIFE DECISION – CZECH NATIONAL SURVEY STUDY

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INTRODUCTION. The development of intensive care has brought the ability to increase patients survival and quality of life but the prolongation of treatment in terminally ill patients without chance to improve outcome has been considered as a futile (1). The aim of study was obtaining information concerning ICU physician's attitudes in the Czech Republic toward end-of-life decision (EOLD) and real implementation into the clinical practice.

METHODS. A structured questionnaire was sent to each member of Czech Society of Anaesthesiology and Intensive Care. The opinion of physicians on ways of EOLD including euthanasia was explored. The answers were compared with respect to physicians religion, social and demographic characteristics, length of practice and type of hospital.

RESULTS. A total 870 questionnaires were sent, response rate was 213 (26%). Ninghty percentage of all physicians considered limiting therapy in terminally ill patients as a acceptable, however the implementation to the clinical practice was much less frequent (Table 1). In incompetent patients 96% responders considered physicians as a key person for decision making. Only 57 (28,9%) resp. 87 (43%) physicians include family resp. nursing staff in decision-making process. Physicians from small hospitals and with shorter clinical practice include relatives and nurses to EOLD significantly fewer. The majority of responders agree with maintenance of analgosedation and infusion therapy, 76% keep ventilatory support, 43% nutrition, 49% oxygen and 14% antibiotics. Euthanasia is acceptable in 39 (19,1%) physicians, from those most of them were unbelievers. Lack of privacy and absence of family being present was considered as a key barriers for providing death dignity.

TABLE 1 ATTITUDES AND PRACTICE OF PHYSICIANS

	Limiting therapy - attitudes	Limiting therapy - real practice
Withholding treatment	205 (99)	158 (75.9)
Withdrawing treatment	191 (91)	100 (48.3)
Terminal weaning	107 (51.4)	19 (9.3)
Do not resuscitate	209 (99.5)	148 (70.5)

Descriptive statistics was used, data are presented as Numbers (%)

CONCLUSION. Withholding and withdrawing treatment is acceptable for most Czech ICUs physicians however implementation in practice is lower. Analgosedation and fluids are the most procedures kept during withholding therapy. Lack of privacy and impersonal environment were considered as the main obstacle for death dignity on ICUs.

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0384

COMPARISON OF DEATHS OCCURRED IN THE WARDS TO THOSE OCCURRED IN THE INTENSIVE CARE UNIT (ICU) AT AN UNIVERSITY HOSPITAL

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INTRODUCTION. The majority of deaths in Brazil happen in hospitals and more specifically in ICU. In this country there is few studies about the dying process and there is not clear legal definitions about withhold or withdraw support (WWS). It is important to know about the reality of the dying process to provide the best treatment for dying patients.The objectives of this study are: To analyze the deaths occurred in the HU/UFSC; To compare the profile of the patients who died in the ICU to those who died in the wards; To identify if the decisions of WWS, comfort care plans, patients' identification as dying and/or do-not-resuscitate orders prior to the death were recorded.

METHODS. Retrospective cohort study, approved by Ethical Committee. Deaths occurred in patients, admitted to the HU/UFSC from July 2004 to June 2007, were analyzed. Demographic characteristics, clinical features and the treatment performed for the patients who died were evaluated. It was considered if WWS preceded the death. Data was allocated in two groups: G1 to the patients who died in the ICU and G2 to the patients who died in the Wards. Data were analyzed using t Student and $\chi 2$ tests (p-value <0,05).

RESULTS. The analyzed hospital has 165 beds (158 in wards and 7 in ICU). During the study period 14330 patients were admitted at hospital. The hospital mortality rates was 4,95%. This index in ICU was 23,77% and in Wards was 3,39%. The data of 710 patients had been analyzed. Two hundred and sixty one died in ICU (G1) and 449 in the wards (G2). The most of patients were men in both groups (56,9% in G1, 53% in G2) and the patients mean age was 57,4±18,1 years (G1) and 69,7±15,8 years (G2) ($p < 0.001$). WWS preceded 37,5% of the deaths in G1 and 9,6% in G2 ($p < 0,001$). Vasopressor drugs were the most frequently WWS in G1, while intensive care admission was the most WWS in G2. Do-not-resuscitate orders was documented in 0,76% of patient's records (G1) and in 2,44% (G2). Comfort care plans were present in 0,38% in cases (G1) and in 11,13% (G2). Patients were identificate as dying in 2,68% (G1) and 29,84% (G2). Cardiopulmonary resuscitation (CPR) prior to death was present in 27,20% of the cases (G1) and in 20,26% (G2).

CONCLUSION. In G1 the patients were younger and the death was more frequently preceded by WWS. In G2 the patients were older, more commonly considered "dying" and the death was more frequently preceded by comfort care plans. A CPR maneuver was more common in G1. Do not resuscitate orders were unusually documented.

GRANT ACKNOWLEDGEMENT. Federal University of Santa Catarina.

0385

LAWYERS IN ICU: 12 MONTH AUDIT OF IN-HOUSE LEGAL ASSISTANCE TO ICU PATIENTS

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INTRODUCTION. The Neurosciences ICU (NICU) sees over 650 adult patients per year. 2/3 are emergency admissions following traumatic brain injury, spinal injuries, subarachnoid haemorrhage or intracerebral haemorrhage. Legal issues regarding power of attorney, compensation claims, dealing with the police etc are not taught at medical school yet are often immediate concerns for both patients and their families.

METHODS. A legal firm specialising in medicolegal issues, particularly brain and spinal injuries, was approached about providing pro-bono advice to patients on NICU. After approval by the Hospital Trust a 12 month pilot project was established with lawyers spending one day per week on the NICU. Formal consent/assent was sought from the patient or their relatives by the ICU consultant.

RESULTS. 31 cases were reviewed. Demographics were similar to the overall patient mix on NICU. 10 cases were road traffic accidents (passenger or pedestrian), 6 RTA (driver), 7 medical cases (SAH or ICH), 2 industrial accidents, 1 sport related injury, 3 alleged assaults and 2 falls. Breach of care and the possibility of compensation was identified in 22 cases. Non-compensation issues were identified for all cases and a total of 123 hours spent on non-compensation issues. The legal firm involved were instructed to pursue compensation claims in 7/22 cases. Feedback from families has been universally positive. The service has been extended to all patients in the Neurological Centre.

CONCLUSION. Many ICU patients have immediate legal concerns. The use of a legal team in ICU has significant benefits in terms of access to legal aid and the time taken for completion of legal issues. Overall wellbeing of patients and their family is improved by relief of anxieties regarding legal matters. Identification of compensation claims will potentially allow earlier access to funding for ongoing care.

0386

RAPID RESPONSE SYSTEMS AND THE DEMAND FROM DO-NOT-ATTEMP-REANIMATION PATIENTS

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INTRODUCTION. Rapid response systems (RRS) are developed as a tool to decrease the assistential gap between the acute critical patients in the wards and the advanced care avaliable just on critical care areas. Indeed, the RRS calls are usually made for all instable patients in the wards, independently of their resuscitation status. So, some calls are made for patients with do-not-attemp-reanimation (DNAR) orders, and others, have a DNAR order registred after the evaluation of the instability. We quantify here the utilization of resourses of RRS to attend DNAR patients in 6 months.

METHODS. We describe the proportion of calls made for DNAR patients, the call criteria and the management of this group of patients.

RESULTS. In 6 months, the RRS received 536 calls, 33 was for patients with a previous DNAR order and 31 for patients that received a DNAR order during the RRS attending. This sums a total of 12% of calls for DNAR patients. The median age was 80 ± 11 years. The more frequent calling criteria for DNAR patients was respiratory distress (30%, 19 calls), low oxigen saturation (28%, 18 calls), death constatation (27%, 17 calls) and hypotension (13%, 8 calls). The RRS prescribed medications for 34 (53%) DNAR patients and solicited adictional exams for 12 (19%). Eleven (17%) DNAR patients were submited to Non-Invasive Ventilation (NIV) and one (2%) was intubated. From the 64 DNAR patients, 1 (2%) was transferred to ICU and 3 (5%) to High Dependency Unit (HDU).

CONCLUSION. These data show that in our experience, a significative proportion of RRS work is dedicated to assist DNAR patients. This group of DNAR patients is old, demand medical attention for respiratory disfunction and has a low rate of investigatory exams performed, low ICU transferences, but high rates of HDU transferences and NIV utilization rates. We suggest that better evaluating the characteristics and needs of this group of patients may provide tools to better organization of care.

Oral Presentations
Abstract awards winners – The best preselected abstracts submitted to the congress: 0387–0390

0387

IMPACT OF SUBGLOTTIC SECRETIONS DRAINAGE ON VENTILATOR-ASSOCIATED PNEUMONIA: A RANDOMIZED MULTICENTRE TRIAL

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INTRODUCTION. Previous randomized studies have shown that subglottic secretions drainage (SSD) could lower the incidence of ventilator-associated pneumonia (VAP), especially early-onset VAPs. Nevertheless, based on the monocentric design of the available studies, the recent guidelines for prevention of VAP have only suggested, not recommended, the use of SSD.

METHODS. Randomized controlled trial conducted in 4 ICUs. Adult patients who were expected to require mechanical ventilation for ≥ 48 hours and had been intubated with the specific Hi-Lo Evac tube® (Mallinckrodt Medical, Ireland) were eligible. Patients admitted after cardiac arrest, drug overdose or acute alcohol intoxication and those with a tracheostomy on ICU admission were excluded. Within the 12 hours after intubation, patients were randomly assigned to discontinuous (SDD+ group) or no (SDD- group) subglottic secretions drainage. Clinical suspicion of VAP was based on previously published criteria. Diagnosis of VAP was confirmed when the quantitative culture of a protected distal sample or bronchoalveolar lavage grew >1000 colony-forming units (CFU/ml) or >10000 CFU/ml, respectively, of at least one microorganism.

RESULTS. 333 patients were included, 169 in the SSD+ group and 164 in the SSD- group. Age, gender, SAPS II score (52.9 in the SSD+ group vs 53.8 in the SSD- group) and SOFA score (8.8 vs 8.6) at admission, and percentage of medical patients (84% vs 86.6%) were similar in the 2 groups. 67 episodes of VAP occurred, 25 in the SSD+ group (14.8%) and 42 in the SSD- group (25.6%) (p=0.02), yielding an incidence rate of 17 (SDD+ group) and 34 (SDD- group) episodes of VAP per 1000 ventilator days (p = 0.002). 12 episodes of laryngeal oedema after extubation were observed (8 in the SDD+ group, vs 4 in the SDD- group, p=0.3). Median duration of mechanical ventilation prior to the first episode of VAP (8.0 days in both groups), duration of mechanical ventilation (11.1 days in the SDD+ group vs. 10.9 days in the SDD- group) and ICU mortality (42.0% vs 40.0%) were not statistically different between the 2 groups.

CONCLUSION. In this multicentre randomized trial, subglottic secretion drainage significantly reduced the incidence of VAP without increasing the risk of laryngeal oedema.

0388

INFLUENCE OF INTENSIVE CARE UNIT SIZE ON OUTCOME OF SEVERE SEPSIS

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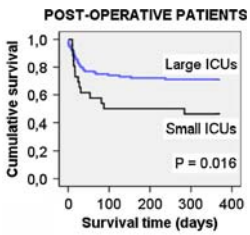
INTRODUCTION. In many disease categories, higher hospital volumes are associated with improved outcomes. We wanted to find out whether the risk of death from sepsis is influenced by the size of the intensive care unit (ICU).

METHODS. In the Finnsepsis study, all ICU patients (n = 4500) admitted to 24 ICUs during a 4-month period (1 Nov 2004 - 28 Feb 2005) were screened. The criteria for severe sepsis were fulfilled in 470 patients. 18 patients were excluded because of treatment in more than one ICU. We divided the units into three groups: university hospital ICUs (230 patients), large non-university hospital ICUs (145 patients) and small non-university hospital ICUs (77 patients).

RESULTS. There were no significant differences between the ICU groups in mean severity of illness (SAPS II scores). The overall hospital mortality rate was 29.2%. In post-operative patients, the hospital mortality rate was 22.9% for patients treated in large ICUs (including university and large non-university hospital ICUs) but 42.3% for patients treated in small ICUs, P = 0.045. The survival curves of post-operative patients are shown in the figure. In medical patients, there were no differences between ICU groups in patient outcomes.



CONCLUSION. Treatment of surgical patients with severe sepsis in small ICUs was associated with increased mortality.

GRANT ACKNOWLEDGEMENT. Finnish Society of Intensive Care.

0389

ARE WE ABLE TO PREDICT THE QUALITY OF LIFE 1 YEAR AFTER INTENSIVE CARE ?

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INTRODUCTION. Research on the outcome of critically ills was mainly focused on mortality. However patients are more concerned about their future quality of life (QOL). Future QOL is often central in the decision making of limiting treatments. We tested the ability of patients (P), families (F), nurses (N) and physicians (Ph) to predict the QOL of the patient 1 year after discharge of ICU.

METHODS. We included adults admitted to our surgical ICU, who stayed >36h in the unit and consented to participate to the study. We collected patient's characteristics and ICU data. At ICU discharge we asked the patient, the family, the attending nurse and the senior physician to predict the QOL of the patient at 1 year after ICU. After 1 year, we re-contacted the patient to obtain his/her actual QOL. QOL was assessed by Euro-QOL: 5 dimensions EQ-5D and the visual analogue scale (EQ-VAS).

RESULTS. We included 762 among 3723 screened patients and obtained data at 1 year after ICU from 642 (84%) patients. 579 (76%) had finally survived and were analysed. The interclass correlations between the EQ-VAS at 1 year and the prediction by P (0.389), F (0.392) and N (0.330) were bad, and the worst by Ph (0.196). The agreement by Bland and Altmann between the prediction by P, F, N, Ph and the measured QOL was poor (+6±40,+6±39,+3±44,−2±44 with P, F, N optimistic and Ph pessimistic). Regarding EQ-5D: in Mobility, Self-care, Activity, the agreement (and Kappas) were satisfactory, but always better for P and F than N and Ph. Regarding Pain and Anxiety, the agreement and Kappas were worse, with no statistical correlation between the predictions by N and Ph and the measured QOL. Correlations and agreements were not significantly affected by types of diagnosis or degrees of QOL at 1 year. Especially in elderly patients (> 65y), there was no significant correlation between EQ-VAS predicted by Ph or any of the EQ-5D predicted by Ph and the measured QOL after 1 year.

CONCLUSION. Patients and families were very imprecise in their prediction of future QOL at 1 year after ICU. Nurses, and particularly physicians were worse in their prediction of QOL of patients, especially regarding the elderlies, that was not correlated to the measured QOL. Caregivers should be very careful when trying to integrate the notion of future QOL in therapeutic decisions.

GRANT ACKNOWLEDGEMENT. This work was supported by the Swiss National Science Foundation 3200B0-100789, the Käthe-Zingg-Schwichtenberg Fonds (ASSM), the Société Académique de Genève and the Fonds de péréquation Recherche et Developpement des HUG.

0390

AMPLITUDE INTEGRATED EEG (AEEG) PREDICTS OUTCOME IN HYPOTHERMIA TREATED CARDIAC ARREST PATIENTS

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INTRODUCTION. The amplitude integrated EEG (aEEG) pattern has shown good correlation to outcome in neonates exposed to asphyxia. Studies evaluating its value in adult cardiac arrest patients are scarce. We have studied the aEEG-patterns and evolution of aEEG-patterns in 101 adult hypothermia treated cardiac arrest patients and correlated the major patterns to outcome.

METHODS. From feb 2004 to feb 2008, 101 consecutive hypothermia treated cardiac arrest patients were monitored using the Nervus®-monitor. The monitor was applied on arrival in the ICU, and data was linked to the department of neurophysiology, where assessment was made without knowledge of patient outcome. Patients were sedated using propofol and fentanyl during hypothermia treatment. The evolution of aEEG-patterns at normothermia was correlated to patient outcome (regaining consciousness). Six months evaluation is ongoing.

RESULTS. 101 patients were monitored, 6 died from circulatory failure before normothermia was resumed, and in one case registration was lost, leaving 94 registrations for evaluation. The patients had a mean age of 61 years, 80% were male, the majority of the cardiac arrests were witnessed (83%) and out-of-hospital (84%). The initial rhythm was ventricular fibrillation in 58% of cases. Normothermia was resumed at a mean of 36 h after cardiac arrest. The aEEG-pattern at start of registration did not correlate to patient outcome. At normothermia, 28 patients had a flat or suppression-burst aEEG, two of whom regained consciousness. Fifty-two of 56 patients with a continuos aEEG without electrographic status epilepticus regained consciousness. Twenty-six patients developed electrographic status epilepticus, 10 from a continuous background pattern, and 16 from a discontinuous pattern. Only one regained consciousness.

CONCLUSION. Electrographic status epilepticus is common among hypothermia treated cardiac arrest patients and the outcome is poor. aEEG-monitoring should be performed routinely and treatment initiated as early as possible. A continuous pattern at normothermia is strongly correlated to recovering consciousness.

GRANT ACKNOWLEDGEMENT. This study was supported by Skane county council's research and development foundation and by the governmental funding of clinical research within the National Health Service.

Oral Presentations
Microcirculation in sepsis: 0391–0395

0391

MICROCIRCULATION AND VASCULAR REACTIVITY DURING DEVELOPMENT OF ENDOTOXIN TOLERANCE IN HUMANS

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INTRODUCTION. Changes in microcirculation and mitochondrial dysfunction appear to be key mechanisms in sepsis, since they can lead to regional mismatch of oxygen supply and demand. Lipopolysaccharide (LPS, endotoxin) can be used to induce endotoxemia as a model of inflammation in humans, but the effects on microcirculatory perfusion have not been tested before. We were particularly interested in microcirculatory changes during repeated administrations of LPS when endotoxin tolerance developed. The aim of our study was to compare 3 methods to investigate microcirculation and vascular reactivity during endotoxemia and endotoxin tolerance.

METHODS. Endotoxin tolerance was induced in 9 volunteers by intravenous injection of 2ng/kg/day lipopolysaccharide on 5 consecutive days. Microcirculation and vascular reactivity was monitored before (t=0) and after (t=2 and 4 hrs) LPS administrations on day 1 and 5. Near Infrared Spectroscopy (NIRS) measured thenar muscle tissue saturation before, during and after arterial occlusion (ischemia) was induced by inflating a cuff above the elbow to 50mmHg above systolic blood pressure for 90 seconds. Orthogonal Polarization Spectral imaging (OPS) measured microvascular perfusion sublingually using side stream darkfield imaging in small, medium and large sized microvessels. Forearm blood flow (FBF) was measured by strain-gauge plethysmography during local intra-arterially infusion of endothelial-dependent vasodilatory acetylcholine.

RESULTS. Endotoxin tolerance developed during 5 consecutive days of LPS administration as demonstrated by the attenuated release of pro-inflammatory cytokines and absence of symptoms and fever on the fifth day. Both NIRS and OPS did not demonstrate changes in microcirculation during endotoxemia or endotoxin tolerance in vivo. FBF measurements showed an acetylcholine dose-dependent attenuation (from 5.7±2.6 to 2.6±2.0) after the first administration of LPS (p=0.01), but not after acetylcholine stimulation when tolerance was present (from 6.1±2.1 to 5.8±3.7) on day 5(p=0.25).

CONCLUSION. In this human endotoxin tolerance model, no significant effect of repeated LPS administrations on microcirculatory perfusion could be observed using NIRS (thenar muscle) and OPS (sublingual). The forearm blood flow however, was attenuated after the first administration of LPS, indicating an endothelial dysfunction in endotoxemia in vivo. This attenuated response to acetylcholine was not present after the fifth administration of LPS, which may indicate that tolerance is also present at the levels of the endothelium.

0392

MICROVASCULAR DENSITY IS STRONGLY CORRELATED TO OXYGEN EXTRACTION AND CARDIAC OUTPUT IN SEPTIC SHOCK PATIENTS

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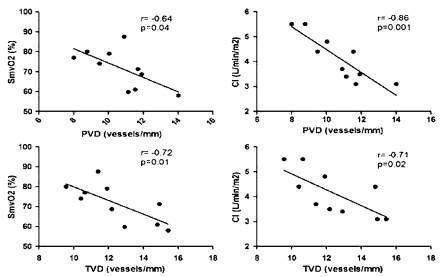
INTRODUCTION. Several authors have reported that there is no relation between systemic hemodynamics and microcirculation[1,2]. These reports have focused on microvascular flow but not density. In contrast, a recent study by Trzeciak[3] showed that microvascular density was inversely related to mixed venous oxygen saturation (SmvO2). The goal of this study was to determine if SmvO2 and cardiac output are related to sublingual microcirculation in SS patients.

METHODS. By using side dark field videomicroscopy (Microscan ®, Microvision medical) we evaluated sublingual microcirculation in 10 SS patients who had already been fluid resuscitated, within the first 24 hours after admission to ICU. Each patient′s microcirculation was evaluated looking at 3 to 6 different sublingual areas (10–20 seconds/image). Simultaneously, we assessed systemic hemodynamic parameters (MAP, mean arterial pressure; NA, Noradrenaline dose; CI, cardiac index and SmvO2). Images were analyzed by semiquantitative scores of flow (MFI, Mean flow index and PPV, proportion of perfused vessels) and density (TVD, total vascular density; PVD, perfused vascular density) of small vessels (<20μm). Correlations between parameters were determined by Pearson coefficient and considered significant if $p < 0.05$.

RESULTS. We found that SmvO2 and CI are inversely correlated to microvascular density, but not to scores of microvascular flow. MAP and NA were not correlated to density and flow scores.



CONCLUSION. Sublingual microvascular density is strongly correlated to oxygen extraction and cardiac output and may be a critical determinant of systemic hemodynamics.

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0393

BOTH PASSIVE LEG RAISING AND VOLUME EXPANSION IMPROVE SUBLINGUAL MICROCIRCULATION IN PRELOAD-DEPENDENT SEPTIC PATIENTS

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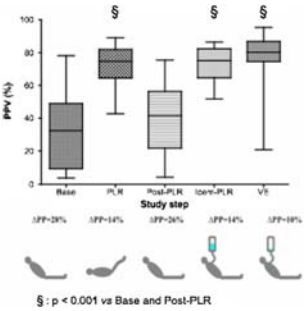
INTRODUCTION. We conducted a prospective study to assess sequential sublingual microcirculatory changes associated with passive leg raising (PLR) and volume expansion (VE) in preload-dependent septic patients.

METHODS. After IRB approval, 25 ventilated septic patients with suspected fluid-responsiveness (respiratory variation in pulse pressure (DeltaPP >13%)) underwent a 5 steps trial. At *Baseline*, systemic hemodynamics and sublingual microcirculatory parameters (MicroScan®, MicroVisionMedical, The Netherlands) including the proportion of perfused vessels (PPV) were acquired. Measurements were repeated after *PLR*, when returning to baseline position (*Post-PLR*), when VE induced the same DeltaPP value than PLR (*Idem PLR*) and at the end of *VE* (Figure). Values were analyzed with Friedman, Wilcoxon and Spearman tests.

RESULTS. Twenty septic shock and 5 severe sepsis patients (57±17 years, APACHE II : 23±7, SOFA : 11±4) were included within the first day following sepsis onset. Both PLR and VE improved sublingual microcirculation (increased PVP) but microcirculatory parameters did not correlate with systemic hemodynamics.



CONCLUSION. In preload-dependent septic patients, PLR and VE induced equal sublingual microcirculatory improvement. This result suggests that VE-induced microcirculatory changes were rather due to hemodynamic effects (systemic or local) than rheologic ones.

0394

FLUID RESUSCITATION IMPROVES SUBLINGUAL MICROCIRCULATORY FLOW IN SEPTIC SHOCK PATIENTS

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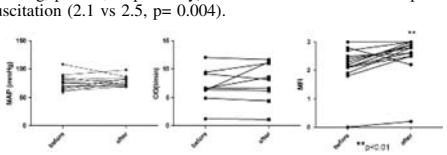
INTRODUCTION. Impaired microcirculation in septic shock (SS) is frequent and has been related to outcome. Fluid challenge (FC) is a hallmark of resuscitation and shifts hypodynamic to hyperdynamic shock at the macrocirculation level. Since microcirculation may behave independently from macrocirculation, little is known about the relation between macro- and micro-circulation after fluid challenge. In this study, we used SDF (1, MicroScan, MicroVision Medical Amsterdam, NL) imaging to assess the sublingual microcirculation in patients with SS. We hypothesized that microcirculatory blood flow may change after fluid challenge relatively independently from macrohemodynamic response.

METHODS. Fourteen patients (mean age 64±17 yrs) with SS of less than 48 hrs, mechanically ventilated and receiving norepinephrine, underwent a fluid challenge (500ml saline over 15 min). SAPS II and SOFA score were collected. SDF imaging of the sublingual microcirculation were performed in each patient, at 3 different spots, before and after FC. Heart rate (HR), invasive mean arterial pressure (MAP), central venous pressure (CVP), and cardiac output (CO) were registered at the same time.
Movie clips of the microcirculation were analysed by 2 independent researchers in a blind manner. Microcirculatory flow Index (MFI) was calculated on a semi-quantitative basis according to the Boerma score (2). Small vessels (diameter<20μm) changes were considered for statistical analysis using Student's t-test. $p < 0.05$ was considered significant. Results are shown as mean±SD.

RESULTS. SAPS II score was 56 ± 18 and SOFA score was 11 ± 4. MFI was constantly impaired at baseline. HR, MAP, CO and CVP did not change significantly before and after the fluid challenge (100 vs 99 bpm, p= 0.68; 75 vs 79 mmHg, p=0.27; 6.9 vs 7.5 l/min, p=0.31 and 10 vs 14 mmHg, p=0.12, respectively). Small vessels MFI score improved significantly after fluid resuscitation (2.1 vs 2.5, p= 0.004).



CONCLUSION. In this cohort, fluid challenge improved microcirculatory flow despite no significant effect on systemic hemodynamic variables. This suggests that microcirculatory parameters are more sensitive in assessing responsiveness to fluid than macro-parameters. Further research should be performed to better clarify the kinetic and the threshold for micro- and macro-hemodynamic modifications in SS and to evaluate such a functional test for outcome prediction.

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GRANT ACKNOWLEDGEMENT. Plan quadriennal EA322.

0395

MICROCIRCULATORY CHANGES AFTER ACTIVATED PROTEIN-C INFUSION IN SEVERE SEPSIS

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INTRODUCTION. In sepsis the link between the systemic inflammatory response and the development of MOF is represented by Microcirculatory and Mitochondrial Distress Syndrome (MMDS) that causes an important cellular impairment of aerobic methabolism not corrigible exclusively with a restoration of a normal hemodynamics and oxygen delivery. We observed the changes caused by MMDS in the tissue oxygenation and in the microcirculation with NIRS and microcirculatory analysis in patient with severe sepsis or septic shock, before, during and after Activated Protein C (APC) infusion. We evaluated if APC influences tissue saturation (an index of O2ER) and if alterations of hemodynamics are linked to these changes.

METHODS. Prospective observational study. We evaluated ten septic patients treated with APC from December 2005 to September 2007. Microcirculation images were registered and analyzed by the SDF technic and MAS software that calculate the MFI (Microvascular Flow Index), mean velocity and FCD (Functional Capillary Density) parameters. We carried out evaluation with NIRS of the StO2 with the spectrometer InSpectra (Hutchinson Technology Inc., Minn) putting a probe of 15mm in the brachioradialis muscle of the patients. The measurements were made in 5 steps: pre-APC, at 24h, 48h, 72h and 24h after the end of the infusion (post-APC). Each measurement (of the basic StO2 and of the slope during and after the ischemia) was registered and transformed from the software InSpectra Analysis. The parameters analyzed with the non-parametric test of Wilcoxon for repeated measurement ($P<0.05$).

RESULTS. MICROCIRCULATION: There was a significant increase of MFI and of FCD started after 72 h from the beginning of infusion for small and medium vessels ($P<0.001$) and an increase of mean velocity at 72h for small vessels and in post-APC for small and medium vessels ($P<0.05$)

NIRS: The increase of the basal StO2 during and after APC treatment and its decrease during the arterial occlusion are statistically significant ($P<0.05$). The increase of the StO2 slope after arterial occlusion is statistically significant starting from the second day of infusion of APC ($P<0.05$).

CONCLUSION. Microcirculation analysis throw SDF technic let visualize the significant modifications which begin in septic syndrome (low capillary density, reduced flow velocity, heterogeneity of the microcirculation) and also the improvements of the microcirculatory state during the APC infusion.

There is an improvement of all the NIRS parameters after the APC infusion, which means an increase of tissutal O2ER. We have to verify if that increase is linked either with a reduced shunt effect in the microcirculation or with the end of metabolic down-regulation that involves the mitochondrial system. APC seams improve microcirculatory state in septic patients acting most of all on small vessels vases. NIRS and the microcirculation monitoring are useful tools to evaluate therapy and the outcome of severe sepsis and septic shock.

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0397

RESPIRATORY TRACT INFECTIONS AFTER CARDIAC SURGERY

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INTRODUCTION. Nosocomial pneumonia (NP) and tracheobronchitis (TBX) after cardiac surgery are associated with worse outcomes. The aim of this study was to identify risk factors associated with NP and TBX after cardiac surgery and to determine their impact on mortality and morbidity.

METHODS. Retrospective observational cohort study of 1600 adult patients operated under extracorporeal circulation and who stayed in the ICU for more than 24 hours. NP was diagnosed in accordance with the American Thoracic Society guidelines. All NP and TBX episodes were confirmed by a quantitative culture of endotracheal aspirate. Univariate and logistic regression analysis were done.

RESULTS. The frequency of NP in our population was 1.2% (15.6 episodes per 1,000 days of mechanical ventilation) and that of TBX was 1.6% (21 episodes per 1,000 days of mechanical ventilation). The duration of mechanical ventilation with NP was longer (median 21.8 days, IQR 8.9 - 35) than without respiratory tract infections (median 5.5 hours, IQR 4.1 - 10). Significant independent risk factors for respiratory tract infections are summarized in Table 1. The median length of stay in the ICU and hospital were significantly longer in patients with NP (30 and 42 days respectively) and TBX (10 and 28 days) than in patients without any respiratory tract infection (3 and 11 days, $p < 0.0001$). Mortality in patients without respiratory tract infection was 0.9% (14 of 1555), in patients with NP was 42% (8 of 19) and 12% (3 of 25) in TBX, differences that were statistically significant ($p < 0.0001$).

TABLE 1 RISK FACTORS FOR RESPIRATORY TRACT INFECTIONS (NP AND TBX, N = 44).

	Relative risk (95% CI)	P Value
LV Ejection Fraction <30%	4.7 (1.9 – 11.4)	0.001
Urgent surgery	4.3 (2.2 – 8.6)	< 0.0001
Chronic Renal Failure	4.2 (2.0 – 8.8)	< 0.0001
Constant	0.003	< 0.0001

CONCLUSION. Patients undergoing cardiac surgery have a low frequency of NP and TBX. Both respiratory tract infections are associated with a poor prognosis.

Oral Presentations
Perioperative organ failure: 0396–0400

0396

APPLICATION OF THE SEQUENTIAL ORGAN FAILURE ASSESSMENT SCORE IN PREDICTION OF MORBIDITY AND MORTALITY AFTER CARDIAC TRANSPLANTATION

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INTRODUCTION. BACKGROUND: The sequential organ failure assessment score SOFA has been shown to predict mortality and morbidity in heterogeneous cardiac surgical patients but not after heart transplantation (HTx) (1, 2, 3). As patients after HTx need early postoperative catecholamines we evaluated the application of SOFA in prediction of 30-day mortality and morbidity following HTx.

METHODS. We retrospectively studied 126 consecutive heart transplant recipients (age: median 47, 12–70 years). The SOFA was calculated postoperatively and daily until intensive care unit (ICU) discharge or for a maximum of 7 days. C-reactive protein (CRP) values and white blood cell (WBC) count were reviewed. Lengths of ICU stay and 30-day mortality were assessed.

RESULTS. From the 1st until the 7th postoperative day (POD) only SOFA values, not CRP or WBC counts, were significantly higher in non-survivors (12.5%) than in survivors (Mann-Whitney test: $p < 0.001$). For SOFA area under the receiver operating characteristic curve (ROC-AUC) for risk of 30-day mortality at ICU admission was 0.90 (95% CI 0.83 to 098). The highest value (0.94, 95% CI 0.88 to 0.99) was reached on the 4th POD. A SOFA value of > 12 points as a predictor for 30-day mortality had a specificity of 79% and sensitivity of 88%. In survivors the maximum of SOFA, but not of CRP or WBC counts, correlated significantly with the length of ICU stay ($p < 0.001$).

CONCLUSION. Although patients after HTx need catecholamines in the early postoperative period, SOFA can be used to grade the severity of morbidity and to identify the risk of 30-day mortality without specific modifications. As an independent score, SOFA is therefore helpful in early therapeutic decision making and resource planning in heart transplant recipients.

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0398

HIGH TIDAL VOLUME AS AN INDEPENDENT RISK FACTOR FOR ACUTE LUNG INJURY AFTER CARDIAC SURGERY

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INTRODUCTION. Despite a widespread use of fast-track protocols, patients undergoing cardiopulmonary by pass (CPB) may need prolonged mechanical ventilation, based with high tidal volume (10–15 ml/kg) and low positive end expiratory pressure (PEEP). Experimental and clinical data showed that this kind of ventilation might increase pulmonary and systemic inflammation in patients with acute lung injury (ALI), and this has been recently suggested in patients undergoing CPB.

Our hypothesis was that mechanical ventilation with large tidal volumes during the post operative period was a risk factor that may contribute to the development of acute lung injury.

METHODS. A prospective observational study was conducted on patients undergoing CPB. Exclusion criteria were age < 18 years old, off pump surgery, heart and lung transplantations.

RESULTS. Among 307 patients, admitted to the cardiac ICU from April to September 2007, 200 met inclusion criteria. 14 (7%) developed ALI on day 3.7±1.4. Multivariate logistic regression analysis adjusted for baseline patient characteristics (age, gender, Simplified Acute Physiology Score (SAPS II)) and underlying peri-operative ALI risk factors (CPB, blood transfusions, total time of surgery), identified high tidal volume, SAPS II, incremental PEEP level and total time of surgery as risk factors for the development of ALI (Table).

TABLE 1

Variables	OR	CI Lower	CI Upper	P
SAPS II	1.221	1.065	1.400	.004
Tot Time Surg	1.009	1.002	1.018	.020
Mean TV/PBW	2.038	1.025	4.054	.042
PEEP	2.085	1.269	3.425	.004

CONCLUSION. Together with SAPS II and total time of surgery, high tidal volume and incremental level of PEEP represent independent risk factors of acute lung injury in patient undergoing CPB.

0399

VALIDATION OF CARDIAC OUTPUT MEASUREMENTS WITH THE LIDCO PULSE CONTOUR SYSTEM IN PATIENTS WITH REDUCED LEFT VENTRICULAR FUNCTION AFTER HEART SURGERY

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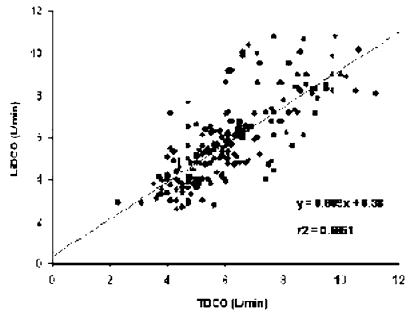
INTRODUCTION. The LiDCO^{TM} is a new continuous, minimally invasive method that employs the pulse contour technique to determine cardiac output (CO). In swine (1) and patients (2,3) with normal ventricular function there seems to be good agreement between LiDCO^{TM} and the thermodilution CO method using a pulmonary artery catheter (TDCO). However, LiDCO^{TM} has not yet been validated in patients with a compromised left ventricular ejection fraction (LVEF) after heart surgery.

METHODS. After institutional approval and obtaining informed consent we studied 27 ASA IV patients with a LVEF < 40%. Postoperatively multiple duplicate CO measurements were carried out at various haemodynamic states with the TDCO and the LiDCO^{TM} technique. The correlation coefficient was determined by a simple regression analysis and mean bias as well as the upper and lower limits of agreement were calculated.



RESULTS. A total of 204 measurements were performed. TDCOs ranged from 2.3 to 11.2 and those determined by LiDCO^{TM} from 2.8 and 10.6 L/min. The correlation coefficient r2 between these two methods was 0.59 ($P < 0.05$). Mean bias as well as lower and upper limits of agreement (i.e. mean bias ± 2 SD) were 0.32, −2.22 and 2.86, respectively. 96% of the differences between the two methods lied between the limits of agreement.

CONCLUSION. These preliminary results suggest that LiDCO^{TM} seems to correlate fairly well with TDCO even in patients with a reduced pump function after cardiac surgery. In spite of the wide range between the limits of agreement LiDCO^{TM} may thus be an alternative to TDCO in cases were insertion of a pulmonary artery catheter is either contra-indicated or not considered opportune.

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0400

THE POSTOPERATIVE VASOPRESSIN AND COPEPTIN RESPONSE IN NON-CARDIAC SURGERY PATIENTS: A PROSPECTIVE, CONTROLLED TRIAL

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INTRODUCTION. The systemic inflammatory response syndrome (SIRS) refers to the general activation of the immune system by non-infectious stimuli, which may cause cardiovascular failure and subsequent multiple organ dysfunction (1). Comparable to the clinical presentation of septic shock, hemodynamic instability associated with SIRS is characterized by hypovolemia and peripheral vasodilatation with or without myocardial dysfunction (2). Further information on the endogenous arginine vasopressin (AVP) response in patients with the postoperative systemic inflammatory response syndrome (SIRS) and vasodilatory shock would give more insight into the pathophysiology of SIRS-associated cardiovascular failure and help to indicate AVP therapy.

METHODS. Patients after uncomplicated abdominal surgery without SIRS (n=10), critically ill patients after non-cardiac surgery with SIRS (n=9) and patients with SIRS plus vasodilatory shock (n=22) were included into this prospective trial. Plasma AVP (radioimmunoassay) (3) and copeptin (immunoluminometric assay) (4) concentrations together with clinical parameters were documented daily during the first seven postoperative days.

RESULTS. The AVP response significantly differed between the three groups. Patients without SIRS had lower AVP concentrations than SIRS patients with (p=0.001) or without shock (p=0.003). Patients with SIRS and shock had higher AVP levels than patients with SIRS alone ($p < 0.001$). Without a group difference, AVP decreased over time (p=0.007). Non-survivors had higher AVP levels than survivors at day 28 ($p < 0.001$). In SIRS patients without shock, serum osmo-larity was indirectly associated with AVP levels, while mean arterial blood pressure and se-rum osmolarity were associated with AVP in SIRS patients with shock. AVP and copeptin correlated significantly with each other ($p < 0.001$; r=0.76). In patients without hemofiltration, copeptin levels could predict 28 day mortality with a high sensitivity and specifity.

CONCLUSION. The postoperative AVP response in non-cardiac surgery patients seems well preserved. A contributory role of AVP to the failure to restore the vascular tone in patients with vasodilatory shock cannot be excluded but seems less important than in septic or postcardiotomy shock.

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Oral Presentations
Paediatric intensive care: 0401–0405

0401

MEASURED AND PREDICTED ENERGY EXPENDITURE AND DELIVERED ENERGY IN CRITICALLY ILL CHILDREN AFTER EXTRACORPOREAL CIRCULATION

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INTRODUCTION. In pediatric intensive care units, energy needs are complex to determine. Extracorporeal circulation (EC) that induces an inflammatory state could influences energy expenditure. The aim of this study was to compare energy expenditure measured (REEm) by indirect calorimetry with theoretical REE and energy intake (EI) in patients with and without EC.

METHODS. Children with expected mechanical ventilation ≥72 hours and a FiO2 ≤60% were prospectively studied and separated into 2 groups according to EC or not. REEm was measured daily by indirect calorimetry until extubation; results were compared to predicted REE by the equation from Schofield WH (1985). EI were recorded daily and energy balance was calculated. Comparisons were tested by the t-test and the Bland-Altman method.

RESULTS. 62 critically ill children, 36 males and 26 females were included. In the 24 EC patients, mean age (±SD) was 19.8±20.1 months with a body weight and body size of 8.0±4.3 kg and 72.7±18.1 cm, respectively. In the 38 non EC patients, mean age was 22.5±1.2 months with a body weight and body size of 9.8±5.1 kg and 77.3±20.7 cm, respectively. These results did not differ between groups. On day 1, CRP was 110.5±65.1 mg/dl in EC and 78.8±87.7 mg/dl (ns) in non EC. 337 indirect calorimetry measurements (5.4±2.5 per patient) were performed; 138 in EC and 199 in non EC. REEm was higher in EC compared to non EC with 57.9±12.3 kcal/kg/d (median 57.5 range: 31.5 to 97.0 and IQ 47.6 to 65.8 kcal/kg/d) in EC and 53.7±10.8 kcal/kg/d (median 52.9, range: 27.8 to 94.1 and IQ 45.6 to 60.3 kcal/kg/d) in non EC ($p < 0.01$). Respiratory quotient was 0.84 ± 0.1 in both groups. Schofield estimated REE correctly for both groups. The mean bias was −1.4±14.4 kcal/kg/d in EC (ns; 95% CI −3.8 to 1.0) and 0.3±14.0 kcal/kg/d in non EC (ns; 95% CI −1.6 to 2.3). During the stay, EI was 47.0±27.0 kcal/kg/d and 52.2±24.3 kcal/kg/d in EC and non EC, respectively ($p < 0.001$). The balance was strongly negative during the first 6 days in EC and during the first 2 days in non EC. The balance became clearly positive since day 8 in EC and day 7 in non EC.

CONCLUSION. Extracorporeal circulation increases slightly REE in critically ill children, but this rise does not meet the criteria of hypermetabolism (REEm >10% predicted REE). The Schofield equation predicts very accurately REE in both groups. The energy balance remains negative longer in patients with EC compared to patients without EC.

0402

COULTER LH750: CLINICAL USEFULNESS OF NEUTROPHIL VCS RESEARCH POPULATION DATA IN THE DIAGNOSIS OF SEPSIS IN NEONATES - CORRELATION WITH ITR

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INTRODUCTION. Neutrophils (NE) and bands counting are auxiliary test in detection of bacterial infections, even if the band count is a low-specificity test with high inaccuracy (1). In neonates absolute NE count is one of the Rochester criteria ad is also used to obtain Immature/mature NE ratio (ITR), a useful index in neonatal sepsis diagnosis. ITR has been considered to have an high variability in terms of sensibility (SE) and specificity (SP)(2). Coulter LH700 series hematology analyser provides CBC/diff data, including 24 research population data (RPD) referred to mean and standard deviation of Volume, Conductivity ans Scatter (VCS) measures of WBC subpopulations. Several experiences have been reported about the clinical usefulness of NE RPD in detecting sepsis in adults (3,4). We daily analyze samples of the neonatal intensive therapy providing CBC/Diff and ITR to those with sepsis suspect. The aim of this study was to evaluate the clinical usefulness of NE RPD in detecting neonates' sepsis in order to find a time-saving test with high SE and SP.

METHODS. We collected Coulter LH750 data of 62 neonatal samples with suspect of sepsis and 36 age-matched normal samples. ITR was calculated with 200-cell count and sepsis was assessed with blood culture.

RESULTS. Results are reported in Table 1. NE RPD values of septic patients, except SDS, are statistically different from normal. On the basis of sepsis diagnosis we analysed the performances of ITR and NE RPD. The current cut-off of 0.2 for ITR has SE=53.8%, SP=77.6%, NEVM=147 has SE=92.3%, SP=65.3% and VSD=26.83 has SE=84.6%, SP=63.3%. Since our major goal is the detection of sepsis in non-neutrophilic patients, we studied the combination of NE#<5.5 and NE RPD. VM=148 has SE=100%, SP=72.5% while VSD=26.83 has SE=100%, SP=70.0%.

TABLE 1 NE RPD

	Cut-off	SE%	SP%	AUC
NE#	5.5	46.2	81.6	0.68
ITR	0.2	53.8	77.6	0.79
VM	147	92.3	65.3	0.83
VSD	26.8	84.6	63.3	0.71
VM (NE#<5.5)	148	100	72.5	0.91
VSD (NE#<5.5)	26.8	100	70	0.82

CONCLUSION. A fast and correct diagnosis of sepsis is essential in the Intensive Care treatment of neonates and our data clearly show that NE RPD of Coulter LH700 series improve the process of detecting sepsis in neonates. RPD have better performance than the current tests in signalling the suspect of sepsis. Moreover they represent a time-saving and faster test than ITR determination.

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0403

AUDIT OF DIFFERENT WAYS OF ESTIMATING BLOOD GLUCOSE LEVELS IN PAEDIATRIC INTENSIVE CARE

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INTRODUCTION. Aggressive 'tight' control of glucose improves outcome in randomised controlled trials in critically ill adults. However, there are concerns that the adverse consequences of hypoglycaemia may outweigh the benefits of tight glucose control in paediatrics. Prior to starting a randomised trial of aggressive glucose control in the Paediatric Intensive Care Unit (PICU) the results from 3 different methods for measuring glucose in critically ill children were compared.

METHODS. The glucose concentrations obtained from automated laboratory equipment, ward based blood gas analyser(BGA) and bedside glucometer (MediSense)were compared from critically ill children having routine blood tests, in a 20 bed regional PICU in England.

RESULTS. 101 routine samples of blood were analysed to determine the glucose concentrations when measured by automated laboratory equipment, by ward based blood gas analyser (BGA) and by bedside glucometer (MediSence),a total of 303 analyses.In the absence of a gold standard, these measurements were compared one with another. Only 53.5% of the glucometer and blood gas analyser (BGA) estimations of glucose (n=101) and 56.4% of glucometer and laboratory measurements (n=101) were within 1.0 mmol/l of each other. 86% of the comparisons between the BGA and the laboratory measurements were within 1.0mmol/L (n=101).

CONCLUSION. There is considerable disagreement between the glucose concentrations measured using the different methods. This may produce difficulties with attempts to aggressively control glucose.

0404

REDUCING ADVERSE DRUG EVENTS ON PAEDIATRIC INTENSIVE CARE – ARE WE WINNING?

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INTRODUCTION. Data from national audits has previously shown approximately 10% of patients admitted to hospital experience an adverse event. Adverse drug events have the potential to cause significant morbidity and mortality. The PICU at RLCH admits approximately 1000 patients per year from neonates to 18 years and as drugs are prescribed on a weight or surface area basis the risk of adverse drug events is high.

METHODS. Using the last 3 years of PICU adverse event database and a Pharmacy intervention audit (June 2006) we identified high alert drugs. Assessed whether awareness of events and interventions are reducing incidents.

RESULTS. Top 5 groups of drugs identified requiring intervention: Prophylactic Cardiac antibiotics, sedation and analgesia, Potassium chloride, dinoprostone and inotropes, and heparin. Interventions identified as effective: change in written guidelines for cardiac antibiotics, sedation and analgesia, dinoprostone and heparin. We have simplified guidelines (cardiac antibiotics, heparin and sedation/analgesia), and changed unit policy to use of standard concentrations of inotropes/prostin. Each change in guidelines has been backed up with notification and training by our education team. All events involving nursing staff are flagged to our nurse education team so that individual training needs can be met, and any general training issues identified. To increase awareness of adverse incidents we also use simulation training. This has helped improve recognition of events and awareness of methods to minimise effects. Adverse incidents are now discussed at medical, nursing and AHP new staff induction and at annual mandatory training.

TABLE 1 REPORTED ADVERSE EVENTS OVER LAST 3 YEARS ON PICU

	Total adverse events	Numbers drug events	% Drug events
2005	223	84	37.7
2006	344	146	42.4
2007	375	116	30.9

TABLE 2 PICU PHARMACIST INTERVENTIONS OVER 1 MONTH JUNE 2006

Drug	Number of Interventions (total 109)	% of total interventions
Prophylactic cardiac antibiotics	28	25.6
Sedation/analgesia	27	24.8
Potassium chloride	3	2.8
Vasoactive drugs	4	3.7
Heparin	7	6.4

CONCLUSION. Simplifying drug guidelines and increasing their availability appear to have helped reduce adverse drug events on PICU. Increasing awareness through multidisciplinary adverse events team (responsible for investigation and feedback) and education and training are also significant factors.

0405

PROSPECTIVE INCIDENCE STUDY OF NOSOCOMIAL INFECTIONS IN THE PICU

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INTRODUCTION. Nosocomial infections are important causes of mortality morbidity and prolonged hospital stay in PICU.

METHODS. A prospective surveillance study was performed in PICU at Tirana University Hospital during one year period February 2007- January 2008 to describe the epidemiologic profile of NI. CDC criteria were used as standard definitions for NI. Data including extrinsic risk factors invasive devices associated with NI were recorded.

RESULTS. During the study period were admitted 484 patients - 405 no surgical and 79 surgical patients with mean age of 30.4 mo.
The incidence rate of NI during the study period was 10.5 per cent with a total number of NI of 52. 19 surgical patients and 33 no surgical patients had NI.
Urinary tract infections the respiratory tract infections blood stream infections were the most encountered with a rate of 4 per cent 3 per cent 1.4 per cent respectively.
The etiologic profile was as follow - gram negative 71.15 per cent gram positive 23.1 per cent and fungi 5.75 per cent.
Mortality was not influenced by the episodes of nosocomial infections.
The length of hospital stay in infected patients was longer than in no infected patients 19.5 days and 3.6 days respectively $P < 0.01$.

CONCLUSION. This study highlights the importance of NI surveillance and the necessity to evaluate preventive measures and design control guidelines which could reduce their consequences.

Oral Presentations
Lung imaging and monitoring: 0406–0410

0406

FUNCTIONAL RESIDUAL CAPACITY GUIDED ALVEOLAR RECRUITMENT STRATEGY IMPROVES OXYGENATION

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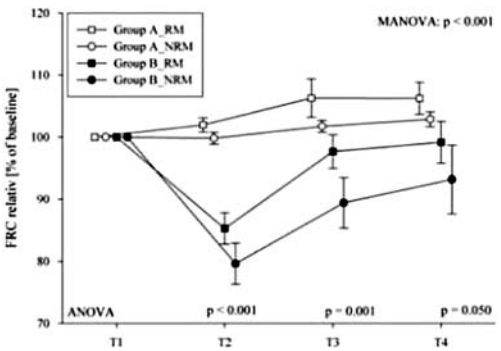
INTRODUCTION. Open endotracheal suctioning may lead to alveolar decrecruitment 1, which can be monitored by means of functional residual capacity (FRC) measurements 2. We hypothesized that a recruitment strategy based on FRC measurements would improve oxygenation after an open endotracheal suctioning manoeuvre.

METHODS. We studied 65 postoperative mechanically ventilated cardiac surgery patients. FRC was assessed by oxygen washout using a sidestream O2-analyser (LUFU system (Dräger Medical AG, Luebeck, Germany)). Patients were ventilated with BIPAP, PEEP of 10 cmH2O, and a tidal volume of 6 – 8 ml / kg. All patients received an open suctioning procedure (20 sec, 14 F catheter, 200 mmHg negative pressure). Prospectively patients were stratified into two groups by the post suctioning FRC value (A: FRC >94% of baseline; B: FRC <94% of baseline). Both groups were randomized into either a recruitment manoeuvre (RM) group (PEEP 15 mbar, PIP 35–40 mbar for 30 sec, group RM) or a non RM group, in which venitilation was resumed without a RM (group NRM), resulting in four groups. FRC and paO2/FiO2 (PF-ratio) were recorded at baseline (T1), after suctioning (T2), after RM or NRM (T3), and 30 min after T3 (T4).

RESULTS. B_RM and B_NRM showed lower FRC values at T2 compared to A_RM or A_NRM, which remained lower at T3 and T4 only in B_NRM. At T3 B_NRM showed lower FRC values compared to B_RM. A_RM and A_NRM showed no differences in FRC values (see Figure 1). B_NRM showed lower values of PF-ratio at T3 (A_RM: 392 ± 24 mmHg; A_NRM: 378 ± 21; B_RM: 381 ± 24; B_NRM: 301 ± 27; $p = 0.036$). This difference did not reach significance at T4 ($p = 0.098$).



CONCLUSION. A FRC guided alveolar recruitment strategy after open endotracheal suctioning restored reduced FRC and showed short term improvements of oxygenation in patients after cardiac surgery.

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0407

USE OF CINE CT TO ASSESS CYCLIC RECRUITMENT – DERECRUITMENT (R/D). EFFECTS OF PEEP, TIDAL VOLUME AND RESPIRATORY RATE ON R/D

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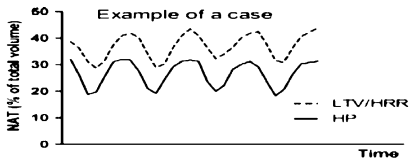
INTRODUCTION. The use of high PEEP levels has been the main approach advocated to avoid R/D. Nevertheless, a recent clinical trial failed to show any protective effect derived from the use of high compared to moderate PEEP levels. R/D is difficult to assess in patients and the use of static CT may not adequately predict dynamic changes taking place during ongoing mechanical ventilation. The goal of this study was to evaluate the effect of PEEP and tidal volume on R/D using cine-CT during uninterrupted MV.

METHODS. We studied ventilated patients fulfilling criteria for ARDS, who underwent a protocol including 4 ventilatory modes: 1)HTV: High tidal volume (TV) (12 ml/kg)/Low respiratory rate(RR) (15/min)/PEEP 9cmH2O, 2) LTV/HRR: Low TV (6ml/kg)/High RR (30/min)/PEEP9 cmH2O, 3)LTV/LRR Low TV (6ml/kg)/Low RR (15/min)/PEEP9 cmH2O, and 4)HP: Low TV (6ml/kg)/High RR(30/min)/High PEEP (15cmH2O). All patients were sedated and paralyzed, connected to a pneumotach (Hans Rudolph, Inc.) including esophageal pressure and proximal airway flow and pressure monitoring. After having a thorax CTscan, a transverse region 2 cm over the diaphragm was chosen and cine-CTs of 8 seconds at this fix transverse region were performed at each ventilator mode (LightSpeed VCT, GE; image reconstruction at 0,25sec-32 images, 0.4 sec / rotation, 16 × 1,25 mm slices, matrix of 512 × 512). Images were analyzed manually with a software (Maluna®, University of Gottingen, Germany), and R/D was determined as the change in non aerated tissue (NAT,-100 to +100HU), along the respiratory cycle, expressed as % of total volume. The effect of PEEP, TV and RR, on R/D and end-expiratory NAT, was evaluated by paired t-tests between the corresponding ventilator modes. A $p < 0.05$ was considered statistically significant.



RESULTS. We have already analyzed 5 patients (52±20y.o, 4 male) who were on their 2nd to 6th day of MV (PaFi 169±25, compliance 24±9 ml/cmH2O). R/D was maximal at HTV (7.8±5.8%) and decreased significantly at lower TVs (LTV/LRR:4.9±4.9%,p=0.02 vs HTV; LTV/HRR:5.0±4.4%, p=0.02 vs HTV). Increasing PEEP while using low TV did not further decrease R/D (HP:4.7±4.6%, p=0.5 vs LTV/HRR). Respiratory rate did not influence R/D at low TV. There was a non significant trend to decreased end-expiratory NAT with HP and HTV compared to both LTV/HRR and LTV/LRR.

CONCLUSION. Our preliminary data suggest that decreasing tidal volume is the most effective intervention to decrease R/D. At low TV, increasing PEEP adds no further protection against R/D despite a trend to decreased end-expiratory NAT. These data are consistent with results observed in large clinical trials on protective strategies. Cine-CT is a suitable and interesting method to assess R/D during uninterrupted MV.

GRANT ACKNOWLEDGEMENT. Fondecyt 11060350.

0408

COMPUTED TOMOGRAPHY CORRELATES OF "BEST POSITIVE END-EXPIRATORY PRESSURE" IN A DECREMENTAL PEEP TRIAL

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INTRODUCTION. Titration of the "best positive end-expiratory pressure" (PEEP) level in patients with acute lung injury (ALI) remain controversial. This work aimed at comparing four commonly used criteria for determination of the best PEEP in experimental ALI and their computed tomography (CT) correlates.

METHODS. Ten pigs (30–35.6 kg) were anesthetized, intubated and mechanically ventilated with a tidal volume (VT) of 10 ml/kg, PEEP = 5 cmH2O, FIO2 of 1.0 and respiratory rate (RR) between 10–20/min. ALI was then induced by means of surfactant depletion until PaO2≤ 200 mmHg. The VT was then set at 6 ml/kg and RR increased to keep the PaCO2 lower than 55 mmHg. After stabilization, a recruitment maneuver was performed (50 cmH2O, 40 s). Thereafter, PEEP was set at 24 cmH2O and decreased to zero in steps of 4 cmH2O (10 min/step). At each step, arterial and mixed venous blood samples were obtained and cardiac output (CO) was measured. In six animals (CT-Group), whole lung helical CT-scans (1 mm thickness) were obtained at each step during end-expiratory and end-inspiratory pauses. Airway pressure and flow signals were recorded and elastance of the respiratory system (Ers), resistance (Rrs) and PEEP continuously computed by the least squares method. The best PEEP was then assessed considering four definitions: 1) PEEP of minimal Ers; 2) PEEP of minimal Ers and highest PaO2; 3) last PEEP with PaO2+PaCO2 ≥ 400 mmHg; 4) last PEEP before the PEEP of minimal Ers. Results are presented as median and inter-quartiles. Comparisons were performed with the Wilcoxon's test and adjusted with the Bonferroni-Holm procedure. Significance was accepted at $p < 0.05$.

RESULTS. The stepwise reduction of PEEP resulted in an increase of cardiac output and arterial blood pressure, as well as a reduction of total lung volume (TLV) and volume of intrapulmonary gas. The intrapulmonary shunt increased and PaO2 decreased significantly at the PEEP of 8 cmH2O ($p < 0.05$). No significant differences were observed among the PEEP of minimal Ers (12.5 cmH2O [12.4–12.6]), PEEP of minimal Ers+highest PaO2 (12.7 cmH2O [12.4–15.7]) and last PEEP with PaO2+PaCO2≥400 mmHg (12.5 cmH2O [9.7–15.3]). The PEEP level 4 cmH2O higher than the PEEP of minimal Ers (16.5 cmH2O [12.4–16.9]) differed significantly from the PEEP levels according the other criteria, and resulted in a compromise among hyperaerated, normally aerated poorly aerated and non aerated lung areas.

CONCLUSION. In this model of ALI, a PEEP level set 4 cmH2O higher than the PEEP of minimal Ers in a decremental PEEP trial resulted in a compromise between oxygenation, lung mechanics and lung aeration. This criterion could be useful to achieve improved pulmonary function and aeration simultaneously.

0409

EFFECTS OF PRONE AND SUPINE POSITION ON REGIONAL PULMONARY PERFUSION MEASURED BY SMALL ANIMAL POSITRON EMISSION TOMOGRAPHY

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INTRODUCTION. There are only limited data about the influence of posture on the pulmonary perfusion (Qr) in small animals. Ga-68 radiolabeled human albumin microspheres (Ga-68-DOTA-HSAM) with a diameter of 20 µm are expected to lodge in the pulmonary capillaries. The purpose of this study was to quantify Qr in prone and supine position in terms of their imaging manifestations in healthy rats.

METHODS. The animal research committee of the Regierungspräsidium Dresden approved the animal facilities and the experiments according to institutional guidelines and the German animal welfare regulations. Seven anesthetized, spontaneous breathing Wistar rats (297 ± 53 g), were positioned either in prone (n=3) or supine (n=4) position and Ga-68-DOTA-HSAM were infused. Qr was achieved by imaging the radioactivity distribution in the lungs. The animal PET 3D volume data were reconstructed with 3D OSEM MAP algorithm. After first measurement animals were arranged in opposite position and the PET measurement was repeated. The 3D data were at first manually coregistered and residual differences in the relative positioning of the lungs were corrected user independently (Rover, ABX GmbH, Germany). Masks for defining regions of interest (ROI) were set in the coregistered volume data for all animals. Mean normalized Qr values (Qmean) of the dorsal and ventral parts of the lungs were calculated on the basis of an automatic ROI-setting including threshold analysis.

RESULTS. Vertical gradient of regional perfusion was significantly steeper in the supine, −0.131 ± 0.01 %/cm, than in the prone animals −0.055 ± 0.01 %/cm (P = 0.002), indicating that the vertical distribution of regional perfusion in dependent regions was more accentuated in the supine than in the prone infused animals. Changes in the vertical gradient after rotation in the opposite position resulted in a vertical gradient of −0.093 ± 0.031 %/cm in prone position. Vertical gradient in the supine position of prone infused animals was −0.093 ± 0.015 %/cm. Position changes did not produce significant changes in vertical gradient in supine (P = 0.125) and in prone infused animals (P = 0.25). Qmean was not affected by posture.

TABLE 1

position of Ga-68-infusion	position of acquisition	Qmean ± SD prone	Qmean ± SD supine
ROI dorsal	prone	0.18 ± 0.04	0.16 ± 0.03
ROI dorsal	supine	0.19 ± 0.05	0.16 ± 0.02
ROI ventral	prone	0.16 ± 0.04	0.14± 0.03
ROI ventral	supine	0.17 ± 0.04	0.14 ± 0.02

CONCLUSION. The influence of posture on regional perfusion was demonstrated, for our knowledge, for the first time in rodents. Qr was significantly decreased from dorsal to ventral regions in supine infused animals. Ga-68-DOTA-HSAM (20 µm) can be used for non-invasive pulmonary perfusion studies in rats with small-animal PET. Lung structure distribution changes were minor. Distribution pattern of regional perfusion in prone and supine position in normal rat lungs will be used as reference data set for further studies on injured rat lungs.

0410

PEEP OPTIMIZING USING ELECTRIC IMPEDANCE TOMOGRAPHY IN PORCINE LUNG INJURY

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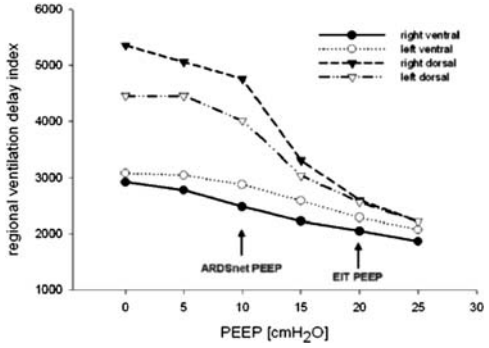
INTRODUCTION. Potential for alveolar recruitment is individually different in patients with Acute Lung Injury (ALI) and can not be predicted by origin of ALI. Delay of regional ventilation (RVD) measured by Electric Impedance Tomography (EIT) during slow inflation has recently been shown to correlate with alveolar recruitment (1). We hypothesized that tidal recruitment can be reduced by individual PEEP optimizing using EIT.

METHODS. ALI was induced (oleic acid + abdominal hypertension) in 8 anesthetized pigs that received PEEP of 0–25cmH2O in steps of 5 in randomized order. PEEP level derived from ARDSnet protocol table was compared to lowest PEEP resulting in minimal differences of local RVD measured by EIT (see Figure).

RESULTS. PEEP from ARDSnet protocol (10(8–10), Median(Range)) was lower than PEEP that minimized tidal recruitment estimated by EIT (20(20–25), $p < 0.05$). PaO2/FiO2 increased with each step of PEEP up to 25 cmH2O and was lower with ARDSnet PEEP (179(139) vs 362(118), mean(SD), $p < 0.01$). PaCO2 was not different (38(6) vs 37(5)).



CONCLUSION. In this model of ALI EIT was helpful to find lowest PEEP level that minimizes tidal recruitment. ARDSnet PEEP was lower and did not entirely avoid tidal recruitment.

REFERENCE(S). 1) Wrigge et al., Crit Care Med 2008,36(3).

Oral Presentations
Ventilator-associated pneumonia: Can we prevent?: 0411–0414

0411

PROPHYLAXIS OF VENTILATOR ASSOCIATED PNEUMONIA BY CONTINUOUS LATERAL ROTATION THERAPY: A PROSPECTIVE RANDOMIZED TRIAL

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INTRODUCTION. Continuous lateral rotation therapy (CLRT) has been shown to be effective for prophylaxis of ventilator associated pneumonia (VAP). However, neither hospital stay nor days on ventilator or mortality could be positively influenced by CLRT. Most studies, however, lack to report on standards of VAP prophylaxis as well as on duration and practicability of CLRT. We performed a prospective randomized trial of the efficacy of CLRT in mechanically ventilated patients with respect to VAP prophylaxis.

METHODS. Patients were eligible if not suffering from pneumonia or acute lung injury but in the need for mechanical ventilation. Patients were randomized within 48 hours after intubation to undergo CLRT in a specially designed bed allowing continuous rotation of the upper part of the body through an arc of 90° or to be treated in supine position. Rotation had to be performed for at least 18 hours per day. All patients were in a semirecumbent position of at least 30°. Suctioning and change of ventilator circuits were standardized. Sedation was allowed only if clinically indicated. All patients received enteral nutrition if possible. Endpoints of the study were spontaneous breathing, death, lack of tolerance, or development of pneumonia defined as newly acquired infiltrate in two consecutive chest x-rays plus signs of inflammation plus purulent bronchial secretions.

RESULTS. Of 150 consecutive patients enrolled, 75 underwent CLRT (mean age 59 ± 16, 50 male) while 75 (age 60 ± 15, 48 male) were randomized into the control group. Patients suffered mostly from resuscitation after cardiac arrest, cardiogenic shock, neurological diseases, or COPD. Groups were comparable with respect to diagnoses and severity of disease. In the CLRT group, 7 patients developed VAP (9%) versus 20 patients (27%) in the control group ($p < 0.01$). ICU and hospital survival were 70% and 63% in the CLRT group and 74% and 63% in the control group, respectively (p = n.s.). Comparing CLRT to control group, days on ventilator were 8 ± 5 and 14 ± 23 days (p=0.02), length of hospital stay was 24 ± 22 and 39 ± 45 days (p=0.02), and ventilator free days during the first 28 days were 15 ± 10 versus 11 ± 10 (p=0.04), respectively. Development of pressure sores, duration of sedation, days on enteral feeding as well as use antibiotics was comparable. Intolerance of CLRT during weaning was observed in 40%.

CONCLUSION. CLRT is an effective prophylaxis for VAP. It exerts additive effects to other prophylactic measures like semirecumbent position and standardized ventilation and suctioning protocols. Lower VAP rate seems to result in shorter duration of ventilation and length of hospital stay. CLRT is not well tolerated in non-sedated patients during the weaning process.

0412

THE INFLUENCE OF TRACHEOSTOMY TUBE WITH INTERMITTENT SUBGLOTTIC DRAINAGE COMPARED TO CONVENTIONAL TRACHEOSTOMY TUBE ON THE INCIDENCE OF VENTILATOR-ASSOCIATED PNEUMONIA

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INTRODUCTION. Subglottic secretion drainage (SSD) via an endotracheal or a tracheostomy tube has recently been introduced in clinical practice for prevention of ventilator associated pneumonia (VAP), since it is cosidered to reduce micro-aspiration of secretions from the area around the cuff. The purpose of this study was to investigate the influence of a tracheostomy tube with SSD versus conventional tracheostomy tube on the incidence of VAP in ICU patients.

METHODS. A randomized comparative clinical study, which included 126 patients, admitted for both medical and surgical reasons, with a length of stay >7 days in the ICU. Group A included 64 patients ventilated via conventional tracheostomy tube (TT-C) and Group B included 62 patients ventilated via a tracheostomy tube with subglottic secretion drainage (TT-SSD). SSD was performed hourly, applying a suction of -20cmH2O. Clinical pulmonary infection score plus quantitative culture of protected specimen brushing were used for the diagnosis of ventilator-associated pneumonia. The following data were recorded: age, APACHE II, predicted mortality rate (PDR), day on which tracheostomy was performed (T-Day), days of mechanical ventilation (MV-Days), length of stay (LOS), incidence of pneumonia, and outcome (death or discharge). Demographic data were compared by the non-parametric Mann-Whitney test. The incidence of pneumonia between the groups was compared by the x^2 test and outcome was compared by the Fisher test. P<0,05 was considered statistically significant.

RESULTS. The results of this comparative study are shown on the table below.

TABLE 1

	Group A (TT-C)	Group B (TT-SSD)	p
Age	50.6±22.7	56.3±19.6	0.268 (NS)
APACHE II	18.5±5.7	18.2±6.2	0.880 (NS)
PDR	33.13±17.8	32.1±18.0	0.880 (NS)
T-Day	4.3±3.4	3.8±2.3	0.830 (NS)
MV-Days	14.6±10.8	20.1±16.9	0.051(NS)
LOS	19.5±11.4	28.6±25.5	0.117 (NS)
VAP	28 (43.75%)	28 (45.16%)	0,170 (NS)
Death	16 (25%)	20 (32.25%)	0.585 (NS)

CONCLUSION. According to the results of this study, the use of a tracheostomy tube with intermittent subglottic drainage does not reduce the incidence of ventilator-associated pneumonia, compared to conventional tracheostomy tube, in patients staying in the ICU longer than 7 days.

REFERENCE(S). Lorente L, Lecuona M, Jimenez A, Mora ML, Sierra A. Influence of an Endotracheal Tube with Polyurethane Cuff and Subglottic Secretion Drainage on Pneumonia. Am J Respir Crit Care Med 2007;176(11):1079–1083.

0413

ORAL DECONTAMINATION WITH CLORHEXIDINE 2% AS A SINGLE INTERVENTION TO DECREASE VENTILATOR ASSOCIATED PNEUMONIA IN A MEDICAL-SURGICAL ICU

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INTRODUCTION. Ventilador Asociated Pneumonia (VAP) is a significant cause of in-hospital morbidity and mortality, especially in the developing countries. Select oral care interventions, such as topical antiseptic agents, could reduce the occurrence of VAP. Some studies have suggested the benefit of the use of Chlorhexidine (CHX) for oral decontamination, nevertheless this benefit has not been completely proven. We hypothesized that oral decontamination with CHX, 2% would reduce the incidence of VAP in our ICU.

METHODS. Design: Observational study. Bidirectional cohort.Patients admitted to a mixed medical-surgical ICU of a University affiliated Hospital who needed mechanical ventilation for 48 h or more were eligible for recruitment. Since July 1st, 2007, the use of use CHX 2% solution three times per day as oral decontamination was implemented. VAP adjusted Incidence rates of were compared with a cohort from October 2006 thru 2007(before CHX) and after the implementation from 2007 –2008. A bivariate and multivariate analysis were performed. P value<0.05 was considered significant statistical.

RESULTS. Eight hundred thirty six patients needed mechanical ventilation for more than 48 hours during the study period (2006–2008). The overall VAP incidence rate was 11.2/1000 days-ventilator. The table shows demographic characteristics of patients. VAP incidence rate was decreased after protocol implementation (13.1 vs. 9.1 VAP/1000-days ventilator, p=0.05, unadjusted OR: 1.4 (IC95% 0.92–2.2). Adjusted OR by APACHE II difference was maintained (OR=1.3, IC95% 0.89–2.01).

TABLE 1 DEMOGRAPHIC CHARACTERISTICS OF PATIENTS

Variable	October 1st 2006 to	July 1st -2007 to Ma	p
Age, mean ± SD	54.5±18.7	53.7±19.6	0.57
Males, %	55.6	57.2	0.3
Apache II,, mean± SD	21.5±5.9	23.1±8.1	0.002
Medical Admision, %	65.1	63.0	0.08
VAP/1000-days-ventila	13.1	9.3	0.05
Days ventilator, mean	6.6 (3.75–11)	6.4 (4–10.8)	0.9
ICU Length of stay, d	8	9	0.41
Overall Mortality, %	26.5	22	0.1

Source: Fundacion Valle del Lili ICU Database

CONCLUSION. The simple implementation of CHX 2% in mechanical ventilated patients was effective in reducing incidence rate VAP. This simple intervention could be beneficial in the devolping countries were VAP incidence is higher.

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0414

LATERAL POSITION TO PREVENT GASTRIC ASPIRATION IN INTUBATED PATIENTS IN A SURGICAL INTENSIVE CARE UNIT

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INTRODUCTION. Elevation of the head of the bed of intubated individuals to ≥ 30 degrees (semi-recumbent position) is recommended as a way to prevent aspiration of gastric content in the airways that may lead to nosocomial pneumonia. However, recent data suggest that horizontal orientation of the endotracheal tube (ETT) decreases bacterial colonization of the lower respiratory tract, in comparison to semi-recumbent position. We designed a study to test the hypothesis that lateral, head down position, to achieve horizontal position of ETT, decreases aspiration of gastric contents in comparison to semi-recumbent position.

METHODS. We enrolled twenty adult patients intubated from less than 48-hour and without signs of pulmonary infection. The first 10 consecutive patients were ventilated in the semi-recumbent position (SR group) and the following 10 patients in the lateral, head down position (LHD group). Patients were studied for 64 hours in the SR group and for 12–24 hours in the LHD group. Tracheal secretions were collected every 8 hours (SR group) or every 4 hours (LHD group) and tested for pepsin presence. Oral and gastric suctions were collected and tested for pepsin at baseline and every 12 hours. Data were analyzed by Chi-square, Fisher's exact test, or T-test, as appropriate.

RESULTS. The two groups were similar at baseline (Table 1). Ten patients from the SR group (100% of samples) and 8 (80% of samples) had pepsin-positive gastric samples. Four patients in each group had pepsin in oral secretions (23% of oral samples for both groups). Pepsin was detected in tracheal secretions of 7 patients (33% of tracheal samples) from the SR group and 5 patients (38% of tracheal samples) from the LHD group (p = 0.35).

TABLE 1 BASELINE CHARACTERISTICS OF THE 2 STUDY GROUPS

	SR group N = 10	LHD group N = 10	P-value
Age, yrs.	63 ± 18	64 ± 14	0.9
Female, %	50	60	1
BMI, kg/m^2	27.4 ± 9	28.5 ± 9.9	0.83
APACHE II	16.8 ± 3.4	14.7 ± 2	0.14
CPIS	4 ± 2	4 ± 2	0.78
RASS	(-)1 ± 2	(-)2 ± 1	0.06
Tube feeding, %	40	20	0.62
Opioids use, %	70	70	1

CONCLUSION. Intubated patients ventilated in the semi-recumbent position manifest a high incidence of a marker of aspiration of gastric contents. Lateral, head down position doesn't decrease significantly this phenomenon.

GRANT ACKNOWLEDGEMENT. Jenney Fund, Dept. of Anesthesia, MGH, Boston, USA.

Poster Sessions
Sedation, analgesia, pharmacology: 0415–0428

0415

A MULTIMODAL SHORT SEDATION REGIMEN AVOIDING SECONDARY INDUCED HYPERALGESIA IN THE INTENSIVE CARE UNIT : A NEW STANDARDIZED APPROACH FOR CRITICALLY ILL PATIENTS

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INTRODUCTION. Using a combination of a N-Methyl-D-Aspartate antagonist (NMDAa) and remifentanil we attempted to use their synergistic effects in order to avoid hypnotic drug accumulation. We assessed the benefits of this Multimodal Short Sedation Regimen by comparing it to more conventional sedative protocols.

METHODS. Medical (n=396), surgical (n=314) and trauma patients (n=88) who needed more than 48 hours of sedation were prospectively allocated into one of 4 groups :Cat.A (patients in shock)- B1(respiratory failure) - B2 (hemodynamic failure)- C (stable patients)) as defined by different hemodynamic (inotropic support) and respiratory (PaO2/FiO2 ratio) parameters. All patients were sedated using a narcotic (remifentanil(0.04–0.45mcg/kg/min)) and a hypnotic agent (propofol(0–7mg/kg/h)+/- midazolam(0–4.5mcg/kg/min)). Titration of the sedative agents was done hourly in order to achieve a Sedation Agitation Score of 4 (yawning; frown). Patients were randomized into two groups (G:n=399). In G1 we added an NMDAa namely Magnesium(0.08g/kg/d)+/- Ketamine(0–5 mcg/kg/min)+/- Clonidine 0–0.02mcg/kg/min) to the baseline sedative regimen and in G2 we added a placebo. The different groups were compared as to Midazolam and Propofol requirements (Mi.; Po.), awakening/weaning times(A/Wt: patient calm, comfortable, cooperative / spontaneously breathing; spontaneously moving)) as well as the global hospitalisation stay (GHs). For statistical analysis a Shapiro-Wilk test, Wilcox and a Student T-test were used.

RESULTS. 6160 patient/days were studied during a two year period. Demographic data were comparable in terms of mean Severity Acute Physiologic Score, age and gender. In G1 patients were ventilated invasively during 10+/−1 days and in G2 during 15+/−2days. The average A/Wtime necessary to shift through the Cat.A to Cat.B was 10+/−5 min in G1 and 28+/−6 hours in G2 ($p < 0.05$); to Cat.B through Cat.C it takes 6+/−2 min(B1) or 5+/−3 min (B2) in G1 compare to 22+/−7 hours in G2($p < 0.05$). The Mi. (mcg/kg/min) in Cat.A was 2–8.5 in G2 and 0–0.9 in G1 ($p < 0.02$); in Cat.B2 it was 1.5–4.5 in G2 and 0–0.8 in G1 ($p < 0.05$). The Pr. (mg/kg/h) in Cat B1 was 0.5–7 in G2 and 0–3.5 in G1; in Cat.C it was 0–10 in G2 and 0–3 in G1. The mean GHs was 2.6 days longer for patients in G2 compared to G1.

CONCLUSION. The described Short Sedation Regimen is usable for medical, surgical and trauma patients. The titration synergy concept used by combining NMDAa, remifentanil and hypnotic agents allows a dose reduction for each individual drug, thus avoiding the risk of hypnotic accumulation. As a result it decreases Intensive Care stay and subsequently has long-term financial implications.

0416

RISK FACTORS LEADING TO MIDAZOLAM THERAPEUTIC FAILURE DURING CONTINUOUS SEDATION IN CRITICALLY ILL VENTILATED PATIENTS

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INTRODUCTION. Nearly 17% of critically ill ventilated patients treated with continuous intravenous midazolam experience therapeutic failure (taquifilaxia or tolerance). These phenomena greatly hinder patient management. The aim of this study is to analyse and describe the factors that could influence its onset

METHODS. Prospective and descriptive study carried out in an intensive care unit (ICU) of a University hospital. We included 1015 ventilated patients that received midazolam to achieve the proposed sedation aims: 3 to 5 level on the Ramsay scale and ventilator synchrony. We defined therapeutic failure as the need to administer more than 0.23 mg/Kg/h to reach these aims. All patients were treated with intravenous opiates. We analyzed demographical, clinical, and outcome data. Univariate and multivariate analyses were performed to investigate significant risk factors and logistic regression was used to fit the model. In each variable we calculated the odds ratio (OR) with its corresponding confidence interval (CI), significance assumed for $P<0.05$.

RESULTS. 176 patients had therapeutic failure. On univariate and multivariate analysis the associated variables were: Male gender OR 1.4 (1.02–1.86, CI 95%), p=0.03; Age under 45 years, OR 2.1 (1.6–2.7, CI 95%), $p < 0.001$, compared with ages between 45 to 65 years; and OR 5.1 (3.4–5.7, CI 95%), $p < 0.001$, compared with ages over 65. Ages between 45 to 65 have an OR 2.4 (1.6–3.8, CI 95%), $p < 0.001$, compared with ages over 65; Ventilation due to respiratory insufficiency, OR 2.8 (2.1–3.9, CI 95%), $p < 0.001$; Need to administer midazolam during 5 or more days, OR 7.4 (5.1–10.8 CI 95%,), $p < 0.000$.
This logistic regression formula P=ez / 1+ ez, could estimate tolerance risk in up to 77% (70.8–80, IC 95%) of the cases.
Where z=constant +0.47(male gender) + 1.03 (age 45–65) + 1.06 (ventilation due to respiratory insufficiency) + 2.41 (midazolam administration $\geq$ 5 days; or z= constant +0.47(male gender) + 2.34 (age under 45) + 1.06 (ventilation due to respiratory insufficiency) + 2.41 (midazolam administration $\geq$ 5 days).

CONCLUSION. Male gender, being younger, being mechanically ventilated for respiratory insufficiency and receiving midazolam during 5 or more days are the main risk factors leading to midazolam therapeutic failure.

0417

MONITORING AND ANALGESIC, SEDATIVE AND NEUROMUSCULAR BLOCKADE STRATEGIES USED IN SPAIN. AN IN-PERSON SURVEY

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INTRODUCTION. There is great variability in the sedo-analgesic strategies used in critically ill ventilated patients. The aim of this study is to investigate the current sedation, analgesia and neuromuscular blockade practises in adult ICUs in Spain.

METHODS. Descriptive study based on an in-person survey of sixty physicians, representative of 60 ICUs. All were critical care specialists or anaesthesia specialists with direct responsibility in critical care management. A questionnaire was developed for this study and consisted of 19 questions on different aspects of usual practises. Each specialist surveyed, anonymously, chose one of five options for each answer. Each answer represents the usual practises in their ICUs, not their personal thought.

RESULTS. Midazolam (MID) is the most common sedative employed for tracheal intubation (TI) (42% of ICUs), followed by propofol (PRO) (36%).Thirty per cent of ICUs do not use NMBs for TI, 27% employ succinylcholine, 24% cisatracurium and 16% rocuronium. For short-term sedation, patients in shock, a midazolam-opioid combination is preferred (50%), followed by remifentanyl combined or not with low doses of other sedatives. For long-term (i.e. ARDS) a midazolam-opioid combination is employed by 71%; 13% employ a midazolam-propofol-opioid combination. 40% of the ICUs do not have a protocolised midazolam or propofol maximum dose limit. For sedation monitoring 51% of the ICUs use the Ramsay scale, 5% the SAS and 3% the RASS; 41% never use sedation scales. 21% use train-of-four monitoring to titrate continuous neuromuscular blockers. No ICU uses pain scales in non-communicative patients nor scales to detect delirium. 51% do not use strategies to avoid midazolam accumulation, 11% employ sequential sedation (replace midazolam with propofol or remifentanil), 11% employ a daily sedation break, 8% bispectral index monitoring and 19% use two or more of the previous strategies. Bispectral monitoring is used by 49% of ICUs, 6% to adjust deep sedation, 6% to titrate barbiturate treatment, 3% to monitor sedation during neuromuscular blockade and 34% in two or more of these situations. Morphine, fentanyl and remifentanil are the most used analgesics in critically ill patients, but ketorolac is still employed in patients with hemorrhagic risk and meperidina in patients with severe acute pancreatitis.

CONCLUSION. There is considerable variation in clinical practises. Some of the employed strategies could produce morbidity. It is recommended that a standardised approach to analgesic, sedation and neuromuscular blockade use and assessment be developed and tested.

0418

RISK FACTORS LEADING TO PROPOFOL THERAPEUTIC FAILURE DURING CONTINUOUS SEDATION IN CRITICALLY ILL VENTILATED PATIENTS

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INTRODUCTION. There is little information about propofol therapeutic failure incidence during its employment for critically ill ventilated patients. These phenomena greatly hinder patient management and may lead to employing excessive and toxic doses. The aim of this study is to analyse and describe the factors that could influence its onset.

METHODS. Prospective and descriptive study carried out in an intensive care unit (ICU) of a University hospital. We included 1460 ventilated patients that received propofol (1% or 2%) to achieve proposed sedation aims: 3 to 5 level on the Ramsay scale and ventilator synchrony. We defined therapeutic failure as the need to administer more than 350 mg/h to reach these aims. Propofol was administered, preferably, in patients with haemodynamic stability and foreseen sedative requirements lower than 3 days, and in patients with need of frequent neurological evaluations independently of foreseen sedative time requirements. Most of the patients were also treated with intravenous opiates. We analyzed demographical, clinical, and outcome data. Univariate and multivariate analyses were performed to investigate significant risk factors and logistic regression was used to fit the model. In each variable we calculated the odds ratio (OR) with its corresponding confidence interval (CI), significance assumed for $P<0.05$.

RESULTS. 54 patients had therapeutic failure, most of them during the first 48 hours of propofol administration. On univariate analysis the associated variables were: Male gender OR 1.4 (1.02–1.86 CI 95%), p=0.03; Age under 45, OR 5.2 (2.9–9.0, CI 95%), $p < 0.001$; Polytraumatism as admission reason, OR 2.9 (1.7–4.9, IC 95%), $p < 0.01$. On multivariate analysis polytraumatism as admission reason lots its statistically significance because a subordinated relationship with age under 45.

TABLE 1 EQUATION VARIABLES

	B	ET	Sig	EXp (B)	C.I. 95,0% Lower/Upper
polytraumatism	0.342	0.317	0.282	1.407	0.755/2.622
sex	1.160	0.397	0.003	3.190	1.466/6.941
age	1.597	0.329	0.000	4.940	2.590/9.421
constant	−5.034	0.418	0.000	0.07	

a:Variable(s) inserted in step 1: polytraumatism, sex, age45

CONCLUSION. In our series being younger (age under 45) is the main factor leading to propofol therapeutic failure. Male have more risk to present it than women.

0419

SEDATION AND ANALGESIA PRACTICE IN MECHANICALLY VENTILATED PATIENTS ADMITED TO 9 ICUS OF UNIVERSITY HOSPITALS IN SPAIN

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INTRODUCTION. To evaluate the analgesia and sedation practice and their complications in mechanically ventilated (MV) patients in 9 ICUs of different university hospitals in Spain.

METHODS. Demographic and sedo-analgesia (SA) procedural data was retrospectively recorded in all mechanically ventilated patients admitted during a 30 day period in 9 Spanish ICUs (1 traumatic, 1 surgical, 1 medical and 6 medical-surgical). Time under sedation and analgesia, agents used and administration patterns were recorded. Sedative failure (defined as an insufficient sedation level after 0.25 mg/kg/h for midazolam (MZ) or 4.5 mg/kg/h for propofol (PF)), and deprivation (defined as agitation during sedation withdrawal excluding organic causes) were also recorded in all patients under continuous sedation. Statistical analysis was performed using SPSS 13.0, significance level $p < 0.05$.

RESULTS. A total of 244 patients were mechanically ventilated for a mean time of 114.7 ± 190.7 hours (range 1–1556) (35.7% MV >72h; n=87). Mean age was 58.9 ±17.2 y/o, 73% were male and most patients were post-surgical (53.3%) followed by medical (33.6%) and traumatic (7.8%) with a mean APACHEII of 15.2 ±7.9. Previous history of alcohol, illegal or prescribed psychotropic drugs intake was documented in 39 (16%), 17 (7%) and 42 (17.2%) patients. ICU mortality was 18.9 (n=46) and mean ICU length of stay (LOS) was 195.5±245.1 hours (range 1–1604).184 patients (75.5%) under MV received continuous infusion of sedatives(S) (mean time 92.7±143.8 hours) and/or analgesics (A) (mean time 136.4±195.1 hours) (75.5% SA; 23% only S; 5.9% only A). PF (mean time 60.7±97.2 hours) was the preferred sedative (64.0%). MZ (42.4%; mean 144.4±218.8 hours) and Morphine chloride (53.3%; mean 144.9±157.4 hours) were the preferred agents for long term sedation ($p < 0,05$) Remifentanil (29.3%) and Fentanyl (22.0%) were used during 62.4±72.1, and 149.7±279.5 hours respectively. The use of other sedatives like Clonidine (1.6%) and barbiturates (1.1%) was low. Fifty four (29.3%) patients received more than 2 sedatives simultaneously, mostly due to sequential sedation (substitution of long half-life sedatives for short half-life ones) (17.4%), sedative failure (7.6%) or deprivation (7.6%). History of alcohol abuse and illegal or prescribed psychotropic drugs intake did not influence LOS, MV or sedation duration. Alcohol intake was associated with sedation failure and deprivation (p=0.03).

CONCLUSION. One out of four patients with MV receives sedation without analgesia. Patients with previous history of alcohol abuse are at risk of presenting sedation failure. There is a wide variability in SA utilization patterns among the different centres.

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0420

COST-CONSEQUENCE SIMULATION OF DIFFERENT SEDATION REGIMES IN GERMANY

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INTRODUCTION. Economic considerations become increasingly important in the ICU due to scarce resources, medical progress and new reimbursement systems. Health economic models offer a promising tool for optimising resource allocation.

METHODS. We performed a cost-consequence analysis of remifentanil-based sedation (RS) vs conventional sedation (CS) of critically ill patients in Germany using a probabilistic Markov model. The patient flow, the length of stay, the duration of mechanical ventilation (MV) and the direct medical costs of RS vs CS in the ICU were simulated. Input data for the model were obtained from UltiSAFE, a Dutch open-label trial with 205 critically ill patients with the exception of unit costs. In UltiSAFE patients received CS according to Dutch guidelines (predominantly fentanyl or morphine combined with midazolam or propofol) or RS (remifentanil, combined with propofol if required) for up to 10 days. Unit costs were measured in a separate microcosting study in a German mixed 12-bed adult ICU using the hospital perspective and prices of 2006. Material, staff and overhead costs were considered. Based on UltiSAFE we performed two analyses distinguished by the considered patient population: (1) Inclusion of all patients (2) Subgroup analysis according to the UltiSAFE target population, thereby including only patients who started weaning within 72 hours of start of treatment.

RESULTS. Compared to CS, RS lowered the mean duration of MV from 5.9 to 4.9 days in the total population and from 3.2 to 2.2 days in the subgroup. Similarly, it reduced the length of ICU stay from 8.4 to 7.4 days or 5.7 to 4.9 days in the total population or in the subgroup, respectively. As a result, RS decreased the ICU costs per patient by € 1128 in the total and € 1003 in the subgroup population. The probability of RS being cost-saving was estimated at 85% for all patients and 91% for the subgroup.

CONCLUSION. From an economic perspective, RS seems to be the preferred regimen compared to CS: It leads to a substantially shorter length of MV and length of ICU stay. The associated cost-savings more than compensated the additional drug costs of RS resulting in net-savings to the hospital.

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0421

MORPHINE OR FENTANYL FOR MECHANICALLY VENTILATED PATIENTS WITH HEMODYNAMIC INSTABILITY?

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INTRODUCTION. One major goal of analgesia and sedation for critically ill patients is to provide control of pain and anxiolysis to facilitate mechanical ventilation. Fentanyl or morphine is commonly used to provide analgesia. However, both medications can promote adverse consequences, including hypotension, prolonged mechanical ventilation, increased ICU duration of stay and high costs. Comparative trials of both opioids have not been performed in critically ill patients and the selection of an agent depends on its pharmacology, adverse effects and costs. Many ICU physicians preferred fentanyl to morphine in hemodynamically unstable patients due to the risk of additional hypotension. However, both drugs accumulate and may cause similar adverse effects when continuously infused. The aim of this study was to compare the hemodynamic effects of morphine and fentanyl in hemodynamically unstable patients under mechanical ventilation.

METHODS. Prospective, randomized, open-label trial including mechanically ventilated patients >16 years and hemodynamically unstable (cathecolamine requirement >1 hour). Exclusion criteria included patients after cardiac arrest or with Do Not Resuscitate (DNR) order. All patients received continuous I.V. midazolam in association with either morphine or fentanyl. The endpoint level of sedation was a Ramsay scale 2–4 and of analgesia was a Behavioral Pain Scale (BPS) <5. Mean arterial pressure (MAP), heart rate (HR), rate of opioid and of benzodiazepines, rate of catecholamine (noradrenaline), BPS score and adverse effects (bowel distention and vomit) were measured every 6 hours. The protocol was finalized with hemodynamic stabilization or sedative infusion interruption. Variables were expressed in frequencies and means. Student's t test was used to compare means and $p < 0.05$ was significant.

RESULTS. A total of 29 patients were enrolled in the study; 16 were randomly assigned to the morphine group and 13 to the fentanyl group. Although not significant, the fentanyl group was older (51±20 yrs vs. 63±12 yrs; p=0.069) but less sicker (APACHE II score, 27 vs.16; p=0.054) then the morphine group. There were no differences for heart rate (103 ±23 vs.101±23) and MAP (82.5±16.1 vs. 83.5±17.5). However, noradrenaline rate was higher in the morphine group (0.165±0.15mg/kg/min vs. 0.11±0.10mg/kg/min; p=0.009). The mean BPS was similar in the two groups (3.5±0.8 vs .3.6±0.9). Bowel distention occurred in 6 patients in the morphine group and in 3 patients in the fentanyl group (p=0.278). Five patients in the morphine group were discharged from ICU as compared with 3 patients in the fentanyl group (p=0.678).

CONCLUSION. These preliminary results indicate that both drugs were associated with similar adverse effects. Noradrenaline rate was higher with morphine then with fentanyl. However, patients with morphine were sicker.

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0422

THE POTENTIAL ECONOMIC IMPACT OF ALTERATIONS TO SEDATION PROTOCOLS IN A DISTRICT GENERAL HOSPITAL INTENSIVE CARE UNIT

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INTRODUCTION. The objective of this research was to assess the potential for improved resource utilization in a District General Hospital (DGH) Intensive Care Unit (ICU) through alterations to existing sedation protocols. We also examined whether other factors needed to be considered to ensure such changes brought long-term benefits.Between 2003–2006, the ICU at the Princess Alexandra Hospital (PAH) operated 4–5 Level 3 beds with a mean occupancy of 103%, admitting a mean of 326 patients with an mean LOS of 6.27 days, requiring a mean of 35 non-clinical transfers (NCT).There was a need to maximize capacity by investigating methods of reducing LOS and the need for NCT via efficient use of available resources. One likely method was through modifications to the ICU sedation protocol.

METHODS.. The original PAH sedation protocols utilized morphine and midazolam for long stay ICU patients, with propofol and alfentanil used for short stay patients. In 2006, protocol modifications introduced the use of remifentanil and propofol in Specifically selected patients. Published evidence suggests a reduction in LOS of a day is possible under similar protocols(1,2). A mobile simulation course on the use of remifentanil was arranged. A retrospective audit was carried out, using the controlled drug register, the ICU admission register and ICU database. Data was collected on the total number of patients admitted to the ICU, those who received remifentanil, the total duration of use of remifentanil and the total LOS of those patients receiving remifentanil, and compared to the average LOS in the PAH's ICNARC data(3).

RESULTS. Our data shows 29%(n=110) of our patients received remifentanil with average duration of 2.2 days. Remifentanil was used in line with the protocol in 84.5% cases and LOS in this group is one day. This shows a reduction in LOS of 1.1 days compared with 2.1 days LOS by cumulative ICNARC CMPD data(3). We have also noticed a marked reduction in number of nonclinical transfers to 4(from 35), reduction in average occupancy to 97% (from 103%) and average LOS to 5.18 (from 6.27)against an increase ICU admission to 337 (from 326).

CONCLUSION. Our data demonstrated a reduction in LOS of 1.1 days, based on appropriate use of Remifentanil in 84.5% of cases. We have also noticed improvement in efficiency of the unit by indirect measurement i.e. increased number of admissions with decreased occupancy and number of nonclinical transfers. Proposed daily drug costs of £70 resulted in a saving of approximately £1500(4) through the reduction in LOS enabling more efficient use of available resources. These findings have shown that there is not only economic benefit to be gained with introduction of remifentanil but that we have improved overall performance and efficiency of our Intensive Care Unit. Further ongoing audit is required to assess whether further improvements in resource utilization might be possible on satisfying outstanding training requirements.

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0423

DESCRITIVE ANALYSIS OF PSYCHO-AFFECTIVE DISORDERS AND PSYCHOTROPIC MEDICATION IN PATIENTS ADMITTED TO 9 SPANISH ICUS

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INTRODUCTION. Psycho-affective disorders have a negative impact on long term outcome of patients surviving ICU(1). However, little information exists about their influence on ICU complications and on their management by intensive care practitioners.

METHODS. All patients admitted to 9 Spanish ICUs (1 medical, 1 trauma, 1 surgical, 6 medical-surgical) during a 30 day period were followed until death or discharge. Demographic data and previous history of alcohol, illegal or prescribed psychotropic use was recorded at admission. Mechanical ventilation as well as analgesia and sedation procedures were recorded. Agitation and the presence of emotional disorders, as well as prescription of psychotropic medication during ICU stay were also recorded. Statistical analysis was performed using SPSS 13.0. Significance level $p < 0.05$.

RESULTS. A total of 471 patients (66.9% males), with a mean age of 58.9±17.6 y/o, were admitted to the ICU after a medical (52.2%), post-surgical (38.4%) or traumatic (7.4%) event. Forty-eight patients (10.2%) had depression and 91 (19.3%) took psychotropic medication on regular basis at the time of admission being benzodiazepines (BZD) (n=71; 15.0%), antidepressants (ADP) (n=43; 9.1%) (72% serotonin reuptake inhibitors (SRI)), and neuroleptics (NRL) (n=9; 1.9%) the most common agents. Mean ICU length of stay (LOS) was 5.7±8.3 days. Half of the patients (51.8%) were mechanically ventilated and 48.2% were under continuous sedation and/or analgesia. Agitation and depression was diagnosed in 14.8% (n=70) and 1.6% (n=9) of admitted patients respectively. The use of validated screening/diagnostic tools or psychiatry consultation to diagnose agitation or depression was done only in 2 cases. NRL (62%) and ADP (80%) associated or not to BZD (47% and 25%) were the preferred agents for the treatment of agitation and depression during ICU stay respectively. There was a trend to longer ICU LOS in patients with previous history psychotropic medication (8.6±10.5 hours versus 5.0±6.4 hours; p=0.055). Compared to admission, more patients (44.5%) left the ICU receiving psychotropic medication ($p < 0.001$), at the expense of an increase on BZD prescription (44.0%) ($p < 0.001$). On the contrary, patients leaving the ICU with ADP (4.3%) were significantly fewer than those at admission ($p < 0.001$).

CONCLUSION. In this study patients with previous history of psycothropic medication were fewer than reported in literature(1). The rate of psychotropic agents used during ICU stay exceeded the diagnosis rate of psycho-affective disorders. The use of tools to screen and diagnose psycho-affective disorders in ICU could improve its detection and adequate treatment.

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0424

ICU SEDATION, DOES IT MATTERS?

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INTRODUCTION. Critically ill patients requiring mechanical ventilation are frequently treated with sedatives and analgesics. Important complications related to sedation practices in the intensive care unit (ICU) have been documented and efforts to modify sedation practices have begun. Administration of sedatives by continuous infusion has been identified as an independent predictor of a longer duration of mechanical ventilation as well as a longer stay in the ICU. Our aim is to know how sedation procedure is carried out in our unit and to propose alternative interventions.

METHODS. Retrospective analysis of all patients who received mechanical ventilation and continuous intravenous infusion with sedative drugs in our adult polyvalent ICU. Study covers the period between June and December 2007. The exclusion criteria were less than 24 h in the ICU and less than 16 h of sedation. In M group (midazolam+morphine) and in P group (propofol+morphine) were the sedatives used. Variables analyzed: gender, age, weight, SAPS II score, admission diagnosis, duration of mechanical ventilation, length of ICU stay (LOS) and time of sedation. For statistical analyses we used median with 25th and 75th percentiles and mean±SD, t test and statistical significance $p < 0.05$.

RESULTS. A total of 115 patients were studied. M group (64 patients): 70% men, median age 52 (38–67) years, median weight 72 (65–77)Kg, median SAPS II score 41 (33–50), the admission diagnosis was trauma in 25%, medical in 54,6% and surgical in 20.4%. P group (51 patients): 64.7% men, median age 50 (35–62) years; median weight 70 (64–75)Kg, median SAPS II score 41 (34–49), the admission diagnosis was trauma in 35.3%, medical in 47% and surgical in 17.7%. The mean LOS was 11.76±7.57 days for M group and 11.67±9.26 days for P group (p=0.48). The mean time of sedation was 5.96±5.48 days for M group and 4.27±3.31 days for P group (p=0.028); the mean duration of mechanical ventilation was 7.23±5.61 days for M group and 5.03±3.51 days for P group (p=0.008). The mean time of tracheal intubation was 8.52±5.82 days in M group and 6.22±3.94 days in P group (p=0.009). In M group the mean consume of midazolam was 0.107±0.179mg/Kg/h and morphine 0.007±0.204mg/Kg/h. In P group the mean consume of propofol was 1.79±0.70mg/Kg/h and morphine 0.0147±0.32mg/Kg/h.

CONCLUSION. In patients who received mechanical ventilation the use of propofol instead of midazolam decreased the time of sedation, mechanical ventilation and tracheal intubation. There was no statistical difference in LOS in ICU. There is a statistical difference between the two groups that should guide towards propofol use. Nevertheless most of the times probably the choice is based on the admission diagnosis and hemodynamic parameters.

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0425

IMPLEMENTATION OF ASSESSMENT AND MANAGEMENT OF PAIN: INTRODUCTION OF A PAINSEDATION TREATMENT ALGORITM

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INTRODUCTION. It is recommended to evaluate the levels of pain and agitation in critically ill patients, but only 43% of the ICU's use an analgeso-sedation scale. Implementation of assessment and management of pain also seems to be difficult.This investigation by questionnaire is performed to see whether it was desired to protocolize our pain and sedation therapy. After that, we introduced an algorithm, based on the Critically Ill Assessment score (CIA-score), and analyzed the compliance.

METHODS. We investigated attitude versus behaviour towards a new clinical strategy. Attitude was analyzed by the results of the questionnaire, where behaviour was analyzed as compliance of a new analgeso-sedation algorithm. This algorithm implies a regular assessment every 4 hours of the CIA-scale and a treatment algorithm in case of high (CIA>9) (with reassessment within 1 hour) or low scores (CIA<7) (with reassessment within 4 hours).

RESULTS. Attitude : all responders (29 nurses and 7 doctors) feel the need for a good management and assessment of pain. 83% of the responders agreed that medication can be administered indepentdently by nurses, when a good analgeso-sedation algorithm is available. Behaviour : the data of 73 patients were analyzed, in total 2596 CIA-scores. There was an adequate score (CIA 7-9) in 69.7% of the assessments. In 9.5% the CIA-score was <7, according to the algorithm reassessment should be performed within 4 hours and this was done in 64.6%. In 20.8% the CIA-score was >9, and reassessment within 1 hour was done in only 26.1% of the cases. Scores <7 indicate a high probability for oversedation, treatment only occurs when a repeated CIA-score is too low, which resulted in weaning in 14.1% and no intervention in 85.9% of the cases with a score<7. For the high scores(CIA >9) 49.7% did not result in a medical intervention within 1 hour. If an intervention was performed, it was more often increasing the sedative drugs (31.8%) than of the analgesive drugs (10.5%).

CONCLUSION. In almost 70% of the patients on our ICU the analgesosedative strategy is according to department-guidelines. This means that in the remaing 30% the compliance to the analgeso-sedative algorithm is not sufficient. Despite all promotion and analyzing of the attitude towards management and assessment of pain on our ward, the introduction of this new algorithm seems to have a limited effect on changing the behaviour of health care professionals.

0426

MECHANICAL VENTILATORY SUPPORT AND HIGH LEVELS OF SEDATION AND ANALGESIA ARE POOR PROGNOSTIC FACTORS TO CRITICAL ILL ONCOLOGIC PATIENTS

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INTRODUCTION. The objective of this study is to available if mechanical ventilatory support and high levels of sedation and analgesia are related to ICU and hospital mortality to oncologic patients.

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

RESULTS. Overall, 56, 2% of patients used invasive ventilatory support; 56, 7% used non-invasive ventilatory support and 24, 6% didn't use ventilatory support. There was significant difference between mortality of patients who needed ventilatory support and those who didn't need ($p < 0,024$). The survival of patients requiring invasive mechanical ventilation was 3 to 4-fold lower ($p < 0,006$) and the survival of patients requering non-invasive ventilation was 2 to 3-fold lower ($p < 0,030$). Additionally, those patients who needed high levels of analgesia ($p < 0,001$) and sedation ($p < 0,009$) (three or more medications) had higher ICU mortality rate. These variables are also related to hospitalar mortality: invasive mechanical ventilation ($p < 0,006$); non-invasive ventilation ($p < 0,005$); analgesia ($p < 0,001$) and sedation ($p < 0, 0001$).

CONCLUSION. Our study suggests that patients with high levels of sedation and analgesy and who had used mechanical ventilation during ICU stay had higher ICU and hospital mortality.

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0427

SAFETY, EFFICACY AND COST-EFFECTIVENESS OF ACITROM FOR DEEP VEIN THROMBOSIS (DVT) PROPHYLAXIS IN PATIENTS ADMITTED TO ICU WITH RESPIRATORY FAILURE- A PRELIMINARY EXPERIENCE

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INTRODUCTION. We present a safe and cost-effective strategy of using oral anticoagulant (Acitrom) for DVT prophylaxis in patients admitted to our ICU with respiratory failure requiring mechanical lung ventilation.

METHODS. After getting Institutes ethical clearance between March 2007 and March 2008, thirty patients of respiratory failure requiring mechanical lung ventilation were randomly included prospectively in the study. Category of patients included in the study were Guillain Barre Syndrome, Myasthenia Gravis, Motor neuron disease, Status epilepticus, Community acquired pneumonia and Acute exacerbation of COPD requiring mechanical lung ventilation.

From each patient the following data was collected at ICU admission:Age,Gender, hospital-admission diagnosis (Any co-morbid conditions),details of prior use of anticoagulant therapy,presence of other risk factors for DVT Exclusion criteria included: Age less than 16 yrs, patients with liver disease,contra-indication for use of Vit K antagonists(eg.Pregnancy)and any anticoagulation. Drug Protocol: After informed consent patients were randomized either to oral anticoagulant therapy (Acitrom) or for low molecular weight heparin (LMWH)group. In the Acitrom group LMWH was given along with oral anticoagulant for 4–5 days until we achieved the target INR of 2–2.5. Elderly, diabetics and hypertensive patients received 1mg/day and all other patients received 2mg/day.After achieving the INR LMWH was stopped and the patient was maintained on Acitrom. INR was done every fifth day or whenever any change in dosage of Acitrom was required. In the LMWH group daily prophylaxis was given based on international practice. Any complication related to anticoagulant therapy was taken into account in both the arms. Therapy was continued until the patient became ambulatory or was discharged from ICU. Surveillance Doppler of lower limbs was done every 15 days to rule out asymptomatic deep vein thrombosis and to see the efficacy of the drug therapy.

RESULTS. The demographic profile and category of patients in two groups was identical. No significant drug related complication was observed in both groups. Surveillance Doppler did not show any evidence of occlusive or non occlusive deep vein thrombosis in both groups. There was statistically significant difference in the drug expenditure between the two groups. In the Acitrom group the average cost per patient was 2–3% of the cost of LMWH cost per patient.

CONCLUSION. Acitrom has been regularly used for prevention of reccurrent thromboembolism but there is paucity of literature regarding its use for DVT prophylaxis in Critically ill patients. We conclude from our limited experience that acitrom can be a safe and highly cost effective alternative to LMWH. However a larger trial is imperative to make any definitive conclusions.

0428

EFFECTIVENESS OF A SEDOANALGESIA PROTOCOL IN NON-INTUBATED CRITICALLY ILL PATIENTS

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INTRODUCTION. To evaluate the experience and effectiveness of a protocol of sedoanalgesia in non-intubated critically ill patients.

METHODS. A prospective and descriptive study was carried out on non-intubated critically ill patients between April 2006 and May 2007.A protocol of sedoanalgesia with Remifentanil (RF) was used in those patients who need pain control, propofol was used in those patients excluded from the previous group and remifentanil after extubation (RF-EX) in patients under mechanical ventilation sedated with remifentanil who are extubated keeping remifentanil at analgesic doses. Sedation for more than six hours, sedation for procedures and need for intubation in less than six hours (unless if it was a direct consequence of sedation) were excluded. Therapeutic failure was defined as: need for intubation for sedation, RASS or VAS out of optimal range (considering optimal sedation range as RASS between +1 and -2 and optimal analgesia as VAS between 0 and 3) or non-optimal doses of drugs (RF> 6μgr/kg/h for more than four hours or PF>2,5mg/kg/h for more than 4 hours). The following parameters were analyzed: age, APACHE score, reason for admission, indication for sedation, mean dose of sedatives, time spent under sedation, mean ICU stay, quality of sedoanalgesia, non-optimal doses and secondary effects.

RESULTS. 32 patients were included (26 males), 9 were sedated with RF, 12 with PF and 11 with RF-EX. Mean age: 45±14 years, APACHE score: 15±2, reason for admittance in the ICU: neurological (10 patients), respiratory (5 patients), politraumatized (15 patients), other pathologies (2 patients). Indications for sedation: in the RF group: pain control (100%), in PF group: agitation (58%) and neurological evaluation (18%) and in the RF-EX group: pain control (45%), neurological evaluation (18%) and pharmacological deprivation (27%). Mean sedative doses: RF group 3,52 ±0,5μgr/kg/h, PF group 1,59±0,3mg/kg/h and in RF-EX group 2,30±0,6μgr/kg/h. Sedation time: with RF 162±60 hours, with PF 100±43 and in RF-EX group 82±30 hours. Optimal sedation level: with RF 86%, with PF 75% and with RF-EX 91%; optimal analgesic level: with RF 89% and with RF-EX 100%. Optimal drug doses: with RF 78%, with PF 67% and with RF-EX 91%.

CONCLUSION. According to our sedoanalgesia protocol, in non-intubated critically ill patients, doses of 1, 59±0,3mg/kg/h of propofol achieved an optimal level of sedation in 75% of the patients. When using RF according to our protocol, an optimal level of sedation and analgesia is achieved between 80 and 90% using doses of 3, 52±0, 5μgr/kg/h.

Poster Sessions
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0429

IN VITRO SUSCEPTIBILITY OF INTENSIVE CARE UNIT (ICU) CANDIDEMIA ISOLATES BY THE EUCAST AND COMMERCIAL METHODS - A TEN YEAR SURVEY

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INTRODUCTION. In recent years a shift is reported in the frequency of candidemia due to non-albicans spp attributed to the increasing use of fluconazole in the ICU setting. This study reports data from Greece on the frequency of Candida spp. isolation from ICU candidemia episodes, their susceptibility to antifungals during the last decade and compares the performance of 3 commercial susceptibility testing methods with the EUCAST microdilution(MD) reference method.

METHODS. We tested 137 Candida isolates ICU acquired candidemia episodes between 1997–2002 when increased use of fluconazole prophylaxis was engaged, and 2003–2007, when administration of empirical FL was reduced and the newer antifungals, such as caspofungin were gradually introduced. The conventional antifungals tested comprised fluconazoleFL), amphotericin B(AB), itraconazole(IT) and flucytocine(FC), whereas the newer antifungals included voriconazole(VO), caspofungin(CAS)and posaconazole(POS). The new candins, micafungin(MICA) and anidulafungin(AND) were also tested in vitro. Susceptibilities were tested by the EUCAST microdilution method the, Sensititre Yeast 9 panel (ST), Etest(Et), and by the CLSI M44 A(FL and POS).

RESULTS. The frequency of the non-albicans species decreased significantly in the last 5 years of the study(from 82.3% to 46.6%, $p < 0.001$). Increased AB MICs were recorded for C. lusitaniae (1–4 mg/L) and C. tropicalis (0.5–1 mg/L) and increased candin MICs against C. parapsilosis (0.5–4 mg/L), C. guilliermondii (0.25–8 mg/L), C. rugosa (0.12–8) and C. kefyr (0.5–16). As expected high FL MICs were noted for C. glabrata and C. krusei. VO, POS and IT generally generated low MICs except against 2 C. glabrata strains (1 mg/L) respectively. Interclass correlation coefficient (ICC) for EUCAST versus sensititre vs. Etest was 0.98–0.99 (P<10-4) for all drugs. Pearson's correlation coefficient (measure of linear associations) for FLU and POS vs EUCAST MD vs Etest, vs disk diffusion was 0.944 (P<0.01).

CONCLUSION. Significant decrease ($p < 0.001$) in the non-albicans ICU candidemia isolates was recorded in the last 5 years, attributed to the rational use of fluconazole. FL MICs did not significantly decrease in the last 5 years (p>0.1). The overall agreement of commercial versus EUCAST was (94–98%). The candins performed well, except against the aforementioned Candida spp. Disk diffusion is an option for rapidly testing candidemia isolates. Standardized susceptibility testing can aid the selection of the most relevant antifungal therapy for the management of ICU candidemia.

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0430

IMPACT ON MORTALITY OF EMPIRICAL TREATMENT AND NON ALBICANS ESPECIES IN CANDIDEMIA IN NON NEUTROPENIC CRITICALLY ILL PATIENTS

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INTRODUCTION. The aims of this stdy was: a) To know the prevalence of non-C.albicans species (NCA) as cause of Candidemia in non neutropenic critically ill patients (CNNCIP) and its influence on global and related mortality to infection, b) to describe the rate of inadequate empirical treatment (IEAT) in this setting and its consequences on outcome, and finally c) to analyse the impact on mortality of the different empirical antifungal therapies (broad spectrum vs Fluconazole).

METHODS. A prospective and observational study was developed in a Spanish teaching hospital mixed-ICU (16 beds) during 12 years (1996–2007). All episodes of candidemia were collected. Clinical, microbiological and outcome variables were recorded. Uni and multivariate analysis were performed to assess the influence of inadequate empirical treatment, the antifungal agents used as empirical treatment and the species involved on mortality (SPSS 13.0).

RESULTS. Among 397 bloodstream infections 7,8% (n=31) of the episodes were CNNCIP. The most frequent isolates were: Candida.albicans (51,7%), Candida parapsilosis (22,5%) and Candida glabrata (19,3%).There were no differences in age, sex and APACHE II score between C.albicans y non albicans species. Previous use of fluconazole was not more frequent in NCA candidemia (25%vs 26,6%; p= 0,91). Global and related mortality to candidemia were 67,7% and 29% respectively. The rate of (IEAT) was 70,9%, but it had no impact on mortality rates. The related to candidemia mortality rate was statistically higher in NCA (46,6% vs 12,5%; p= 0,03). The frequency of each antifungal drug used as empirical therapy was: Fluconazole (31,2%), Amphotericin B (31,2%), Caspofungin (18,7%) and Voriconazole (18,7%). The empirical antifungal therapy chosen had no impact on mortality neither global candidemias analysis nor NCA subanalysis. A multiivariate analysis confirmed the NCA isolate as the unique factor associated to related mortality to candidemia (OR=6.06; CI95%:1.01–36.6; p= 0.05).

CONCLUSION. We have observed an increase of NCA fungemia in non neutropenic critically ill patients with a mortality rate higher that those caused by C. albicans. This higher mortality was not associated neither IEAT nor the antifungal drug used as empirical therapy.

0431

VORICONAZOLE DOSING IN CRITICALLY ILL PATIENTS UNDERGOING CONTINUOUS VENOVENOUS HEMOFILTRATION

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INTRODUCTION. Voriconazole (VRC) is a triazole potent broad-spectrum antifungal agent, an important part of antimicrobial therapy in critically ill patients. VRC is predominantly eliminated by metabolism. Continuous renal replacement therapy is one of the standard methods in the ICU. There is a lack information about pharmacokinetic alteration of VRC during these procedures to date.

METHODS. We measured VRC concentration in serum and in ultrafiltrate by RP-HPLC method with UV detection in critically ill patients undergoing continuous venovenous hemofiltration (CVVH). We profiled 5-point pharmacokinetic concentration-time curve during a 12 hours interval of standard maintenance dosing 4 mg / kg. We derived an area under the curve (AUC), sieving coefficient (Sc) and total body clearance (CLt) and compared these with the literature. At the same time, we reviewed pharmacodynamics of VRC, minimal inhibitory concentration (MIC) for Candida spp. and for filamentous fungi in the literature.

RESULTS. We are presenting preliminary data of three patients with septic shock, renal failure and suffering from an invasive mycotic infection. AUC was 22.8, 73.5 and 27.0 mg / h /l. CLt was 17.5, 5.4 and 14.8 l / h. Sc was 0.19, 0.06 and 0.16. Measured serum concentrations of VRC in every time point were higher than 1 mg / l which represents the MIC90 value for the all Candida spp. and all filamentous fungi.

CONCLUSION. Standard dosing of voriconazole was adequate during CVVH in our three critically ill patients and dosing adjustment was not required.

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0432

CHANGES IN THE CONSUMPTION OF ANTIFUNGALS IN CRITICALLY ILL PATIENTS ADMITTED TO SPANISH ICUS (2002–2007 PERIOD)

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INTRODUCTION. To describe the changes in the use of antifungals in the Services of ICM (ICU) and the impact of the new antifungals.

METHODS. Observational, prospective and multicenter study based on patients included in the National Surveillance Study of Nosocomial Infection (ENVIN) between 2002 and 2007. Prescriptions of nystatin, fluconazole, itraconazole, voriconazole, amphotericin B deoxycholate, liposomal amphotericin, amphotericin B lipid complex and caspofungin directed to prophylaxis, community-acquired infection, extra-ICU nosocomial infection, and ICU-acquired infection ere analyzed. Type of treatment (empirical or specific) and duration were also assessed. Results are presented in percentages in relation to the total number of antimicrobials used for each indication and/or period.

RESULTS. During the study period a total of 52,613 patients were controlled, 29,930 (56.9%) of whom received 66,024 antimicrobials, 3184 (4.8%) of which were antifungal agents. Absolute indications and percentages in relation to the total number of antimicrobials as well as the distribution by type of indication are presented in the tables. Major findings included a predominance of fluconazole (56.9% of all antifungals) with an increase of use during the study period (2.4% to 3.1% of all antimicrobials), decrease of amphotericin deoxycholate (0.5% to 0.03%), and increase of caspofungin (0% to 1.03%) and voriconazole (0% to 0.69%). The use of lipid amphotericin formulations did not vary. There was a predominance of fluconazole in all indications. Mean duration of treatment in the ICU ranged between 8 and 11 days. Empirical treatments were the most frequent (60%).

CONCLUSION. Limited use of antifungal agents in critically ill patients. Fluconazole was the most commonly used antifungal drug in all indications and showing an increasing trend. Caspofungin and voriconazole showed a progressive increasing use and a parallel decrease for the indications of amphotericin B deoxycholate. Predominance of the use of antifungals in empirical treatment

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HUMAN TISSUE CONCENTRATIONS OF VORICONAZOLE

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INTRODUCTION. The broad-spectrum antifungal voriconazole (VRC) is used against various invasive mycoses in critically ill patients. VRC exhibits a good penetration into body fluids, such as cerebrospinal fluid, epithelial lining fluid and pleural effusion. VRC tissue levels were determined in tissue samples obtained during routine autopsy from patients who have died during treatment with VRC.

METHODS. VRC levels were determined in various tissue samples (kidneys, liver, heart, spleen, lung, brain) of 2 patients, who had been on treatment with VRC. Patient 1 had received a single dose of 200 mg, patient 2 had obtained a total dose of 3,800 mg. The intervals between the last administration and death were 36 and 12 hours, respectively. Both patients had been on vasopressor therapy and mechanical ventilation. Antimycotic therapy had been initiated for suspected or proven invasive fungal infections. VRC tissue levels were assessed by extraction of homogenized tissue samples, purification by solid phase extraction and measurement of VRC by high performance liquid chromatography.

RESULTS. Tissue levels of VRC in patient 2 exceeded those achieved in patient 1 in all samples. Highest VRC concentrations (mean ± standard deviation) in VRC treated patients have been found in the organs of elimination - the liver (patient 1: 2.14 ± 0.40 μg/mL, patient 2: 4.21 ± 0.77 μg/mL) and the kidneys (patient 1: 1.97 ± 0.41 μg/mL, patient 2: 6.89 ± 0.06 μg/mL). Mean VRC lung concentration amounted to 1.30 ± 0.63 μg/ml. In the lung of patient 1, VRC levels reached 0.72 - 0.76 μg/ml after a single dose. In patient 2, lung concentrations ranged between 1.47 and 2.04 μg/ml. In different areas of brain tissue VRC was below the limit of detection (< 0.25 μg/mL) in patient 1 and achieved levels of 3.34 ± 0.18 μg/mL in patient 2. There was no difference in VRC concentrations between different areas of the brain, such as cortex, hippocampus, nucleus caudatus, medulla oblongata and cerebellum. VRC concentrations amounted to 1.31 ± 0.03 μg/mL and 2.95 ± 0.05 μg/mL in samples of the spleen of patient 1 and 2, respectively. In the myocardium samples of patient 1 VRC was undetectable, but reached a mean concentration of 2,44 ± 0,25 μg/mL in patient 2.

CONCLUSION. VRC is detectable in the lung and other tissues already after the firs administration and thus appears to penetrate rapidly into human tissues. VRC accumulates in the liver and the kidneys, which are also the routes of elimination. Its penetration into brain and heart is probably slower.

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0434

CANDIDEMIA IN CRITICALLY ILL PATIENT IN TERTIARY CARE INTENSIVE CARE UNIT

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INTRODUCTION. Candidemia is frequently a life–threatening complication in critically ill patients admitted to intensive care units.

METHODS. A 2-year retrospective observational study conducted in the open ICU of a tertiary care hospital at Mumbai, India. Patients whose blood cultures were positive for fungal growth were included in the study. The incidence, sub classification, risk factors and mortality were assessed from the data.

RESULTS. From Feb 2006 to Jan 2008, 121 critically ill patients were found to have positive blood cultures for candida groups of fungi. Out of this, 80 (66.11%) patients had acquired the infection as Nosocomial and rest 41 (32.89%) patients had positive blood cultures at the time of admission to the hospital / ICU. The mean incidence of candidemia was 16.8/1000 admissions. Candida albicans and candida tropicalis were isolated in 87.6% and 8.26% of patients, respectively. The main risk factors for candidemia were malignancy (54.5%), diabetes (35%) and end stage renal disease (21%). Crude mortality was 40%.

TABLE 1 SUBCLASSIFICATION OF CANDIDA SPECIES

Subclassification	No. of patients	Percentage
Candida Albicans	106	87.6%
Candida Tropicalis	10	8.26%
Candida Glebrata	03	2.4%
Candida Parapsilosis	01	0.09%
Candida Krusei	01	0.09%

TABLE 2 RISK FACTORS ASSOCIATED WITH CANDIDEMIA

Risk Factors	No. of patients	Percentage
Malignancy	66	54.54%
Diabetes	35	28.92%
End-stage renal disease	21	17.35%
Parentral Nutrition	16	13.22%
Chronic Liver Disease	08	09.68%
Others	12	14.82%

CONCLUSION. Candidemia is a common occurrence in critically ill patients admitted to Intensive Care Unit of our hospital. The main underlying risk factor is immuno-suppression due to various causes. If not promptly recognized and adequately treatment, mortality remains high. So, we should have a high index of suspicion of candidemia in critically ill patients.

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0435

EFFICACY AND SAFETY OF LIPOSOMAL AMPHOTERICIN B IN CANDIDEMIA IN PATIENTS ADMITTED TO INTENSIVE CARE UNITS: A RETROSPECTIVE, MULTICENTER, PHARMACOEPIDEMIOLOGICAL STUDY

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INTRODUCTION. Invasive candidiasis, the most frequent fungal infection within high risk patients hospitalized in intensive care units (ICUs), is associated with a high mortality rate. The objective of this study was to analyse the efficacy and safety of liposomal amphotericin B (L-AMB) administered to ICU inpatients with candidemia.

METHODS. Retrospective, multicenter study of ICU inpatients with candidemia treated with L-AMB in 2006.

RESULTS. Forty-one patients were included in the study. Mean APACHE II score was 21.4 (SD: 7.7), mean time at ICU was 44.3 (SD: 32.9) days and mortality rate at ICU was 48.8%. Most common causes of admission at ICU were medical pathology (43.9%) and surgery (41.5%), and 65.9% of the patients had severe sepsis or septic shock. In most of the cases candidemia was due to Candida albicans (65.9%), follow by C. parapsilosis (9.8) and C glabrata (7.3%) and others (9.7%). Mean duration of treatment was 13.8 days and mean dose was 3.8 mg/kg/day. More than half of the patients had received previous antifungal treatment (63.4%), mainly fluconazole (34.1%) and caspofungin (22.0%). L-AMB most common indications were: non-stable disease (51.2%), infection localization (34.1%) and guidelines application (29.3%). Satisfactory clinical response and microbiological response was achieved in 58.5% (95% CI: 43.5, 73.6) and 63.4% (95% CI: 48.7, 78.2) of the patients, respectively. In evaluable patients, satisfactory clinical response was 66.6% (95% CI: 28.2, 60.7) and microbiological response was 78.8% (95% CI: 64.8%, 92.7%). None of the adverse reactions detected were reported as serious. There was no renal failure requiring a change in the antifungal treatment and no change in the mean creatinine value despite the fact that 58.5% of patients were receiving nephrotoxic drugs.

CONCLUSION. L-AMB was used in critically ill patients with candidemia previously treated or not. Satisfactory clinical response was very high. L-AMB was well tolerated even in patients taking concomitant nephrotoxic drugs.

0436

CANDIDAEMIA AND IN VITRO SENSITIVITY OF CANDIDA ISOLATES IN A GENERAL HOSPITAL AND IN ITS ICU

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INTRODUCTION. to investigate the production of slime factor among candida spp, isolated from blood cultures, to study in vitro activities of antifungal agents and compare these results with slime production, during 2003 –2006 period.

METHODS. we studied a total of 28 Candida spp isolated from blood cultures. They were incubated in Bactek 9120 system (Becton Dickinson) in aerobic, anaerobic and mycosis vials. All positive cultures were Gram stained and re-cultured in blood agar, Mac Conkey agar, Sabouraud with TCC and chromagar candida (Becton Dickinson). The protocol for negative blood cultures included a seven days period. Identification of microorganisms and susceptibility test were performed with the Vitek 1 and 2 systems, API and ATP Fungus (BioMerieux, France).

RESULTS. There were isolated 1 Aspergillus and 27 Candida strains: albicans 15, krusei 9,tropicalis 1, parapsilosis 1, zeylonoides 1. The locations were: ICU 18, medical dept 6, surgical dept 4. The susceptibility test results revealed a difference between 24 and 48 hours incubation time. The MIC for amphotericin B (AMB)for all candida species was 0.25 – 1 μg/ml and they were all characterized as sensitive to AMB as well as to 5-flurocytosin. 5 out of 15 C. Albicans strains have MICs for fluconazole 16–128 μg/ml and high MICs for itraconazole and ketoconazole.

CONCLUSION. Non-albicans Candida strains had no prevalence over candida albicans. Both candida species showed resistance to one or more antifungal agents and a progressive increase of it over the years studied. Assessment of the susceptibility test after a 48 hours incubation period is recommended.

0437

PULMONARY ARTERY CATHETER SLEEVE - AN EFFECTIVE BARRIER?

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INTRODUCTION. Pulmonary artery catheterization is widely used in intensive care. Infectious complications associated with the use of pulmonary artery catheters (PACs) are a significant source of morbidity and mortality. Shielded ("hands-off") PACs have been found to reduce PAC-related systemic infections. However, there is a risk that mobilization of a PAC within a contaminated sleeve may result in inoculation of organisms into the patient's bloodstream. We conducted a prospective observational trial to address the question whether it is safe to manipulate the PAC within the protective sleeve.

METHODS. We prospectively enrolled 102 patients with PACs and collected the following data: APACHE II and SOFA scores, patient demographics, type, site, date and time of PAC insertion, type of surgery, antibiotic therapy at PAC insertion and removal. Upon PAC removal, 4 specimens were taken under sterile conditions: Saline reaspirated from the protective sleeve (1, "sleeve fluid"), the distal 5 cm of the PACs (2, "tip"), swab specimens from the introducer hub (3, "hub swab)" and from the skin at the PAC exit site (4, "exit swab"). In the microbiology laboratory, sleeve fluid and tips were inoculated onto horse blood agar and incubated. After 48 hours, colony counts were performed. Catheter hub and exit swabs were also inoculated onto horse blood agar and incubated. After 48 hours, growth of organisms was classified as "Nil" (no growth), "Colonization" (scanty growth) or "Infective" (moderate/abundant growth).

RESULTS. Mean duration of PAC residence was 39.1 (24) hours. 92 PACs were internal jugular, 8 subclavian and 2 femoral. 11 patients had blood cultures (all negative), and there was no episode of catheter-related bloodstream infection. 6 patients had an infective shield fluid (5 coagulase-negative staphylococci (CNS), 1 mixed gram-negative bacilli (GNB)). 4 catheter tips were infective (3 CNS, 10 Escherichia coli), 6 introducer hubs were colonized (4 CNS, 1 GNB, 1 diphtheroid). Patients having PACs with an infective sleeve fluid did not differ significantly from those without an infective sleeve fluid in terms of APACHE/SOFA scores, age, gender or site of insertion. There was a highly significant association between a colonized introducer hub and growth of organisms in the shield fluid, OR 30 (4–213, $p < 0.001$). Neither a positive PAC tip nor a positive exit site swab was associated with an infective sleeve fluid culture.

CONCLUSION. In this cohort of 102 patients with a short duration of PAC residence, 6 patients had potentially infective cultures of sleeve fluid. This was significantly associated with a colonized introducer hub. These figures suggest that advancing a PAC within a "sterile" protective sleeve may have the potential to inoculate organisms into the patient's bloodstream.

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REDUCTION OF THE CATHETER-RELATED BLOODSTREAM INFECTIONS IN AN INTENSIVE CARE UNIT

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INTRODUCTION. To determine the utility of a multiple system intervention to reduce catheter-related bloodstream infections (CR-BSI) in an intensive care unit (ICU).

METHODS. We carried out a prospective cohort study in a medical and surgical ICU. We determine the rate of CR-BSI per 1000 catheters days during the application of an evidence-based intervention used to decrease the CR-BSI in 2007 (March to December) compared with the rate during the same period in 2006 in which we just applied conventional measures of prevention.

During the intervention period we applied five measures: giving educational sessions about how to insert and maintain central catheters, cleaning the skin with chlorhexidine, filling in a checklist during the insertion of the catheter, using the subclavian vein as the preferred site and avoiding the femoral site if possible, and removing unnecessary catheters. CR-BSI was defined as the recovery of the same organism (same species, same antibiotic susceptibility profile) from the catheter tip and blood cultures.

RESULTS. During the control and intervention period we registered 4289 vs 4174 patient-days and 3572 vs 3296 catheter-days respectively.
During the intervention period 8 CR-BSI were diagnosed compared with 24 CR-BSI in the control period. The mean incidence rate of CR-BSI was 6.7/1000 catheter days in the control period and 2.4/1000 catheter days in the intervention period (RR 0.3; 95% CI 0.1 to 0.7; p= 0.03).
A nursing intervention during the filling of the checklist was required in 17.7% of the insertions. The ratio of use of catheter was 81.5% during the control period and 80.6% in the intervention period without significant differences between periods.

CONCLUSION. The implementation of a multiple system intervention with evidence-based measures significantly reduces the CR-BSI in our intensive care unit.

0439

INTRAVASCULAR CATHETER-RELATED BLOODSTREAM INFECTIONS – THE RESULTS AFTER IMPLEMENTATION OF A NEW APPROACH FOR AN OLD PROBLEM

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INTRODUCTION. Intravascular catheter-related infections are very critical in ICU environment, with elevated morbi-mortality and great impact on costs. In our unit, according to a quality political, it was established standards on prevention, diagnosis and treatment of nosocomial infections, with a periodic review of ours rates. We will describe one year of follow up results after a task force model chosen when we noticed an increase of the catheter related infections incidence: outcome management.

METHODS. Prospective study, two-phases model, in a general ICU of 23 beds from December 2006 to January of 2008. First phase: multi-professional work group was created (4 physicians, 6 nurses and 2 respiratory therapists) who performed a meeting with the "brainstorm" technique. All the infections data were reviewed. The group identified main risk factors related to the problem using a diagram cause-effect. Then, it was established corrective measures, deadlines and ways for execution. The second phase was the implementation of the measures chosen: team for catheter insertion; full-barrier precautions for insertion of central venous catheters; semi-permeable and transparent dressings; avoiding the jugular and the femoral sites whenever possible; routine replacement of the catheters after ten days insertion; removal of the unnecessary catheters. The target was the return of catheter-related infection rates of the previously year.

RESULTS. Sixty-one patients were followed during their stay in the ICU. A total of 118 intravascular catheters were used in the following sites: 61,9% subclavian vein (n=73), 19,5% internal jugular vein (n=23) and 18,6% in femoral vein (n=22). The median of catheter indwelling time was 10 days (SD de +/- 5,16). Regarding the rates or infection, there was a reduction in average rate from 13,08 to 7,43 per 1000 days of catheters ($p < 0,05$), with almost the same density of use (54,25 in 2007 versus 54,67 in 2006). The bacterial related to the infections were: BGN in 58.4% (n = 7), MRSA in 33.3% (n = 4) and staphylococcus coagulase negative 8.3% (n = 1). There was no statistical difference in time or site of the puncture between the infected group with the non-infected.

CONCLUSION. Catheter-related bloodstream infection is the nosocomial infection par excellence: costly, common, and frequently fatal. A program to improve patient safety must focus on simple and inexpensive interventions and prevention measures. Our target was achieved, although we were not able to identify the one factor that brought the biggest impact alone. However, we will keep our efforts to a new primary goal: zero rate of infection related to intravascular catheters.

0440

SIMPLE MEASURES AND THE REDUCTION OF CENTRAL VENOUS CATHETER-RELATED BLOODSTREAM INFECTIONS (CR-BSI)

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INTRODUCTION. CR-BSI is common, potentially lethal, and can indicate the poor quality and the inexistence of safety culture in an ICU. Some studies have demonstrated interventions to reduce this rate[1,2], which appears different when there is a comparison between United States of America (4.0) and developing countries (12.5)[3]. The aim of this study was to evaluate the impact of some simple measures that we used in our ICU to decrease CR-BSI.

METHODS. After we had analyzed CR-BSI rate in our 10 bed medical-surgical ICU in 2006 using National Nosocomial Infection Surveillance (NNIS) methodology [4], we studied the problem and implemented simple and not expensive measures. Better control of catheter insertion with development of a central-line checklist, not use of femoral site if possible and the daily rounds discussing the removal of catheters were the main actions adopted. The analysis of 2007 rate was done and compared with 2006.

RESULTS. Results are summarized in table.

TABLE 1. PERIODS RATES USING NNIS METHODOLOGY

	2006	2007
Rate of Central Venous Catheter use*	0.61 (0.44 – 0.76)	0.54 (0.48 – 0.61)
Rate of CR-BSI per 1000 device days*	23.08 (8.33 – 33.52)	11.75 (0 – 20.59)

** Overall (pooled) and 10th to 90th percentile range for months of the years*

CONCLUSION. Simple measures resulted in an expressive reduction (55.3%) in rates of CR-BSI. With this result, that is similar to the developing countries, we intend to maintain it and reach better rates.

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0441

AGE AS A RISK FACTOR FOR DEVICES RELATED INFECTION

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INTRODUCTION. Elderly people are more prone to infections.

Until recently there was a tendency to treat them in a more conservative way, but nowadays their admission in the ICU has become normal as well as the strong support they receive-Objective: to know the age- related infection rate (IR) in the critically ill patients.

METHODS. Prospective multicenter study carried out during 3 months in the year 2007. Patients were allocated in three groups (A;B;C) according to their age: less than 60 (A), between 60 –74 (B) and equal or more than 75 years (C). The characteristics of patients were analysed as well as the use of devices. IR is shown per 100 patients and per 1000 days of device. Ventilator associated pneumonia (VAP), urine infection related to urinary catheter (UTI), and primary and vascular catheter related bacteremia (PB +CRB) were monitored.

RESULTS. The survey included 12.453 patients admitted to the ICUs for more than >24h, with 38,8% in the group A, 35,2% in group B and 25,9% in group C, which represent an increase with regard to the previous years. The incidence rates were: use of device (days with device/days of stay) 0,49%, 0,48% and 0,43% for VAP; 0,82–0,81 y 0,80% for UC; and 1,33–1,33 y 1,21% for PB +CB, including arterial (AC) and venous catheter (CVC). Density and rates of infection are shown in table.

TABLE 1

	<60 y	60–75 y	>75 y
N	4.835	4.387	3.231
VAP x 100 pts	7,74	5,6	3,28
VAP x 1000 d MV	19,3	14,6	15,9
UTI x 100 pts	2,9	3,4	3,2
UTI x 1000 d UC	4,49	5,40	5,6
PB+CRB x 100 pts	3,6	3,2	2,3
PB+CRB x 1000 d CVC+AC	5,16	4,86	4,05

CONCLUSION. A quarter of the ICU' populations are ≥75 years. Exposition to medical devices decrease with age, specially MV and vascular catheters. Infection Rates are lower in the eldest except for UTI. Differences are less significant using incidence density rather than by 100 patients.

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0442

EPIDURALS IN PATIENTS WITH SEPSIS

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INTRODUCTION. Epidural analgesia has become widely regarded as the "gold standard" for post-operative pain relief after major surgery. Due to a lack of data in septic patients receiving epidurals, we have little knowledge of the true perioperative complication rates. The underlying knowledge of epidural abscess and haematoma rates are therefore unknown, making patient consent in septic individuals a difficult issue. The complications rate for patients (the majority being elective)receiving central nerve blockade is quoted as 0.1–0.001% for abscess formation1. Following the MASTER trial there is now some doubt to whether or not there is any improvement in the postoperative mortality in high risk patients undergoing major surgery2 despite the apparent reduction in respiratory morbidity.

METHODS. Following an initial retrospective (2004–2006), 30 case note, review in 2006 we continued our audit prospectively through 2007 (22 case note) in septic patients receiving epidural having undergone major emergency abdominal surgery and required intensive care unit (ICU) post-operatively. The aims were to assess complications associated with epidural usage in this particular patient group. Post-operatively patients were regularly reviewed by our acute pain team until no further acute pain input was required.

RESULTS. Of all the epidurals 38 were sited in theatre and 14 in the ICU for analgesia and as an aid to weaning from mechanical ventilation. The ratio of male to female was 27:25. The overall perioperative mortality was 42% (22/52). Two or more organ failure was seen in 33 patients. Positive blood cultures were identified in 5 cases. Of the epidurals 18 required two or more level attempts and the mean duration of in-situ catheter days was 4.7 (+/−1.3). At the time of insertion patient temperatures ranged from 35.6 to 38.9oC. Associated complications occurred in 6 cases with one epidural haematoma, one subdural catheter placement, two vascular punctures and two dural punctures despite the epidural insertions being made by senior trainees or consultants in 49/52 cases.

CONCLUSION. Due to the rarity of epidural complications in the general surgical population it is not possible to conclude whether the serious complications are greater in septic patients per se, however, it is a question of risk versus benefit in such a patient group. Unless a large scale, multicentre audit or research project is undertaken it is extremely difficult to evaluate both the true, and evidence-based, benefits and risks of epidural analgesia and anaesthesia in the septic patient population undergoing both major surgery and requiring postoperative ICU management.

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0443

ELEVATED CARDIAC TROPONIN I AND ELECTRO-CARDIOGRAPHIC AND ECHOCARDIOGRAPHIC ABNORMALITIES AFTER ANEURYSMAL SUBARACHNOID HEMORRHAGE

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INTRODUCTION. Patients with aneurysmal subarachnoid hemorrhage (aSAH) also experience myocardial injury at the time of rupture, but the prevalence and manifestations of neurocardiac injury are not well described. We investigated neurocardiac injury prevalence as quantified by elevated cardiac troponin I (cTnI) ≥0.3ng/ml within the first 5 days after aSAH and its relationship to electrocardiographic (ECG) and echocardiographic abnormalities.

METHODS. Prospective longitudinal study of aSAH patients with Fisher grade≥2 and/or Hunt/Hess grade≥3 admitted to the Neuro ICU. Serum cTnI collected for 5 days following hemorrhage with peak value per patient utilized for cohort dichotomization (cTnI≥0.3ng/ml vs cTnI<0.3ng/ml. We evaluated the relationship between cTnI peak and demographics, bleed severity, admission 12-lead ECG, Holter monitoring days 1–5, and echocardiogram.

RESULTS. Of 280 subjects, 31% had cTnI≥0.3ng/ml. Few patients in either group had a past cardiac disease history (10% cTnI≥0.3ng/ml vs 7.2% cTnI<0.3ng/ml, p=.448). A significant relationship existed between elevated cTnI and older age (mean 57yrs±11 cTnI≥0.3ng/ml vs 53yrs±11 cTnI<0.3ng/ml, p=.002), but not race or gender. A significant relationship existed between cTnI≥0.3ng/ml and greater bleed severity by Hunt/Hess (p=<.0001) and admission Glasgow Coma Scale ($p < .0001$). Patients with higher cTnI were significantly more likely to have initial 12-lead ECG findings of prolonged Qtc (mean 484ms±51 cTnI≥0.3ng/ml vs mean 452ms±47 cTnI<0.3ng/ml, $p < .001$), but not PR (p=.688) or QRS (p=.217) duration. On Holter monitoring, patients with elevated troponin were more likely to have ventricular dysrhythmias (21% cTnI≥0.3ng/ml vs 9.8% cTnI<0.3ng/ml, p=.030) but not atrial dysrhythmias (p=.473). Elevated troponin was also associated with lower cardiac ejection fraction ($p < .0001$) and wall motion abnormalities (40.6% cTnI≥0.3ng/ml vs 5.5% cTnI<0.3ng/ml, $p < .0001$) on echocardiogram, as well as pressor infusion (36.8% cTnI≥0.3ng/ml vs 18% cTnI<0.3ng/ml, p=.006).

CONCLUSION. Neurocardiac injury determined by elevated cTnI occurs commonly in young patients without cardiac history after aSAH, and is related to bleed severity. Elevated cTnI is associated with ECG abnormalities at admission and throughout the first 5 days after hemorrhage, as well with as poorer cardiac function on echocardiogram. Further study is needed to determine the mechanistic cause of neurocardiogenic injury and its contribution to neurologic outcomes.

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0444

PREDICTORS OF BRAIN INJURY IN CRITICALLY ILL PATIENTS

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INTRODUCTION. Critically ill patients are at high risk of developing brain dysfunction which may present clinically as delirium, coma, and long-term cognitive impairment (1). The mechanisms underlying this brain dysfunction are unknown. In order to evaluate the hypothesis that brain dysfunction is associated with histological markers of brain injury, we evvaluated the prevalence and predictors of histologically defined acute brain injury in patients who died of critical illness.

METHODS. We conducted a case-control study of patients admitted to 2 medical and 3 surgical ICUs during the period 1996–2006 who died and underwent autopsy. Patients with prior neurological disease were excluded. Brain histology was reviewed for evidence of ischemic, hemorrhagic, or inflammatory injury. Clinical and pathological characteristics were compared between cases (histological injury present) and controls (injury absent) in a univariable and multivariable analysis.

RESULTS. We evaluated histological and clinical data in 214 patients admitted to the ICU for respiratory failure (41% of patients), circulatory failure (25%), postoperatively (12%), and and other (12%). Histological evidence of acute brain injury was detected in 99 patients (46%). Lesions were most common in the cerebral cortex (38% of patients), followed by hippocampus (30%), cerebellum (20%), basal ganglia (15%), and brainstem (12%). Lesions were ischemic in 32% of patients and hemorrhagic in 25%, and inflammtory in 12%. Multivariable predictors of brain injury were female gender (OR 1.9, 95% CI 1.3–3), ARDS (OR 2.1, 95% CI 1.5–4.6), and septic shock (OR 1.4, 95% CI 1.1–4.8).

CONCLUSION. Histological evidence of brain injury was found in nearly half of critically ill patients without neurological antecedents who died in the ICU. An association was noted between brain injury and ARDS and septic shock. These results suggest a relationship between systemic inflammatory conditions and acute brain injury.

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0445

VALUE OF SERUM LEVELS OF BRAIN INJURY BIOMARKERS IN THE PROGNOSIS AND EVOLUTION OF ACUTE SPONTANEOUS CEREBRAL HAEMORRAGHES AND THEIR RELATIONSHIP WITH SEVERITY SCALES

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INTRODUCTION. Reliable biomarkers are being studied to predict the prognosis of Spontaneous Cerebral Haemorraghes (CH) like matrix metalloproteinses (MMP-9), D-dimer (DD), B-type natriuretic peptide (BNP) and S-100β protein. We aimed to: Evaluate the utility of systematic measurement of these brain injury biomarkers (BIM) to predict the prognosis of acute CH.

METHODS. Prospective observational cohort study. Adult patients admitted in ICU with CH were included. Serum levels of BIM were measured at admission and sequentially (days 1,2,3,5,7 and 10) using the " Triage Stroke Panel" of Biosite®. Severity scales (SS): APACHE II, SOFA and Glasgow were registred. Statistical analisis with Paired-Samples T-Test (BIM serum levels), Independent-Samples T-Test (BIM and SS-mortality) and Bivariate Pearson Correlation (BIM-SS).

RESULTS. Preliminary communication with the first 50 patients. Age 56±1,8 years; 66% men; APACHE II at admission 11±1. ICU stay 7,8±1 days and 5,4±1 days of mechanical ventilation (DMV). Mortality 20%. There was significant correlation between mortality and SS, specifically APACHE II (p 0,02), SOFA (p 0,001), Glasgow (p 0,001). Serum levels of MMP-9, BNP and DD were high at admission and significantly raised during evolution; pick level of MMP-9 was reached earlier than BNP and DD. Nevertheless no significant correlation was found between mortality and BIM.

TABLE 1 EVOLUTION OF BIM SERUM LEVELS

	Mean±Std.Error	p
BNP Day 0–5	154±41–159±36	0,02
BNP Day 0–7	154±41–177±34	0,02
MMP–9 Day 0–1	354±54–251±40	0,04
MMP-9 Day 0–3	354±54–201±38	0,04
MMP-9 Day 0–5	354±54-145±20	0,00
DD Day 0–3	1357±207–2295±279	0,00
DD Day 0–5	1357±207–2547±301	0,00
DD Day 0–7	1357±207–3715±342	0,00

CONCLUSION. The evolution of BNP, MMP9 and DD serum levels may reflect an estructural brain injury with a clear temporal profile. No significant correlation was found between mortality and BIM.

0446

METABOLIC CHARACTERIZATION OF CEREBRAL CONTUSIONS FOLLOWING HEAD INJURY IDENTIFICATION OF A TRANSITIONAL PENUMBRAL ZONE

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INTRODUCTION. Pericontusional tissue represents tissue at risk in traumatic brain injury (TBI), and a target for therapy. Diffusion tensor MR imaging (DTI) maps the apparent diffusion coefficient (ADC) that characterises tissue water. Higher ADC values are associated with vasogenic edema, and lower ADC with cytotoxic oedema. DTI shows regional differences in contusions, with a central core and a surrounding region of vasogenic oedema. Many contusions also demonstrate a region of cytotoxic oedema, peripheral to the vasogenic oedema. We have used oxygen-15 positron emission tomography (15O PET) to characterise physiology in these brain regions in TBI.

METHODS. Six patients (median GCS 5) who required sedation and mechanical ventilation for ICP control underwent DTI at 3Tesla, and 15O PET imaging studies within 24 hours post injury. Four regions of interest were manually drawn around the contusion in order to quantify cerebral physiology respectively in the core of the lesion (low ADC core) in the surrounding vasogenic oedema (high ADC region), in the adjacent rim of tissue with low ADC (cytotoxic edema) and on a control region (structurally normal appearing tissue). ADC maps were coregistered to PET images of cerebral blood flow (CBF), oxygen extraction fraction (OEF), and cerebral metabolic rate of oxygen (CMRO2) in the four ROIs.

RESULTS. The ADC showed statistically significant differences between all of the groups, confirming the validity of the tissue compartmentation ($p < 0.05$ for all comparisons). Median CBF and CMRO2 were significantly lower ($p < 0.05$) in both the core (15 ml/100g/min and 18 μmol/100g/min) and vasogenic oedema (22 ml/100g/min and 34 μmol/100g/min) than control regions (27 ml/100g/min and 67 μmol/100g/min). The rim of cytotoxic oedema showed intermediate CBF and CMRO2 values (25 ml/100g/min and 43 μmol/100g/min), with CMRO2 values that approached previous defined survival thresholds.1 OEF was not abnormally elevated in any of the regions.

CONCLUSION. These distinct patterns of physiology in contusions recapitulate a probable evolution of pathophysiology, with incorporation of the cytotoxic rim into the vasogenic oedema and, eventually into the contusion core. This mechanism may underlie the process of contusion expansion in TBI. The coexistence of low/normal OEF with cytotoxic oedema suggests that pericontusional ischemia may be microvascular in origin.

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0447

ARTERIAL BLOOD PRESSURE MONITORING IN ACUTE STROKE PATIENTS: INVASIVE OR NONINVASIVE?

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INTRODUCTION. The optimal management of blood pressure in acute stroke remains poorly defined. Some studies note an association of poor outcome with patients with high BP on hospital admission. Others have noted a decreased risk of neurologic deterioration from stroke with higher BP and worse outcomes in patients who have a decrease in BP after admission. Therefore accurate measurement of blood pressure is crucial in the acute phase of stroke. Besides, the institution of successfuly treatments of blood pressure reduction or augmentation depends on it. Either non invasive or intraarterial blood pressure monitoring is commonly used in ICU. In different populations have been proved that non invasive method does not achieve right accuracy. In acute stroke population discrepancies between direct intraarterial blood pressure (IABP) and indirect blood pressure measurements (NIBP) can adversely affect therapeutic decisions and may have a negative impact on outcomes. The aim of this observational study was to test the hypotheses that IABP measurements are not accurately reflected by NIBP in a population of acute stroke patients.

METHODS. A total of 52 first ever stroke patients underwent simultaneous noninvasive automatic oscillometric and intra arterial blood pressure monitoring. Each patient's height, weight, and arm circumferences at the mid-arm level were recorded. Intraarterial and oscillometric blood pressure measurements were obtained at least every 3 mins until 10 measurements from the arm into which the arterial catheter was inserted. Agreement between methods was assessed using Bland Altman analysis.

RESULTS. Overall 520 pairs of simultaneous oscillometric and invasive blood pressure measurements were collected in 52 patients. The mean age was 57 +/−3 years. The mean NIHSS was 15 +/- 6. Thirty-five percent of the acute stroke patients were on intravenous anti hypertensive treatment. No patient was on vasopressor therapy. Mean arterial blood pressure ranged from 52 to 165 mmHg. The overall discrepancy between methods of measurement to mean blood pressure was 7,8 +/- 9,6 mmHg ($p < 0,001$). The estimation of systolic blood pressure (SBP) using oscillometric recordings underestimated radial artery SBP by 12,7 mmHg (95% confidence interval :7,2 −15, $p < 0,001$ In contrast an upward bias of 6,7 mmHg (95% confidence interval: 4,5 +/- 7,2, $p < 0,001$) was documented when noninvasive diastolic blood pressure (DBP) recordings were compared with intra arterial recordings. For SBP and DBP, the Pearson correlation coefficients between noninvasive and intraarterial recordings were 0,812 and 0,792 respectively.

CONCLUSION. The noninvasive automatic oscillometric blood pressure measurements underestimated mean arterial blood pressure. The SBP is underestimated and the DBP is overestimated by noninvasive automatic device. Therefore oscillometric blood pressure measurement does not achieve adequate accuracy in our acute stroke population. Physicians must consider it before institution of treatments of blood pressure reduction or augmentation.

0448

HAEMODYNAMIC AND METABOLIC STATES PREDICT MORBIDITY AFTER THE OCCURRENCE OF SUBARACHNOID HAEMORRHAGE

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INTRODUCTION. The incidence of subarachnoid haemorrhage (SAH) accounts for about 3% of all strokes with for 30-day mortality of approximately 40%. Initial treatment involves tabilization of vital signs and prevention or treatment of sequelae of SAH (rebleeding, hydrocephalus, seizures, vasospasm). Patients with SAH are often haemodynamically unstable with fluctuations of cardiac index (CI), blood pressure and arrhythmias being potential problems. Our aim was to identify the variables that could potentially be predictors of morbidity in patients with SAH.

METHODS. Data of 140 adult patients with SAH (age mean 63,5±10) admitted at our Intensive Care Unit (ICU) were prospectively collected from June 2005 to December 2007. 70 hemodynamic, ventilatory, and metabolic parameters were evaluated within 3 hours after ICU admission. The CI and others haemodynamic derived parameters were obtained by PRAM (Pressure Recording Analytical Method). Accordingly to the GIVITI (Gruppo Italiano per la Valutazione degli Interventi in Terapia Intensiva - Italian Group for the Evaluation of Interventions in ICU) database definitions, complications were defined as one or more organ dysfunctions or failures occurred during the ICU stay. Statistically, univariate and multivariate analyses, and receiver operating characteristic (ROC) curve analysis were applied.

RESULTS. Organ failure resulted in 49 patients (35%). 10 variables gained a significant level at the univariate analysis. Among these, a high blood lactate concentration (Lac), a high CO2 production index (VCO2i), a low central venous saturation (ScVO2), and a low CI achieved the statistical significance at the multivariate analysis (see Table). The ROC analysis showed a cut-off value of 2,2 mmol/l for Lac, 68% for ScVO2, 2,0 l/min/m2 for CI, and 113 ml/min/m2 for VCOi. Sensibility vs specificity was 78% vs 69% for Lac, 75% vs 67% for ScvO2, 82% vs 77% for CI, and 72% vs 67% for VCO2i. The area under the ROC curve (AUC) resulted 0,8 for Lac, 0,78 for ScVO2, 0,79 for CI and 0,76 for VCO2i. The different ICU severity risk scores did not reach the statistical significance. The average of ICU stay was 21 ± 6 and 10,2 ± 3,4 days (complicated vs uncomplicated patients, $p < 0,001$). Mortality was higher in patients with complications (25% vs 6%, $p < 0,001$).

TABLE 1

	OR	CI 95%	p
ScVO2	1,2	1,1–1,4	0,05
Lac	3,2	1,3–8,2	0,01
VCO2i	1,1	1–1,2	0,05
CI	1,3	1,2–1,6	0,01

CONCLUSION. Our findings demonstrated that various ICU severity risk scores seemed not to predict the morbidity in patients with SAH. Conversely, the indexes of haemodynamic and metabolic states (CI, ScVO2, Lac, and VCO2i), early evaluated after ICU admission, resulted fine predictors of complications. Patients admitted at ICU after an occurrence of SAH should be accurately hemodynamically and metabolically monitored in order to improve their clinical management and outcome.

0449

ACCURACY OF PROTEIN S-100B AS A MARKER OF BRAIN DAMAGE IN NONSEVERE HEAD TRAUMA

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INTRODUCTION. The protein S-100B is a brain-specific protein release from astroglial cells into the circulation after Traumatic Brain Injury. Research indicates that the S-100B serum level could be a useful indicator of Head Trauma severity, but there is not evidence enough about the role of S-100B after nonsevere Head Trauma (NSHT). The hypothesis that S-100B is a useful screening tool for the management of minor head injuries was tested.

METHODS. Forty five patients with NSHT without decrease of conciousness but associated syumptons/signs, like amnesia, headache, dizziness, convulsion and vomits, were prospectively included. We recorded the clinical data on admission and a blood sample before tree hours after NHST, for S-100B inmunoluminiscence analysis. A routine cranial computed tomography scan (CT) was obtained within 24 hours after the injury. The diagnositc properties of S-100B serum levels < 0.105 µg /L, for prediction of intracranial lesions revealed by CT were tested with receiver operating characteristic (ROC) analysis.

RESULTS. S-100B levels were < 0.105 µg /L, in eight of forty five patients (18%) without intracranial lesions. A Sensitivity of 100%, CI, 61–100%; a specifity of 21,6%, CI, 11,4%–72,2%; a Negative Predictive Value of 100%, CI, 67.6%–100% was calculated for this S-100B value. ROC curve and cross-table analysis showed that above cut-off values of S-100B, improve specifity, without changes on sensitivity. In this study the S-100B levels were >0.105 µg /L, in all the patients with brain damage, six of forty five (12.5%).

CONCLUSION. Determination of serum protein S-100B seems to be a useful biochemical indicator of brain damage, in spite of the low specificity for the detection of intracranial lesions. These results, shows that cut-off value of S-100B <0.105 µg /L, with high negative predictive value, appear to be of substantial clinical relevance for the management of NSHT.

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0450

COMPLICATIONS AFTER SPONTANEOUS INTRACEREBRAL HEMORRHAGE IN THE INTENSIVE CARE UNIT

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INTRODUCTION. Spontaneous Intracerebral Hemorrhage (SIH) has the greatest mortality among strokes. During the stay in the intensive care unit (ICU) these patients develop some complications that often modify the evolution of the disease. The aim of our study was to determine these complications developed by the patients with SIH during their stay in ICU and its relation with mortality.

METHODS. Prospective cohort study. Sixty six adults admitted to the ICU with SIH were studied during one year. SIH less than 24 hours,traumatic and subarachnoid haemorrhage, hemorrhagic transformation in acute ischemic stroke, coagulopathy and patients with preceding use of antiplatelet or anticoagulants agents were excluded. On admission we recorded: sex, age, high blood pressure (HBP), Apache II, Glasgow (GCS), location, volume (ABC/2). Complications during the stay in ICU were classified as neurologic, hemodynamic, infectious and metabolic. The average stay and mortality were determined. We studied the complications that influence more in mortality.

RESULTS. Forty three patients were men. The mean age was 58±13 (35–79) years. Fifty four percent were hypertense. Mean value of Apache II was 16±6 and GCS 7.4. The most common location were basal ganglia (41%) and lobar (41%). The average hematoma volume on CT was 48±25 (8–140)mL. Fifty three percent exceeded 30 mL. The average stay in ICU was 15.4±15(2–78) days. ICU mortality was 44%. Most patients died within the first week. Encephalic death was the most common cause (90%) followed by infectious complications (10%). The most frequent complications were metabolic (30%), neurologic (27%), hemodynamic (26%) and infectious (17%). In the group of metabolic complications, high glucose levels (44%) was most common complication although only hyponatremia was associated with mortality in the ICU (p=0.01). In the group of neurologic complications, brain herniation (59%)in any of its variants was the most frequent and was statistically related to mortality (p=0.03) followed by edema (45.5%), ventricular hemorrhage (41%), rebleeding (35%), hydrocephalus (29%), ischemic (29%) and seizures (12%). The most frequent hemodynamic complication was HBP (53%). The supraventricular tachycardia and auricular fibrillation were the most common arrhythmias. The most frequent infectious complications were traqueobronchitis (36%), pneumonia (21%), urinary tract infection (18%), catheter-related infection (12%) and ventriculitis (1.2%). Only pneumonia was related to mortality ($p < 0.001$).

CONCLUSION. Mortality of patients with SIH in the ICU was high and usually happened during the first week. The main cause of mortality was brain death. Most frequent complications were metabolics. Neurologic complications, such as brain herniation, were related to higher mortality. Pneumonia was the infectious complication more frequently associated with mortality.

0451

PROGNOSTIC FACTORS FOR NEUROLOGICAL OUTCOME IN PATIENTS WITH ACUTE ISCHEMIC STROKE TREATED WITH INTRAVENOUS RECOMBINANT TISSUE PLASMINOGEN ACTIVATOR

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INTRODUCTION. IV administration of recombinant tissue plasminogen activator (rt-PA) within 3 hours of symptoms onset is the only approved therapy for patients with acute ischemic stroke. The identification of predictors of neurological improvement may help to improve patient selection. The aim of this study was to analyse prognostic factors of neurological outcome in our acute stroke patients treated with rt-PA.

METHODS. Observational prospective analysis of all patients with acute ischemic stroke admitted in our ICU and treated with rt-PA (2004–2007). We analysed epidemiological data, stroke severity, CT scan findings, early clinical improvement, complications and neurological outcome at 3 months using a modified Rankin Scale (mRS). Results are expressed as mean (SD) or percentage, using a $p < 0.05$ as significance level. We applied SPSS with the t test for continuous variables and Chi-square for categorical ones, and logistic regression tests, calculating odds ratio with their confidence interval for the significant variables.

RESULTS. We have treated 64 patients (64% Male), age 66 yrs. The baseline NIHSS was 14 ± 5. History of diabetes was present in 13 patients (20%). Early signs of infarct on CT were found in 18 p (28%). We observed an early neurological improvement (> 4 points compared to baseline in NIHSS at 24 hours) in 30 patients (47%). The rate of asymptomatic and symptomatic haemorrhages at 36 hours was 14% and 3.1%. The mRS at 3 months was good (0–2) in 34 p. (53.1%). Independent factors related to neurological outcome in multivariate analysis was an early clinical improvement (OR 151, CI 8–2552), while age and baseline NIHSS were associated with poor outcome.

Variables related with neurological outcome are shown in Table 1.

TABLE 1 VARIABLES RELATED WITH THE NEUROLOGICAL OUTCOME

	Good outcome	Poor outcome	p
Diabetes	18%	82%	0.009
Age > 70 yrs	38,5%	61.5%	0.035
Early signs on CT	11.5%	88.5%	0.012
Baseline NIHSS	12	15	0.019
Improvement > 4 points NIHSS at 24 hours	88.5%	11.5%	<0.001

CONCLUSION. In our series of acute stroke patients treated with rt-PA a good neurological outcome at 3 months was achieved in 53%. We found that age and stroke severity (baseline NIHSS and early signs of infarction on CT) were related with poor outcome, while an early neurological improvement was strongly associated with a good neurological recovery, probably related to an early recanalization.

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0452

CLINICAL CHARACTERISTICS AND OUTCOME OF PATIENTS WITH VENOUS CEREBRAL THROMBOSIS (CVT) HOSPITALIZED IN ICU

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INTRODUCTION. CVT has a better prognosis than cerebral arterial thrombosis and is rarely hospitalized in ICU. In 624 patients, (Ferro, Stroke 2004; 35; 664–670) only 7 patients (1.1%) required mechanical ventilation. No information on clinic, outcome and strategy of care of these patients have been published.

METHODS. We report our experience of care of patients with CVT admitted in ICU from January 2003 until December 2007.

RESULTS. Twenty three cases of CVT (age: mean 43 yrs ± 15, ranging from 16 to 68yrs) were hospitalized in ICU in relation with: coma in 48%, status epilepticus in 22%; 13% in post-op. The median delay from the onset of symptoms to the CVT diagnosis was 5.63 days ± 5 SD days and from the diagnosis to ICU admission was 3.96 days ± 3SD days. Diagnosis of CVT was established by MRI/MR venography in 8 patients (35%), intra-arterial angiography in 3 (13%), CT venography in 12 (52%) Monitoring: intra-arterial catheter (20 patients, 87%), transcranial Doppler (14, 61%), capnography (13, 56%), continuous jugular oxygen saturation (4, 17%). Treatment: all patients received heparin at therapeutic dose; 18 patients (78%) were intubated and mechanically ventilated; 14 (61%) received antiepileptic drugs ventilation. Norepinephrine was used in 10 patients (43.5%) to maintain cerebral perfusion pressure. Within the first 24 hours in ICU, fluid balance was negative in 9 patients (39%) because of brain edema and in 10 patients at day 5 (43.5%). Intra-cranial hematoma was drained in 1 patient, another had a brain abscess drainage, 3 patients had a decompressive craniectomy (2 died). Outcome : 5 patients (22%) died in ICU, four in relation with refractory intracranial hypertension, and 1 for lethal pulmonary embolism. Comparison between survival and dead patients (non parametric tests and univariate analysis): except for sex (more death on female than in male group ($p < 0.05$), no difference were observed for medical context, chronic therapy; blood pressure, central venous pressure, heart rate, trans-cranial Doppler data and biological routine tests, except for platelet level at entry (240.103± 108 in survival vs 160.103±37 in dead patients; $p < 0.0033$) and initial glycemia (6.41± 1.4 in survival vs 14.24± 13.36; $p < 0.06$). Localisation of thrombosis or intracranial complications did not differ between the 2 groups. The mean modified Rankin score for alive patients was 2,6.

CONCLUSION. Only 22% patients with CVT died in ICU under heparin treatment. Other instrumental therapeutic options did not seem to improve poor outcome, which is associated with low platelet level and higher glycemia.

REFERENCE(S). Ferro, Stroke 2004; 35; 664–670.

0453

THE ACUTE IN-HOSPITAL MORTALITY FOR INTRACEREBRAL HEMORRHAGE PATIENTS WITH A DEDICATED NEUROCRITICAL CARE TEAM

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INTRODUCTION. Dedicated Neurocritical care units increase survival chances for neurologically unstable patients. We were interested in the effect of the Neurocritical care unit in a population with intracerebral hemorrhage (ICH) outcome. This study was done to review the mortality and treatment protocols in ICH. The national benchmark is 37–38% death rate within 30 days of admission.

METHODS. The charts were retrospectively reviewed for the patients who were discharged from the Neurocritical ICU between January 1, 2006 and December 31, 2006. In-hospital mortality was assessed and information regarding gender, age, and length of stay was collected. Statistical analyses using chi-square tests and wilcoxon rank sum tests were performed using SPSS 15.0.

RESULTS. There were 168 patients that were treated for ICH during this time period. Patients ranged in age from 22 to 94 years (mean = 65.2 years) and 58% were female. Eighteen patients (10.7%) died during this time period. Patients that died were significantly older than patients that survived (73.9 vs. 64.1, $p = 0.02$). The range of time to death was 1 to 21 days with an average of 5.3 days. Six of the 18 patients died within 1 day and an additional 7 died within 4 days. 3 patients survived longer than 10 days with one patient surviving 21 days. The cause of death in the later 3 patients was not directly related to the ICH diagnosis. The mortality prior to starting the Neurocritical care program was 26%.

CONCLUSION. The mortality rate with the addition of a dedicated neurocritical care team in our hospital was lower than the nationally reported range. Also this improvement was noted from our pervious critical care model. Based upon this study, we follow strict protocols for all intracranial hemorrhage patients.

0454

BRAIN CT: CONFIRMATION OF CLINICAL EXPECTATIONS AND CONSEQUENCES FOR TREATMENT

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INTRODUCTION. Brain CT (BCT) scans are an important diagnostic tool for intracranial disorders. We analysed the ICU BCTs with regard to the expected findings, final results and consequences on treatment.

METHODS. Prospective observational study, in a mixed medical and (neuro) surgical intensive care of a university hospital. All patients who went for BCT, between May 2007 and January 2008 were included. The physician requesting the BCT filled out a special radiological request form, in which the expectations for the results of this BCT and the consequences given these findings for treatment, were addressed. The BCT was evaluated by a radiologist. An "expectation" was radiologically confirmed if the finding was new or increased and negative if unchanged, decreased or not found. Treatment strategy after BCT was registered (unchanged, changed according to plan or otherwise).

RESULTS. 189 clinical questions in 117 BCT's were evaluated. The most important expected findings were shift, edema, ischemia/infarction, hematoma and hydrocefalus. In 20% these expectations were radiologically confirmed. After the BCT, the physician changed the treatment strategy in 53%. This was based on positive radiological confirmation in only 24%. Strikingly, in 76% the treatment was changed although no radiological confirmation of an expected finding was obtained. The chance of a therapy change after a positive CT scan finding is 1.5 times greater than an unchanged policy after a positive CT scan. However, non of the predefined expected abnormalities showed a significant change to be followed by a change in policy. The confidence limits of the crude overall risk tells us that the chance that the policy will be adjusted due to the CT scan can be as small as 1.04 (almost non) and as large as 2.4 (almost 2.5 times).

TABLE 1 EXPECTED ABNORMALITY

	N	Ctscan Pos	Neg	Policy Pos	Neg	RR (95%CL)
Shift	16	1	15	11	5	undefined
Edema	30	7	23	18	12	4 (0.6–29.2)
Ischaemia infarction	43	13	30	17	26	1.8 (0.7–4.4)
Haematoma	74	10	64	38	36	2.2 (0.6–7.9)
Hydrocephalus	26	7	19	16	10	0.5 (0.1–1.7)
Total clinical questions	189	38	151	100	89	1.5(1.04/2.4)*

** Crude RR over all strata (Mantel-Haenszel weighted RR):Chi2 4.24; p 0.04*

CONCLUSION. Pre-emptive expectations of findings in a BCT are only radiologically confirmed in 20%. After evaluation of the BCT there is little correlation between the findings on the BCT and the following treatment, leading to more changes in treatment at negative findings on BCT.

0455

THE EFFECTS OF THERAPEUTIC DECOMPRESSIVE CRANIECTOMY ON LONG-TERM OUTCOME

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INTRODUCTION. High intracranial pressure (HIP) is still the most frequent cause of death and disability after severe head injury. The aim of the study is to investigate the prognostic impact of therapeutic decompressive craniectomy (TDC) in terms of overall survival and functional outcome in patients with HIP after traumatic brain injury.

METHODS. Between 2005 and 2007 forty head trauma patients underwenting TDC (Group 1) were compared with an equal number of patients not treated with TDC during the years 2002–2004 (Group 2). Mean age was 40 years (range 15–65), 35 (43%) were woman and 45 (56.2%) men. The mean Glasgow Coma Scale [GCS] at ICU admission was 10 (range 7–13) in Group 1 and 7 (range 5–9) in Group 2. Injury Severity Score mean was 35 (range 30–40) in Group 1 and 45 (range 43–47) in Group 2. SAPSII mean was 40 (range 35–45). Intracranial pressure was analysed with intraparenchimal catheter, and was considered like HIP without possibility of treatment when PIC was more than 30 mmH2O for more than 20 minutes during maximal medical therapies. In the two groups ICU mortality, Glasgow Outcome Scale (GOS) and GCS after 28 days and after 1 year was valuated.

RESULTS. Mortality rate at 24 hrs was 12.5% in Group 1 and 20% in Group 2, mortality in ICU was 15% in Group 1 and 40% in Group 2, at 28 days 12.5% in Group 1 and 17.5% in Group 2, at 1 year 2.5% in Group 1 and 5% in Group 2. The GCS mean at 28 days was 12 (range 10–14) in Group 1 and 8 (range 6–10) in Group 2. At 1 year in Group 1 GOS was 5 in 10 patients (41.6%), 4 in 7 (16.6%), 3 in 5 (29.1%) and 2 in 2 patients (8.3%); in Group 2 GOS was 5 in 2 patients (22.2%), 4 in 1 (11,1%), 3 in 2 (22.2%), 2 in 4 (44.4%).

TABLE 1

	Group 1	Group 2
Mortality Rate at 24 hours	12.5	20
Mortality in ICU	15	20
Mortality at 28 days	12.5	17.5
Mortality at 1 year	2.5	5

Mortality Rate in two Groups

TABLE 2

	Group 1	Group
GCS at 28 days	12	8
GCS at 1 year	14	9
GOS at 1 year	4	3

GCS and GOS mean for two Groups

CONCLUSION. TDC treated Group seems to have a significantly better outcome then TDC-untreated head trauma Group in terms of functional outcome and overall survival.

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0456

TIMELY EFFICACY OF DECOMPRESSIVE CRANIECTOMY IN THE MANAGEMENT OF SEVERE TRAUMATIC BRAIN INJURY

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INTRODUCTION. Severe traumatic brain injury (TBI) is associated with high mortality and morbidity. Decompressive craniectomy (DC) has recently regained therapeutic interest; however, treatment guidelines consider it a last-tier treatment after failure of conservative therapy.

METHODS. Retrospective chart review analysis was conducted to determine the timely efficacy of DC for the management of severe TBI. Out of 250 patients with severe TBI admitted to the ICU between the years 2000–2006, 30 underwent DC. The following parameters were recorded: age, Glasgow Coma Scale (GCS, accident site), Injury Severity Score (ISS), CT-Scan findings (Marshall scale), APACHE II and SOFA scores upon admission. Follow-up period was of at least 1 year after ICU discharge, the outcome being evaluated with the Glasgow Outcome Score (GOS). The patients were divided in 2 groups: 1) group A (n=17), when early DC within hours and 2) group B (n=13) when delayed DC (within days) after TBI was performed. The decision for early DC was based on clinical parameters, CT-scan and operative findings. The patients were treated with delayed DC when maximal treatment failed. Mann-Whitney was used for the statistical analysis between the groups. All values are expressed as mean (±SD).

RESULTS. Patients that underwent DC comprised 12% of severe TBI admissions (n=250). Early DC was conducted within 3.6 (±1.9) hrs post TBI and delayed DC within 6.6 (±4.5) days. The groups presented no statistical difference regarding: age 41.4 (±20.7) vs 30.8 (±14.9) years, GCS 7.6 (±3.7) vs 7.3 (±3.7), ISS 28.4 (±8.3) vs 30.5 (±13.7), APACHE II 14.6 (±7.31) vs 14.9 (±5.5), SOFA 4.4 (±3.2) vs 5.5 (±2.9) and ICU stay 21.2 (±13.7) vs 23.6 (±17.8) days. CT-scan scale between groups was not quite statistically significant, 3.9 (±0.3) vs 3.4 (±0.7) (p=0,0945). Outcome upon ICU discharge and 1year later is shown in table.

TABLE 1 OUTCOME UPON ICU DISCHARGE AND 1YEAR LATER

	GOS 4–5 (ICU) n (%)	GOS 4–5 (1yr) n (%)	GOS 2–3 (ICU) n (%)	GOS 2–3 (1yr) n (%)	GOS 1 (ICU) n (%)	GOS 1 (1yr) n (%)
Group A n=17	8(47)	9(52.9)	7(41.2)	4(23.5)	2(11.7)	4(23.5)
Group B n=13	8(61.5)	8(61.5)	2(15.4)	2(15.4)	3(23)	3(23)

CONCLUSION. Decompressive craniectomy may be considered an efficient method not only as a 'second tier' therapy in patients suffering of severe TBI with surgically removable lesions.

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Poster Sessions
Sepsis: Experimental: 0457–0470

0457

RELATIONSHIP BETWEEN MITOCHONDRIAL ENZYME ACTIVITY AND PROTEIN EXPRESSION IN CRITICALLY ILL PATIENTS

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INTRODUCTION. Decreased functional capacity of mitochondrial complex I and compromised cellular energetic status are associated with non-survival in septic patients [1]. Mitochondrial enzyme activity largely reflects the level of expressed protein (balance between biogenesis and degradation), but also persisting modifications e.g. from oxidative/nitrosative damage. In an ongoing study in critically ill patients, we investigated respiratory complex activities and corresponding protein expression in skeletal muscle.

METHODS. With ethics approval and appropriate consents, critically ill patients were recruited within 24h of ICU admission. Age-matched control patients were undergoing elective hip surgery. Muscle biopsies were taken from *vastus lateralis*. Mitochondrial enzyme activities were determined as previously [1]. Acid-precipitated protein extracts were neutralised and used for immunoblotting. Blots were semi-quantified by densitometry and normalised to the signal obtained with a standard sample. Data were analysed for significance using one-way ANOVA.

RESULTS. Both mitochondrial respiratory enzyme activity and protein expression were decreased in critically ill patients. Expression of the mitochondrial oxidative stress protein MnSOD was increased.

TABLE 1 PROTEIN EXPRESSION AND ENZYME ACTIVITIES IN PATIENT SKELETAL MUSCLE BIOPSIES

	Control (7)	Survivors (6)	Non-survivors (4)
Protein expression:		Relative Density	
Complex I	1.11 (0.68, 1.34)	0.33 (0.32, 0.34) †	0.33 (0.20, 0.50) †
Complex II	0.78 (0.60, 0.86)	0.50 (0.31, 0.61) †	0.38 (0.27, 0.49) †
Complex III	0.57 (0.31, 0.90)	0.15 (0.10, 0,27) †	0.09 (0.07, 0.13) †
Complex IV	0.73 (0.67, 0.92)	0.36 (0.26, 0.47) †	0.29 (0.20, 0.44) ‡
MnSOD	0.83 (0.70, 0.88)	0.98 (0.95, 1.03) †	0.91 (0.88, 0.92)
Enzyme activity:		nmol/min/mg protein	
Complex I	13.3 (10.2, 15.5)	8.7 (4.5, 11.9)	10.9 (7.6, 31.1)
Complex IV	39.9 (23.4, 66.62)	49.0 (37.1, 54.8)	7.2 (5.8, 12.4)
Citrate synthase	106.2 (63.6, 117.7)	48.4 (39.7, 72.0)	40.4 (30.6, 50.5)

Median (IQ ranges); †$p \leq 0.05$; ‡$p \leq 0.01$ vs controls

CONCLUSION. The reduction in mitochondrial enzyme activity described in critical illness [1] can be partly explained by decreased levels of expressed protein. Elevated MnSOD expression indicates a response to oxidative stress. Together, the data suggest increased degradation of oxidatively-damaged proteins. We previously demonstrated preserved ATP content and transcript levels for markers of mitochondrial biogenesis in patients who eventually survived, but depressed levels in eventual non-survivors [2]. A decreased ability to replace damaged mitochondrial proteins may contribute to ATP depletion and mortality.

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0458

DIFFERENTIAL REGULATION OF NEUTROPHIL SURVIVAL AND INFLAMMATORY FUNCTION BY ENDOGENOUS SERINE PROTEASES

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INTRODUCTION. Activated neutrophils (PMNs) have been implicated in the pathogenesis of sepsis and ARDS. PMN serine proteases such as elastase are believed to contribute to tissue injury. Since increased PMN inflammatory activity is characteristically associated with prolonged survival through inhibition of constitutive PMN apoptosis, we sought to define the role of PMN serine proteases in PMN survival and inflammatory function.

METHODS. We incubated PMN from healthy volunteers for 5 hours (2 hours for oxidative burst) with the serine protease inhibitor, diisopropylfluorophosphate (DFP, 2.5 mM). PMN apoptosis was quantified by flow cytometry as the nuclear uptake of propidium iodide by permeabilized cells (n=5). Caspase-3 (n=4), -8 (n=3) & elastase (n=5) activities were measured using specific substrate with a fluorescent (caspase-3 & elastase) or colorimetric (caspase-8) plate reader. Western blot was performed to characterize the processing of caspase-3 and caspase-8 (n=3). Oxidative burst was measured as the conversion of dihydrorhodamine 123 by flow cytometry (n=4).

RESULTS. DFP almost completely ablated elastase activity. PMN apoptosis, and activity of caspases-3 were significantly inhibited by DFP. Caspase-8 activity was slightly inhibited by DFP (Table). The 12kDa form of active caspase-3 was reduced, and pro-caspase-8 expression significantly increased in DFP treated samples (Figure). DFP also inhibited PMN oxidative burst capacity (Table).

TABLE 1

Samples	Apoptosis (n=5)	Oxidative Burst (n=4)	Caspase 3 Activity (n=4)	Caspase 8 Activity (n=3)	Elastase Activity (n=5)
Control	100	100	100	100	100
DFP	18.94	13.85	13.23	78.13	19.08
P-Value	< 0.05	< 0.05	< 0.05	$= 0.07$	< 0.05

CONCLUSION. Endogenous PMN serine proteases such as elastase support PMN respiratory burst activity, but also promote PMN programmed cell death by enhancing caspase activity. This differential activity may in part explain the equivocal effects of elastase inhibitors in clinical trials in sepsis and ARDS.

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0459

SELECTIVE ALPHA7 NICOTINIC ACETYLCHOLINE RECEPTOR STIMULATION INHIBITS CYTOKINE RELEASE IN HUMAN BLOOD CELLS STIMULATED WITH VARIOUS TOLL-LIKE RECEPTOR AGONISTS

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INTRODUCTION. The efferent vagus nerve can limit the inflammatory response via stimulation of the alpha7 nicotinic acetylcholine receptor (alpha7nAChR). Nicotine, a non-selective alpha7nAChR agonist has been shown to inhibit cytokine release in human PBMCs and monocytes as well as in animal models of inflammation. Due to its lack of selectivity however, nicotine has many unwanted side effects. Therefore, selective targeting of the alpha7nAChR may be promising for the treatment of inflammatory conditions. We compared the effect of the selective alpha7nAChR agonist GTS-21 and nicotine on LPS-induced cytokine release in human blood cells. Furthermore, because pattern recognition of the diverse classes of microbial products causing infection involves various TLRs, we investigated whether the immunomodulating effect of alpha7nAChR stimulation is dependent on the TLR stimulated.

METHODS. Isolated monocytes and PBMCs of healthy male volunteers were incubated with the TLR4 agonist LPS in combination with GTS-21 (1 nM - 100 uM) and nicotine (100 uM - 1 mM). Furthermore, whole blood of healthy male volunteers was incubated with TLR2, TLR3, TLR4 and TLR5 agonists in combination with GTS-21, nicotine and the alpha7nAChR antagonist mecamylamine. TNF-alpha, IL-6, IL-1beta, IFN-gamma and IL-10 production was determined by ELISA and multiplex cytokine assays. All described changes are statistically significant.

RESULTS. Stimulation of the alpha7nAChR by both GTS-21 and nicotine resulted in a dramatic dose-dependent inhibition of LPS-induced pro-inflammatory cytokine release in human monocytes and PBMCs. Likewise, pro-inflammatory cytokine release induced by stimulation of the various Toll-like receptors in human whole blood was dose-dependently inhibited by both GTS-21 and nicotine. Production of the anti-inflammatory cytokine IL-10 was not inhibited but stimulated by GTS-21. GTS-21 inhibited pro-inflammatory cytokine production stronger than nicotine at equimolar concentrations. Finally, inhibition of the alpha7nAChR did not have any effect on cytokine production.

CONCLUSION. Selective stimulation of the alpha7nAChR by GTS-21 has a profound anti-inflammatory effect by inhibiting pro-inflammatory and stimulating anti-inflammatory cytokine release. In addition, GTS-21 proved to be more potent than nicotine in inhibiting pro-inflammatory cytokine release. The anti-inflammatory effect of alpha7nAChR stimulation was not restricted to a specific TLR. Therefore, this pathway appears to modulate the inflammatory response by a general mechanism. The lack of an effect of inhibition of the alpha7nAChR suggests that this receptor is not constitutively activated. Selective targeting of the alpha7nAChR using GTS-21 holds promise for future treatment options to modulate the innate immune response.

0460

ACTIVATION OF RXR ATTENUATES CYTOKINE AND CHEMOKINE PRODUCTION IN HUMAN MONOCYTES

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INTRODUCTION. Aberrant regulation of innate immune responses and uncontrolled cytokine bursts are hallmarks of sepsis and endotoxemia. Activation of the liver X receptor (LXR) have been demonstrated to suppress inflammatory genes. Our group has recently proposed that LXR is a key regulator of cytokine release in LPS-challenged human monocytes, possibly by interfering with posttranscriptional events (Myhre, 2008). LXR forms heterodimers with retinoid X receptor (RXR), which bind to LXR responsive elements in promoter regions of target genes. RXR is also a functional partner of several other nuclear receptors. We wanted to study the influence of RXR activation on endotoxin-induced cytokine release.

METHODS. Peripheral venous blood was obtained from healthy volunteers, and mononuclear cells were isolated by Polymorphprep centrifugation and selective adherence. Adherent human monocytes were pre-treated with synthetic RXR (9 cis retinoic acid/9cisRA) agonists and subsequently challenged with lipopolysaccharide (E.coli LPS, 1 μg/ml). The amount of cytokines released from the adherent monocyte cultures were measured in the supernatants, and the intracellular phosphoproteins activated were measured in cell lysates by a multiplex antibody bead kit, measuring 30 different cytokines (Biosource) or 5 different phosphoproteins (Bio-Rad), according to the manufacturer's instructions. Differences between the groups were analyzed using one-way analysis of variance (ANOVA) for repeated measures with Newman-Keuls comparison test. $P \leq 0.05$ was considered significant.

RESULTS. In this experimental model, using adherent human monocytes, activation of RXR by 9cis-RA (0,1 μM; 1μM), 1 hour before LPS stimulation, strongly decreased the LPS-induced levels of TNFalpha after 6 hours. Also, IL-6, IL-10, MIP-1alpha and MIP-1beta were significantly attenuated. The studies on intracellular signaling did not reveal any inhibition of LPS-mediated p38 MAPK, JNK, Akt, IkappaB and ERK phosphorylation after 20 minutes.

CONCLUSION. In this study we demonstrate that the nuclear receptor RXR has a strong anti-inflammatory effect in LPS-stimulated human adherent monocytes. The study indicates that RXR may be a target in the immunomodulation of sepsis.

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0461

CHRONIC SEPSIS INCREASES LOCAL ANAESTHETICS SENSITIVITY OF MUSCLE VOLTAGE DEPENDENT SODIUM CHANNELS

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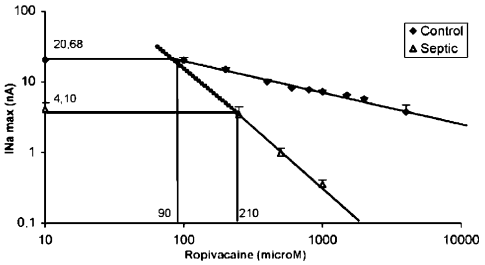
INTRODUCTION. Loss of excitability of skeletal muscle is a central feature of critical illness myopathy (CIM). Electrophysiologic alterations of the voltage dependant sodium channel (NaV) were reported in animal models of CIM (1). As NaV are inhibited by local anaesthetics as ropivacaine, we wonder if sepsis modifiy the sensitivity of NaV to local anaesthetics. The aim of our study was to assess if the local anaesthetics sensitivity of NaV was modified by a chronic sepsis.

METHODS. NaV properties were studied at different ropivacaine concentrations in control and septic rats. Chronic sepsis was induced by cecal ligation and puncture. At D8, peroneus longus was dissected then dissociated by collagenase treatment, and the sodium current recorded by macropatch patch clamp.

RESULTS. Chronic sepsis induced a decrease of maximum sodium current (INamax): 20.68±0.17 vs 4.10±1.01 nA, mean difference = 16.58, IC95 = 14.94–18.21, $p < 0.0001$. An increase of ropivacaine sensitivity was also observed in septic muscle channels (Figure 1). For a 1 mM ropivacaine concentration, INamax = 7.33±0.32 nA (35.46±1.53%) vs 0.36±0.05 nA (8.69±1.23%), mean difference 6.98 nA (26.77%), IC95 6.49–7.46 nA (23.99–29.55%), $p < 0.0001$. The IC50 was 440 μM in control muscles vs 330 μM in septic ones.



CONCLUSION. Our results show that chronic sepsis induces a significant increase of skeletal muscle NaV sensitivity to ropivacaine.

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0462

MECHANISMS OF MRSA-INDUCED ENDOTHELIAL CELL DEATH

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INTRODUCTION. Thermal injury leads to the loss of the natural cutaneous barrier to infection, which leads to microbial colonization by methicillin-resistant Staphylococcus aureus (MRSA). MRSA can induce apoptosis/necrosis in various cell types, but the specific molecular and cellular basis of MRSA-induced lung cell death is poorly understood. We have recently shown that MRSA induces a significant increase in endothelial microvascular permeability and lung NOS activity in our novel ovine model of MRSA-induced pneumonia and sepsis.

METHODS. Human microvascular endothelial cells from the lung (HMVEC-L) were challenged with 105 cfu MRSA AW6 in the presence and absence of the NOS inhibitor L-NAME or the NADPH oxidase inhibitor apocynin, then visualized for ROS/RNS generation via DCHF fluorescence. Real-time changes in mitochondrial membrane potential were tracked via JC-1 fluorescence. MRSA-challenged HMVECs were further analyzed via western blot and confocal microscopy, for 8-oxoguanine or poly (ADP-ribose) (PAR) polymer formation. Translocation of AIF from the mitochondrial compartment to the nucleus, activation of caspase-3, and consequent poly(ADP-ribose) polymerase (PARP) cleavage, all indicators of apoptosis, were also assessed.

RESULTS. Compared to unchallenged controls, MRSA caused a 4-fold immediate nuclear ROS/RNS production that was dependent on NOS and NADPH oxidase activity, and a delayed 7-fold ROS/RNS response that was independent of NOS/NADPH oxidase activities. A significant shift in JC-1 fluorescence from 590nm to 520nm was observed within minutes, suggesting that MRSA causes a rapid depolarization of mitochondrial membranes. MRSA also caused 8-oxoguanine and PAR formation, indicators of oxidative DNA damage, within minutes of MRSA exposure. Furthermore, MRSA caused the translocation of AIF from the mitochondria to the nucleus as well as caspase-3 and PARP cleavage.

CONCLUSION. MRSA causes immediate NOS/NADPH oxidase-dependent nuclear oxidation. Mitochondrial depolarization also occurs within minutes, followed by a delayed mitochondrial oxidative burst and activation of apoptotic pathways involving AIF, caspase-3, and PARP.

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0463

MIDAZOLAM UNMASKS BLOOD PRESSURE RESPONSES TO THE KATP PORE BLOCKER IN SEPTIC RATS

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INTRODUCTION. Vascular K_{ATP} channel hyperactivity has been implicated in the pathogenesis of septic shock. However, glibenclamide, the channel's classic inhibitor, is ineffective in reversing septic shock clinically. In contrast, use of inhibitors acting on the channel's pore-forming subunit, rather than on the SUR regulatory subunit to which glibenclamide binds, can reverse sepsis-induced vascular hyporeactivity *in vitro*.[1] We thus investigated the effect of pore blockade in an *in vivo* model, and the effect of sedation, a potential confounder that might alter vascular tone, neural reflexes, and sympathetic activity.

METHODS. Male Wistar rats were subjected to faecal peritonitis and were fluid resuscitated for 6 hours. Changes in BP induced by norepinephrine (NE; 0.05 \mug/kg/min i.v. infusion), +/- the vascular K_{ATP} channel pore blocker PNU-37883A (PNU; 1.5 mg/kg i.v. bolus and 1.0 mg/kg/h i.v. infusion), were compared in awake and sedated animals (with midazolam 0.2 mg/kg i.v. bolus and 0.2 mg/kg/h i.v. infusion). The BP-lowering effect of the specific K_{ATP} channel opener levcromakalim (LEV; 150 \mug/kg i.v.), and the ability of PNU to reverse this, was also compared.

RESULTS. Faecal peritonitis induced vascular hyporeactivity as early as 6 hours, as reflected by a substantially lower rise in BP to NE (Table 1). This was associated with accentuated responses to LEV, that were completely reversed by PNU. However, PNU did not reverse vascular hyporeactivity to NE, although it was able to cause a significant rise in baseline BP in sedated but not awake septic animals.

TABLE 1

State	Treatment	Change in BP (mmHg) Sham (n = 4)	Change in BP (mmHg) Septic (n = 4)
Awake	NE	47.6±3.3	5.0±3.3
Sedated	NE	42.4±3.5	5.3±1.5
Awake	LEV	−29.3±2.3	−43.8±1.0*
Awake	LEV+PNU	0.1±2.6	−3.4±3.2
Awake	PNU	22.2±4.2	2.2±1.6
Sedated	PNU	15.3±1.5	11.0±2.5**
Awake	PNU+NE	31.8±1.6	5.9±2.7
Sedated	PNU+NE	36.0±0.5	5.5±1.3

** P <0.01 vs. sham animals; ** P <0.05 vs. awake animals*

CONCLUSION. The vascular K_{ATP} channel is upregulated in sepsis, as evidenced by the greater hypotensive effect of pharmacological channel activation. K_{ATP} channel blockade is however ineffective as a pressor agent in awake septic animals. The increased effectiveness seen in the sedated state may be related to loss of neural control (baroreflex sensitivity) or decreased sympathetic stimulation. Thus K_{ATP} channel blockade might be of limited help clinically in reversing sepsis-induced vascular hyporeactivity.

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0464

PHOSPHOINOSITIDE-3 KINASE GAMMA KINASAE ACTIVITY CONTRIBUTES TO AN INCREASED COAGULATION PHENOTYPES DURING SEPSIS

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INTRODUCTION. Sepsis is a systemic response to infection, which often leads to organ failure and death. An important aspect of the pathophysiology of sepsis is the systemic activation of coagulation and concurrent attenuation of fibrinolysis. Phosphoinositide-3 kinase gamma (PI3Kg), an isoform of the PI3K cell signalling family, has been shown to be involved in the development of sepsis. However, the role of this molecule in the dysregulation of the coagulation cascade during sepsis remains unknown. It is hypothesized that mice lacking PI3Kg or possessing a kinase dead form of this enzyme will be protected from septic-induced activation of coagulation and attenuation of fibrinolysis.

METHODS. PI3Kg wild-type (WT), knockout (KO) and kinase dead (KD) mice were randomized to undergo either cecal-ligation and perforation (CLP)-induced sepsis or a sham laporatomy. After 18 hours, livers were harvested and levels of fibrinogen (pro-coagulatory), plasminogen activator inhibitor-1 (PAI-1) (anti-fibrinolytic), and tissue plasminogen activator (tPA) (fibrinolytic) were assessed.

RESULTS. Following CLP-induced sepsis, WT mice developed a significant increase in fibrinogen and PAI-1 and a significant decrease in tPA compared to sham control. Both KO and KD mice also showed a significant increase in fibrinogen and PAI-1 and a significant decrease in tPA compared to sham controls, however these alterations were significantly less than observed in WT mice.

TABLE 1

	WT Sham	KO Sham	KD Sham	WT CLP	KO CLP	KD CLP
Fibrinogen (ng/mgPro)	805±35	807±40	779±33	1424±89 **	1043±57 *	1079±58 *
PAI-1 (pg/∧mugPro)	2.9±0.2	2.7±0.2	3.1±.4	84.8±13.4 **	50.5±9.2 *	52.0±9.0 *
tPA (pg/ngPro)	404±17	369±53	423±23	1±1 **	104±36 *	61±31 *

*Means ± SE. Significance is indicated by **,* = vs. all other groups, with p < 0.05*

CONCLUSION. PI3Kg knockout and kinase dead mice are partially protected from septic-induced activation of coagulatory molecules and attenuation of fibrinolytic molecules, which indicates that the kinase activity of PI3Kg plays a significant role in septic dysregulation of coagulation and may contribute to the development septic-induced injury.

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0465

THE INFLUENCE OF MOXIFLOXACIN ON THE INNATE IMMUNE SYSTEM DURING SEPSIS

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INTRODUCTION. The innate immune system plays a central role for the pathogenesis of sepsis. It has been shown that anti-bacterial substances can modulate the immune system. However, it is not much known whether antibiotics modulate respectively stimulate the innate immune system. This study investigates whether Moxifloxacin (MXF) regulates the expression of the major innate immune receptors, the toll-like receptors (TLRs), and influences cytokine expression in an in-vitro sepsis model.

METHODS. 1) The monocytic cell line THP-1 was stimulated with Lipopolysacharide (LPS), MXF, and MXF in combination with LPS and phosphate buffered saline (PBS) as control for 24h. The TLR expression and the synthesis of the cytokines Tumour Necrosis Factor α (TNF-α), Interleukin-1 (IL-1) and Interleukin-6 (IL-6) were analysed on mRNA-level (RT-PCR). Results are presented as mean ± SEM. P-values ≤ 0.05 were considered to be significant. 2) To determine, whether MXF activates TLRs, a HEK293 cell line, which expresses a reporter gene driven by NFB, was cultivated MXF. Consequently, the activation of TLR activation was estimated by luminecence measurement.

RESULTS. 1) The mono-stimulation with MXF has no effect on TLR-expression and cytokine production. However, in contrast to the mono-stimulation with LPS, MXF in combination with LPS mediated significantly the up-regulation of TLR3 (15.08±1.81 Arbitrary Units (AU) vs. 0.36±0.38 AU), TLR4 (3.38±0.77 AU vs. 1.02±0.18 AU), TLR6 (3.62±1.40 AU vs. 0.76±0.29 AU), TLR7 (12.36±3.05 AU vs. 1.35±0.23 AU), TLR8 (56.30±3.52 AU vs. 6.20±0.75 AU; all $p < 0.001$). In addition, the production of TNF-α (138.2±31.72 AU vs. 30.56±6.8 AU), IL-1β (2529±777.4 AU vs. 4.97±1.82 AU) and IL-6 (646.8±159.6 AU vs. 1.42±0.72 AU, all $p < 0.001$) was raised after stimulation of MXF with LPS. In contrast, TLR2 expression is significantly higher for LPS stimulation in combination with MXF than LPS alone (2.25±0.47 AU vs. 1.46±0.28 AU; $p < 0.01$). 2 MXF does not show any direct TLR activation in the TLR ligand screening.

CONCLUSION. MXF leads to a differential regulation of the TLR expression and cytokine production only in LPS-stimulated monocytes. However, MXF does not stimulate TLRs itself. Thus, it has been shown that MXF modulates the innate immune system in a gram-negative in-vitro model of sepsis.

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ANTI-INFLAMMATORY EFFECTS OF DROTRECOGIN ALFA (ACTIVATED) ON SOLID ORGAN TISSUE IN MURINE SEPSIS

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INTRODUCTION. Anti-inflammatory effects of drotrecogin alfa (activated) (DAA) have been identified. However, there is lack of data regarding direct organ-related effects of DAA. Since isolated murine heart cells are able to synthesize and release Macrophage Inflammatory Protein-2 (MIP2) upon stimulation with pro-inflammatory cytokines [1], we investigated whether DAA provides effects on murine heart in sepsis.

METHODS. Sepsis was induced by cecal ligation and puncture (CLP) in male NMRI-mice (n=20, body weight 30±3g). Animals were randomly assigned to vehicle infusion (control), or CLP sepsis with DAA infusion (DAA; 24µg/kg/hr). A third group received only sham operation and vehicle infusion (Sham). 48 hrs prior to CLP all mice were given a permanent central i.v.-line and an arterial transmitter to measure heart rate (HR) and mean arterial pressure (MAP). CLP was adjusted to survive 24hrs. After 12hrs of sepsis, heart tissue was snap frozen in liquid hydrogen and plasma samples were collected and frozen following manufacturers guidelines until measurement. RNA was extracted of frozen tissue (RNeasy, Qiagen, Germany) and analysed by real-time-PCR with mouse specific primers to CD14 and MIP2 normalized to ß-Actin (all: biomers, Ulm, Germany) using an iCycler (Biorad, Hercules, USA). Determination of Interleukin (IL)-6, IL10, and monocyte chemoattractant protein-1 (MCP-1) was performed using a cytometric bead array (CBA, BD Biosciences, Heidelberg, Germany). Differences between groups were evaluated by 1-way ANOVA and Pair-wise fixed reallocation randomisation test© for PCR diagnostic. All data are given as mean±SD. P<0.05 was considered significant.

RESULTS. There were no significant differences in HR between the groups (Sham 650±38/min; DAA 547±175/min; Control 530±143/min). MAP was significantly higher in sham group (p=0.031) and non-significantly higher in DAA group when compared to control (Sham 137±15mmHg; DAA 111±26mmHg; Control 97±4mmHg). Normalized expression ratio of CD14 was 28.7 fold higher in control group compared to sham group. DAA treatment resulted in an 18.1 fold expression ratio (p=0.001). MIP2 expression ratio was 25.4 fold higher in control and 11.0 fold higher in DAA group. IL-6 (DAA 4663±6229 pg/ml, p=0.027; Control 10906±8324 pg/ml; Sham 54±32 pg/ml, p < 0.001), IL-10 (DAA 220±338 pg/ml, p=0.072; Control 2539±5251; Sham 7±11, p=0.049) and MCP-1 (DAA 2708±3401 pg/ml, p=0.031; Control 7010±7095; Sham 75±107, p=0.001) were significantly lower after treatment with DAA compared to control.

CONCLUSION. Our data provide evidence of DAA-induced direct anti-inflammatory effects on murine heart cells, suggesting that DAA plays an important role in the anti-inflammatory response to septic injury.

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0467

CERVICAL CHORDOTOMY INCREASES SURVIVAL AND DECREASE THE DEGREE OF SYSTEMIC INFLAMMATORY RESPONSE, ACUTE LUNG INJURY IN RATS WITH ENDOTOXEMIA INDUCED BY LIPOPOLYSACCHARIDE

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INTRODUCTION. Study design: In vivo study using a chordotomy of C7 spinal cord model in adult male rats.
Objective: To investigate the effects of cervical chordotomy on systemic inflammatory response, acute lung injury and the outcomes in rats with endotoxemia induced by LPS.

METHODS. The experiment was made up of two parts:

Part one :Animals (N=72) were randomly divided into 3 groups: NC,E and E+C group, and those latter groups were divided into 4 subgroups respectively according to different time interval (n=8). Rats in E and E+C group were injected LPS intraperitoneally;and the C7 spinal cord of rats in E+C group were disconnected. Samples of blood and lung were collected at different time interval. The plasma levels of NE, IL-10, IL-6 and PaO2 were determined. The changes of histopathology and lung wet/dry weight ratio in every group were observed.
Part two: Another 20 animals (N=20) were randomly divided into 2 groups: E and E+C group, each 10 animals. Rats in E and E+C group were injected LPS intraperitoneally;and the C7 spinal cord of rats in E+C group were disconnected.We observed the 48-hour survival rates of rats in E and E+C group.

RESULTS. Rats in E+C group demonstrated decreased levels of NE and IL-6 with increased production of IL-10. The degree of lung injury was also alleviated, and PaO2 was improved. Moreover, the 48-hour survival rate was increased from 20%(E) to 70%(E+C).

TABLE 1 PLASMA NE,IL-6,IL-10 CONCENTRATION AND PAO2 AND W/D RATIO IN EACH GROUP (N=8)

	NE (pg/ml)	IL-6 (pg/ml)	IL-10 (pg/ml)	PaO2 (mmHg)	W/D
NC	209.5±77.0	163.1±31.9	188.7±58.0	100.8±17.0	4.1±0.2
E group 3h	1597.6±526.4*	341.0±41.3*	54.0±10.0*	90.2±3.9	4.3±0.3
E group 6h	1825.9±719.5*	297.3±74.2*	48.0±17.7*	62.4±8.0*	5.0±0.3*
E group 12h	2357.2±1271.5*	342.4±62.9*	112.4±17.1	72.6±6.0*	5.0±0.2*
E group 48h	3036.1±1103.7*	430.8±198.8*	252.5±18.6	78.1±5.5*	5.0±0.3*
E+C group 3h	1286.9±384.6*	228.5±62.5#	151.7±32.6#	94.7±4.9	4.2±0.4
E+C group 6h	874.3±361.4*#	202.9±63.2#	277.9±75.9#	92.2±4.0#	4.6±0.5*#
E+C group 12h	496.0±282.7*#	182.9±71.3#	752.2±33.5*#	94.3±10.5#	4.5±0.5#
E+C group 48h	467.0±128.4*#	276.2±10.0*	1236.6±247.1*#	96.8±13.5#	4.4±0.4#

**: campared with the NC group, $p < 0.05$; #campared with the E group, $p < 0.05$*

CONCLUSION. It suggests that cervical chordotomy can inhibit the secretion of proinflammatory cytokines, alleviate the degree of acute lung injury and improve the outcomes significantly.

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EFFECTS ON PROINFLAMMATORY RESPONSE OF VOLUME REPLACEMENT FLUIDS IN A TWO HIT MODEL OF PORCINE SEPSIS?

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INTRODUCTION. Using a porcine two hit model combining a haemorrhagic and septic shock we tested the effects of 6%HES 130/0.42 (HES130), Gelatine 4% (Gela) and 10%HES 200/0.5 (HES200) compared to Ringer Acetate (RAc) on inflammation and systemic haemodynamics.

METHODS. Prospective randomised, controlled animal study. 23 anaesthetised, ventilated pigs (28.2 ± 1.7 kg) were randomised (5 in each shock group, 3 in control group) to volume replacement therapy with colloids, RAc or a non-septic control group (control) receiving RAc. Animals were bled in the shock groups until reaching half of their baseline mean arterial pressure (MAP) or cardiac output (CO) for 45 minutes. After hemorrhagic shock Volume resuscitation started until baseline MAP was accomplished. As second hit sepsis was induced using an E. Coli bacterial clot into abdominal cavity 6 h after hemorrhagic shock. Infusion rate was titrated to maintain a central venous pressure of 12 mmHg. Systemic haemodynamics and cytokines were obtained before (bl) hemorrhagic and septic shock and every 2 hours after induction of septic shock. Cytokine levels were assessed with commercially available enzyme linked immunosorbent assay kits specific for pigs and used according to manufacturer's guidelines. Statistics were performed using ANOVA.

RESULTS. 12h after sepsis induction MAP (mmHg) was lower in RAc group (59±5) compared to all other groups (HES200 70±21; HES130: 86±11, Gela: 71±26; Control: 96±7). CO [ml/kg] increased in all groups and was higher in colloid groups at study end (HES200: 157±61; HES130: 171±47; Gela: 160±42; RAc: 137±32; Control: 120±28). TNF-α Levels [pg/ml] was significantly higher in the HES200 group (4122 ± 1417) after 2 hours of sepsis compared to HES 130, RAc and control at study end (HES130: 1199 ± 1238; RAc 1101 ± 498; Control 285 ± 386; Gela 1939 ± 1961). The IL-10 [pg/ml] Levels increased after 12 hours of sepsis in all sepsis groups but only significantly in the HES 200 group (HES200: 411 ± 245) compared to HES130, RAc, and control group (HES130 88 ± 197; RAc 14 ± 31;control 0±0). 2 hours after sepsis induction the IL-6 Levels [pg/ml] increased in all sepsis groups (HES130 1543 ± 1521; RAc 874 ± 363; Gela 1623 ± 1242) and significantly in the HES 200 group (3845 ± 1472) compared to RAc (864 ± 363) and control (91 ± 157).

CONCLUSION. In this porcine two hit model 10%HES 200/0.5 induced a significantly higher proinflammatory response compared to 6%HES130/0.42, RAc and control. A more marked endothelial damage could be a potential mechanism explaining this result.

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INFUSION OF 10% HES 200/0.5 IS LINKED TO TUBULAR INJURY AND RENAL DYSFUNCTION IN OVINE ENDOTOXEMIC SHOCK

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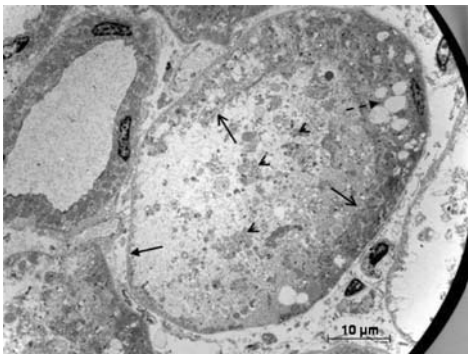
INTRODUCTION. The purpose of the present study was to compare the impact of 10% HES 200/0.5, 6% HES 130/0.4 and crystalloids on renal function and integrity in ovine endotoxemic shock.

METHODS. Thirty sheep were subjected to incremental doses of endotoxin (started at 5 ng/kg/min and doubled every hr) until MAP fell below 65 mmHg. Thereafter, fluid resuscitation was initiated to maintain CVP at 8–12 mmHg and PAOP at 12–15 mmHg. In sheep allocated to the colloid groups, HES was infused up to a max. dose of 20 mL/kg. Thereafter, only crystalloids were infused in both HES groups. In the crystalloid group, a balanced, isotonic crystalloid (Sterofundin® ISO) was infused to achieve goal values.

RESULTS. Creatinine concentrations were significantly elevated in sheep treated with 10% HES 200/0.5 as compared to the other two groups. Light microscopy revealed acute tubular injury characterized by necrotic tubular cells in the latter group. Likewise, electronic microscopy revealed tubular damage (Fig. 1) with destruction of epithelial cells (open arrows), vacuolar cell degeneration (dashed arrow), "naked" basal membranes (closed arrow), and intratubular protein precipitation (arrowheads) only in sheep treated with 10% HES 200/0.5.



CONCLUSION. The present study provides evidence that 10% HES 200/0.5 impairs renal function secondary to acute tubular injury in ovine endotoxemic shock.

0470

PEROXYNITRITE DECOMPOSITION CATALYST AMELIORATES SEVERITY OF METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS (MRSA) PNEUMONIA AND SEPSIS

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INTRODUCTION. Methicillin-resistant staphylococcus aureus (MRSA)-related pneumonia and/or sepsis are a frequent serious menace. We have previously shown that excessive nitric oxide mediates MRSA-induced cardiovascular collapse. In the present study, we tested the hypothesis that resultant reactive nitrogen species (RNS) play a major role in the MRSA-related cardiovascular morbidity.

METHODS. Sheep were operatively prepared for chronic study. After 5 days recovery, tracheostomy was performed under anesthesia and pneumonia was induced by instillation of live MRSA (AW6) (5X1011 CFU) into the airway by a bronchoscope. After the injury, animals were awakened and maintained on mechanical ventilation by 100% O2 for first 3h and thereafter O2 concentration was adjusted according to blood gases. The sheep were resuscitated by Lactated Ringer's solution with initial rate 2ml/kg/h that was further adjusted according to hematocrit. Study groups: sham (non-injured, non-treated, n=6); Control (injured, not treated, n=4); and treated (injured, treated with peroxynitrite catalyst, INO-4885 [0.1mg/kg bolus followed by 0.02mg/kg/h continuous infusion], n=3). Experiment lasted 24 h.

RESULTS. Injured animals showed the signs of severe sepsis-related multiple organ failure 3h after insult. Cardiovascular morbidity was evidenced by severe hypotension (MAP), with increased heart rate, cardiac output, left atrial pressure and severely decreased systemic vascular resistance index. Microvascular hyper permeability was evidenced by severe hemoconcentration, decreased plasma protein with decreased plasma oncotic pressure, and increased fluid retention. All these changes were attenuated by intravenous administration of peroxynitrite catalyst. MAP was 94±3 at baseline and 66±3 at 24 h in control vs. 93±1 at baseline and 82±10 at 24 h in treated groups. Fluid retention was 163±63 and 134±54 in control and treated groups at 24 h respectively.

CONCLUSION. RNS play a profound role in cardiovascular collapse due to MRSA sepsis. RNS inhibitors should be considered for the future therapy for septic patients.

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Poster Sessions
Perioperative infections: 0471–0477

0471

DEEP STERNAL INFECTION IN CARDIAC SURGERY PATIENTS

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INTRODUCTION. Deep sternal infection (DSI) is a severe complication of cardiac surgery. The incidence of DSI ranges from 0,5 to 5% percent, with the incidence in most centres being between 1 and 2%. DSI increases the duration and costs of hospitalization, and has a dramatic impact in the prognosis and outcome. The purpose of this study was to determine its exact magnitude in our patients and the prognosis.

METHODS. Prospective, observational study carried out during a year (November 2006 - October 2007) in a tertiary-care teaching hospital. Inclusion criterion: adult patients undergoing open heart surgery via midline sternotomy. Surgical wound infections (SWI) were defined and classified according to the Centers for Disease control and Prevention (CDC) criteria.

RESULTS. Five hundred and thirty eight patients underwent surgery. The mean age was 63 years (41–81), with 65,4% male. Coronary artery bypass grafting (CABG) followed by valve procedures were the main interventions with 38,5%, and 26,9% respectively. A total of 26 (4,83%) patients had a SWI in the chest area. 52,4% had history of tobacco use; 37,5% had prior respiratory disease and 68,6% overweight or obesity. SWI was considered superficial in 76,9% (20). DSl occurred in 1,1% (6/538). Overall, the most common infecting microorganism was coagulase-negative staphylococci (72,7%), with gram-positive cocci accounting for 86,4%, including Staphylococcus aureus (MSSA) in 13,6%. Gram-negative-bacilli were documented in 4,5%. In addition to antibiotic treatment, vacuum-assisted closure (VAC) was initiated as a therapy in 34,6%, before surgery. Mortality in patients with clear mediastinitis reached 100% (2).

CONCLUSION. Our incidence rate of deep sternal infection is within the standards with a high mortality rate for mediatinitis.

0472

INFECTIOUS COMPLICATIONS OF PULMONARY ARTERY CATHETER USE IN CARDIAC SURGERY

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INTRODUCTION. In critically ill patients, the impact of pulmonary artery catheter (PAC) use on outcome is debatable (1,2). Patients undergoing heart surgery show a high risk of catheter colonization and catheter-related bloodstream infections (3). The aim of this study was to assess the incidence and etiology of colonization and infection of pulmonary artery catheters inserted in cardiac surgery patients.

METHODS. Design: prospective, observational study. Settings: A 16-bed heart surgery intensive care unit in a tertiary university hospital.Patients: heart surgery patients. Interventions: none. Criteria for catheter-related bloodstream infection (CR-BSI): a bacteremia or fungemia in a patient with an intravascular catheter with at least one positive blood culture obtained from a peripheral vein and clinical manifestations of infection (i.e., fever, chills, and/or hypotension) and no apparent source for the BSI except the catheter (3).

RESULTS. Total number of patients included in the study was 183, 132 males and 51 females, average age of 63.7 years old. The average ejection fraction (EF) was 34.4% and Euro Score 6.8. The total mortality in the study group was 8.2% The PAC was left in place from 1 to 13 days, average 4.4 days. Twelve patients had positive blood cultures (6.6%), while 24 patients had positive catheter tip cultures (13.1%). The average number of days catheter was left in place in the group with positive catheter tip culture was 5.8 days. Six patients fulfilled criteria for catheter related sepsis (3.3%) of which two patients died. The study group had lower mortality compared to expected values based on low EF and high Euro Score. The number of days catheter was used presents as a risk factor for catheter colonization and blood stream infection.

CONCLUSION. The incidence of colonization of catheter tip and CR-BSI in the study group is similar to other studies and meta analysis. The heterogeneous characteristics of the group and lack of data related to number of days on mechanical ventilation, incidence of postoperative myocardial infarction, bleeding and re-interventions could decrease the value of results obtained. Further, randomized studies should evaluate use of pulmonary artery catheter and infection in cardiac surgery.

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0473

POSTOPERATIVE PROCALCITONIN KINETICS: AN INDICATOR FOR THERAPEUTIC STRATEGY IN PERITONITIS?

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INTRODUCTION. Differentiation between acute bacterial infection from other types of inflammation is often difficult in particular in postoperative period. The aim of this study was to assess the profile of time course of procalcitonin (PCT) in peritonitis patient after surgical and anti-effective therapies in ICU.

METHODS. Every patient admitted to the ICU consequently to surgical procedure for peritonitis over a 18 months period, from July 2006 to December 2007, was included in our study. PCT, CRP and cytokines (TNF, IL-6, IL-8) were measured at admission (J0), on second day (J2) and on fourth and seventh day (J4, J7). Prognostic indicators of severity were recorded on admission: Apache II, IGS II and SOFA score.

RESULTS. Sixty-one patients were included in the study. A second look operation was performed for 10 patients (group I). Fifty one patients (group II) were not surgically reinvestigated. Second look discovered persistent peritonitis 6, peritoneal abscess 1, necrotic pancreatitis 1, ileal fistula 1 and mesenteric ischemia 1. The day of ICU admission, the concentrations of PCT (53.9 $\pm$ 42.6 ng/ml) were not significantly different in the group I than in the group II (46.4 $\pm$ 51.4 ng/ml). There is a remarkable and significant decrease in concentrations of procalcitonin on day 2, 4 and 7 in group II whereas the concentrations of procalcitonin increase until day 4 then plateau in group I ($p < 0.03$).

Changes in procalcitonin in patients with (group I) and without (group II) second look.

TABLE 1

PCT (ng/ml)	Group I	Group II	p
Day 0	53.95 (n=10)	45.53 (n=52)	0.74
Day 2	68.08 (n=10)	18.08 (n=39)	0.00002
Day 4	82.21 (n=9)	5.38 (n=26)	0.0004
Day 7	38.66 (n=9)	2.75 (n=12)	0.03

CONCLUSION. During postoperative period after initial surgical procedure for peritonitis, persistence of high PCT levels may be related to inefficacy of anti-infective therapies. Therapeutic strategy must be discussed including second look.

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0474

COMPARATIVE ANALYSIS OF THE PLASMA LEVELS OF MARKERS FOR ACUTE INFLAMMATION IN PATIENTS RECEIVING APROTININ AND CORTICOSTEROIDS DURING CORONARY ARTERY BYPASS GRAFTING WITH EXTRACORPOREAL CIRCULATION

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INTRODUCTION. Approximately 20% of low-risk patients have postoperative complications. Several therapeutic measures aiming at reducing the SIRS after CPB, have been studied; huge difficulties, however, need to be overcome.So, our objective was to compare the plasma levels of markers for acute inflammation in patients undergoing extracorporeal circulation (CPB) receiving either aprotinin or corticosteroids.

METHODS. The study comprised 40 patients CABG with CPB divided into the following 3 groups: G0 (control = 12); GA (aprotinin = 12); and GC (methylprednisolone = 16). Blood samples were collected as follows: T0, 24 hours prior to surgery; and T1 and T2, 3 and 18 hours after, respectively. Were quantified: TNF-alpha; IL-6; PCR; fibrinogen; haptoglobin; leukocytes and neutrophils.

RESULTS. The groups did not differ in regard to their demographic, clinical and surgical characteristics. The IL-6 levels were lower in G0 as compared to those in GA and GC (374.4 $\pm$ 341.8; 260.2 $\pm$ 373.3; 249.2 $\pm$ 311.3 pg/ml, respectively), but not significantly ($P = 0.2$). The TNF-alpha levels in groups 0, A and C did not differ. The differences in the greatest postoperative serum levels (T1 and T2)for fibrinogen, haptoglobin and PCR were equivalent ($P = NS$). A difference was observed between the greatest levels in T1 and T2 and the baseline levels of leukocytes in group C as compared to those in groups 0 and A (15.0 $\pm$ 5.9; 8.4 $\pm$ 4.1 and 9.2 $\pm$ 3.4, respectively; $P = 0.02$ and $P = 0.003$). The relative levels of neutrophils did not differ ($P = 0.3$).

CONCLUSION. This study could not show a reduction in several markers of the acute phase of inflammatory response in patients undergoing CABG with CPB and receiving aprotinin and methylprednisolone.

0475

A RISK FACTORS ASSOCISTED WITH ARTERIAL PUNCTURE FOLLOWING THE INTERNAL JUGULAR VEIN ACCESS PROCEDURES

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INTRODUCTION. The most frequent complication with the internal jugular vein cannulation access is the carotid artery puncture. The objective of this 1-year prospective, single-center study was to illuminate the incidence of carotid artery puncture following more than one cannulation attempt with the internal jugular vein access procedures (IJVAP).

METHODS. We analyzed all landmarks guided IJVAP that were performed by either the anterior or the posterior approach, using the Seldinger technique in both: operating theatre and intensive care unit, during 1-year period. The side of the puncture site was chosen according to clinical necessities. Age, gender, puncture side, number of cannulation attempts and number of arterial puncture after cannulation were recordered. Correct placement of central venous catheter was confirmed by free venous blood return, free flow of fluid through all ports of catheter and post insertion chest X-ray.

RESULTS. During the study period, we studied 112 IJVAP attempts (74 right-sided and 38 left-sided). The patient s age and gender were not associated with increased risk for arterial puncture. The arterial puncture occurred in nine IJVAP attempts (8.03%). Arterial punctures occurred more often although the difference was not statistically significant in the left-sided IJVAP (left-sided IJVAP=13,1%; right-sided IJVAP=5,4%, p=0.12). The single attempt successful rate was 85, 7%, with low risk of arterial puncture (3,1%). Of 16, more than one cannulation attempt IJVAP, six (37.5%) were accompanied by unintentional carotid route puncture. More than one cannulation attempt frequently occurred during left sided IJVAP (left-sided IJVAP=26, 31%; right-sided IJVAP=8,1%, $p < 0.05$), and was associated with a significantly increased arterial puncture rate($p < 0.001$).

CONCLUSION. Our results imply that more than one cannulation attempts frequently occurred during left-sided IJVAP, and it was considerably associated with increased arterial puncture rate. Generally, carotid puncture commonly occurred during left-sided IJVAPs, but this difference was not statistically significant.

0476

SERIOUS POSTOPERATIVE COMPLICATIONS AFTER ESOPHAGECTOMY FOR ESOPHAGEAL CARCINOMA: ANALYSIS OF RISK FACTORS

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INTRODUCTION. Patient survival after surgery for locally advanced esophageal carcinoma has improved in recent years. The advances in surgical technique and perioperative management are the main reasons for this improvement. Nevertheless, these patients continue to present a high incidence of postoperative complications. To identify risk factors for postoperative morbidity and mortality in patients undergoing esophagectomy for esophageal cancer.

METHODS. A series of 159 consecutive patients who had undergone esophagectomy for locally advanced esophageal cancer were analysed retrospectively. The study was performed at the Germans Trias i Pujol University Hospital in Spain. Patients were operated on between January 1985 and December 2004 by the same team of surgeons. In 1991, through the study period, preoperative chemotherapy and radiotherapy were introduced for the treatment of squamous carcinoma (SC). The data were obtained through the revision of clinical histories.

RESULTS. Infections were the main cause of both complications and postoperative mortality. The 54% of our patients presented serious complications. The mortality of the series was 12.5%. Multiorganic failure secondary to sepsis was the more frequent cause of death. The postoperative complications showed a significant association with: alcoholism ($p < 0.04$), hepatic cirrhosis ($p < 0.03$), the location of the tumor in middle third of the esophagus ($p < 0.04$), and the APACHE II score greater of 10 ($p < 0.003$). Mortality was associated significantly (Table 1) with the presence of chronic pulmonary disease ($p = 0,03$) and with an APACHE II score superior to 10 ($p = 0,02$).

TABLE 1 FACTORS ASSOCIATED WITH MORTALITY

Parameter	Odds Ratio	95% Wald Confidence Lower/ Upper	p
APACHE II > 10	3.034	0.958 / 9.487	0.0228
COPD	3.225	1.132 / 9.687	0.0302

CONCLUSION. The APACHE II score can be used so much as prognostic factor of mortality like of serious complications. Chronic obstructive pulmonary disease is a risk factor for postoperative mortality. Alcoholism, hepatic cirrhosis and the location of the tumor, are factors associated to postoperative serious complications.

GRANT ACKNOWLEDGEMENT. Hospital's interdisciplinary committee for esophageal surgery.

0477

VOMITING INDUCED SPONTANEOUS DIAPHRAGM RUPTURE IN A PATIENT WITH EHLERS DANLOS SYNDROME

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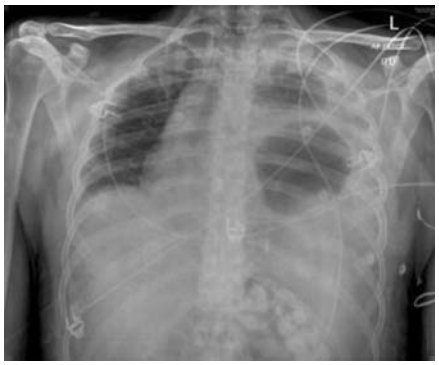
INTRODUCTION. Ehlers Danlos syndrome(EDS)is an inherited connective tissue disorder caused by the production of abnormal collagen. The major manifestations of EDS are skin fragility, skin hyper extensibility, and joint hypermobility (1).EDS typeIV can present as a surgical emergency with organ or arterial rupture. We present the spontaneous occurrence of diaphragmatic rupture with gastric herniation due to violent vomiting in a patient with EDS typeIV.

METHODS. 35 year old male known case of EDS presented with a 2 day history of non colicky lower abdominal pain; he had a negative laparotomy for suspected appendicitis. Post operative period was complicated by refractory nausea and vomiting and then developed respiratory distress with subcutaneous emphysema. Chest Xray and CT scan revealed a diaphragmatic rupture and gastric herniation. The patient underwent a diaphragmatic hernia repair but required ventilatory support for 24 hours post operatively. The patient was subsequently discharged from intensive care.

RESULTS. We succesfully report the occurence of spontaneous diaphragmatic rupture due to projectile vomiting in a patient with Vascular type Ehlers Danlos syndrome, though transient respiratory support was required, the patient made an uneventful recovery.



CONCLUSION. Ehlers Danlos syndrome is characterised by tissue fragility, these cases can present as surgical emergencies due to bowel, organ or vascular rupture. The success of the management lies in the recognition of the syndrome and its associated complications.

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Poster Sessions
Tracheostomy in the ICU: 0478–0488

0478

BETTER TIMING OF TRACHEOSTOMY IN CRITICALLY ILL MEDICAL PATIENTS WHO WERE EXPECTED TO REQUIRE PROLONGED MECHANICAL VENTILATION

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INTRODUCTION. Tracheostomy is one of the most commonly performed procedure in the ICU. But there're no established recommendations about deciding the appropriate point of time. In addition to the effect of early and late timed tracheostomy on patient's outcome. We also tried to investigate whether the proper timing of tracheostomy would be different according to the patients' different type of underlying lung disease.

METHODS. From August 2006 to February 2008, This study has been conducted prospectively in medical ICU of one tertiary teaching hospital. Patients on their third to fifth day after translaryngeal intubation have been screened daily. 74 patients who were expected to require prolonged mechanical ventilation and satisfied our inclusion criteria were randomized. tracheostomy was performed surgically within 7 intubation days in early group and 14∼21 intubation days in late group.

RESULTS. 38 and 36 patients were separately randomized as early group and late group. Each 19 and 18 patients were excluded Because of final refusal to tracheostomy and inappropriate timing of procedure. Mean translaryngeal intubation days of each group were 6.6±1.5 and 16.2±3.4 days. Early group showed significant short mechanical ventilation duration(18.6±13.6 vs. 36.1±27.0 days, p=0.017). and short length of ICU stay(22.7±14.3 vs. 38.3±26.5 days, p=0.032). There are no significant differences in ICU mortality(26.3% vs. 38.9%, p=0.479) and hospital mortality(42.1% vs. 44.4%, p=0.615).

CONCLUSION. Our study showed that early tracheostomy can shorten the duration of mechanical ventilation and ICU stay in patient requiring prolonged mechanical ventilation. But possible differences according to the baseline lung characteristics need to study much more patients.

0479

ENDOSCOPIC INJURIES AND LARYNGEAL DYSPNEA AFTER EXTUBATION. INCIDENCE, RISK FACTORS

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INTRODUCTION. Endotracheal intubation may generate laryngeal or tracheal complications responsible for respiratory distress resulting in extubation failure. This respiratory distress, with symptoms of upper airway obstruction, is commonly called laryngeal edema. Further studies have shown that different types of laryngeal or tracheal injuries and not only edema could be responsible for upper airway obstruction[1]. Our study has evaluated the incidence of postextubation laryngeal injuries in ICU and their relationship with postextubation laryngeal dyspnea and extubation failure.

METHODS. After extubation a laryngeal nasofibroscopy was performed in 136 patients within 3 hours by otolaryngologists and damages (ulceration, granulation, edema and vocal cord mobility) were grading (0,1,2). Patients with audible inspiratory wheeze after extubation were classified as postextubation stridor (PES). PES with laryngeal endoscopic lesions were defined as Laryngeal dyspnea (LD).

RESULTS. Thirty-six patients had a normal exam with a shorter duration of intubation (3.7±4.9vs8.0±9.3; $p < 0.01$), a lowest APACHE II at admission (23.1±7.2vs 26.3±7.8;p=0.03), and were intubated more frequently with neuromuscular blockade than patients with laryngeal injuries (97%vs81% p=0.04). We found 45 patients with ulceration, 74 with edema, 15 with granulation and 26 patients had vocal cord mobility altered.18 patients (13.2%) presented PES. Five patients did not have laryngeal injury. Two of them had postextubation tracheal injuries : sub-glottic stenosis and obstructive fibrinous tracheal pseudomembrane. Three patients had saliva over the larynx making obstruction associated with poor cough reflex. 13 patients developed LD (9.6%). Endoscopic findings were: 12 patients with grade 2 vocal cord edema and altered mobility. One patient had a grade 2 vocal cord granulation with obstruction of the laryngeal lumen. In unvaried analysis, risk factors of LD were: gender female, duration of translaryngeal intubation, number of intubation and a smaller height/ETT diameter ratio. Height/ETT diameter ratio was the only clinical independent risk factor of LD (OR 0.90 [0.85–0.96]; $p < 0.001$). 17 patients (12.5%) needed to be reintubated in the 48 hours following extubation. In unvaried analysis, these patients had more frequently: a GCS<15 at extubation (11/17 vs 27/119; $p < 0.01$), a longer duration of intubation (13.7 ±13.8 days vs 5.9 ± 7.2; $p < 0.01$), a LD (5/17 vs 8/119 LD; p=0.01), they presented more frequently abnormal vocal cord mobility (10/17 vs 16/119; $p < 0.01$) and grade 1 or 2 granulation (5/17 vs 10/119; p=0.02). Independent risk factors of extubation failure were: GCS<15 at extubation, grade 1 or 2 granulation of vocal cord and abnormal vocal cord mobility.

CONCLUSION. Laryngeal injuries following intubation are frequent and could be associated with a use of large diameter of ETT, a long duration of intubation, and the absence of using curare during intubation. These injuries could have several localization and different patterns, but all of these injuries can potentially result in significant airway obstruction. It not seems possible to recognize each type clinically, only endoscopic examination could determine it and the best treatment to avoid recurrences and extubation failure.

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0480

PATIENT OUTCOMES AFTER EXTUBATION IN AN ADULT INTENSIVE CARE UNIT

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INTRODUCTION. Reintubation following extubation may be associated with higher mortality for intensive care patients. Risk factors for reintubation include pneumonia and high rapid shallow breathing index (RSBI)[1]. Weaning, extubation, and the use of continuous positive airways pressure (CPAP) after extubation are not protocolised on our unit. An observational study over six months was performed to establish the rate of reintubation on our unit and to describe the characteristics of the patients who were extubated.

METHODS. Between January and July 2007 100 consecutive patients who were extubated on the intensive care unit were studied using a standardized questionnaire. Only data from the first episode of extubation was collected if patients were extubated more than once. Separate admissions to intensive care were counted as separate episodes. Statistical analysis was performed on contingency tables using two-tailed Chi-squared tests with Yates' correction. All analysis was done using Microsoft Excel spreadsheet software.

RESULTS. Ninety-seven patients were included in the analysis. Three patients were excluded from the analysis due to incomplete data. Mean age (SD) was 57.2 (17.2) years. 47.4% of admissions were medical, and 52.6% of admissions were surgical. The duration of intubation prior to extubation was a median of 3 days (range 4 h to 24 days; IQR 1–5 days). There were 16 reintubations (16.3%) and 14 tracheostomies were performed (14.4%). Mean time to reintubation was 16.9 h (range 10 mins – 96 h). The mean (SD) duration of the first intubation period in reintubated patients was 6.4 (5.1) days. Patients who were reintubated were admitted with pneumonia (3 patients, 18.8%); post-cardiac arrest (3 patients, 18.8%) or after aortic aneurysm repair (2 patients, 12.5%). 69 (70.4%) patients were extubated after being weaned onto CPAP (with or without additional pressure support). 28 patients (28.8%) were extubated from biphasic positive airways pressure ventilation. There were 84 (85.7%) planned extubations, of whom 13 patients (15.5%) were reintubated. There were 9 (9.2%) unplanned extubations, of whom 3 (33%) were subsequently reintubated. Unplanned extubation was not significantly associated with reintubation (p=0.37). Prior to extubation, mean (SD) fraction of inspired oxygen was 0.38 (0.08), mean (SD) P-F ratio was 29.8 (13.4) kPa and median respiratory rate was 10.5 breaths per minute. Non-invasive CPAP was used in 26 (26.8%) of patients after extubation. Five (19.2%) of these patients were re-intubated.There were only 7 deaths on the unit among the 97 patients studied, giving a unit mortality rate of 7.2%. Mortality among reintubated patients was 12.5% compared to 6.2% in the non-reintubated group, but this was not statistically significant (p=0.72). 75% of those patients who were reintubated went on to have a tracheostomy.

CONCLUSION. There was no association between reintubation and unit mortality in this population of patients. There was no association between unplanned extubation and reintubation. 75% of patients who were reintubated went on to have a tracheostomy to facilitate weaning.

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0481

COMPARISON OF TWO TECHNIQUES OF PERCUTANEOUS DILATATIONAL TRACHEOSTOMY (PDT): GRIGGS' DILATING FORCEPS VS ULTRAPERC® SINGLE STAGE DILATOR

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INTRODUCTION. The percutaneous dilatational tracheostomy is a minimally invasive, safe, reliable and widely accepted procedure. PDT using Griggs' dilating forceps over the guidewire is still practiced in many ICUs. Recently, a single stage dilational tracheostomy kit, Ultraperc® having a gradually curved dilator and an ergonomic tube introducer has gained popularity. The aim of our study was to compare the two techniques of PDT in terms of procedural time, amount of blood loss and immediate complications.

METHODS. Thirty consecutive patients on mechanical ventilation needing tracheostomy during the course of treatment were randomly divided into two equal groups. PDT was performed in either group under sedation, as per the technique. Procedural time was defined from incision to successful placement of tracheostomy tube. Amount of blood loss was calculated by percentage soakage of a 12inch x 9inch gauze piece. 5ml blood completely soaks such a gauze piece. Immediate complications such as bleeding from the stoma, transient hypoxemia (SpO_2< 95%) and hypercarbia (> 5 mm increase in $ETCO_2$ from the baseline) were recorded. Bleeding was classified in four grades: I : <5 mL, II : 6–10 mL, III : 11–20 mL and IV : >20 mL. Chest x-ray was done after the procedure to look for pneumothorax, lung collapse and position of tracheostomy tube.

RESULTS. The procedure with Ultraperc® single stage dilator technique took slightly longer time but had reduced amount of blood loss as compared to Griggs' dilating forceps technique. The incidence of hypoxemia and hypercarbia was higher with Ultraperc® single stage dilator technique attributed to longer procedure time.

TABLE 1

	Griggs' Dilating Forceps	Ultraperc® single Stage Dilator
Procedural time (min)	2.5 ± 0.5	4 ± 0.7
Blood loss Grade I	2	9
Blood loss Grade II	3	5
Blood loss Grade III	9	1
Blood loss Grade IV	1	0
Hypoxemia	3	5
Hypercarbia	2	4

CONCLUSION. Although Griggs' dilating forceps technique is an easier and quicker technique to perform but it causes more tissue trauma than Ultraperc® single stage dilator technique.

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0482

USE OF PORTABLE ULTRASOUND TO MINIMISE RISKS ASSOCIATED WITH PERCUTANEOUS DILATIONAL TRACHEOSTOMY

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INTRODUCTION. Percutaneous dilational tracheostomy (PDT) has become the commonest surgical procedure performed within the ICU, since its description by Ciaglia in 1985. PDT performed in selected patients by experienced and trained individuals is comparable in safety to that of surgical tracheostomy (ST)1. PDT is easier and quicker to perform with less periprocedural bleeding, is cost effective and is cosmetically more desirable than ST. However, it is associated with a 5–11% risk of complications, including catastrophic haemorrhage2, pneumothorax, surgical emphysema, misplacement, cartilage damage, and death2. Bleeding is the commonest complication associated with PDT. MRI assessment of cervical anatomy suggests considerable variation in the relation of blood vessels to the anterior aspect of the trachea3. Portable ultrasound (P-US) prior to PDT has demonstrated the presence of a vulnerable vessel in up to 27% of patients4. NICE guidelines on the placement of central venous catheters encourage the use of P-US to identify blood vessels and to enhance the safety of the procedure.

METHODS. The project was submitted to the Local Research and Ethics Committee for approval. P-US was used in 97 serial adult patients who had no history of surgery to the neck, prior to PDT as a planned procedure in the general ICU. US examination of the neck was undertaken using a SonoSite iLook25 with a linear 10MHz probe with the patients' neck prepared in position for a standard PDT(SonoSite, Inc, Bothell, WA, USA). The focussed P-US study examined the ease of identification of the tracheal rings and their relation to the midline, the presence of arteries or veins within a 2cm radius of intended point of entry of seeker needle, and the position of the thyroid isthmus or lobes. Subsequently, P-US was not used to further facilitate the PDT procedure.

RESULTS. Ninety seven patients (M:F,45:52) between the age of 26–74yrs (mean 58yrs) were studied. The tracheal rings and their midline, thyroid lobes and isthmus were identified in all patients. Thirty one patients (32%) had a clinically undetected vessel within a 2cm radius of intended point of entry (6 art:25 veins). Of these 4 and 11 respectively were more than 4mm in diameter. The latter 15 patients did not undergo a PDT, and instead, ST was performed safely and without immediate complications. The remaining 82 patients underwent safe and uneventful PDTs without any immediate complications.

CONCLUSION. P-US is a strong and useful non-invasive tool which may enhance informed patient selection and risk stratification, with resultant improvements in the safety and outcome of PDT.

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0483

ROUTINE CHEST RADIOGRAPHY AFTER UNCOMPLICATED, BRONCHOSCOPICALLY DIRECTED PERCUTANEOUS DILATATIONAL TRACHEOSTOMY IS NOT REQUIRED

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INTRODUCTION. Percutaneous dilatational tracheostomy (PDT) is an established technique used to facilitate ventilatory weaning and avoid the complications of long term translaryngeal intubation. Post-procedure chest radiography is common however its value after a routine PDT has been questioned [1,2].

METHODS. Our institution's practice is a bronchoscopically directed PDT technique using a Ciaglia 'Blue Rhino' dilator for tube insertion in adults. A retrospective audit of case records and radiological images was undertaken from 1996 to 2001. This was followed by a prospective cohort study from 2002 to 2005 where every PDT was followed by a chest radiograph (CXR) and compared to the most recent CXR taken as part of routine clinical practice. The responsible physician commented as to whether the PDT was routine and if the CXR changed post-procedure management. A review in January 2006 changed practice and a post–procedure CXR was required only if there were technical difficulties or concerns with ventilation.

RESULTS. A total of 221 patients were identified in the retrospective study from 1996–2001. The overall complication rate was 8.6% subdivided as follows: bleeding (5.4%), mispositioned tube (0.9%), surgical emphysema (0.9%), pneumomediastinum (0.45%). All cases with radiographic abnormalities had been technically difficult with a high index of clinical suspicion for injury. The prospective cohort studies from 2002–7 identified a total of 478 cases - 218 cases had a mandatory post-procedure CXR (before the change in practice in 2006) and 260 with CXR only if clinically indicated. Of the mandatory post-procedure CXRs following routine PDT, there was no evidence of barotrauma or tube misposition. Following routine PDT the CXR altered management in only one case where a higher level of positive end-expiratory pressure (PEEP) was used to treat radiographic atelectasis. From 2002–7 there were 2 cases of surgical emphysema with immediate clinical manifestation. Both cases required no specific treatment and had been difficult with multiple tracheal cannulations.

CONCLUSION. We have studied a total of 699 PDTs over 11 years and after routine PDT no evidence of barotrauma or other problem requiring urgent intervention was identified on CXR. On one occasion the post-procedure CXR affected management, treating radiographic atelectasis, however derecruitment of bronchopulmonary segments is common after PDT and can be anticipated [2]. In uncomplicated, bronchoscopically guided PDT a routine post-procedure CXR is unnecessary in the absence of clinical deterioration. We recommend that a chest radiograph is mandatory in the following circumstances - anticipated postoperative complications secondary to technical difficulties, visualised tracheal damage or pre-procedure pneumothorax.

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0484

SAFETY AND COMPLICATIONS OF PERCUTANEOUS TRACHEOSTOMY IN A COHORT OF 800 MIXED ICU PATIENTS

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INTRODUCTION. Percutaneous tracheostomy (PCT) is a well established technique used primarily to assist weaning from mechanical ventilation on many intensive care units (ICU).

Objective: The aim of this study is to present our experience with PCT performed at ICU bedside by critical care staff and residents in the last two years of fellowship training in order to evaluate its efficacy in terms of safety and intraoperative and postoperative complications. We also aimed to quantificate the learning curve for PCT.

METHODS. We analysed our experiences of a total of 800 PCT performed in our ICU by a collaborative team (critical care and otolaryngologist physicians). Statistical significance was assessed by the Chi-squared test with significance interpreted as a p value < 0.05.

RESULTS. Most of the procedures (n = 685, 85.6%) were performed at the bedside by residents in the last two years (fourth and fifth) of fellowship training. We observed complications in 32 patients (4%). Intraprocedural complications occurred in 17 patients (2.1%), early postprocedural in 6 (0.75%), and late postprocedural in 9 (1.1%). No case of death was directly related to PCT. The number of complications was superior in PCT performed by the residents in their initial five attempts than in the rest of attempts (9.2 % vs 2.6%; $p < 0.05$).

CONCLUSION. PCT is a simple procedure to be learned and to achieve adequate training. The low incidence of complications indicates that bedside PCT can be performed safely, and can be considered a routine procedure in the management of ICU patients in daily practice.

0485

EARLY VS LATE PERCUTANEOUS DILATATIONAL TRACHEOSTOMY (PDT) IN AN ITALIAN CARDIAC INTENSIVE CARE UNIT

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INTRODUCTION. Early tracheostomy is considered useful in improving ICU patients survival. However some controversies exist when considering cardiac surgery patients because PDT, when performed soon after sternotomy, could be associated with an increase in deep sternal wound infections and in overall morbidity and mortality.

METHODS. 86 cardiac patients, both medical and surgical, admitted to our ICU, underwent PDT during the last three years. A retrospective analysis of their clinical data was performed in order to study the possibile correlations between early or late tracheostomy and outcome in both classes of patients.

RESULTS. 45/86 patients (52.3%) were surgical patients, admitted to ICU after Coronary Artery Bypass Grafting or Valvular surgery. Most of them (75,6%) underwent combined or emergent surgery and in several cases were reoperated.
41/86 patients (47.7%) were admitted to medical ICU after complicated myocardial infarction.
Both groups had similar mortality rates: 26/45 (57.8%) in surgical patients and 21/41 (51.2%) in medical patients.
Medical patients showed an increase in mortality when late PDT was performed while surgical patients showed the highest incidence of mortality after early PDT.

TABLE 1 MORTALITY RATES ACCORDING TO DIFFERENT PDT TIMINGS

PDT timing	< 7 days	> 7 days	> 10 days	> 14 days
Medical pts	19/41 (46.3%)	22/41 (53.7%)	12/41 (29.3%)	8/41 (19.5%)
Mortality rate	9/19 (47.4%)	12/22 (54.5%)	8/12 (66.7%)	6/8 (75%)
Surgical pts	16/45 (35.6%)	29/45 (64.4%)	23/45 (51.1%)	16/45 (35.6%)
Mortality rate	10/16 (62.5%)	16/29 (55.2%)	11/23 (47.8%)	9/16 (56.2%)

CONCLUSION. According to recent literature, our data suggest that tracheostomy itself is not able to improve the outcome in unselected patients. Different characteristics and particular requirements of the patients seem to play an oustanding role in determining the indications to tracheostomy, in chosing the correct timing and in showing the real effects on outcome.

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0486

LEGS DOWN IMPROVE VENTILATION AND OXYGENATION IN SUPPORTED INVASIVE VENTILATION

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INTRODUCTION. Body position is of great influence in ventilated ICU patients. According to the surviving sepsis guidelines, patients should be ventilated in the 45 degree body position. In a previous abstract we demonstrated the role of the 30 degree body position on ventilation and oxygenation parameters in patients who were weaned from the ventilator. In this study we investigated the potential benefit of legs horizontal and legs down position on end tidal CO2 (%), rapid shallow breathing index and oxygen saturation in patients who were on pressure support ventilation.

METHODS. 16 patients on pressure support ventilation were studied. Patients were ventilated with a Servo 300(A)® and Servo-i ® ventilator (Maquet). First, patients were placed in the 30 degree position with the legs horizontal. Half an hour after stabilisation, end tidal CO2, tidal volume, breathing frequency and oxygen saturation were measured. After that legs were lowered as much as possible. Rapid shallow breathing index was calculated as :respiratory rate divided by tidal volume. Values were compared using paired samples T-test. A significance level of $< 0,05$ was considered significant.

RESULTS. Oxygen saturation improved with 0,63% +/- 0,96 when legs were lowered ($p < 0,05$). End tidal CO2 improved with 0,16% +/- 0,26 when patients were placed in legs down position ($p < 0,05$). Rapid shallow breathing index did not show significant changes.

CONCLUSION. We demonstrated an improvement in oxygen saturation and a decrease in end tidal CO2 when the legs of patients were lowered during pressure support ventilation. Perhaps relieve of abdominal pressure plays a role in an increased ventilation. In this study patients were examined who were weaned from the ventilator. We think, positional therapy in this group of patients is very important. Further study is necessary to confirm our observations.

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0487

TRACHEOSTOMY PRACTICE IN THE ICU OF TWO LARGE TERTIARY MEDICAL CENTERS

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INTRODUCTION. Tracheostomy is a common procedure in critically ill patients undergoing prolonged mechanical ventilation. The proper time and indications remain controversial and different practices may exist between hospitals. Our aim was to record practice concerning tracheostomy in the Intensive care units of two large tertiary centers in Greece.

METHODS. Our study was conducted in two large tertiary care hospitals. "Attikon" university hospital has an 18 – bed Intensive care unit and "George Gennimatas" general hospital has a 12 bed Intensive care unit. Patients hospitalized in these two medical - surgical ICUs between 1st January 2007 and 31st December 2007 who were submitted to tracheostomy were included in the study. Demographics of patients, cause of admission, severity of admission as measured by Apache II score, timing, duration of mechanical ventilation, and outcome were recorded.

RESULTS. Four hundred patients were hospitalized during the study period (225 and 175 for each hospital). One hundred twenty three patients were submitted to tracheostomy (31%, 61/225 for "Attikon" and 62/175 for "G Gennimatas"). There were 78 men and 45 women. Percutaneous tracheostomy was performed in 98% of cases. Surgical tracheostomy was performed in the rest because of nodular thyroid gland. Complications were noticed in two patients (one case of hemorrhage and one case of trachea trauma ending to death). Median age of patients was 59 years, (range 17- 97). Median length of ICU stay was 47 days (range 5 – 230 days). Mean Apache II severity score was 19 (range 15 - 25). Overall number of deaths was 47 (66%, 27/ 62 and 15 / 61). Seventy - three patients were surgical (59%) and the rest were medical. There were 17 cases of abdominal surgery, 10 cases of cardiac / thoracic surgery, 28 neurosurgical patients, two burn patients,12 multi-trauma patients, one p with tracheal trauma and 3 orthopedic cases. Mean time for tracheostomy performance was 18 days (range 12 – 30).15/ 61 and 12/ 62 patients needed continuous venovenous hemodiafiltration. Mean duration of mechanical ventilation was 35 days (range 12 – 230 days).

CONCLUSION. Although the severity of hospitalized patients is similar in the two hospitals, tracheotomies are performed with a different frequency in each one of them. Timing and indications of tracheostomy are a matter of controversy and although it can help weaning from mechanical ventilation, it remains a surgical procedure with possibly severe complications.

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"BLUE DOLPHIN"® PERCUTANEOUS DILATIVE TRACHEOSTOMY: EVOLUTION OF CIAGLIA TECNIQUE IS GOING ON. PRELIMINARY RESULTS

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INTRODUCTION. 23 years ago the Authors of first Ciaglia Percutaneous Dilative Tracheostomy (PDT) published the preliminare results. This I.C.U. bedside procedure introduced one of the most useful innovations for intensivists. Fifteen years after Ciaglia Blue Rhino (BR) represented a very good development of the PDT with one-step dilation. "Blue Dolphin" (BD) PDT is the last evolution to the one-shot procedure.

METHODS. Seventeen patients admitted to I.C.U. (of two Italian Hospital) with acute diseases conditioning long-term mechanical ventilation were undergone consecutively to PDT with "Blue Dolphin" (BD) technique.
The first part of the procedure was quiet similar to the well known one of previous abovementioned methods. After the use of first 14 Fr. introducer dilation and insertion of the cannula was obtained with a balloon-tipped catheter loading dilator assembly where, over the loading dilator, had at first preassembled the tracheal cannula. The dilative balloon is very like to a balloon for Percutaneous Transluminal Coronary Angioplasty obviously modified and bigger. The balloon was inflated at 11 atmospheres of pressure for 5 or 6 seconds. For every procedure was performed an inside and outside video to check every aspect of the "modus operandi". Vital signs of the patients was of course monitoring continuously.

RESULTS. The BD was performed in the group of patients without choosing "best necks". The operating doctors were the same of the common approach ("Blue Rhino" PDT). Sixteen on seventeen procedures were uneventfully completed. Median time of BDs was 2,5 minutes (from the 14 Fr. introducer removal to the insertion of the cannula). Vital signs were unmodified during the procedures. The single case in which BD was not completed was related to the choice of the level of dilation (between cricoid and first tracheal ring) and consequent failing balloon dilation. The PDT was however completed with BR rescue. Neither major nor minor complications occurred all over the study.

CONCLUSION. First operating experiences with BD show that the introduction of a dilation ballon is effective, quick and safe. The assembly of balloon together the cannula loading dilator optimizes the kit reaching just about a one-shot PDT. Further studies need to be done for a more definitive evaluation.

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0489

RISK FACTORS PREDICTING CANDIDAEMIA SPECIES POTENTIALLY RESISTANT TO FLUCONAZOLE: IMPLICATIONS FOR EMPIRIC THERAPY

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INTRODUCTION. *C. albicans* is the species responsible for the majority of candidaemia in critically ill adult patients, followed by *C. tropicalis* and *C. glabrata*. In the last few years there has been an increase in the number of *Candida non-albicans* isolates, with special attention being paid to *C. glabrata* and *C. krusei* in view of their diminished sensitivity or resistance to fluconazole. As fluconazole is still a main line therapy for candidaemia, risk factors identifying infection by the more resistant species would be very useful in order to provide early and appropriate therapy. Objective of the study: To identify risk factors for candidaemia species potentially resistant to fluconazole.

METHODS. Observational study, including all patients with *Candida* isolates in blood cultures in adult patients in our hospital during the period January 2003 to December 2007. Two groups were compared: those with fluconazole-sensitive *Candida* isolates (ATP group: *albicans, tropicalis, parapsilosis)*, and patients with potentially resistant to fluconazole *Candida* isolates (GK group: *glabrata, krusei*). We analyzed demographic risk factors, underlying diseases (diabetes, neutropenia, cancer, HIV, severe trauma, solid organ transplantation, bone marrow transplantation, acute renal failure), APACHE II on the day the positive blood culture was taken, and prior treatment with antibiotic, antifungals and/or steroids.
Statistical analysis: chi-square or Fisher's exact test, Student's t or Mann-Whitney U-test as needed, and multivariate analysis including variables with $p < 0.05$ in the univariate analysis.

RESULTS. 154 patients were included. The average age was 58±18 years old. There were a similar distribution in gender (female 63 cases, 40.6%), severity score measured by APACHE II on the candidaemia day was 12.1±5.9. 62 patients (40%) were in the ICU with an average stay in the ICU prior to candidaemia of 11.7±9.8 days. *Candida* sensitive to fluconazole accounted for 79.9% of cases (n=123: *C. albicans* 70, *C. tropicalis* 26, *C. parapsilosis* 25, other 2), while 20.1% were *Candida* species potentially resistant to fluconazole (31 cases: *C. glabrata* 20, *C. krusei* 11). Variables associated with *Candida species* isolated from the GK group were neutropenia, acute renal failure and azole pretreatment. Multivariate analysis showed that azole pretreatment, OR 8.23 (95% CI 2.33–29, $p = 0.01$) and renal insufficiency OR 3.7 (95% CI 1.5–9.0 $p = 0.004$) were the only risk factors independently associated with this group. We performed the same multivariate analysis in the 62 patients who required ICU admission, and found azole pre-treatment as the only risk factor, OR 5.86 (95% CI 1–34, $p = 0.05$).

CONCLUSION. Prior azole treatment is a major risk factor for fungaemia involving species potentially resistant to fluconazole. In such patients, a non-azole antifungal agent may be a superior option.

0490

PULMONARY INFECTION VERSES ACUTE CHEST SYNDROME/VASO-OCLUSIVE CRISIS (VOC) IN SICKLE CELL DISEASE (SCD) AT AN INTENSIVE CARE UNIT (ICU)

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INTRODUCTION. Sickle cell disease includes a group of diseases where the red blood cells produce a mutant form of β hemoglobin called sickle hemoglobin. Sickle cell anemia is the best known example of sickle cell disease. We report our experience with SCD patients admitted to ICU either with Acute Chest Syndrome (ACS)/Vaso-oclusive crisis (VOC) or pulmonary infections and outcome. Individuals with sickle cell disease generally fare well, but suffer from periodic sickle cell crises. These crises occur when red blood cells become stuck in blood vessels, and cause ischemia or infarction. Such crises can cause pain and organ damage. Patients with sickle cell disease are also prone to infections and have an average life expectancy of 40 years.

METHODS. Data was collected from patients file on day-to-day manner from October 2002 to December 2006. This is 11-bed adult medical/surgical ICU with admission rate 45–50 patients per month. The average APACHEE II is 22 and mortality is 17%.

All Acute Chest Syndrome (ACS)/Vaso-oclusive crisis (VOC) or pulmonary infections were studied in 157 adult SCD patients admitted to the intensive care unit (ICU). All SCD whose haemoglobin S was more than 30% has received exchange transfusion. The average APACHEE II score in chest infection group was 21.3 in ACS/VOC group was 20.7.

RESULTS. Out of 157 SCD admitted to ICU 98 patients were admitted with chest infections and 59 patients were admitted with chest infections, in chest infection group 41%(31) patients required ventilator support as compared to patients admitted with ACS/VOC 12%(7) p-value 0.0003 and 32% patients required blood exchange transfusion and 85%(50) in ACS/VOC group p-value <0.0001, the intotrpes require in chest infection group was 39% (38) and ACS/VOC group was 0% (0) the p-value <0.0001.The mortality in chest infection group was 19% where as in ACS/VOC group 5%, the p-value 0.0258 (Table 1).

TABLE 1 COMPARISON SCD* PATIENTS ADMITTED TO ICU WITH CHEST INFECTIONS VERSES ACS/VOC

	On ventilator	X-change	Inotrops	Mortality
Chest infections 98 Patients	41%	32%	39%	19%
ACS/VOC 59 patients	12%	85%	0%	5%
p-value	0.0003	<0.0001	<0.0001	0.258

CONCLUSION. SCD patients admitted to ICU with severe chest infection need extra precautions as compare to SCD admitted with ACS/VOC. Early exchange transfusion if haemoglobin S percent is >30 is beneficial and improve the mortality.

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THE DIAGNOSTIC ROLE OF BIOMARKERS IN MENINGITIS FOR NEUROSURGICAL PATIENTS IN ICU

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INTRODUCTION. The diagnosis of meningitis in neurosurgical patients is difficult, as the standard markers in cerebrospinal fluid (CSF) are not always diagnostic. In order to find a reliable marker for the diagnosis of meningitis in these patients we measured interleukin-6 (IL-6) and vascular endothelial growth factor (VEGF) in CSF and we compared them with standard markers (CSF leucocytosis, glucose, proteins).

METHODS. 17 neurosurgical patients (13men) with intracerebral or/and subarrachnoid hemorrhage, aged 52±15 years, septic with clinical suspicion of meningitis were enrolled. All patients had intraventricular catheters for external drainage of CSF. 8 had proven meningitis. Samples of CSF and blood were taken at time of suspected meningitis and in meningitis group at time of clinical improvement also. Leucocytes, glucose and proteins were measured in blood and CSF. The samples were centifigurated and frozed in – 4oC and IL-6 and VEGF were measured in CSF and serum (the upper limit measured for IL-6 was 5000 pg/ml).

RESULTS. IL-6 concentrations in CSF were extremely high in all patients (3649±1914pg/ml). IL-6 levels were higher in CSF from patients with meningitis compared with those from patients without meningitis (5000±0 versus 2449±1971 pg/ml, p=0.002). In all patients CSF levels of IL-6 were higher than plasma levels ($p < 0.0001$) and in meningitis group were over 100fold higher, ($p < 0.0001$). In meningitis group, CSF IL-6 levels decreased significantly as patients improved (p=0.03). In contrast VEGF levels performed high in serum as well as in CSF (842±166pg/ml vs 130±47pg/ml), but did not differ in two groups. Between two groups (meningitis and no meningitis group) there was no difference in CSF pleocytosis (523±318,7 vs 273±137,9) CSF glucose (57,1±14,7 vs 85,2±11,6mg/dl) and CSF proteins (275±49,5 vs 225,7±59,4gr/dl).

CONCLUSION. It seems that CSF pleocytosis and glucose are not efficient markers to establish meningitis in neurosurgical patients. CSF IL-6 increases in meningitis, much more than plasma levels, suggesting local production, predicts meningitis with 100% sensitivity 64% specificity and decreases with clinical improvement. More data may help to consider IL-6 as a sensitive and specific marker for postsurgical meningitis in the difficult neurosurgical patient.

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MICROBIAL DIAGNOSIS IN SEVERE HUMAN SEPSIS: MULTIPLEX PCR VS. BLOOD CULTURE - A PROSPECTIVE STUDY

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INTRODUCTION. Sepsis is a life-threatening disease that results from excessive host responses to microbial infections with a rapidly increasing mortality per hour after infection. Therefore, the causative pathogens and/or antibiotic resistances are to be determined as early as possible. The traditional gold standard blood culture (BC) usually takes at least 2–3 days. Facing the time-to-result, nucleic acid based technologies (NAT) are increasingly desirable. The aim of this study was to compare the sensitivities and specificities of BC with a novel molecular-biological pathogen detection method. The NAT-system includes a sample preparation technology, which enables the enrichment of bacterial and fungal DNA out of whole DNA-samples. Cell lysis within whole blood and subsequent DNA preparation are followed by multiplex PCR to rapidly identify 99% of clinically relevant sepsis causative pathogens. At the same time, five of the most common antibiotic resistance genes are detected.

METHODS. In a prospective study (6/2006–7/2007), a totality of 35 peripheral blood samples from 25 patients (septic group) were consecutively drawn for the evaluation of possible sepsis by culture (e.g. BC) and molecular diagnosis. 32 whole blood samples were taken from 22 patients (control group) without the clinical indication of sepsis. The DNA preparation was performed according to a standard DNA extraction protocol combined with protein-based affinity chromatography (LOOXSTER®, SIRS-Lab). All purified DNA specimens were analyzed by multiplex PCR (VYOO®, SIRS-Lab). The blood samples were incubated in an automated blood culture device (BacTAlert®, BioMerieux). Positive isolates from BC were determined for identification and antimicrobial susceptibility by standard laboratory procedures.

RESULTS. In the septic group, 20% of the patients were tested BC positive with none of them belonging to the positive 28 day mortality group. In the 58% NAT positive patients, four non-survivors (80%) were included. The NAT method was negative as expected for all samples of the control group patients. In contrast, 23% BC were positive in this group. Concerning the clinical microbiological evaluation, the BC positive controls can be considered as false positive results. The positive results from blood cultures were not available before 72 hours whereas the NAT method delivered results within 6–8 hours.

CONCLUSION. Compared to the gold standard and other culture-based methods, the NAT method was in significantly less time more sensitive and specific. This might be a milestone allowing "same day diagnosis" of sepsis and SIRS as well. Further, the results revealed the expanding potential of NAT-based methods for the diagnosis of systemic microbial infections.

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0493

IL–6 GENE TRANSCRIPTION IN INFECTION AND SEVERE SEPSIS DISPLAYS DISTINCTIVE CHARACTERISTICS

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INTRODUCTION. Interleukin 6 (IL-6) is a cytokine with diverse biological activities. IL-6 has been reported as a possible diagnostic marker for the presence of bacteraemia and serves as a marker of disease severity in sepsis [1]. Indeed recently adverse outcome in community-acquired pneumonia has been reported in the context of elevated IL-6 levels [2]. We investigated IL6 gene transcription in peripheral blood leukocytes in three study groups, 58 patients with severe sepsis, 15 patients with a gram-negative infection but without sepsis and 10 healthy controls.

METHODS. This is a prospective observational study. Blood samples were collected from healthy controls at 1 time point. In bacteraemic patients, blood sampling was carried out within 24 hours of the positive blood culture being reported. In 58 patients presenting with severe sepsis blood sampling was carried on day 1 of intensive care admission and on day 7 in survivors. Mononuclear cells were isolated, and total RNA was extracted. IL-6 mRNA was quantified using the technique of quantitative real-time polymerase chain reaction (qRT-PCR). All values are stated as median and inter-quartile range. Between group comparisons was performed by Wilcoxon rank sum test.

RESULTS. In the sepsis group 19 patients died. IL-6 mRNA copy numbers was significantly reduced in the bacteraemic group (2.96*106; 3.59*106–2.66*106) compared to controls (3.73*106; 4.12*106 – 3.48*106), ($p = 0.012$), and was significantly reduced in the sepsis group (3.73*106; 4.47*106 – 3.28*106) compared to the bacteraemic group (2.96*106; 3.59*106–2.66*106) ($p = 0.0032$). There was no association between IL6 mRNA copy numbers and outcome measures such as mortality, the presence of shock after prolonged sepsis, duration of vasopressor support, duration of mechanical ventilation and duration of intensive care stay.

CONCLUSION. The human host response to infection is related to a distinct pattern of IL-6 gene transcription. There is deficient IL-6 gene transcription in patients who tolerated infection with impunity. Down-regulation of IL6 in the setting of infection may be reflective of an appropriate bactericidal response.

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0494

PROCALCITONIN (PCT) SERUM LEVEL IN SEVERE SEPSIS AND SEPTIC SHOCK INDUCED BY MULTIRESISTANT PATHOGENS

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INTRODUCTION. Procalcitonin (PCT) as a marker for bacterial infections facilitates an early diagnostics and appropriate therapeutic decisions, as well as informs about the course and prognosis of the disease1. The aim of the study was to evaluate the usefulness of the PCT serum level test in sepsis induced by multiresistant pathogens.

METHODS. A prospective study included 35 patients aged 18–75 years, meeting the criteria of severe sepsis or septic shock, treated between July and December 2007, divided into two groups: I – patients with sepsis induced by multiresistant pathogens, II – patients without isolation of multiresistant pathogens. The following parameters were assessed: APACHE II and SOFA scores; lactate; PCT levels (VIDAS BRAHMS PCT) on the 1st, 3rd, 5th day of sepsis therapy; the length of stay (LOS) and mortality. A microbiological analysis of material obtained from the blood, central venous catheters, lower respiratory tract, pleural and abdominal cavity was performed. Data were analysed using the nonparametric Mann-Whitney test and chi-square test.

RESULTS. Demographic data in both groups were comparable. The following pathogens were isolated in group I (n=19): MRCNS, MRSA, VRE, ESBL-producing Gram-negative rods; and in group II (n=16): Gram-negative bacteria, MSSA, MSCNS, E. faecalis. The PCT serum level in group I was higher than in group II (88.3±62.13ng/mL vs.12.0±8.78ng/mL; $p < 0.05$). A statistically significant difference in LOS and mortality between group I and II was noted (21.0±8.56 vs.14.2±4.77 days, $p < 0.05$; 41.6% vs.25.0%, $p < 0.05$; respectively). The PCT serum level was found to be significantly higher in septic shock vs. severe sepsis patients ($p < 0.05$).

CONCLUSION. The occurrence of multiresistant pathogens significantly affects the PCT serum level in severe sepsis and septic shock. PCT is a sensitive marker of the severity of sepsis.

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0495

TEMPORAL CHANGES IN TISSUE OXYGENATION IN PREDICTED SURVIVORS AND NON-SURVIVORS OF FAECAL PERITONITIS

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INTRODUCTION. We recently reported that tissue oxygen tension (tPO_2), the balance of local O_2 supply/demand, is variably affected in four different organs (kidney cortex, liver, muscle, bladder) during endotoxaemic sepsis (1) and early (6h) faecal peritonitis (2). We sought to measure temporal changes in circulatory pathophysiology and tPO_2 in these organs in predicted survivors and non-survivors of faecal peritonitis.

METHODS. Fluid-resuscitated male Wistar rats received an intraperitoneal injection of faecal slurry, modelling faecal peritonitis. At 6h post-insult rats were anaesthetised and echocardiography performed. Rats were divided into predicted survivors (mild sepsis) and non-survivors (severe sepsis) based on a stroke volume greater or less than 0.14 ml, respectively (3). At either 6h or 24h post-sepsis, animals received a tracheostomy and tPO_2 probes placed in muscle, between two liver lobes, within the bladder lumen and left renal cortex. After 30-min stabilisation, recordings were made of tPO_2, and cardiac output (CO) by echocardiography (Vivid 7, GE Healthcare, UK). Blood gas analysis was performed to determine lactate levels. Comparisons were made against sham-operated animals that underwent instrumentation but received no septic insult.

RESULTS. Data shown as mean (± SE), $^*p < 0.05$ between sham (n=8) & sepsis (n=8). Statistics: 2-way RM-ANOVA and post-hoc Tukey's test.

TABLE 1

Time/ Group	CO (ml/ min)	Global DO_2 (l/min)	Muscle tPO_2 (kPa)	Bladder tPO_2 (kPa)	Liver tPO_2 (kPa)	Kidney tPO_2 (kPa)	Lactate (mmol/l)
6h Sham	114 (5)	16 (1)	5.3 (0.7)	6.9 (0.4)	2.7 (0.3)	2.2 (0.4)	1.6 (0.2)
6h Mild	77 (3)*	15 (1)	4.5 (0.5)	7.5 (0.2)	2.0 (0.5)	1.6 (0.2)	2.1 (0.4)
6h Severe	55 (2)*	11 (1)*	3.2 (0.6)*	7.5 (0.4)	0.5 (0.1)*	1.1 (0.3)*	3.5 (0.2)*
24h Sham	115 (5)	18 (1)	5.1 (0.7)	8.0 (0.3)	2.4 (0.4)	2.5 (0.3)	2.0 (0.2)
24h Mild	120 (8)	18 (1)	4.7 (1.0)	8.3 (0.6)	2.5 (0.7)	3.0 (0.7)	3.9 (0.4)*
24h Severe	119 (13)	16 (2)	4.7 (1.2)	6.7 (0.5)	2.0 (0.7)	2.1 (0.5)	4.7 (1.0)*

CONCLUSION. Early (6h) sepsis caused circulatory dysfunction and an oxygen supply/demand imbalance that varied between organ beds, with liver most affected, followed by muscle and kidney. During established (24h) sepsis, circulatory function and tPO_2 were restored although animals showed signs of clinical illness and continued hyperlactataemia. The data support the hypothesis that early circulatory impairment followed by later mitochondrial dysfunction may combine to produce multi-organ failure in sepsis.

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0496

DIFFERENTIAL GENE EXPRESSION PROFILE IN A 24-HOUR PORCINE MODEL OF FLUID-RESUSCITATED FECAL PERITONITIS

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INTRODUCTION. The molecular and pathophysiological mechanisms underlying sepsis-related liver dysfunction are not yet fully understood. To elucidate the pathways involved we investigated gene expression by microarray in a clinically relevant porcine model of fluid-resuscitated septic shock.

METHODS. Anesthetized and ventilated pigs (40±3kg) were randomly assigned to fluid-resuscitated septic shock by fecal peritonitis (S, n=6) or control (C, n=6). In vivo liver samples were collected at baseline (BL) and 24h for analysis of mRNA expression by Affimetrix microarray (S:n=2, C:n=2). Changes in gene expression (ratio in base 2) between BL and 24h and at 24h were analyzed by GeneMath 3.5. To identify the affected molecular pathways, gene expression data were mapped on a pathway database using MapFinder 2.1.

RESULTS. Septic pigs developed a normotensive, hyperdynamic circulation. In sepsis 2495 genes had significantly changed (>2-fold up or <0.5-fold down) between 24h and BL versus only 1955 genes in the control group. After pathway mapping, we identified pathways of inflammation, apoptosis and cell death being upregulated in sepsis, which were not altered in controls ($p < 0.05$). 24 h after induction, sepsis had limited effect on expression of mitochondrial genes. Detoxification by P450 cytochrome enzymes was upregulated in controls while septic pigs showed no change or even downregulation ($p < 0.05$).

CONCLUSION. Fluid-resuscitated sepsis is accompanied by an upregulation of inflammation, apoptosis and cell death, while hepatic detoxification is suppressed.

0497

OXYGEN CHALLENGE TEST REVEALS MACRO- AND MICROCIRCULATORY DYSSYNCHRONY IN PREDICTED SURVIVORS AND NON-SURVIVORS OF FAECAL PERITONITIS

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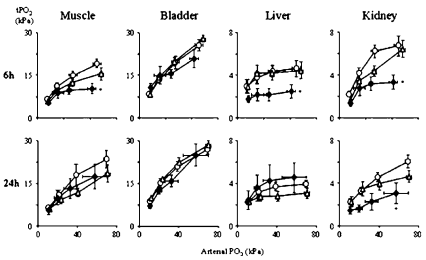
INTRODUCTION. An increment in transcutanoeus tissue oxygen tension (tPO_2) of <21 mmHg following 100% O_2 administration was associated with a poor outcome in septic patients (1). We applied this oxygen challenge test (OCT) in our rat model of faecal peritonitis in peripheral (muscle, bladder) and deep (liver, renal cortex) organ beds.

METHODS. Fluid-resuscitated male Wistar rats received an intraperitoneal injection of faecal slurry, modelling faecal peritonitis. At 6h post-insult rats were anaesthetised and echocardiography performed. Rats were divided into predicted survivors and non-survivors based on a stroke volume greater or less than 0.14 ml, respectively (2). Animals then received a tracheostomy and had tPO_2 probes placed in muscle, between two liver lobes, within the bladder lumen and left renal cortex to measure the regional oxygen supply/demand balance. After confirmation of normovolaemia, the fraction of inspired oxygen (FiO_2) was increased to 0.3, 0.6 and 1.0 at 15 minute intervals. In separate experiments, this was repeated at 24h post-insult. Comparisons were made at both timepoints against sham-operated animals that underwent instrumentation but received no septic insult.

RESULTS. Data shown as mean (± SE), $^*p < 0.05$ between sham (open circles; n=8), good-prognosis sepsis (light grey triangles; n=8) and poor-prognosis sepsis (black diamonds; n=8). Statistics: 2-way RM-ANOVA + Tukey's test.



CONCLUSION. The OCT revealed a reduced response to hyperoxia in predicted non-survivors after 6h of sepsis, suggestive of microcirculatory dysfunction in this early phase of sepsis, Apart from the renal cortex, this had recovered by 24h even though clinical status, organ function and lactataemia had significantly worsened (data not shown). The OCT could provide a simple method to assess microvascular perfusion and its responsiveness.

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0498

PROCALCITONIN AS AN EARLY DIAGNOSTIC MARKER FOR SEPTIC SHOCK

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INTRODUCTION. Procalcitonin (PCT) is more a "follow-up" prognosis marker than an early diagnostic tool. In early stages of shock, it may differentiate between septic and other causes of shock allowing an early treatment according to it. The objective of our study was to determine PCT usefulness as an early diagnostic marker for septic shock.

METHODS. Prospective, longitudinal, observational study from October 2007 to March 2008. 108 patients with an initial diagnosis of shock were included. PCT was determined at admittance and 5 days later. Sedimentation Rate (SR), C-reactive protein (CRP), leukocytes, APACHE II Score and SOFA score were also obtained. Results are expressed in median (25–75th interquartile interval) and analysis was made with U Mann-Whitney and Pearson chi square as required and ROC curves created to determine predictive values.

RESULTS. At admittance, patients with septic shock presented higher PCT, SR, CRP and leukocyte values than other shock from other causes: PCT 4 (3–5) vs. 0 (0–0) of septic shock vs. others respectively ($p < 0.01$); SR 20(15–25) in septic shock vs. 9 (7–14) and p value <0.01; CRP 15 (10–19) vs. 7(4–10) respectively ($p < 0.01$); Leukocytes 11.3 (9–13.3) vs. 6 (4.3–8.1) and $p < 0.01$. APACHE II score for both groups was different: 22 (18–24) of septic shock vs. 12 (10–15) ($p < 0.01$) but SOFA score for both patients was identical: 10(10–12). As a diagnostic tool for septic shock, when compared with other markers, PCT resulted to be 100% sensitive, 89% specific with positive predictive value of 86%, negative predictive value of 100% and an area under the curve of 0.996.

CONCLUSION. As expected, this study demonstrates that elevations of PCT in shock patients at admittance, is the best way to differentiate between septic shock and other causes of shock.

Poster Sessions
Creative nursing: 0499–0511

0499

SUCCESSFUL IMPLEMENTATION OF A DELIRIUM ASSESSMENT TOOL IN THE ICU

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INTRODUCTION. In critically ill patients delirium is a serious and frequent disorder. As early recognition of the delirium is important for adequate treatment routine screening of the patients is necessary. To be meaningful for practice this screening should be performed frequently and interrater reliability (IRR) should be high. The aim of our study was to implement the validated confusion assessment method-ICU (CAM-ICU) in our ICU, aiming at a scorings rate of >80%, an IRR score of >0.80 and a high level of knowledge concerning delirium.

METHODS. The implementation strategy focused on potential barriers for screening with the CAM-ICU, i.e. lack of knowledge and availability of the assessment tool. We integrated the CAM-ICU in our patient data management system (PDMS). Necessary testing tools became available at every bed. Every patient had to be assessed once a shift, if not a pop-up on the PDMS-screen appeared. We used 'delirium key-nurses' for further instruction and introduction in the ICU. In addition, instruction posters for nurses and the medical staff were distributed. Feedback about results and performance of the CAM-ICU was supplied weekly by mail and during clinical meetings. Scoring rate was calculated by the percentage scored patients per day. IRR was assessed by calculating the Cohen's Kappa between the score on the CAM-ICU by the ICU nurse with the score by an expert psychiatric nurse. To assess the knowledge level (on a scale for 0–10), all ICU nurses performed a test prior to group training and a post-test 4 months later.

RESULTS. During 4 months, 78 patients were screened for IRR. In the first month this was 0.78 (N=25, 95%CI: 0,5–1,0). After intensive training on the job and feedback twice a week, the IRR increased relevantly to 0.89 (N=47, 95%CI: 0,75–1,0). The scoring rate of the CAM-ICU increased from 77% to 92%. The delirium knowledge level of the nurses increased from 6.2±1.7 to 7.4±1.2 (p=0.0001).

CONCLUSION. Tailoring our implementation strategy to the ICU was successful. The main goals were achieved in a relatively short time. Early recognition of delirium with the CAM-ICU has become a standard component of the daily care of our ICU nurses and contributes to the quality of care.

0501

UTILIZATION OF A NURSING "JOURNAL CLUB" TO DISSEMINATE EVIDENCE-BASED PRACTICE

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INTRODUCTION. Nursing practice based on evidence improves patient outcomes. Members of an American Association of Critical Care Nursing (AACN) local California chapter in the United States reported significant barriers that prevent them from incorporating research findings into their practice. Subsequently, a masters-prepared advance practice nurse developed a unique "Journal Club" to reduce these barriers and increase awareness of Evidence-Based Practice (EBP).

METHODS. In 2002, a monthly Journal Club was initiated to engage acute and critical care nurses from local regional hospitals in discussion of current, recently published research findings. The monthly topics were selected based on clinical relevance, educational needs assessment, and requests by members. The monthly Journal Club meetings take place at the same time and place in a local restaurant, usually with vendor sponsored dinners. Methods to decrease the inherent barriers related to critiquing academic research included a chapter led critique and review of research findings. This method decreased anxiety related to lack of skills to critique or synthesize the literature and difficulties interpreting the findings by many nurses. Chapter facilitated discussion of complex research by placing less emphasis on interpretation of statistics and research methodologies and focused on adaptation of findings into real clinical practice. The confidential, non-threatening, supportive environment promoted open, frank discussion and diminished intimidation.

RESULTS. Over the past five year period, the monthly Journal Club attendance increased from 4–6 members in 2002 to 40–50 members currently and continues to grow. Several members travel over 100km to attend. Community subgroups of interest have also been established to review sedation protocols and other hot topics prompted by an initial Journal Club discussion. Many hospitals are willing to "share" policies, guidelines, and tools that they have created with other nurses/institutions in the community to avoid having to "reinvent the wheel" to get things rolling in their hospital of practice.

CONCLUSION. The regional Journal Club has grown to be a huge success. The creator of the Journal Club and the Board of Directors of the AACN chapter have received numerous member anecdotal accounts of the influence meetings have played in their professional lives by sharpening their professional interest and increasing awareness. The use of research in everyday practice is promoted by simplification of complex research topics and promotes replacing practice based on tradition with practice based on evidence and results in positive patient outcomes.

0502

IMPROVING POSTOPERATIVE PAIN RELIEF BY EXTENDING SERVICES BEYOND THE ICU WALLS

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INTRODUCTION. Postoperative pain treatment is often initiated during operation, followed up in the recovery room/ICU, and to be continued in a ward. Information, observation and understanding of pain treatment protocols has become a multidisciplinary matter (1,2). In order to secure uniform postoperative pain treatment, we have implemented a system based on extending the ICU protocols to the wards: A) Dedicating a "pain nurse" from the ICU to follow up on patients after they left the ICU/recovery room. B) Developing uniform procedures for treatment of postoperative pain. C) Introducing the "pain nurses" in a liaison role between doctors and nurses in all wards. D) Implement a uniform pain scoring form in all wards. The objective of this investigation is to evaluate the system we have implemented. Since epidural pain relief is associated with both technical problems and potentially serious side effects (3,4), we used this group of patients in this study.

METHODS. Between 2002 and 2006 2062 patients received an epidural infusion as postoperative pain relief. A standardized mixture for epidural pain relief consisting of Bupivacain, Adrenaline and Fentanyl was given to all patients. All data was entered into the form described above by the nurses responsible for the patient on the wards. In this study we have retrieved the following information: Age, type of operation, level of catheter insertion, duration of treatment, average dose (ml/hour), total dose, reason for unscheduled termination of treatment, side effects and patient satisfaction – whether the overall treatment was perceived as poor, acceptable, good or excellent.

RESULTS. From 2002 to 2006 the number of patients indicating that their pain relief was excellent rose from 32% to 73%. The number of patients reporting that their treatment was poor fell from 12% to 3%. In 2002 13% of the patients had to terminate the treatment due to technical problems, in 2006 only 5% of them had to do the same. In 2002 12% of the patients had to terminate the treatment due to side effects. In 2006 only 5% had the treatment stopped due to this.

CONCLUSION. We conclude that the improvement we have seen in the postoperative treatment with epidural infusion is due to the organizational changes we have introduced. We believe that informing those closest to the patients – the nurses on the wards – is the single most important initiative we introduced in order to improve the postoperative pain treatment. The effect of this has been a better communication and understanding of the patients needs. A more vigilant set of observations and hence swifter response from the staff when the pain treatment was not satisfactory, or when side effects occur. It is also likely that similar improvements can be obtained in other areas where ICU treatment strategies are supposed to continue after the patients have left the ICU. Well-established and documented treatments may result in sub optimal results due to lack of communication and knowledge, and poor implementation of protocols between the ICU and all other involved personnel and departments.

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0503

SERVICE GAP: PREGNANT AND POSTNATAL WOMEN IN ICU

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INTRODUCTION. Pregnant and postnatal women in ICU require specialist care that may not be readily available within the critical care team, with midwifery increasingly recognised as a separate profession to nursing. The aim of this study was to examine the health services provided to parturient women in ICU to identify if a service gap existed.

METHODS. A prospective cross-sectional study was conducted in four tertiary-level intensive care units (ICU) in Melbourne, Australia. Only one ICU was in a hospital that provided obstetric services. All pregnant and postnatal women admitted to ICU were eligible for the study. Nurses formed core research teams and assisted with the auto-enrolment of eligible women, time-critical data collection and the obtaining of consent. Additional data were gathered from the medical history following discharge. Data were entered in SPSS (v12) and analysed.

RESULTS. Of the 43 known eligible women, 35 were enrolled, and 33 gave consent; 8 were pregnant. Two of the eight pregnant women were 8 weeks' and 14 weeks' gestation respectively. The gestation of the other six pregnant women ranged from 27 to 36 weeks'. Of the six women with a viable pregnancy, three had a fetal ultrasound when in ICU, five out of six had at least one cardiotocograph and one woman had no fetal assessment in ICU. None of the pregnant women gave birth during the ICU admission. Of the 25 postnatal women, 92% were admitted in the first 24 hours following birth. Four women saw their baby whilst in ICU, with the remaining women needing to wait until they were transferred out of ICU. An obstetric condition was the principle diagnosis for two thirds of women. However, pregnant and postnatal women were seen by 23 different types of medical specialties whilst in ICU. The mean number of specialties seen by individual women was 3.6 (median 4.0). 53% of women were seen by an obstetrician when in ICU: 100% of women with private health insurance (n=11) compared with only 29% of public patients ($p < .05$). Having the ICU and obstetric services on the one-site increased the chance of the woman being seen by an obstetrician, but did not guarantee it. Only 30% of the pregnant and postnatal women in ICU were seen by a midwife. Whether the woman was pregnant or postnatal did not affect her chance of being seen by an obstetrician or midwife in ICU. 70% (n=23) of women were transferred by ambulance between hospitals to access the ICU bed.

CONCLUSION. Women received fragmented care from many health professionals and service providers. A service gap existed in the care provided to the pregnant and postnatal women admitted to ICU and articulated processes are required if pregnant and postnatal women are to have access to maternity care in ICU.

0504

FEVER MAGNITUDE AS PREDICTOR OF PATIENT ACUITY IN THE ICU

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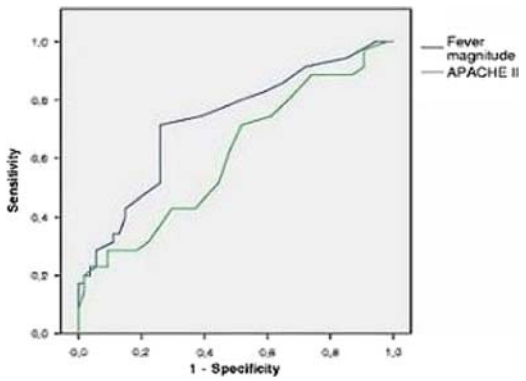
INTRODUCTION. Prediction of ICU patient (pt) acuity is very important because inadequate coverage of pt care needs is associated with adverse outcomes. Since clinical severity is highly correlated with pt care needs[1], this study compares fever magnitude vs. pt clinical severity as predictors of ICU pt acuity.

METHODS. We prospectively studied 89 pts with fever (defined as tympanic temperature >38.3°C) admitted to the medical-surgical ICU of an academic hospital, in a 6-month period. Pt acuity was assessed daily with TISS-28. Clinical severity on admission was assessed with APACHE II score. Receiver operating characteristics (ROC) curve analysis was used to evaluate the discriminative power of fever magnitude on high pt acuity (mean daily TISS-28 >34 points).

RESULTS. 67 of 89 pts were male, and 48 were medical. Mean (±SE) age was 50.4±2.0 years and mean APACHE II score was 14.3±0.6 points. 35 pts were of high acuity. ROC analysis showed that, compared to APACHE II, fever magnitude was a better predictor of high pt acuity, although the difference did not reach significance (area under the curve: 0.73±0.06 vs 0.61±0.06, p=0.114). Temperature >39.1°C was selected as fever magnitude threshold by ROC analysis (sensitivity 71.4%, specificity 75.1%).



CONCLUSION. Fever magnitude is a good predictor of high pt acuity in the ICU, and can be used instead of APACHE II for properly allocating nursing manpower among febrile pts.

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0505

NURSING WORKLOAD BASED ON NURSING ACTIVITIES SCORE IN GROUPS OF SURGICAL AND NON-SURGICAL PATIENTS IN POLISH INTENSIVE CARE UNITS

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INTRODUCTION. Using nursing time in intensive care units is connected with measuring nursing workload. Its aim is to determine optimal level of staffing in order to ensure high quality of medical services.

The purpose of the paper is to present nursing workload in two patients groups: surgical and non-surgical.

METHODS. The studied group comprised 314 patients treated in 5 intensive care units with different treatment profiles [1]. The study applied prospective analysis of nursing workload among surgical and non-surgical patients. The methodological tool was NAS – Nursing Activities Score [2]. For evaluation of the severity of the patient's clinical condition APACHE II was used. Research techniques included participant-observation and the analysis of patients' medical documentation and the analysis of medical staff documentation.

RESULTS. In the studied group there were 176 patients treated with various surgical methods (56%) oraz 138 non-surgical patients (44%). Clinical severity condition among surgical patients and non-surgical patients was slightly different and did not show correlation with nursing workload (p>0,005). The median in APACHE II for surgical patients was 20 (1 - 36) and for non-surgical patients it was 21 (3 - 42). Nursing workload expressed with a median of scores in NAS for surgical patients was 69,7; 43,6–130,9, while for non-surgical patients it was 74; 12–150,3 (p>0,05). Optimal level of nurse staffing in the studied units expressed by nurse:patient ratio based on NAS was 1:1,2, while the real ratio nurse:patient was 1:1,3 – 1:2.

CONCLUSION. No correlation between the patient's clinical condition and nursing workload was observed.

No statistically significant differences were found in nursing workload in surgical and non-surgical group.

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0506

PROFESSIONAL AUTONOMY AND JOB SATISFACTION: A QUESTIONNAIRE SURVEY OF HOSPITAL CRITICAL CARE NURSES IN MAINLAND GREECE

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INTRODUCTION. Professional autonomy is generally considered a highly desirable nursing attribute and a major factor of nurse job satisfaction. In the critical care environment a high level of accountability, responsibility and autonomy are required in order to optimize outcomes of critical unstable patients.

METHODS. A cross-sectional survey was conducted in 16 public hospitals located in Athens, from mid Apr to the end of July 2007. 302 critical care nurses completed questionnaires, yielding a response rate of 70%.

RESULTS. Overall Greek critical care nurses reported acting moderately autonomously with a mean score of 165.4 (SD=24.6) compared with the possible range from 60 to 240. Respondents' age, gender, level of appointment, completion of clinical specialty, length of critical care experience, shift and membership of a professional organization were found to be significantly associated with reported autonomy ($p < 0.005$). A positive moderate association was found between reported autonomy, job satisfaction and role conflict and role ambiguity ($r=0.331$, $p < 0.001$ $r=0.324$, $p < 0.001$ respectively). No significant association was found between job satisfaction and reported role conflict and role ambiguity (r=0.047,p=0.411).

CONCLUSION. Greek critical care nurses' autonomy appears to allow further support and enhancement if the nurses are to realize their full professional role.

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0507

THE NURSES ROLE IN DETECTING AND MANAGING THE DETERIORATING WARD PATIENT: A SYSTEMATIC REVIEW

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INTRODUCTION. Ward patients can experience unexpected physiological deterioration that can lead to critical outcomes and death. This deterioration can be signalled in the patients physiological signs that are monitored by ward nurses as part of routine practice. In many cases these physiological signs have been missed, neglected or poorly managed (1 2). Systems designed to track patients physiological signs and trigger referral to an expert team have been widely implemented. Proving effectiveness of these systems has been problematical, partly due to the reliance on a timely and robust system of observation monitoring, plus compliance by the ward teams in the referral process to response teams. It is vital that we understand these ward processes. A systematic literature review is presented that critically evaluates research describing or appraising the nursing practice of taking and recording observations in the detection and management of the deteriorating ward patient.

METHODS. Eight data bases were systematically searched from 1990 to 2006, plus citations from key articles and reports. Experts in the field were contacted. All study designs were incorporated. Eligible studies were assessed for quality using an assessment tool for both qualitative and quantitative studies. The findings from the studies were critically evaluated using a narrative technique.

RESULTS. Fifteen studies were eligible from 740 titles. Study quality varied. Findings are presented using the Record, Recognise, Report and Rescue (4R) model that outlines a series of actions that characterises the optimal process of detection, recognition and appropriate management of the deteriorating ward patient. Complex dichotomies exist in each of the 4R model categories that show ward nurses struggling to adequately detect and manage the deteriorating ward patient, hampered by inexperience, lack of skill and excessive workloads. Where support systems are in place, they require skilled and complex collaboration with medical staff and can be inconsistently activated and utilised.

CONCLUSION. Effective detection and mangement of patient deterioration relies on robust patient observation practice and adherence to track and trigger referral triggers. In order to see the benefit of these systems we need to understand the issues that enhance and inhibit the practice of recording, recognising, reporting and rescuing (4Rs) by ward nurses. We can then find ways to better equip wards to deal with these issues and improve patient outcome.

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0508

MEDICAL ART THERAPY: INFLUENCE ON QUALITY OF LIFE AND COMPLIANCE OF PATIENTS WITH ADVANCED HEART FAILURE

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INTRODUCTION. Medical Art Therapy (MAT) enables medically ill people to express their feelings of frustration, fear, anxiety and hopes in art. In heart failure (HF) depression and anxiety are common.

Aim: To evaluate the influence of guided group MAT on the quality of life and compliance to therapy of patients with advanced HF.

METHODS. Methods: Between April and July 2006, 20 advanced HF patients were randomly divided: ten in the intervention group (group A) and ten in the control group (group B). First and last visits were individual during which the Ulman Personality Assessment Procedure (a MAT diagnostic tool), the Minnesota Living with HF and compliance questionnaires were recorded. Both groups met weekly for 6 weeks. A MAT therapist (N.T.) guided group A to express their feelings using art material. Group B met for a routine clinical visit only.

RESULTS. Results: Baseline Ulman, compliance and Minnesota scores were similar amongst the two groups. By the end of the study, Ulman score improved significantly in group A compared to group B (95±10 to 82± 14 p=0.0006 vs. 86±10 to 81±12 p=0.5) as was the compliance score (29±11 to 33±13 p=0.05 vs. 36±5 to 36±6 p=0.9). In group A, Minnesota score improved significantly in 7 patients and did not change in 3 while in group B it improved in 2, did not change in 6 and worsened in 2.

CONCLUSION. Conclusions: MAT improves quality of life and compliance in advanced HF patients and should be a part of the therapeutic arsenal in every HF clinic.

0509

QUANTIFICATION OF NURSE WORKLOAD AND DISCHARGE CRITERIA - A PILOT STUDY IN POSTOPERATIVE PATIENTS

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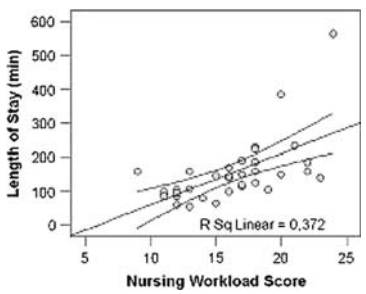
INTRODUCTION. Efficient and humane care of postoperative patients in the postanaesthesia care unit (PACU) calls for objective measures to forecast patient acuity, and enable prediction of nurse workload related to different patient categories. Additionally, discharge criteria will ensure that length of stay does not exceed what is needed.

METHODS. Prospective evaluation of two scoring systems; one that measured nurse workload, developed by Kaiser Permanente, USA (1) and another that rated objective discharge criteria, developed by the Danish anaesthesia society (2). Patients were scored upon admission and discharge, and during their stay in the PACU.

RESULTS. Thirty-seven postoperative patients were included in this pilot study. Nurse workload was correlated to length of stay and was primarily determined by the number of drugs and/or doses of drugs administered ($p < 0.01$, Rsq = 0.37). Twelve patients (32%) fulfilled criteria for discharge upon admission to the PACU. Pain was the major reason why patients did not fulfil discharge criteria at any time.



CONCLUSION. These scoring systems seem to provide relevant information about nursing workload for postoperative patients. Also, objective discharge criteria may ensure that patients will receive care better adapted to individual needs. This pilot investigation precedes a study in 750 patients, data from which will be available at the ESICM congress.

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0510

EDUCATING INTENSIVE CARE NURSES IN END OF LIFE ISSUES AND SKILLS

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INTRODUCTION. Intensive Care nurses are well trained in the skills needed for the battle for life.However less education is available in the skills needed when the patient is dying.This presentation describes a workshop developed by nurses for nurses as part of post basic studies for a diploma in ICU nursing.

METHODS. A two day seminar was developed to give nursing staff insight, theoritical knowledge and skills to use when dealing with the dying patient and the grieving family.The setting was a nursing school situated in a thousand bed general hospital.The participants were twenty-five trained nurses working in adult intensive care, neurosurgical, internal medical and recovery departments.The facilitators were the nurse tutor intensive care course and two nurses trained in group dynamics and with expertise in End of Life and ethics. Two six hour sessions were held. Use of a group dynamic allowed each nurse to express how they view EOL care in their own personal practice. This opening was followed by a group exercise using collage,an art therapy technique adapted to allow exploration of painful feelings on death and dying.By promoting self awareness into individual attitudes on death the caregiver is strengthened when caring for others.Theoritical knowledge was given next via frontal lectures on ethics, attitudes on EOL and law regarding the rights of the dying. The care of the grieving family was addressed using the Family Needs Inventory(CCFNI). Techniques of breaking bad news were discussed and theories of other disciplines such as Oncology were examined for models of palliative care that could be used in intensive care settings.

RESULTS. A pre-workshop questionaire showed that all nurses felt they had received inadequate training in EOL care.The collage exercise demonstrated that nurses experience considerable distress from the death of patients. Post workshop feedback confirmed that nurses felt they had been given tools to use while dealing with death and dying.

CONCLUSION. Composure has been described to be the ability of the nurse to be present for the patient at the end of life,and demonstrate concern and compassion whilst changing the aim of saving life to the preservation of the dignity of the patient and the stability of the family.This workshop was given by nurses to help nurses achieve composure, that most difficult of skills, and allow them to be there for their patients when doing is no longer possible.

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0511

PATIENT DIARIES IN DANISH ICUS - CONSTRUCTING NATIONAL GUIDELINES

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INTRODUCTION. Patient diaries have been used in intensive care units (ICUs) in the Scandinavian countries since the 1980s and in other European countries through the 1990s–2000s as a means to help patients to come to terms with their critical illness, which is often accompanied by distorted memory, lack of recall and nightmares (1). Studies are emerging into the effect of patient diaries as a debriefing instrument in relation to symptoms of posttraumatic stress disorder (PTSD) (2–3). The purpose of this study was to describe the use of patient diaries in Danish ICUs and to construct a National Guideline for Patient Diaries in the ICU (4).

METHODS. The study is descriptive and interactive. The first part of the study was to establish the use of diaries through telephone interviews with nurses at all ICUs using patient diaries, and the second part was to construct a National Guideline by consensus among Danish ICU nurses from the five administrative regions of Denmark. The guideline was constructed using the AGREE-instrument and was submitted to the Department of Health for discussion of ethical and legal issues, as Danish law is very restrictive regarding patient protection.

RESULTS. Patient diaries are used in half of the Danish ICUs and only few local guidelines have been written. The use of patient diaries has been an unsystematic bottom-up initiative by ICU nurses with little management support. On an initial workshop on patient diaries it was clear that consensus could not be reached regarding the application of the intervention. Five regional groups were established and consensus was gradually achieved by negotiation among the groups.

CONCLUSION. Patient diaries are emerging as an effective instrument for debriefing and prevention of PTSD in patients discharged from ICU. The practice of writing diaries is not homogeneous and needs more conformity in order to be studied further. More studies are needed to establish the role of the family in patient diaries and of follow-up regimes for this group of patients.

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Poster Sessions
Alternative strategies for oxygenation and CO^2-removal: 0512–0523

0512

BLOOD ACIDIFICATION ENHANCES CARBON DIOXIDE REMOVAL OF MEMBRANE LUNG: PRELIMINARY EXPERIMENTAL DATA

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INTRODUCTION. Extracorporeal CO2 removal is an effective technique to limit minute ventilation, thus allowing a protective ventilatory strategy even in the most severe ARDS patients. However, since CO2 is driven through the membrane lung only by the partial pressure of the dissolved CO2, which is less than 10% of the total CO2 content, extracorporeal blood flow as high as 2 liters/min are required to remove the total CO2 production of an adult patient. We hypothesized that acidification of the blood entering the ML could convert the CO2 contained in blood as bicarbonate ions to dissolved CO2, hence increasing the partial pressure of CO2 (pCO2). The consequent increase in CO2 transfer though the ML should allow for a reduction of extracorporeal blood flow.

METHODS. Six pigs (37±2 Kg) were sedated, intubated, mechanically ventilated and connected to a veno-venous extracorporeal circuit comprising a ML (Quadrox D). Minute ventilation was adjusted during the experiment to maintain a constant arterial pCO2. The extracorporeal blood flow was set at 500 ml/min while the gas flow was 10 l/min of oxygen. A continuous infusion of 0.5 N lactic acid was added to the extracorporeal blood flow before the ML at a rate of 1, 2 and 5 mEq/min for 15 minutes each. After each infusion we waited at least 30 minutes to allow the acid to be metabolized. Each infusion was repeated two times. At each step we obtained the amount of CO2 removed, free hemoglobin and gas analysis from different sites of interest.

RESULTS. The pH of the acid loaded blood decreased as expected, while blood pCO2 increased (see Table). ML CO2 removal (VCO2 ML) increased 11, 23, 70% during acid infusion of respectively 1, 2 and 5 mEq/min. Blood free hemoglobin, a marker of hemolysis, was constantly within normal values.

TABLE 1

Acid infusion (mEq/min)	0	1	2	5
Venous drainage pCO2 (mmHg)	52±9	53±12	55±8	57±8
Venous drainage pH	7.440±0.045	7.426±0.055	7.402±0.025	7.355±0.028
Pre ML, acid loaded pCO2 (mmHg)	52±9	66±15	82±13	132±16
Pre ML, acid loaded pH	7.440±0.045	7.310±0.05	7.214±0.048	6.926±0.044
ML VCO2 (ml/min)	108±5	123±21	137±21	173±24

CONCLUSION. Blood acidification at the inlet of a ML, with infusion of 1, 2 and 5 mEq/min of a lactic acid, can increase up to 70%, the CO2 removal capacity of the ML, allowing to remove the equivalent of 80% (173±23 ml/min) of the total CO2 production of an adult man from as low as 500 ml of blood.

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0513

PUMPLESS ARTERIO-VENOUS EXTRACORPOREAL INTERVENTIONAL LUNG ASSIST IN POST-TRAUMATIC ACUTE RESPIRATORY DISTRESS SYNDROME

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INTRODUCTION. ARDS due to trauma is associated with a high mortality rate. The use of pump-driven extracorporeal membrane oxygenation (ECMO) is reported in severe posttraumatic ARDS, but the complication rate (bleeding, shock) is high. We report on the use of a pumpless interventional lung assist (iLA, Novalung, Hechingen, Germany) establishing an arteriovenous shunt, in which a single-use ultracompact gas exchange system is integrated.

METHODS. iLA was inserted in 36 trauma patients suffering from severe ARDS with lifethreatening hypoxemia/hypercapnia. Contraindications were hemodynamic instability (cardiac index < 3 l/min/m2) or severe coagulation disorder (platelets < 60.000, aPTT > 60 sec). The system was started after careful cannulation of femoral artery (15-17 F) and vein (17-19 F).

RESULTS. The median (interquartil ranges) age of patients was 23 (20–31) years. The Injury Severity Score (ISS = 42 [34–59]) indicated a most severe trauma. The implementation of iLA induced a moderate increase in oxygenation and a marked and rapid correction of hypercapnia, allowing a significant decrease in tidal volume and plateau inspiratory pressure (''lung protective strategy''). In 7 patients (19%) moderate complications (transient ischemia of lower limb, bleeding) occurred. The hospital mortality rate was 36%.

TABLE 1 EFFECTS OF ILA IN POST-TRAUMATIC ARDS (MEDIAN VALUES + INTERQUARTIL RANGES)

	pre iLA	2 hrs after iLA-start	24 hrs after iLA-start
PaO2/FIO2 (mmHg)	69 (49–84)	91 (64–136) **	116 (79–174) **
PaCO2 (mmHg)	66 (52–78)	40 (35–48) **	39 (31–46) **
art. pH	7,23 (7,17–7,32)	7,39 (7,28–7,46) **	7,45 (7,35–7,48) **
mean art. pressure (mmHg)	71 (65–79)	81 (71–90)	83 (75–98)
norepinephrine (ug/kg/min)	0,2 (0,03–0,4)	0,2 (0,03–0,4)	0,1 (0,04–0,5)
tidal volume (ml/kg/IBW)	6,6 (6,1–7,3)	6,1 (4,7–6,7) *	5,5 (4,6–6,8) **
iLA-flow (l/min)		2,0 (1,6–2,2)	1,9 (1,7–2,2)

** = $p < 0.05$; ** = $p < 0.01$; IBW = ideal body weight*

CONCLUSION. iLA might find a place in the scenario of trauma management, since it provides a useful technique in posttraumatic ARDS. Due to effective CO2-removal, iLA is an important tool in realising lung protective ventilation. In our patients, the mortality rate was lower than expected from the ISS.

0514

HIGH EFFECTIVENESS OF A NEW PORTABLE MINI-ECMO SYSTEM FOR OUT-OF-CENTRE ECMO SUPPORT

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INTRODUCTION. Severe respiratory and cardiac failure resistant to critical care treatment leads to hypoxemia and death of hypoxic organ failure. New treatment options for hypoxemia are necessary, even for patients primary located in outlying medical facilities. We report our experience with a new developed, portable Mini-ECMO (Extracorporeal Membrane Oxygenation) system for emergency treatment of hypoxemia caused by ARDS, cardiogenic shock or septic shock. We describe out-of-centre emergency percutaneous ECMO implementation and additional air- and ground ambulance transfer for referral centre treatment.

METHODS. Between March 2006 and April 2008, we treated 15 adult patients located in outlying medical facilities with the new portable Mini-ECMO system and carried out interhospital transfer on the running system. Diagnosis included ARDS (n = 6), cardiogenic shock (n = 6) and septic shock (n = 3). Bedside cannulation was achieved percutaneously. In respiratory failure, we used a femoro-jugular veno-venous vessel access, in cardiocirculatory failure we implementated the Mini-ECMO system using a femoro-femoral veno-arterial vessel access. The new portable Mini-ECMO system consists of a centrifugal pump and a membrane oxygenator. Because of tip-to-tip heparin bonded circuits, we need no full dose heparinization. The system (27kg) is capable for hand-held use and suitable for storing on a standard gurney. With its inbuilt battery pack and oxyen-supply the hole system can act as a stand-alone device (e.g. during patient transfer from ICU to the ambulance).

RESULTS. Bedside cannulation was uneventful, bleeding complications did not occur. After start of the extracorporeal membrane oxygenation the systemic blood-flow and oxygenation were restored. During extracorporeal assistance, including air (n = 12) and ground (n = 3) ambulance transfer, no technical complication arrived. Limb ischemia due to the arterial cannula was observed in two cases. Hospital survival rate was 66%.

CONCLUSION. The use of this new portable MINI-ECMO system is safe and high effective for management of hypoxemic patients with severe respiratory and cardiocirculatory failure, resistant to conventional critical care treatment. Especially patients in outlying medical facilities can now be first time treated with bedside ECMO support without extended technical or personnel support. Interhospital transfer for ARDS centre treatment or urgent coronary interventions can now be handled in re-established cardiac output and oxygen delivery. The new hand-held MINI-ECMO device enables emergency treatment of hypoxemia and improves survival rate in critically ill patients.

0515

MAJOR THORACIC SURGERY DURING EXTRACORPOREAL LIFE SUPPORT IN ARDS

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INTRODUCTION. major surgical procedures in patients with ARDS during extracorporeal respiratory support are potentially lifethreatening due to anticoagulation. Moreover, during thoracothomies the surgeon must face the not-collapsable ARDS lung that can limit the accessibility to the thoracic cavity.

METHODS. retrospective analysis of indications, complications and outcome of thoracothomies performed during veno-venous ECLS in patients with ARDS.

RESULTS. From 1980, 132 patients with ARDS have been supported with ECLS in our institution. In 21 patients (16%) [13 females, 8 males, mean age 30 ± 12 (8–53 years)] we performed a total of 32 thoracic surgical procedures.

In 15 patients, thoracothomy indication was to control major chest tube bleeding or massive hemothorax, 4 lobectomies were performed. 6 patients underwent revisions within 48 hrs due to persistent bleeding, in other 3 patients 4 delayed reopening were required due to thoracic cavity tamponade with mediastinal shift. Of these 15 patients, 5 (33%)were successfully deconnected from ECLS, and discharged alive from the hospital, 2 remained on ECLS for more than 2 weeks after the first thoracotomy. In one patient a sternotomy with pericardiectomy, following three episodes of cardiac tamponade, was performed; the patient was deconnected from ECLS after operation and survived. In 4 patients thoracothomy indication was to control the source of septic shock and concomitant bronchopleural fistula, 3 pneumonectomy and 1 lobectomy were performed, none survived. One patient underwent a first thoracotomy for bleeding and subsequentely a pneumonectomy due to lung colliquation, and died. Packed red cell and fresh frozen plasma transfusions during surgical procedures were 2.58 ± 1.53 lt and 2.37 ± 1.56 respectively.

CONCLUSION. surgical control of hemorrhage from the thoracic cavity in ARDS patients anticoagulated for ECLS is a demanding task. Since 1991, the use of heparinized circuits allowed us to perform the surgical procedures with normal or close to normal coagulation status while on bypass. Nevertheless, multiple procedures, as reported in literature, are frequently required to control bleeding. Other thoracotomy indications had an unfavorable outcome in our experience.

GRANT ACKNOWLEDGEMENT. Supported by MIUR.

0516

PHYSIOLOGIC EFFECTS OF INTRAPULMONARY PERCUSSIVE VENTILATION IN PATIENTS AT RISK FOR RESPIRATORY DISTRESS AFTER EXTUBATION

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INTRODUCTION. Intrapulmonary percussive ventilation (IPV) is a technique that delivers small burst of gas at high rate, intended for mobilization of secretions, and which can be superimposed on spontaneous breathing (SB). Surprisingly little studies assessed the physiological changes induced by IPV. In stable COPD patients, IPV induced a significant unloading of the diaphragm (1). In a bench study, we demonstrated that IPV added to a conventional ventilator, increases positive end expiratory pressure and tidal volume (2). The aim of this prospective study was to assess the short term physiologic effect of a session of IPV in patients at high risk extubation failure treated by non invasive pressure support ventilation (NPSV).

METHODS. In 10 patients, 1 hour after extubation, we evaluated gas exchange, respiratory rate and inspiratory effort during a 20 minute-period of NPSV and a 20 minute-period of IPV superimposed on SB (IPV-SB). PSV was gradually increased until expired tidal volume was 6 to 8 ml per kilogram of body weight. Positive end-expiratory pressure was set at 4–5 cm H2O. The setting for IPV were as follows: frequency of the percussion = 250/min, driving pressure 1.2 bar. The interface was a facial mask. Initial measurements were performed while the patient was in SB(initial) with return to a final SB condition.

RESULTS. Main results are shown in Table 1. Data are reported as the median and interquartile range [IQR]. § $p < 0.05$ vs SB; # $p < 0.05$ vs IPV. IPV-SB and NPSV improved inspiratory effort ($p < 0.05$). IPV was less efficient than NPSV in reducing inspiratory effort ($p < 0.05$). Neither pH, PaCO2 nor PaO2/FiO2 changed significantly with IPV-SB compared to SB.

TABLE 1

	SB initial	IPV-SB	NPSV	SB final
PTPdi/breath	9.1 [7.0–15.0]	7.9 [5.9–12] §	5.8 [4.5–7.4] §,#	8.9 [7.0–15]
PTPdi/min	250[156–288]	156 [114–196] §	118[104–131] §,#	189 [149–234]
RR (breath/min)	23 [18–31]	17 [16–30] §	19 [17–23] §	20 [17–32]
pH	7.41[7.38–7.44]	7.43[7.39–7.45]	7.43[7.39–7.45]	7.42[7.38–7.45]
PaCO2(mmHg)	44.0 [41–52]	43 [38–50]	43 [40–46] §	43 [40–50]
PaO2/FiO2(mmHg)	261 [210–280]	262 [233–293]	299 [222–303] §	260 [216–348]

CONCLUSION. This physiological study, performed in patients at high risk for extubation failure confirmed that the application of IPV is associated with a reduction of the inspiratory effort, and interestingly, with a marked reduction in respiratory rate. The unloading effect is moderate and less important than with NPSV.

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0517

EFFECT OF FREQUENCY ON LUNG PROTECTION DURING HIGH FREQUENCY OSCILLATION VENTILATION IN SHEEP ACUTE RESPIRATORY DISTRESS SYNDROME MODEL

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INTRODUCTION. To evaluate the effect of frequency on the prevention of Ventilation-Induced Lung Injury (VILI) during High Frequency Oscillation Ventilation (HFOV) in a Sheep Acute Respiratory Distress Syndrome (ARDS) Model.

METHODS. Twenty-four adult sheep (38.3± 2.3 kg) were randomly divided into four groups (n=6): 3 HFOV groups (3, 6, 9Hz) and conventional mechanical ventilation (CMV) group. After induction of ARDS model (PaO2 400mmHg. After this recruitment procedure, optimal mean airway pressure was selected by decreased in 2mmHg every 5 minuets until PaO2 decreased blow 400mmHg, and ventilation was continued for 4 h. Hemodynamics, respiratory mechanics and gas exchange were measured throughout the experiment, and lung histopathological changes, lung wet/dry weight ratio, lung IL-6 expression (ELISA) were determined.

RESULTS. Heart rate (HR), Mean arterial pressure (MAP), cardiac output (CO), Central venous pressure (CVP) and pulmonary arterial wedge pressure (PAWP) did not differ among the four groups in experiment ($p > 0.05$). After lung recruitment, sustained improvements in the oxygenation index were observed in all groups. Histologically, lung injury score was significantly lower in 9Hz HFOV group than other groups ($p < 0.05$). Lung wet/dry weight ratio did no differ among the 4 groups ($p > 0.05$). The expression of IL-6 in lung tissue significantly reduced in 6Hz and 9Hz HFOV-treated animals ($p < 0.05$).

CONCLUSION. Compared with CMV and low frequency in HFOV, the higher frequency in HFOV result in less lung injury. High Frequency Oscillation Ventilation (HFOV) may be an optimal lung-protective strategy.

0518

ACUTE EFFECTS OF HIGH FREQUENCY PERCUSSIVE VENTILATION ON OXYGENATION IN PATIENTS WITH ACUTE RESPIRATORY FAILURE

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INTRODUCTION. High Frequency Percussive Ventilation (HFPV) has been used in the past mainly as a rescue therapy in patients with acute respiratory failure and persistent hypoxemia with promising results. However the role of HFPV has not been completely confirmed yet because of a relatively small number of published data. We tested the efficacy of the HFPV (VDR 4 ventilator) in patients with hypoxemia of various etiologies in comparison with the conventional mechanical ventilation.

METHODS. We studied 8 mechanically ventilated patients (APACHE II score 20 ± 6, SOFA score 10 ± 3, Lung Injury Score 2.4 ± 0.8). Oxygenation, respiratory parameters and hemodynamics were monitored on conventional mechanical ventilation (volume control ventilation, VCV), during a short course of 2 hours on HFPV and finally 30 minutes after reconnection to conventional ventilation.

RESULTS. Values of PO_2/FiO_2, PO_2, PCO_2, pH on conventional mechanical ventilation, before the onset of HFPV, after 2hours on HFPV and 30min after reconnection to conventional mechanical ventilation were analyzed with repeated-measurements method (Anova) and resulted in an overall significant effect. All p-values were Bonferroni adjusted. PO_2/FiO_2 before the onset of HFPV and 2 hours after was significantly increased (128 ± 68 vs. 281 ±110, respectively, p=0.02). In contrast, it was decreased 30min after reconnection to VCV (202 ± 81, p=0.04). pH values were increased 2hours after HFPV compared to those before (7.47 ± .09 vs. 7.37 ± .09 respectively, p=0.01) and 30min after reconnection to VCV (7.42 ± .09, p=0.03). Changes in PCO_2 were also significant between VCV and HFPV (44.7 ± 15.3mmHg vs. 32.5 ± 5.7mmHg respectively, p=0.049) and 30min after reconnection to VCV (39.07 ± 6.7mmHg, p=0.01). Changes in PO_2 were also significant before and after HFPV(91.6 ± 25.1mmHg vs. 178.7 ± 66.1mmHg respectively, p=0.01) and 30min after reconnection to VCV (123.5 ± 39.2, p=0.03). There were no statistically significant changes in hemodynamics during the study period.

CONCLUSION. These results indicate that a short course of HFPV acutely improves oxygenation without affecting hemodynamics. Further study should focus on longitudinal effects of HFPV as an alternative type for ventilation in patients with hypoxemia.

0519

BIOLOGICAL MARKERS OF LUNG INJURY BEFORE AND AFTER THE INSTITUTION OF HIGH FREQUENCY PERCUSSIVE VENTILATION IN PATIENTS WITH SMOKE INHALATION INJURY

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INTRODUCTION. Several biological markers of lung injury are predictors of morbidity and mortality in patients with acute lung injury (ALI). The low tidal volume lung-protective ventilation strategy is associated with a significant decrease in plasma biomarker levels compared to the high tidal volume ventilation strategy. The primary objective of this study was to test whether the institution of high frequency percussive ventilation in spontaneously ventilating patients with severe smoke inhalation injury exacerbates pre-existing lung injury by using measurements of biomarkers of lung injury before and after starting HFPV.

METHODS. A prospective observational cohort study was conducted in the burn intensive care unit. Twelve intubated, mechanically ventilated patients with smoke inhalation injury were enrolled. Physiologic data and serum samples were collected within 6 hours before intubation and at two different time points within the first 24 hours after intubation to measure the concentration of interleukin (IL)-6, IL-8 and TNFalpha. The differences in biomarker levels before and after intubation were analysed using repeated measures analysis of variance and a paired t test with correction for multiple comparisons.

RESULTS. Before endotracheal intubation, all of the biological markers (IL-8, IL-6 and TNFalpha) were elevated in the spontaneously breathing patients after smoke exposition. After intubation and the institution of HFPV monitored with Bicore device (tidal volume 7 to 8 ml/kg per ideal body weight), none of the biological markers was significantly increased at either an early (3 ±- 2 hours) or later (20 ± 3,5 hours) time point. However, the levels of IL-8 were significantly decreased at the later time point (20 ± 3,5 hours) after intubation. During the 24-hour period after intubation, the PaO2/FiO2 (partial pressure of arterial oxygen/fraction of the inspired oxygen) ratio significantly increased and the plateau airway pressure significantly decreased.

CONCLUSION. Levels of IL-8, IL-6, and TNF are elevated in spontaneously ventilating patients with ALI following smoke inhalation prior to endotracheal intubation. The institution of HFPV does not further increase the levels of biological markers of lung injury; the results suggest that the institution of HFPV does not worsen the pre-existing lung injury in most patients with smoke inhalation injury.

0520

VENTILATORY PARAMETERS NOT AFFECTED BY HIGH FREQUENCY CHEST WALL OSCILLATION AND MANUAL HYPERINFLATION

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INTRODUCTION. The Vest® System is a new device used for mobilising secretions in ventilated patients. The system operates by means of external oscillations of the chest wall.

METHODS. 6 Patients were studied in the standard treated group and 6 in the group treated with the Vest® System. Standard therapy consisted of manual hyperinflation with 100% oxygen 3 times a day with suctioning of the airways and exprimation. Patients received an external vest around the thorax. The external vest contained an air chamber which could be inflated with pulsatile oscillative flow. In this way external compressions were done during 20 minutes. SpO2, breathing frequency, tidal volumes, PeCO2 and dynamic lung compliance were recorded at baseline, direct after and 1 hour after therapy. Differences between the measured values compared to baseline were calculated on the time point :direct after treatment and after 1 hour of therapy. These differences were used to investigate if there was a statistical difference between the standard care group and the group treated with The Vest® System. SPSS version 15.0 for Windows was used to investigate the statistical difference with non-parametric Mann Whitney U testing. A significance level of < 0.05 was considered significant.

RESULTS. The difference in breathing frequency directly after treatment was significant lower in the group treated with The Vest® System. Oxygen saturation directly after treatment was significantly higher in the standard treated group.

TABLE 1 DIFFERENCES COMPARED TO BASELINE IN THE 2 GROUPS OF PATIENTS

	Standard therapy	The Vest® system
Tidal volume difference direct mean +/- SD	- 9.0 +/- 66.0	- 23.3 +/- 91.3
Tidal volume difference after 1 hour mean +/- SD	0.6 +/- 57.6	14.6 +/- 108.3
SpO2 difference direct mean +/- SD	0.7 +/- 1.8	- 0.02 +/- 1.73 *
SpO2 difference after 1 hour mean +/- SD	0.5 +/- 1.8	0.1 +/- 1.8
PeCO2 difference direct mean +/- SD	0.16 +/- 0.51	−0.02 +/- 0.53
PeCO2 difference after 1 hour mean +/- SD	0.06 +/- 0.36	0.03 +/- 0.62
Dynamic lung compliance difference direct mean +/- SD	- 0.3 +/- 5.7	- 1.5 +/- 7.5
Dynamic lung compliance difference after 1 hour mean +/- SD	0.2 +/- 5.6	1.5 +/- 7.6
Breathing frequency difference direct mean +/- SD	4.1 +/- 6.7	- 0.2 +/- 6.0 **
Breathing frequency difference after 1 hour mean +/- SD	- 1.7 +/- 3.1	- 1.6 +/- 4.0

*$= p < 0.05$; **$=p < 0.005$*

CONCLUSION. We did not demonstrate an advantage in the group treated with the Vest® System. The SpO2 improvement in the standard treatment group is probably the result of manual hyperinflation with 100% oxygen. The demonstrated increase in breathing frequency direct after treatment with manual hyperinflation and exprimation could have been the result of waking up the sedated patient. The value of the Vest® System needs still to be demonstrated but also the value of conventional therapy as manual hyperinflation needs to be proven.

0521

REDUCTION IN COMPLICATION AND MORTALITY RATES WITH A NEW ALGORITHM FOR EXTRACORPOREAL PUMPLESS LUNG ASSIST - A PROSPECTIVE SINGLE-CENTER REPORT

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INTRODUCTION. Pumpless arterio-venous interventional lung assist (iLA, Novalung, Hechingen, Germany) is used for extracorporeal gas exchange in severe ARDS. iLA is a single-used ultracompact gas exchange system perfused by the heart after arterial and venous cannulation. We report on a reduced complication and mortality rate using a new indication and implementation algorithm in comparison with a published cohort(1).

METHODS. Between 10/2004 and 3/2008 iLA was used in 51 patients suffering from severe ARDS (PaO2/FIO2 75 +/- 27 mmHg, PaCO2 73 +/- 19 mmHg) due to pneumonia, trauma, sepsis, pancreatitis/peritonitis or postoperatively. Insertion was performed mainly for extracorporeal CO2-removal after careful evaluation including a stabilisation period only when certain hemodynamic (norepinephrine $<$ 0,4 ug/kg/min), pulmonary (PaO2/FIO2 70–200 mmHg) and coagulation (platelets $>$ 60.000, aPTT $<$ 60 sec) conditions were fulfilled. A new implementation algorithm was developed including use of smaller arterial cannulae and improved material/insertion technique.

RESULTS. Using a modified algorithm with prior stabilisation, smaller cannulae and improved technique, the incidence of complications and the mortality rate were significantly reduced, although the severity of disease (SOFA-score) was similar between the cohorts. iLA induced a marked CO2-removal allowing a lung protective ventilation (tidal volume $<$ 6 ml/kg).

TABLE 1 COMPLICATION AND MORTALITY RATE (PAT/%) FOLLOWING ILA-IMPLEMENTATION * = P $<$ 0.05)

	cohort 1 (n = 90) 9/1996–9/2004 (1)	cohort 2 (n = 51) 10/2004–3/2008
ischemia of lower limb	13 (14,4%)	4 (7,8%) *
total complication rate	22 (24,4%)	6 (11,8%) *
cannula size (arterial)	17,8 +/- 1,3 F	16,5 +/- 1,3 F *
mortality rate	53 (58,8%)	25 (49,0%) *

CONCLUSION. Pumpless arterio-venous extracorporeal lung assist is a safe and effective measure for CO2-removal allowing a strict lung protective strategy in ARDS.

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0522

TO EVALUATE THE ROLE OF CONTINUOUS TRACHEAL GAS INSUFFLATION (C-TGI) WITH PROTECTIVE LUNG VENTILATION IN PATIENTS WITH RESPIRATORY ACIDOSIS OF VARIED ETIOLOGY

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INTRODUCTION. CO2 elimination with TGI is dependent on flow rate as fresh gas flushes higher proportion of proximal dead space. High flow rate causes tubulence at tip and increases distal gas mixing. The aim of present study is to confirm effect of TGI throughout the respiratory cycle on alveolar ventilation at various catheter flows and as an adjunct to protective lung ventilation for various pulmonary diseases. We measured effect of TGI on pH and PCO2 in cases of severe respiratory acidosis.

METHODS. 20 patients (13 males and 7 females) with varied etiologies were studied. ALI/ARDS(n= 9), Pneumonia with / without sepsis and MODS (n = 8), Post LVRS (n = 1), Post lobectomy (n=1), Disseminated CMV with MODS (n=1). All the patients were on protective lung ventilation strategies and had respiratory acidosis. The ventilatory parameters were Tidal volume 4–10 ml/Kg, FiO2: 0.4–1, PEEP : 5– 15, RR: 12 – 30/ min), Inspiration: Expiration (I:E) : 1:2 – 1:4. c- TGI was given with a tool using infant feeding tube through a catheter mount and with a flow rate 4 – 10 litres / min. Data collected were arterial blood gas (ABG) at 0, 1, 4 hour and at every 24 hours after establishing TGI. The following parameters in ABG were noted: pH, PaCO2, PaO2, HCO3 and compared.

RESULTS. After the use of c- TGI with protective lung ventilation we noted Respiratory acidosis with a baseline pH 7.123 $\pm$ 0.11 with improvement in pH at 1 hour (7.225 $\pm$ 0.1086 (p=0.000)) and 4 hour (pH 7.261 $\pm$ 0.0941 (p= 0.000)). The PaCO2 at baseline was 82.9 $\pm$ 23.79 mmHg and there was fall in PaCO2.

PCO2 levels were 64.53 $\pm$ 18.79(p = 0.00) at 1 hr and 60.4 $\pm$ 17.95 (p= 0.00) at 4 hour which are significant.

TABLE 1 STATISTICS

	pH (0)	pH (1 hr.)	pH (4 hr)	PCO2 (0)	PCO2 (1 hr)	PCO2 (4 hr)
Mean	7.1235	7.2255	7.261	82.9000	64.53	60.48
Std Error of Mean	2.520 E-02	2.428 E -02	2.115 E-02	5.3188	4.2023	4.0138
Median	7.1400	7.2300	7.2700	73.600	63.600	57.0000
Standard Deviation	0.1127	0.1086	0.094	23.7966	18.7932	17.9503

CONCLUSION. In a cohort of 20 patients with respiratory acidosis of varied etiology, cTGI appears to have a significant effect on lowering PaCO2 and pH values in initial 1 hour of TGI with protective ventilation. There was significant improvement in PaCO2 and pH at 4 hours and correction in respiratory acidosis.

REFERENCE(S). 1.Hideaki Imanaka, Max Kirmse, Harald Mang, Dean Hess, and Robert M. Kacma Am. J. Respir. Crit. Care Med., Volume 159, Number 1, January 1999, 49–54. Expiratory Phase Tracheal Gas Insufflation and Pressure Control in Sheep with Permissive Hypercapnia - 2.Equipment review: Tracheal gas insufflation Avi Nahum. Critical Care 1998, 2:43–47.

0523

TREATMENT OF BRONCHO-PLEURAL FISTULA USING ENDOBRONCHIAL WATANABE SPIGOTS IN MECHANICAL VENTILATED PATIENTS

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INTRODUCTION. Bronchopleural fistula (BPF) is a challenging problem in patients under mechanical ventilation (MV), where it is associated with a significant mortality. Surgery is frequently not possible because of the poor patient's general conditions and high operative risk. The treatment of BPF using Endobronchial Spigots was recently described. This per-endoscopic technique makes use of silicone stoppers to obstruct segmental bronchi in the area of a BPF. We report our experience of therapeutic bronchial obstruction for persistant BPF mechanically ventilated patients.

METHODS. Indications for endobronchial spigots were association of (1) distal BPF in a mechanically ventilated patient with weaning failure (2) persistent pleural leakage after several days of drainage (3) patient not suitable for surgery. The technique comprises 2 steps: 1. Localization of one or several bronchi related to the fistula, using a Fogarty balloon catheter introduced through the bronchoscope working channel. The leakage is localized by inflating the balloon catheter in the selected bronchi until the bubbling stops in the pleural drainage system. 2. Introduction of the silicone stopper (Novatech ® "EWS" or Endobronchial Watanabe Spigots) previously attached to a biopsy forceps through the bronchial tree, down to the localized segmental bronchi. Complete success of the technique was defined by an absolute control of the air leakage, allowing pleural tube removal. The partial success of the technique was defined by the persistence of a reducted air leakage associated with patient's improvement.

RESULTS. Between January 2003 to November 2007, 9 mechanically ventilated patients with untractable BPF were treated by therapeutic bronchial occlusion using EWS. The cause of BPF was an empyema in 6 patients, traumatic pneumothorax in 2 patients and complication of lung surgery in one. In one case, a spigot migration produced a tracheal tube obstruction which obliged to emergency reintubation. In 2 cases (3,4) the air leakage reoccured due to collateral ventilation leading to a second EWS positioning. Results are detailed in table.

TABLE 1

Patient	Day's drainage before EWS	Withdrawal chest tube	MV weaning	EWS success	Evolution	Etiology of death
1	4	0	0	partial	Death	Sepsis
2	26	1	1	1	Cured	0
3	19	0	0	0	Death	ARDS
4	50	0	0	0	Death	Sepsis
5	30	0	0	partial	Death	Sepsis
6	30	1	1	1	Cured	0
7	8	1	1	1	Death	Aspiration
8	30	0	0	0	Death	ARDS
9	35	1	1	1	Cured	0

CONCLUSION. Endoscopic treatment of EBF using EWS is an efficient technique in mechanically ventilated, non operable patients. Several EWS positioning could be necessary. The possibility of a spontaneous migration of the spigot should be taken into account in patients under mechanical ventilation through an orotracheal tube.

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0524

AN APPRAISAL OF MULTIVARIATE LOGISTIC REGRESSION MODELS IN THE CRITICAL CARE LITERATURE ANNO 2006: PRELIMINARY RESULTS

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INTRODUCTION. Improper reporting of multivariate logistic regression models (MLR) can potentially make the results of a study inaccurate, misleading, or difficult to interpret (1). The aim of this study is to evaluate the adequacy of (reporting) MLR in two major critical care journals anno 2006; Critical Care Medicine and ICM.

METHODS. At the present 129 articles published in Critical Care Medicine in 2006 were manually reviewed for 10 potential limitations in the reporting of MLR. Potential limitations were essentially based upon previous recommendations (1,2). Values are expressed in median (25th - 75th percentiles) and percentages when appropriate.

RESULTS. Of the 129 articles, 29 (22%) reported the use of MLR and the results were shown and could subsequently be comprehended fully in 25. A median of 3 (2–21) models per article were reported. A total of 79 models could be checked for potential limitations. The selection of variables initially included in the models was clearly specified or could be deduced from the manuscript in 91% of the models. Testing for collinearity was properly reported in only 10%. The type of MLR modelling (stepwise, forward, backward..) was not specified in 6%. Non-conformity to the linear gradient and testing for an interaction term or effect modification were checked in only 20% and 25% of all models respectively, and in only 29% and 32% of models including > 500 patients. Units of continuous variables were not provided in 33%. Criteria for overfitting data was violated in 35% and Hosmer-Lemeshow statistics were not provided in 84% of the models. Discrimination statistics by mean of area under ROC curves were provided in 3% and in 2/18 (11%) of models which had the primary intention in predicting outcome respectively. The recommendation regarding the coding of the end-point according to the Cochrane Collaboration was violated in 9%. A median of 4 (3–5) limitations were found per model.

CONCLUSION. According to these preliminary results only a minority of the reports published in critical care literature include enough information to allow the critical reader to fully comprehend the MLR model and the subsequent conclusion of the study. Critical care journals should pay more attention to the statistical review of manuscripts using MLR.

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0525

REASON FOR INTENSIVE CARE UNIT ADMISSION AS A DETERMINANT OF CLINICAL COURSE AND OUTCOME OF VERY ELDERLY PATIENTS

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INTRODUCTION. As population demographics change and as new technologies and interventions prolong life expectancy, the proportion of very elderly patients admitted to and surviving ICU will constantly increase. This poses complex challenges for the benefit of their management and the ultimate use of ICU resources. The objective of this study was to review the impact of reason for admission on the ICU course of the very elderly patients in a multidisciplinary ICU.

METHODS. All records of patients >=75 years admitted to the ICU between Jan.2003-Dec.2006 were retrospectively evaluated from our electronic database. The assessed data included: age, previous medical history, reason for admission (elective/emergency surgery, medical, stroke and trauma), severity of illness scores (GCS, APACHE II, SOFA1 upon admission and SOFA2 upon discharge), ventilator associated pneumonia (VAP), days of mechanical ventilation (MV), use of inotropes, ICU length of stay (LOS), ICU mortality according to reason for admission. Data are presented as mean values ±SD. For statistical purposes One way ANOVA and chi-square test were applied.

RESULTS. The study population (n = 167) accounted for 11.65% of total ICU admissions (n = 1433). Patient data according to reason for admission and statistical significance are referred to in Table 1. Total duration of MV in all categories of survivors was 8.15 ± 10.3 days. Previous medical history (cardiac, pulmonary, neurological disease, hypertension, diabetes) did not seem to influence mortality.

TABLE 1 PATIENT DATA AND STATISTICAL ANALYSIS

Admission reason n(%)	El. surgery 56 (33.5)	Em. surgery 38(22.8)	Medical 40(24)	Stroke 22(13.2)	Trauma 11(6.6)	p value
Age (years)	77.5±3.2	79.9±3.5	79.35±4.8	77.8±2.9	78±3.3	.015
APACHE II	12.2±5.9	17.6±7,7	22.8±8.1	22±7.3	24±5.6	.000
GCS	14.7±1.2	12.6±3.9	9.4±4.7	6.3±2.4	9.7±9.3	.000
SOFA1	2.3±2.4	4.4±3	5.6±2.9	5.09±2.4	6.2±2.9	.000
SOFA2	2.4±1.9	3.5 ±2.4	4.8±2.9	5.2±2.6	4.7±1.5	.000
ICU LOS (days)	2.9±7.3	9.7±13.2	18.5±21.08	16±15.1	17.4±18.4	.000
Inotropes n(%)	14(25)	19(50)	21(152.5)	3(13.6)	6(54.5)	.002
VAP n(%)	3(5.7)	8(21.6)	18(45)	5(22.7)	4(36.4)	.000
Nonsurvivors n(%)	5(8.9)	7(18.4)	21(52.5)	10(45.4)	6(54.5)	.000

CONCLUSION. Patients who underwent elective surgery clearly displayed an uneventful course and a satisfactory survival rate. Acute medical and surgical conditions predisposed to a higher mortality rate due to initial acuity of illness, a longer ICU LOS and an increased incidence of VAP. Nonetheless ICU stay proved to be beneficial in the above category of patients as shown by the discharge SOFA score. Our results reinforce the aspect that age alone should not hamper the decision for ICU admission.

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0526

LONG-TERM PROGNOSIS OF PATIENTS WITH LUNG CANCER ADMITTED TO THE INTENSIVE CARE UNIT

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INTRODUCTION. Benefit of ICU admission for lung cancer patients remains unclear. ICU triage decision of such patients may be affected by both the estimated late outcome and the possibility to administer specific cancer-related treatments following ICU stay.

METHODS. Retrospective study of critically-ill lung cancer medical patients admitted to a 10-bed respiratory intensive care unit in a tertiary care university hospital in order to identify early predictive factors of long-term mortality and outcome (six months) and to assess whether the ICU survivors received afterward any cancer related treatments.

RESULTS. 105 consecutive lung cancer patients were included over a nine-year period. Of the 105 patients (mean age 64.8 yrs), 87 patients (83%) had non-small cell lung cancer (NSCLC). An advanced disease was diagnosed in 83 patients (79%) [NSCLC stage IIIB and IV or disseminated small lung cell cancer (SCLC)]. The main reason for ICU admission was acute respiratory insufficiency (59%). The simplified acute physiologic score (SAPS II) score was 40 ± 21. Forty-one percent required mechanical ventilation. The ICU, hospital and 6-month mortality rates were 44%, 55% and 72%, respectively. A performance status (PS)>2 or =2 [odds ratio OR=6.4 (95% confidence interval CI (2–21)] and mechanical ventilation [OR=5 (95%CI (1.7–14)] were independently associated with an increased 6-month mortality. Thirty (70%) of the ICU survivors received specific cancer treatments after their ICU stay.

TABLE 1 FACTORS ASSOCIATED WITH 6-MONTH MORTALITY. UNIVARIATE ANALYSIS

Variables	All n = 105	Survivors n = 29	Non Survivors n = 76	p
Age, yr	64.8 ± 10.6 (39-86)	66.0 ± 8 (42-81)	64.2 ± 11 (39-86)	0.41
SAPS II	40 ± 21 (13 to 112)	30.7 ± 10 (13–54)	44.2 ± 23 (13–112)	0.009
Performance Status 0 or 1	56	23	33	0.001
Advanced Cancer	83	19	64	0.015
Admission for Acute respiratory failure	62	12	50	0.02
Admisson for Haemoptysis	47	14	33	0.65
Admission for Septic Shock	10	1	9	0.19
Admission for Neurological reason	10	3	7	0.85
Mechanical Ventilation	43	4	39	0.0005
Vasopressors	33	3	30	0.004

Complete clinical information was available for 103 patients at 6 months

TABLE 2 PREDICTION OF 6 MONTH HOSPITAL MORTALITY USING MULTIVARIATE ANALYSIS

Variables	p value	Odds ratio (95% interval confidence)
Performance Status 0 or 1	p = 0,021	OR 6,4 (2–21)
Mechanical ventilation	p = 0,031	OR 5 (1,7–14)

Complete clinical information was available for 103 patients at 6 months

CONCLUSION. ICU admission of non-surgical lung cancer patients may be beneficial for selected patients (PS 0 or 1) in terms of the administration of cancer-related treatments after discharge and long-term survival.

0527

RISK FACTORS FOR MORTALITY FOLLOWING CARDIAC VALVE RE-OPERATIONS FOR PROSTHETIC VALVE DYSFUNCTION

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INTRODUCTION. The purpose of the study was to identify independent risk factors for intensive care mortality in patients undergoing cardiac valve re-operations in our institution.

METHODS. We retrospectively analyzed the data concerning 235 patients admitted in our intensive care unit following valve re-operations during a ten years period (1997–2006). Multivariate stepwise logistic regression was used to analyze preoperative, intra-operative and intensive care variables and determine risk factors for intensive care mortality. Statistical analysis was performed using Stata 8 for UNIX.

RESULTS. The overall hospital mortality was 7.89% (19 patients /238) for a predicted mortality by Euroscore of 10.12%. Intensive care mortality was 6.8% (16/235). Univariate analysis showed that the following variables were associated with higher mortality rates: age, urgent intervention, advanced New-York Heart Association functional class, increase preoperative urea, creatinine and lactic dehydrogenase (LDH) plasma levels, low preoperative hemoglobin level, presence of paravalvular leak, number of re-operation (Redo), length of intervention and extracorporeal circulation, necessity for transfusion and length of administration of inotropes. Multivariate logistic regression identified high preoperative LDH, urea plasma levels and Redo as independent predictors of intensive care mortality (Table I) with a high specificity and sensitivity (Area under the ROC curve = 0.94). A score was computed using these factors and the coefficients to predict mortality. No mortality was observed for a score value < 3.5.

For postoperatives factors, the prolonged use of inotropes was independently associated with intensive care mortality. Failure to wean patients from inotropes during the first 48 hours was associated with very significant higher mortality rate (odds ratio = 12).

TABLE 1 LOGISTIC REGRESSION ANALYSIS OF INDEPEDANT RISK FACTORS FOR IC MORTALITY

	Coefficients	Odds Ratio	CI 95%	p values
LDH (UI/L)	0.00087	1.00087	1.00033–1.00141	0.002
Urea (mg/dL)	0.02918	1.02961	1.00284–1.05708	0.030
Redo	1.00978	2.99952	1.05329–8.53051	0.040
Constant	−7.7172			<0.001

CONCLUSION. Number of re-operations, higher urea and lactic dehydrogenase preoperative plasma levels were independent predictors of intensive care mortality in patients admitted to our intensive care unit following cardiac valve re-operations. Failure to wean patients from inotropes within 48 post-operative hours was associated with a high increase in mortality.

0528

INFLUENCE OF BODY MASS INDEX ON ICU OUTCOME

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INTRODUCTION. Overweight is an increasing issue in the society, but the influence of body mass index (BMI) on intensive care unit (ICU) outcome is uncertain. Our objective was to evaluate the impact of BMI on ICU outcome and test the hypothesis that underweight or obese patients will have a higher morbidity and mortality compared to patients with a normal BMI.

METHODS. Retrospective study of 930 consecutively admitted ICU patients at Umeå University Hospital, Sweden, from 2006 to 2007. 238 patients fulfilled the inclusion criteria age $\geq$ 20 years, ICU stay $\geq$ 72 h (main study group). A group of 52 nonsurvivors, ICU stay $<$ 72 h constituted the separate early death group. Patients were compared by age, APACHE II score, BMI, admission diagnosis and ICU outcome (mortality, ICU length of stay (LOS), time on ventilator, and SOFA score. Using an individual matching procedure, the obese groups (BMI >30) and underweight group (BMI <20) were compared with the normal weight group (BMI 20.0–24.4). The relationship between BMI and ICU outcome was determined by multiple linear regression analysis.

RESULTS. In the main study group, duration of ventilation, ICU LOS (Figure 1), SOFA score and mortality showed no differences among BMI groups (p= 0.55, p=0.06, p=0.40, and p=0.71) and admission diagnoses were not related to BMI groups (p=0.06). Multiple regression analysis and individual matching (Table 1) showed that BMI was not an independent predictor of ICU outcome.

TABLE 1 OUTCOME VARIABLES FOR MATCHED PAIRS

		BMI <20.0	BMI 20.0–24.4	p	BMI >30.0	BMI 20.0–24.4	p
ICU lenght of stay	(hours)	233 ± 139	217 ± 81	0.82	261 ± 220	211 ± 128	0.61
Time on ventilator	(hours)	162 ± 119	165 ± 92	0.75	177 ± 190	154 ± 117	0.69
Creatinine day 1	mumol/L	77 ± 46	87 ± 24	0.09	134 ± 86	87 ± 52	0.01*
Delta SOFA		0.3 ± 2.1	0.6 ± 2.3	0.39	0.7 ± 1.9	1.1 ± 2.0	0.33

CONCLUSION. ICU outcome (mortality, ICU LOS, time on ventilator, SOFA score) was not influenced by BMI.

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0529

PATIENTS WITH CARDIAC ARREST TRANSFERRED FROM AGED PEOPLE RESIDENCE

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INTRODUCTION. Today, in some developed countries, many aged people stay in aged people residence rather than private home with their families by several reasons. Most aged people residence have some relationship with supporting hospitals or clinics because most aged people have some medical problems, who usually regularly consult a doctor of these hospitals or clinics. However, in emergency condition, particularly in the night or holly day, these inhabitants can not be transferred to these hospitals and are transferred near emergency department in which hospital doctors have no information of the patients' medical condition and their philosophy for living and dying process. We often perform aggressive resuscitation against the patient's mind. The aim of this study is to clarify the circumstances of management of inhabitants of aged people residence in emergency condition.

METHODS. We reviewed patients with OHCPA who were transferred to our center from aged people residence for past 2 years. In Yokohama, CPA patient is basically transferred to the nearest ED of selected 11 hospitals with adequate ability of proper CPR except special cases in which families can immediately tell the patient's mind and hope to EMS.

RESULTS. 27 patients were transferred to our CCE Center. Although in all 27 patients, ADL were restricted and death could be expected, all patients and their families did not consulted concerning their dying process. We blindly performed agressive resuscitation. 12 patients reached ROSC and only 2 survived, 1 of them could returned to the previous aged people residence with neurologically normal condition and the other transferred to other hospital with vegetative state. Although both were witnessed by nurse in the residence, both showed asystole as a first cardiac rhythm on the scene. Of all 27 patients, 16 were witnessed by staff. Of all patients, 7 were witnessed in the dining room, 1 in the bath room, and 1 found in the labatory without witness. In 18 patients who found in the private room, only 7 witnessed by staff and 1 by emergency life saving technicien (ELST) after the scene. In 7 cases bystander voluntarily performed CPR, in 11 cases bystander performed after telephone CPR advice, and in 8 cases any CPR was performed.

CONCLUSION. Most of patients in aged people residence have some ill condition such as malswallowing, low ability and actibity in daily life. They can be expected to die from these conditions. In some countries including Japan, death is put under taboo and most staffs of these residences do not discuss a death with patient or their families. However, to prepare for emergency condition including CPA and to avoid confusion and unwilling feeling in these conditions, we should consult the patient and his families about his dying process.

0530

READMITION TO THE ICU: ONE YEAR STUDY

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INTRODUCTION. ICU readmission during the same hospital stay is a quality indicator. Readmission soon after ICU discharge is considered a premature discharge. Readmissions are associated with worsening of the patients' disease process, higher hospital costs, and poor outcome. The aim of this study was to describe patients characteristics readmitted to the intensive care unit (ICU) during the same hospital stay.

METHODS. Prospective cohort study of all patients (n = 604) consecutive admitted from June-2005 to June-2006 to a mixed university ICU with 18 beds. Data collected were: demographics, diagnosis at admission, APACHE II, and SOFA score at admission and at discharge of ICU, TISS score at 24h, 72h and at discharge ICU; outcomes recorded were: ICU and hospital length of stay, ventilator-days, and ICU and hospital mortality.

RESULTS. During the study period, 604 patients were admitted in the ICU; their mean age was 61 ± 17 yrs and APACHE II was 18.5 ± 9. Forty-one patients (6.78%) required ICU readmission, 31 from ward, 7 from operating room, 2 from hemodialysis and 1 from another ICU. Patients were classified at admission in clinical (83%) and postoperative (17%). Patients requiring ICU readmission had more co-morbidities (3.2 ± 0.8 vs. 2.3 ± 1.0; p = 0.07). There were no differences in age (63 ± 16 yrs vs. 61 ± 17 yrs), APACHE II (19.8 ± 7.3 vs. 18.3 ± 9.1), Glasgow coma scale (12.9 ± 3.7 vs. 12.5 ± 4.2;), SOFA at admission (4.17 ± 3.4 vs. 3.7 ± 3.4) and TISS at 24h (22.2 ± 6 vs. 21.8 ± 7.4) or 72h (21.7 ± 6.1 vs. 21.9 ± 7.7). Twenty seven patients (65.8%) required mechanical ventilation (MV); 25 required invasive MV, 1 non-invasive MV and 1 both techniques. The duration of MV (11.6 ± 13.5 days vs. 9.8 ± 12.1 days) and ICU length of stay (12 ± 13 days vs. 10 ± 21 days) were similar for both groups. Readmitted patients had higher SOFA score at ICU discharge (5.8 ± 5.6 vs. 4.0 ± 4.8; p=0.028). Mean TISS at ICU discharge was slightly greater in readmitted patients (19.2 ± 8.8 vs. 16.8 ± 9.8; p=0.14). The pressure ulcers proportion was higher in readmitted patients (26.8% vs. 12.2%; p=0.016). Although ICU mortality was not different (41.4% vs. 31.6%), hospital mortality rate was significantly higher in readmitted patients (58.5% vs. 41.4%; p=0.049).

CONCLUSION. Patients who required ICU readmission had more organ dysfunctions and higher hospital mortality risk.

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0531

DESCRIPTIVE ANALYSIS AND EPIDEMIOLOGY OF PATIENTS ADMITTED TO AN INTERMEDIATE CARE UNIT BASED ON CONVENTIONAL AND INDEPENDENT MODEL

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INTRODUCTION. Intermediate Care Areas (ICA) are ways to provide health care services to potentially critical patients that allow for improved cost-benefit ratio of the care offered by Intensive Care Units (ICU) and the conventional and independent model can facilitate utilization of critical care resources.

METHODS. Restrospective analysis in 1,090 consecutive admissions from January 2007 to December 2007 in a 18 ICA bed unit. To evaluate specific analysis of mortality, 204 patients were excluded due to readmission. Demographic data were (gender and age, type of patient, origin on admission, and disease group), occupancy rate, severity score (SAPS II and APACHE II), ventilatory parameters, frequency of transfer to the ICU and analysis of the lenght of stay (LOS) and mortality were included.

RESULTS. In the 1090 admissions 549 were male and 542 were female. The mean age was 66,5 ± 20 years. The mean APACHE II and SAPS II score were 10,2 ± 5,1 and 25,9 ± 11,respectively. The mean occupancy rate was 95%. A total of 222 patients were under ventilatory support (20,36%) on admission. When stratified by disease group 228 patients were gastrointestinal (20,8%) and 155 patients (14,1%) were respiratory. In total of admissions 60,7% were nonoperative and 39,3% were operative reason. In relation to origin of admission 70,6% were from ICU, 10,9% from general ward, 10,8% from emergence department, and 7,7% from operating room. Discharge profile was 733 to general ward (67,2%), 178 to home (16,3%) and a total of 159 patients (14,6%) needed to be transferred to the ICU. Invasive mechanical ventilation was used in 48,4% of patients. The most frequent ventilatory mode was continuous positive pressure (CPAP) in 65,2% of patients. The mean positive end expiratory pressure (PEEP) was 9,17 ± 1,04 cmH2O, the mean time under ventilatory support was 7,7 ± 7,8 days. Nocturnal mechanical ventilation was used in 3,6% of patients. The mean LOS was 5,3 ± 6,3 days. The mortality rate intra ICA was 1,8% and post ICA discharge was 9,1%.

CONCLUSION. When confronted with a growing demand for ICU services, developing intermediate care beds for low-risk patients represent a safe and effective strategy for providing critical care at a reduced cost. A proportion of ICU admissions can be considered low risk for receiving services that are unique to or best provided in an ICU. Despite the widespread notion that larger ICA (above 10 beds) can show low occupancy rates, our data is in contrast and shows that a high occupancy rate is feasible and leads to a better utilization of critical resources.

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0532

PREDICTIVE FACTORS OF INVASIVE PROCEDURES IN A COHORT OF 407 SEVERE POSTPARTUM HAEMORRHAGE

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INTRODUCTION. Despite the overall decline in maternal mortality in high-outcome countries, postpartum haemorrhage (PPH) still makes a major contribution to maternal mortality and severe morbidity in Europe. The goal of this study was to identify the predictive factors for invasive procedures (haemostatic surgery and arterial embolisation) in case of postpartum haemorrhage already treated with sulprostone infusion.

METHODS. All PPH patients were admitted in our tertiary centre transferred from other hospitals, over a 3-year period. We have compared the patients characteristics in two groups : 1/ a « Invasive Procedure » (IP) group including patient managed with haemostatic surgery and/or arterial embolisation and 2/ a « Medically Managed » (MM) group including the remaining patients for which no intervention was needed. A multivariate analysis led to identify independent predictors of invasive procedure, performed in the 4 hours following admission.

RESULTS. Patients characteristics confirm the occurrence of severe bleeding in our 407 patients before admission in our centre (Table 1).
The five identified predictors are represented on the Table 2.

TABLE 1 PARAMETERS AT ADMISSION

	Overall n = 407	« MM » group n = 234	« IP » group n = 173	p value
RBC before transfer (units)	2 ± 3	1 ± 2	3 ± 4	< 0.0001
SBP (mmHg)	113 ± 25	119 ± 23	105 ± 25	< 0.0001
HR (bpm)	102 ± 22	96 ± 19	111 ± 24	< 0.0001
Hemoglobine (g/dL)	8.9 ± 1.9	9.3 ± 1.7	8.4 ± 2.0	< 0.0001
PT (%)	66 ± 19	72 ± 15	58 ± 21	< 0.0001
Fibrinogen (g/L)	2.5 ± 1.1	2.8 ± 0.9	1.9 ± 1.1	< 0.0001
Troponin (pg/L)	0.4 ± 2.4	0.2 ± 1.7	0.6 ± 3.1	< 0.0001

(RBC : red blood cell, SBP : systolic blood pressure, HR : heart rate)

TABLE 2 ITEMS PRESENT AT ADMISSION

	OR	confidence interval 95%	p value
Placentation's abnormality	13.5	3.6 – 51.3	0.0001
PT < 50%	2.8	1.1 – 6.8	0.02
Fibrinogen < 2 g/l	3.0	1.5 – 5.5	0.001
Troponin I detectable	3.0	1.8 – 5.2	0.0001
HR > 115 bpm	3.8	3.0 – 7.0	< 0.0001

CONCLUSION. Patients with a persistent or worsening PPH are often difficult to evaluate, because of the importance of the bleeding and/or the treatment already administrated. The delay in the management of those patients directly influences outcome. We described five predictive factors that allow to classify patients in high, intermediate or low risk of needing a haemostatic invasive procedure.

0533

PROGNOSTIC VALUE OF ANTITHROMBIN III IN CRITICAL CARE PATIENTS

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INTRODUCTION. Changes in biomarkers of coagulation, anticoagulation, fibrinolysis and inflammation occur in patients with systemic inflammatory response syndrome. The purpose of this prospective study is to evaluate the prognostic value of antithrombin III activity in severe ill patients.

METHODS. Baseline levels of antithrombin III (AT III) in blood sample, of 45 critically ill patients was correlated with acute disease severity, as measured by Acute Physiology and Chronic Health Evaluation Scores (APACHE II), and with organ failure severity, as measured by The Sequential Organ Failure Assessment (SOFA) score. The quantitative determination of the antithrombin activity level in plasma was measured by the synthetic chromogenic substrate method. Correlation between parameters was made by linear regration analysis and comparison of antithrombin levels in all groups was made by t-test ($p < 0.05$).

RESULTS. Trauma, lung infection, brain injury and abdomen infection was the main underling patients' diseases. On the time of their admission in ICU the patients had mean APACHE II score 22.22 ± 5.68, mean SOFA score 9.11 ± 3.10 30 and mean baseline levels of antithrombin III 71% ±22%. 30 of 45 patients (64.23%) died in ICU after 21.02 ± 12.56 days of hospitalization. The mortality of patients with baseline levels of antithrombin III less than 60% (14 patients) was 78.58% and the mortality of patients with baseline levels of antithrombin III more than 60% (31 patients) was 58%. The characteristics of the four groups of patients are shown in the Table 1.

There is not a statistical important correlation between baseline levels of AT III and the outcome of the patient. Also there is not a statistical important correlation between baseline levels of AT III and APACHE II severity score. There is statistical important correlation between baseline levels of AT III and the SOFA score in the group of patients with multiple trauma. The baseline levels of AT III in patients with brain injury is higher compared with the other groups of patients ($p < 0.05$).

TABLE 1

	PATIENTS	AGE	AT III	APACHE II	SOFA
Lung infection	14	67.92±14.84	64%±22%	23.28±5.01	10.07±2.52
Abdomen infection	7	71.51±11.94	59%±12%	22.14±6.56	9.14±4.48
Brain injury	14	60.5±10.93	89%±23%	24.42±5.59	10.07±2.01
Multiple trauma	10	47±29.59	62%±16%	17.7±15.28	6.4±2.57

CONCLUSION. Although a higher mortality rate is found in patients with baseline AT III activity of less than 60% AT III activity measured as a single blood marker cannot be used as a prognostic parameter. APACHE II is a superior to AT III activity prognostic parameter.

0534

PLASMA BRAIN NATRIURETIC PEPTIDE (BNP), C-REACTIVE PROTEIN (CRP) AND HIGH DENSITY LIPOPROTEIN (HDL) AS PROGNOSTIC INDICATORS IN LONG TERM ICU PATIENTS

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INTRODUCTION. Biomarkers have recently showed promise as a complementary prognostic tool in ICU patients. Both CRP and HDL have a role as indicators of inflammation and BNP levels rise not only in cardiac dysfunction but as a response to proinflammatory stimuli.

METHODS. Methods: Prospective study of 22 patients that stayed in the ICU for at least 7 days and had the following characteristics: Age 63.4±12.9 years, length of stay 23.2±11.0 days, APACHE score 20.7±7.8.

CRP, HDL and BNP were measured both in admission and on day 7.

First, we correlated the above parameters with the length of stay (LOS) in the ICU by using Pearson's correlation test. Secondly, we compared the means between survivors and non-survivors after 6 months with independent samples' t-test. We finally performed receiver operating curves (ROC curves) of the above parameters according to mortality.

RESULTS. Mortality in the ICU was 22.73% and six-month mortality 63.63%.

The values of the parameters are showed in Table 1.

No correlation could be found between the LOS and the aforementioned parameters, neither a difference could be found between survivors and non-survivors with the independent samples' t-test ($p>0.05$).

ROC curves are shown in Table 2.

TABLE 1 VALUES OF THE PARAMETERS

	BNP (pg/ml)	CRP (mg/dl)	HDL (mg/dl)
Day 1	488.28±806.76	14.21±15.13	29.83±15.57
Day 7	676.62±872.82	11.16±7.93	21.04±13.85

TABLE 2 ROC CURVE VALUES

	BNP	CRP	HDL
Day 1	0.580	0.545	0.491
Day 7	0.598	0.652	0.696

CONCLUSION. Measuring these biomarkers on admission does not predict a long ICU stay. Only CRP and HDL on day 7 might add prognostic information in this group of patients.

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0535

LONG-TERM ICU COMPLICATIONS AFTER PROLONGED CRITICAL ILLNESS: POST-ICU ASSESSMENT IN AN OUTPATIENT CLINIC SETTING

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INTRODUCTION. Survivors of critical illness may experience a spectrum of morbidities that may reduce quality of life and prolongs the recovery after discharge from the hospital.

In November 2007 our ICU started a post ICU outpatient clinic to evaluate specific problems of patients experienced after discharge to improve their medical and psychological status.

METHODS. Survivors after severe sepsis with than 10 days mechanical ventilation were identified and invited to visit the clinic. A questionnaire was mailed to the participants with questions regarding daily living activity (ADL and Barthel). Medical and psychological aspects were discussed during the visit.

RESULTS. We evaluated the first 24 patients. Preliminary analysis shows that survivors experience a significant range of especially psychological and medical complaints within the first three months after discharge. Problems frequently encountered were weight loss > 10% (38%), critical illness polyneuropathy (42%), sleep disturbances (29%), post-traumatic stress disorder (29%), and signs of emotional imbalance (20%). New medical problems were less common and not severe. Only nine patients (38%) were discharged with maximum IADL and Barthel score. Duration of complaints varied between 2 weeks up to one year after discharge.

CONCLUSION. After prolonged critical illness significant morbidity may influence recovery and rehabilitation following discharge from hospital. Quality of life including ADL must be considered when assessing ICU outcome. At present this problem may be underestimated and more studies are warranted to improve post-ICU care.

0536

THE GERMAN TRANSLATION OF THE CAM-ICU TO MONITOR DELIRIUM IN INTENSIVE CARE PATIENTS – APPLICABILITY AND TIME CONSUMPTION

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INTRODUCTION. Delirium is associated with longer stay in ICU, higher treatment costs and increased mortality up to six months [1,2]. Though recommended by guidelines [3], very few ICUs have implemented a daily monitoring for delirium yet. When introducing a delirium-monitoring tool, objections such as „too time-consuming" and „too complicated" will be encountered, and it is often stated, that clinical judgment alone would prove satisfactory to detect delirium. We tested the German translation of the „Confusion Assessment Method for the Intensive Care Unit (CAM-ICU)" [4] in a 20 bed surgical intensive care unit (ICU) for applicability, time-consumption, and compared clinical judgment of nurses to detect delirium with CAM-ICU assessment.

METHODS. Every patient admitted to our ICU in June 2007 was monitored for delirium with the CAM-ICU on a daily basis. (1) Nurses were interviewed for their delirium criteria, and they assessed their patients for delirium based on their clinical judgment. Patients with severe neurological impairment (stroke or dementia) and inability to understand German language were excluded. (2) To assess applicability of the CAM-ICU, nurses familiar with the CAM-ICU were stop watched when examining patients and interviewed for ease of use of each of the four CAM-ICU features.

RESULTS. 69 patients were eligible for analysis (mean ± SD; 68 ±12,2 yrs; 79 ±17 kg BW; 40 male, 29 female). (1) 43% of patients developed delirium at some time during their ICU-stay, 58% were intubated. 13% of patients were deemed non-delirious if assessed only by clinical judgment, but were in fact delirious. Nurse's subjective criteria for delirium included confusion, disorientation, altered level of consciousness, inappropriate speech and inability to concentrate on a brief communication. (2) 18 Nurses familiar with the CAM-ICU rated the CAM-ICU as easy to understand and use, and required a mean 2:30 min (range; 1:15 – 3:00 min) to complete all 4 features in delirious patients.

CONCLUSION. More than a quarter of delirious patients were deemed non-delirious by mere clinical judgment. These patients had predominantly a hypoactive subtype of delirium as assessed with the Richmond-Agitation-Sedation-Scale. No more than 3 minutes were required to complete all four features of CAM-ICU. Mostly, however, CAM-ICU can be cut short because the diagnosis is made with the first one to three features. A daily delirium monitoring with the CAM-ICU is not time-consuming, can be performed by nurses, and detects a significant number of delirious patients, which go undiagnosed otherwise.

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0537

THE INCIDENCE OF DELIRIUM IN INTENSIVE CARE PATIENTS AND ASSOCIATION WITH GABA AGONIST ADMINISTRATION

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INTRODUCTION. The reported incidence of delirium in non-comatose intensive care patients ranges from 19% to 80%[1,2] and has been associated with GABA agonist (propofol and benzodiezepine) use[3]. Delirious patients may not be agitated, so signs of delirium must be actively sought. The Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) is a validated screening tool[4]. The aim of this study was to use the CAM-ICU in a 13 bed mixed surgical and medical ICU to determine the incidence of delirium and whether there was any correlation with sedative agent use.

METHODS. JS and RT (trainee ICU doctors who had had a brief tutorial on CAM-ICU) reviewed each ICU patient daily and performed a CAM-ICU if assessable (Richmond Agitation and Sedation Score more than minus 4 = rousable enough to assess). Sedative agents given in the preceding 24 hours were recorded. Statistical significance was determined with Fisher's exact test.

RESULTS. 186 reviews of 45 patients were made over 6 weeks; in 117 of these (63%) the patients were rousable enough to perform a CAM-ICU. On 16 of the 117 CAM-ICU assessments (14%) the patients were delirious, and on 12 of these (75%) the delirium was of the hypoactive type (patient calm or drowsy). 11 of the 45 patients (24%) were delirious at least once.
7 out of 24 assessments (29%) on patients who had received a GABA agonist in the previous 24 hours were positive for delirium, compared to 7 out of 66 assessments (11%) on patients who had received no drug in the previous 24 hours (p=0.047), and 2 out of 27 assessments (7.4%) on patients who had received any sedation that did not include GABA agonists (p=0.066) in the previous 24 hours.

TABLE 1 INCIDENCE OF DELIRIUM WHEN ASSESSED, CATEGORISED BY SEDATIVE ADMINISTRATION

	Delirious at time of assessment n (%)	Not-delirious at time of assessment n (%)
All patients	16(14)	101(86)
No sedative drug given in previous 24 hours	7 (11)	59 (89)
GABA agonist given in previous 24 hours	7 (29)	17 (71)
Any non-GABA agonist sedative drug given in previous 24 hours	2 (7)	25 (93)
Any sedative drug given in previous 24 hours	9 (18)	42 (82)

CONCLUSION. The incidence of delirium on this intensive care unit was within the range previously reported. Significantly more patients who had received a GABA agonist were delirious compared with those who were sedative free.

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0538

SEDATION AND ANALGESIA PRACTICE IN EUROPEAN INTENSIVE CARE UNITS

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INTRODUCTION. We conducted an e survey among ESICM members to identify and characterise the practice of sedation and analgesia in the critical care units.

METHODS. After obtaining the approval of the Research Committee of ESICM, the e-survey questionnaire was published on the ESICM website for participation of the ESICM members from 1st December 2007 to 31st January 2008. There were 32 questions in the survey.

RESULTS. 92 members responded, of whom 80% were senior medical staff, 50% of the respondents were Anaesthesiologists and 35% with ICU as their primary speciality. Around 90% of the respondents worked in the ICUs which admitted both medical and surgical patients. Only 50% of the respondents had a written protocol for sedation in their units and assessed sedation level every 4–6 hours. A sedation scoring system was used by 90% of the respondents, with Ramsay scoring being the most frequently used system (60%). 21% of the respondents use Bispectral monitor to assess the sedation level, of which 50% were Neurocritical care units. There were only 13% of the respondents who preferred to use propofol for sedation in children, and the youngest age they would use ranged from 6 months to 16 years in children. Only 50% of the respondents admitted that they would adjust the calorie requirement when patients are on propofol infusion. 22% of the respondents have encountered propofol infusion syndrome in their clinical practice. 53% used rise in lactate and 3% used Acyl or malonyl carnitine levels as a marker, if they suspected propofol infusion syndrome. 96% of the respondents used continuous infusion for sedation, with propofol being the preferred drug used by 83% of them for short term sedation (less than 48 hours). Midazolam was the second common drug used for short term sedation (around 58%) but it was the preferred drug (85%) for long term sedation (more than 48 hours). The respondents felt that haemodynamic status (90% of them) and cost (63% of them) did influence their choice of sedation. Only 60% of the respondents were practising sedation hold regularly and around 30% hardly practised sedation hold. Haloperidol was the preferred drug (70%) for treating agitation in the intensive care unit, with clonidine being the second choice (30%).
Atracurium was the neuromuscular blocker preferred by the respondents, with approximately 80% of them used it only intermittently. One third of the respondents were not monitoring neuromuscular blockade and only 50% used peripheral nerve stimulator to monitor the neuromuscular blockade.

CONCLUSION. There is wide variation in sedation and analgesia practice. There is also substantial difference in the way sedation and neuromuscular blockade are being monitored. Considering the potential benefit in the patient outcome, it might be worthwhile implementing evidence based protocol in the clinical practice.

0539

EFFECTS OF GAS SCAVENGING SYSTEMS ON THE FUNCTIONING OF ICU VENTILATORS

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INTRODUCTION. When inhaled sedation is used with intensive care ventilators, gas scavenging systems are recommended in order to minimize occupational exposure (1). Theses devices are dedicated for anaesthesia ventilators and may disturb the functioning of ICU ventilators. This prospective cross-over study compared the effects of charcoal adsorption and active suctioning system on PEEP level and stability during mechanical ventilation.

METHODS. 20 patients (age: 64 [50 – 76], SAPS II: 54 [43 – 62]) requiring deep sedation (Ramsay score 5 or 6) were included. Patients were ventilated with a Galileo Gold or G5 ventilator (Hamilton Medical) in Adaptive Support Ventilation (ASV). The AnaConDa® filter (Sedana Medical) was used for heat and moisture and to deliver Sevoflurane. Measurements were done without scavenging system (w/o scavenging) and after 30 minutes of Sevoflurane infusion, using in random order a charcoal adsorption canister (w/charcoal) (Cardiff, Smiths Industries) or an active suctioning system (w/suction) (Scavenging tubing system, Hamilton Medical) connected to the gas outlet. Respiratory mechanics, tidal volume and PEEP delivered were measured at 67 hertz using a proximal pneumotachograph. Comparison between PEEP delivered and PEEP set was assessed by the average of 5 expiratory cycles. PEEP oscillations were evaluated by the standard deviation from the mean. Autotriggering was assessed by visual inspection and flow-pressure traces analysis. Results are given in medians [25th – 75th quartile] and comparison used Signed Rank Test.

RESULTS. PEEP delivered was decreased w/charcoal as compare to w/o scavenging and w/ suction (6.0 [4.9 – 10.0], 6.8 [5.2 – 10.1], 6.6 [5.2 – 10.2] cmH2O respectively; p = 0,001). PEEP oscillations were increased w/charcoal as compared to w/o scavenging and w/suction (0.8 [0.5 – 1.8], 0.3 [0.3 – 0.4], and 0.3 [0.3 – 0.4] cmH2O respectively; $p < 0,001$). Autotriggering occurred in 10 patients w/charcoal and did not occured w/o scavenging and w/ suction. The expiratory time constant was decreased w/charcoal as compared to w/o scavenging and w/suction (0.57[0.50 – 0.82], 0.75[0.66 – 0.93], and 0.77[0.64 – 0.92] s respectively; p = 0.02), which resulted in different tidal volume delivered (499 [405 – 578], 523 [427 – 594], and 541 [436 – 587] mL respectively, p = 0.02). Plateau pressure, inspiratory resistances, static compliance and inspiratory time constant were not modified.

CONCLUSION. Charcoal adsorption disturbs the functioning of ICU ventilators. For anaesthesia gas scavenging in ICU, an active suctioning system should be preferred.

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0540

APPLICATION OF ULTRASOUND-GUIDED PIGTAIL CATHETER FOR DRAINAGE OF PLEURAL EFFUSIONS IN THE ICU

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INTRODUCTION. Little is known about the effectiveness of the pigtail catheter for drainage of pleural effusions in the intensive care unit (ICU).

METHODS. We conducted a retrospective review of adult patients (≥18 years) who underwent ultrasound-guided pigtail catheter drainage of pleural effusions in the medical and surgical ICUs from January 2005 to July 2007 in a university hospital.

RESULTS. Among the 133 enrolled patients, there were 93 (70%) males and 40 (30%) females, with the mean age of 63.7±15.4 years old. The reasons for pigtail drainage were as follows: complicated parapneumonic effusion or thoracic empyema (n=59, 44%), massive transudative pleural effusions (n=33, 25%), postoperative pleural effusion (n=29, 15%), malignant pleural effusion (n=18, 14%) and traumatic hemothorax (n=3, 2%). In comparing the total amount of fluids drained, the duration of drainage, success rate and complication rate among these different causes of pleural effusion, pigtail drainage for massive transudative pleural effusion yielded the largest amount of pleural fluids (5382 ± 4844 ml), provided the longest duration of drainage (9 ± 7 days), and had the highest complication rate (18%). The success rate was highest when used to treat traumatic hemothorax (100%) and postoperative pleural effusions (85%); drains inserted for empyema were more likely to fail (overall success rate, 42%). No significant insertion complication, such as hollow organ perforation, was caused by this procedure.

CONCLUSION. The ultrasound-guided pigtail catheters are useful in the drainage of a variety of pleural effusions in critically ill patients. Using ultrasonic guidance, insertion complications, such as hollow organ perforation and pneumothorax, can be reduced significantly. Drainage for massive transudative pleural effusions should be of serious concern, because it may lead to prolonged drainage and infection. Thoracic empyema remains a difficult clinical problem, and pigtail catheter drainage of this empyema was only partly effective in our study.

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0541

HIGHER PEEP LEVELS RESULTS IN SMALL INCREASES IN INTRABDOMIAL PRESSURE IN CRITICAL CARE PATIENTS

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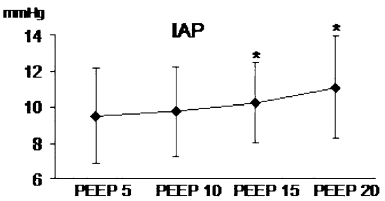
INTRODUCTION. In recent years, the measurement of intraabdominal pressure (IAP) and abdominal perfusion pressure (APP) in critically ill patients has become important because of the high risk of developing abdominal compartment syndrome (ACS). These patients are frequently affected of acute lung injury (ALI) or acute distress respiratory syndrome (ARDS)(1). Recent studies have proved that higher PEEP levels are better than lower PEEP levels to treat patients with ALI/ARDS (2). Transmission of IAP to the thorax has an impact on the respiratory system, and changes in intra-thoracic pressure may affect IAP, but the effects of PEEP on IAP and APP measurement are not clear. OBJECTIVE: To evaluate the effect of increased PEEP levels on IAP measurement.

METHODS. Mechanically ventilated and hemodynamically stable patients were included. Patients with high intracranial pressure, in prone position or with open abdominal wall were excluded. IAP and mean arterial pressure (MAP) were measured at different PEEP levels (5, 10, 15 and 20 cmH2O). After each change in PEEP a set of measurements was recorded after a stabilization interval of 5 minutes. After the last measure, PEEP was returned to basal level. IAP was measured according to the method described in The International Conference of Experts on Intra-abdominal Hypertension and Abdominal Compartment Syndrom (WSACS)(1).

RESULTS. 12 patients were studied. MAP and APP were stable throughout the study in all cases. Plateau pressure increases proportionally with PEEP. IAP increased with PEEP 15 and PEEP 20 cmH2O. No complications or adverse events were observed.

* $p < 0.05$ vs previous value.



CONCLUSION. Increases in PEEP levels were associated with significative increases in IAP without changes in APP measurements. These changes had no clinical relevance when IAP was within the normal or mild higher range. The main limitation of our study was the abs ence of patients with severe intra-abdomial hypertension or abdominal compartment syndrome.

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0542

EVALUATION OF THE USER-FRIENDLINESS OF NEW GENERATION ICU VENTILATORS

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INTRODUCTION. In the ICU setting, incidents are often caused by human errors, often related to mechanical ventilation (1). ICU ventilators are becoming increasingly sophisticated and complex, which can lead to errors, particularly in emergency situations. The aim of this study was to evaluate the user-friendliness of 7 new generation ICU ventilators.

METHODS. 10 Physicians well trained in mechanical ventilation, but without knowledge of the 7 ICU ventilators tested, performed 8 tasks per machine. Time performances were compared between each other and with a reference time established by a trained respiratory therapist (RT). Tasks were to successively: switch on the ventilator, recognize the already adjusted mode, recognize and set alarms, change mode, find the pre-oxygenation command, adjust parameters for pressure support mode, stand-by and find NIV mode. Physicians rated their subjective assessment of task difficulty on a visual analogue scale (0: very easy-10 very difficult).

RESULTS. Results are expressed as medians and interquartile range (IQR: 25th-75th percentile). For each task physicians were slower than the RT: 44 (25–89) s for the most rapid, vs. 14 (5–22) s for the RT. A mean of 9 (7–13) failures was observed by ventilator; on 3 machines more than 10 failures occurred. The most rapid task with the fewest failures was pre-oxygenation (5, 3-17 s). Tasks with the most failures were adjusting pressure support mode and finding NIV mode. The longest task was mode recognition (106, 74–146). The most common errors were: confusion between adjusted and measured parameters, type and level of trigger and plateau pressure assessment. Visual analogue difficulty scores ranged from 3.8 to 7.3.

CONCLUSION. Physicians without prior experience with specific ICU ventilators perform poorly when confronted with specific tasks. These results suggest a need for standardization between machines and improved interface user-friendliness in the design of ICU ventilators.

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0543

ULTRASONOGRAPHY OF THE NECK PRIOR TO PERCUTANEOUS TRACHEOSTOMY

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INTRODUCTION. Percutaneous tracheostomy is a common but potentially hazardous procedure. Major haemorrhages have been reported requiring emergency surgical intervention to prevent significant morbidity or mortality1. Aberrant vessels may be missed despite adequate surface assessment before the procedure. Portable ultrasound machines are available in all intensive care units in compliance with NICE guidelines to assist with central venous access. It has been suggested that the incidence of major bleeding may be reduced by routine ultrasonography of the anterior neck prior to the procedure2, 3.

METHODS. A prospective audit was performed in our critical care unit. A questionnaire was completed for every tracheostomy performed over a three month period. Recorded information included, any abnormalities observed during surface examination, the ultrasonographic findings including tracheal depth, complications during the percutaneous procedure and whether an open surgical tracheostomy became appropriate as a result of clinical or ultrasonographic examination. Coagulation abnormalities were corrected prior to any procedure in line with standard practice.

RESULTS. 39 tracheostomies were performed within the study period. Percutaneous tracheostomies were performed using the single "rhino" dilatation technique. 3 patients were referred for surgical tracheostomies on the basis of their history. In 11% of the remaining cases ultrasonography was unavailable. Of the remaining 30 patients, 12 patients had abnormal anatomy detected on ultrasonography resulting in 8 changes to technique or practice. No patient received a transfusion as a result of any procedure, however 1 patient developed post tracheostomy surgical emphysema. The mean tracheal depth was 1.88 86cm (range 4cm-1cm).

CONCLUSION. We describe a safe non-invasive technique using available resources at little extra cost and may reduce complications associated with percutaneous tracheostomy. We have demonstrated a change in practice in 26.6% of patients and 3 patients had a surgical tracheostomy as a result (10%).

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0544

DELIVERING HUMIDIFIED HIGH FLOW THERAPY AT INCREASING GAS FLOW RATES GENERATES HIGHER AIRWAY PRESSURE

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INTRODUCTION. A recent study in cardiac surgical patients demonstrated that a positive pressure is delivered during humidified high flow oxygen therapy (HHFT)(1).
This study set out to determine the relationship between flow and pressure in cardiac surgical patients receiving HHFT via a nasal interface.

METHODS. Following ethical approval, 12 patients scheduled for elective cardiac surgery were consented and enrolled into this study. Whilst sedated and ventilated post-operatively a 10French catheter was inserted into the nasopharynx via the nose. Pressure measurements were performed once the participant was awake and extubated. Placement of the catheter was first confirmed using end tidal CO2 monitoring. The Fisher and Paykel Healthcare Optiflow TM system was used to deliver humidified nasal oxygen and measurements were performed with gas flow rates of 30, 40 and 50 lpm. Measurements were performed with patients mouth open and mouth closed. Pressure was recorded over one minute of breathing. The mean nasopharyngeal airway pressure was determined by averaging the pressure over one minute. This allowed the entire pressure profile of each breath to be included within the mean airway pressure calculation.

RESULTS. n = 12. Average age = 64.6years (40 – 84); average height = 174.3cms (163 – 205); average weight = 86.3kgs (55 – 121). 75% (n = 9) male.

At 50 lpm with mouth closed, the Optiflow TM system with nasal interface delivered a mean nasopharyngeal airway pressure of 3.3 cmH20.

Other results were:

TABLE 1

	30 lpm	40 lpm	50 lpm
Mean Airway Pressure Mouth Open (cmH2O)	1.0	1.3	1.7
Mean Airway Pressure Mouth Closed (cmH2O)	1.9	2.6	3.3

CONCLUSION. This study demonstrates that the pressure delivered by the Optiflow TM Humidified High Flow therapy system does increase as flow rate is increased in a group of cardiac surgical patients.

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0545

LUNG SOUND DISTRIBUTION SHIFTS TO LOWER LUNG REGIONS WITH INCREASED PEEP

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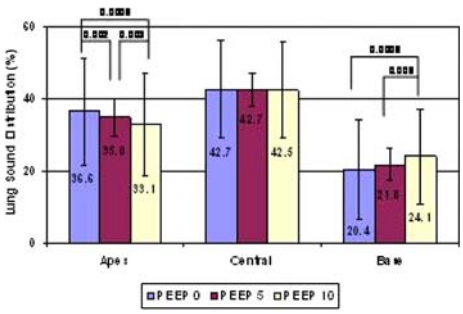
INTRODUCTION. Vibration response imaging (VRI) maps the lung sound distribution during the respiratory process. VRI measurement has been proved sensitive to changes in PEEP. In the present study, we compared the lung sound distribution at different PEEP levels. Our hypothesis was that elevation of PEEP is associated with better recruitment of dependent lung areas and should be reflected by increased lung sounds in these areas.

METHODS. Lung sounds distribution was assessed at peak inspiration in three lung regions (apex, central and base). Maps of lung sounds obtained at PEEP 0, 5 and 10 cm H2O were compared in 34 mechanically ventilated patients. Furthermore, maps of two repeated measurements at each PEEP level were also evaluated.

RESULTS. Lung sound distribution in the base areas was significantly increased when increasing PEEP (paired t-tests). Furthermore, lung sound distribution in the apex areas was significantly decreased. Central lung segments did not change with PEEP. Furthermore, maps of repeated measurement at same level of PEEP were not significantly different.



CONCLUSION. Lung sound distribution shifted from apex to base when increasing PEEP probably reflecting increased flow in these areas.

0546

VISUAL TRACKING SYSTEM OF EMERGENCY ROOM PATIENT FLOW SIGNIFICANTLY REDUCED WAITING TIMES AT EMERGENCY DEPARTMENT

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INTRODUCTION. Patient satisfaction at emergency departments (EDs) can be improved by reduction in patient waiting times. In this paper, we evaluated the impact of an ED informatisation system, available for all ED (medical and nursing) staff and displaying a visual tracking system of all pts admitted to the ED.

METHODS. We retrospectively analysed all different waiting times for all patients admitted to the ED in a 3months periods before and after the installation of the visual tracking system. Different waiting times were : wR : wait for registration, wX : wait for initial triage, wC : wait for consulting room, Wi : wait for technical investigation, divided in time of technical investigation and time to result of technical investigation available, wT : wait for diagnosis/ treatment and finally wD : wait for discharge from ED (home or hospital).

RESULTS. A total of 4720 pts were included in the first 3months period (2005), compared to 4910 pts for the second period (2006). We observed a significant decrease in all, except one (wR), waiting times after the installation of the visual tracking system. Analysis of different waiting times revealed that largest reductions were obtained in the wait for initial triage and consult (wX : m28min reduced to m19min and wC : m43min reduced to m27min). We also observed a significant reduction in outliers, i.e. extremely long waiting times, mostly occurring for technical investigations (wI) (as well for the investigations as for the results of the investigations) as for final diagnosis (wT).

CONCLUSION. The implementation of an ED informatisation system, providing continuously real-time updated visual tracking screens displaying the flow of all ED pts, resulted in signicificantly reduced waiting times and increased patients satisfaction at the Emergency Department.

0547

CRITICAL: COMMON RESOURCES FOR INTERACTIVE TRAINING OF INTENSIVE CARE STAFF AT ALL LEVELS

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INTRODUCTION. The practice of teaching and training medical and nursing staff in the intensive care domain currently consists of bedside teaching with real-life patients. Presently, simulators available are expensive or difficult to access for the majority of staff. The search for a "virtual patient" suitable for the teaching needs of senior intensive care educators is still not available. While high fidelity simulators for anaesthesia and trauma are available, and could be adapted, their cost and location means that only small numbers of learners can participate.

METHODS. The 4 European partners of the CRITICAL project aim to deliver a screen-based, digital Virtual Intensive Care Patient (VIP) with a wide range of physiological attributes, capable of being reconfigured to treat the variety of pathological states which result in different patient symptoms and outcomes.

The project uses a software toolset called EduCAT which allows teachers who are not computer specialists the flexibility to create their own interactive educational material. Via the web, these intensive care tutors in hospitals and universities worldwide can provide trainees with a readily available, low cost approach to medical management of different disease states. They will be able to try alternative treatment options and observe patient outcomes faster than in "real life" without any danger to patients in the "real" clinical environment.

Prominent international leaders of ICM will head the project and develop medical-based scenarios which have been rigorously tested, evaluated and refined throughout the project life-cycle.

RESULTS. By the project end in August 2009, the result will be a developed software simulation of an intensive care patient, available in 4 languages (English, French, German and Spanish) which will be configured by the teacher and used directly for diagnostic exercises set by the teacher.

CONCLUSION. The VIP will be accessed over the internet from a website which will also provide a collaborative forum for interested education groups to further develop the model and share latest research of best practice bringing intensive care teaching into the 21st Century.

GRANT ACKNOWLEDGEMENT. We gratefully acknowledge the assistance of ECOTEC UK (Leonardo da Vinci Programme) who have provided 75% of total funding for this project.

0548

HIGH FREQUENCY CHEST WALL OSCILLATION IS NOT BETTER THAN MANUAL HYPERINFLATION IN ATELECTATIC VENTILATED PATIENTS

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INTRODUCTION. Atelectasis is a frequent occurring disease in ventilated patients. There is no standard treatment for this disease. The treatments of choice are :suctioning, positional therapy, bronchoscopy and conservative treatment. The patient with atelectasis suffers from impaired ventilation capacity and impaired oxygenation in most cases. Therefore the atelectasis should be cleared. We investigated the role of a new external pneumatic oscillation device, The Vest® system compared with suctioning in combination with exprimation and hyperinflation, which is the standard therapy for atelectasis in our intensive care unit.

METHODS. We performed a single centre randomised open study to investigate the effects of The Vest® system in atelectatic ventilated patients who were hospitalised in our ICU in 2007. After approval of our ethical committee, 6 patients were studied with the Vest® system. They were treated 3 times a day with the use of an external vest, which contained an air chamber. A pulse generator was connected with the airspace in the Vest®. In this way pulsatile, oscillative compressions were made around the thorax, during 20 minutes. Standard manual hyperinflation in combination with exprimation and suctioning was done 3 times a day in 6 patients. After maximal 12 treatments, the study was stopped. Complete atelectasis of one lobe was scored as 3 points, major atelectasis of one lobe was 2 points and minor atelectasis of one lobe was scored as one point. Complete atelectasis of the right lung should be scored as 9 points. One independent radiologist reviewed the X rays. Atelectasis score and time to reach the lowest score were compared with Mann Whitney U testing. A significance level of $< 0{,}05$ was considered as significant.

RESULTS. Atelectasis score just prior to treatment minus lowest atelectasis score was 1,3 +/- 1,5 in the Vest® group and 2,5 +/- 2,4 in the conservative treated group. Time to reach the lowest atelectasis score was 77,3 +/- 23 hours in the Vest® group and in the standard treated group 58,7 +/- 31,1. No significant changes in both values were seen in both groups.

CONCLUSION. In this study no benefit in resolution in atelectasis has been demonstrated when the Vest® system was used compared to manual hyperinflation in combination with exprimation and suctioning. The sample size in this study was small. Treatment duration and frequency of chestwall oscillations could also be of influence on our results.

0549

BREATH SOUND ANALYSIS DETECTS INJURY AND RECRUITMENT IN THE LUNG DURING MECHANICAL VENTILATION

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INTRODUCTION. Acute lung injury may change the acoustic properties of the respiratory system. Pathologic phenomenons, such as "crackles", are usually heard on auscultation. The aims of this study were to evaluate whether computerized analysis of breath sounds can help in 1) localizing lung injury and 2) detecting the recruiting effect obtained by raised positive end-expiratory pressure (PEEP) and confirmed by computed tomography (CT).

METHODS. Microphones were applied to four locations on the chest of six anaesthetised pigs, ventilated in volume-control mode with a PEEP of 5 cmH2O applied. Breath sounds were recorded before and after unilateral oleic acid-induced lung injury. Then PEEP was increased in steps of 5 cmH2O from 0 to 20 cmH2O. Breath sounds as well CT scans were recorded at each PEEP level. Pathological changes detected by Fast-Fourier-Transform (FFT) frequency analysis of the sounds were compared to the quantity of non-aerated and very poorly aerated (+100/−300 HU) lung tissue present in the 9 mm CT images.

RESULTS. The acoustic spectra recorded in healthy condition were mainly within 400–500 Hz for both lungs. After unilateral oleic acid injury, the breath sounds recorded over the injured lung, but not over the non-injured lung, turned highly pathologic in all animals, showing increased spectral frequency content above 500 Hz and −70 dB. During stepwise increase of PEEP, the proportion of pathologic sounds gradually decreased and with a PEEP of 20 cmH2O, the breath sounds recorded over the injured lung were significantly decreased. The gradual decrease in acoustic pathology corresponded to a gradual transition of lung tissue from non-aerated or very poorly aerated to aerated in end-expiratory CT images (Table).

TABLE 1

INJURED LUNG	PEEP 0	PEEP 5	PEEP 10	PEEP 15	PEEP 20
Pathologic sounds (FTT % > 500 Hz)	32.0 ± 7.3	36.2 ± 7.0	33.6 ± 9.0	27.6 ± 14.5	12.5 ± 9.5*
Non/very poorly aerated lung (ml)	22.7 ± 8.2	19.5 ± 8.0	15.4 ± 5.8*	6.1 ± 3.8*	2.2 ± 1.2*

*Data are mean +/- SD * = $p < 0.05$ compared to PEEP 0 (cmH2O) by Wilcoxon test*

CONCLUSION. Quantification of pathological breath sounds by computerized analysis can be helpful in localizing lung injury and recruitment obtained by raised positive end-expiratory pressure in volume-control ventilation, thus positioning the tidal inflation above the level of end-expiratory collapse of injured lung.

GRANT ACKNOWLEDGEMENT. The Swedish Medical Research Council (5315).

0550

CIRCUIT LIFETIME COULD BE A QUALITY INDICATOR IN CONTINUOUS RENAL REPLACEMENT THERAPY IN THE CRITICALLY ILL

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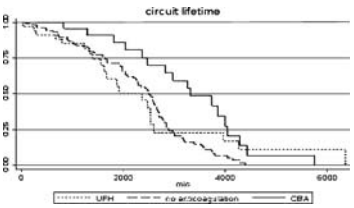
INTRODUCTION. Continuous renal replacement is frequently used in critically ill patients with acute renal failure and sepsis. A frequent change of clotted circuits increases the workload and costs substantially. Circuit down time is the most important factor, compromising the cumulative filtration goal (35 ml/kg/h). Cumulative filtration rate, especially with the predilution mode is difficult to measure. Alternatively, circuit lifetime might serve as an easy to measure indicator to assess quality.

METHODS. In our 12 bed medical ICU, we used CVVHDF in the pre- and postdilution mode (Prismaflex system, Hospal®). Circuit lifetimes were prospectively collected during a 12 month period. Unfractionated heparin (UFN) was the first choice. No anticoagulation was used in patients with severe coagulation abnormalities or hepatic failure, while regional citrate anticoagulation (CBA) was used in patients with recurrent circuit clotting or with bleeding predispositions. Regular change of circuits was planned after 72 h. We performed survival analysis. Circuit lifetimes were censored when changed because of interventions outside the ICU, a switch to palliative treatment or a 24 h change due to severe septic shock, but not when changed because of access or technical problems.

RESULTS. 38 consecutive patients and 167 circuits were observed. No bleeding or major metabolic complications were seen. There were no differences concerning vascular access site, the proportion of sepsis and vasopressor dependency between the anticoagulation groups. Consistent with the literature, circuit lifetime was longer and circuit patency rate higher in CBA. Our circuit lifetimes are higher than generally reported.



CONCLUSION. CBA is safe and has superior circuit lifetime and patency, compared to UFH. Beneath monitoring of the complication rate, measuring of circuit lifetime, processed by survival analysis tools is easy and feasible to assess quality of a highly complex procedure in critically ill patients.

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0551

EFFECTIVENESS OF COMBINED ACUTE BLOOD PURIFICATION THERAPY BY DIRECT HEMOPERFUSION USING A POLYMYXIN B-IMMOBILIZED FIBER COLUMN AND CONTINUOUS VENOVENOUS HEMODIAFILTRATION USING A POLYMETHYLMETHACRYLATE MEMBRANE HEMOFILTER FOR SEPTIC SHOCK PATIENTS

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INTRODUCTION. Septic shock is a condition associated with diffuse coagulopathy and multiple organ failure, and frequently leads to death. Direct hemoperfusion using a polymyxin B-immobilized fiber column (DHP-PMX) was first developed in 1994, Japan and has been used for the treatment of septic shock. In particular, we usually start DHP-PMX within three hours at the diagnosis of septic shock. On the other, there is another kinds of hemofiltration column, the continuous venovenous hemodiafiltration using a polymethylmethacrylate membrane hemofilter (CVVHDF using PMMA), we have reported with the effectiveness of clinical treatment for crinically ill patients in both therapies.

METHODS. We treated 34 septic shock patients with Acute Physiology and Chronic Health Evaluation (APACHE) II scores of over 20 by DHP-PMX. We reviewed the effectiveness of DHP-PMX therapy by comparison of the improvement rates of the APACHE II score, blood pressure. In another examination, the patients were divided into three groups: namely, group-1 in which CVVHDF using PMMA therapy following DHP-PMX (17 cases), group-2 in which CVVHDF using a polyacrylonitrile membrane hemofilter (PAN) therapy following DHP-PMX (6 cases), and, group-3 in which CVVHDF was not performed after DHP-PMX (11 cases). The outcomes and improvement rates of the laboratory parameters (IL-6, protein C, PAI-1, endocannabinoids, HMGB-1 and oxidative stress) in the three groups were compared.

RESULTS. The average of APACHE II score and sepsis-related organ failure assessment (SOFA) score were 30.2 and 12.7, respectively. The overall survival rate was 55.9% (good outcome judging from the APACHE II score). The improvement rates of the blood pressure (increased by more than 30 mmHg) were 58.8% (good effect judging from systematic review (1)). For another examination, only group-1 showed a better outcome (survival rate of 76.5%) compared with the other groups (survival rate of group-2 for 33.3%, group-3 for 36.4%). In addition, only group-1 showed significant improvements of the serum PAI-1 (155.6ng/ml before therapy vs. 90.5ng/ml on day 3; p=0.0041), protein C (34.2% before therapy vs. 40.0% on day 3; p=0.0433), IL-6 (13915.6pg/ml before therapy vs. 1052.1pg/ml on day 3; p=0.0477), N-arachidonoylethanolamine (AEA) levels(553.0pg/ml before therapy vs. 477.6pg/ml on day 3; p=0.0235) and oxidative stress marker (F2-isoprostane) (552.8pg/ml before therapy vs. 370.8pg/ml on day 3; p=0.0368).

CONCLUSION. Our study suggests that the early introduction of DHP-PMX treatment yielded good outcomes. In addition, therapies aimed at blood purification, CVVHDF and continuous hemofiltration (CVVHF) have been reported to be effective for the removal of inflammatory cytokines and various mediators. Although several types columns have been used for CVVHDF, few reports have shown the influence of the column using CVVHDF on the removal rate of the above-mentioned factors. Our findings suggest that CVVHDF using PMMA following DHP-PMX treatment have removed of various factors, and has improved survival rates in severe septic shock patients.

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Poster Sessions
Pediatric and neonatal care: 0552–0563

0552

PARENTS THAT STAY CONTINUOUSLY WITH THEIR CHILD IN THE PICU REDUCES THEIR DISTRESS

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INTRODUCTION. The aim of this study was to evaluate whether the distress presented by children in the Pediatric intensive care unit (PICU) was affected by the parents staying continuously with their child or not.

METHODS. Design: Prospective, observational study.
Setting: PICU at Hospital Regional da Asa Sul (Brasilia, Brazil).
Patients: A convenient sample of children admitted to the PICU from August 2002 to January 2003 aged 1 to 153 months.
Study Design: The sample was divided in two groups. One group was constituted of children of parents that stayed continuously with their child while in the other group parents didn't stay. The decision of staying or not with the children was made freely by the parents. Informed written consent was obtained in all the cases.
Measurements: Demographic data was collected for all the patients. Distress was assessed by obtaining COMFORT scale scores for each patient in the morning. Blood samples for measurement of total cortisol and glycemic levels were also obtained each morning. The risk of mortality was assessed through PRISM scores. Statistical analysis was performed using Mann-Whitney's test. The chosen level of significance was $P < 0.05$.

RESULTS. Twenty children were enrolled, divided in two groups of 10. The medium age was 6.5 months, with no statistical significant difference between the groups. The average PRISM scores were equivalent for both groups (14 and 13.9). The therapeutical interventions for each group were similar, including the total amount of analgesics and sedatives administered. There was statistical significant difference between the COMFORT scale scores of the children which the parents stayed continuously and the other group (7.6 and 13.4, p= 0.0423). There was no significant difference between the cortisol of the children that stayed with parents and the children that stayed without parents (25.5 ± 16.2 and 52.2 ± 42.8, p= 0.07). There was no significant difference between the measured glycemia in the two groups (99.3 ± 20.7 and 111.1 ± 34, p= 0.21). The average length of stay in PICU was significantly different (7 days in the staying parents group vs. 11 days in the other group).

CONCLUSION. The patients of both groups showed signs of distress. Comparison between groups suggests that parents staying continuously with their child in PICU can reduce their level of distress and also could shorter their lenght of stay.

0553

IMPACT OF NONPULMONARY ORGAN FAILURE ON OUTCOME IN CHILDREN TREATED WITH HIGH FREQUENCY OSCILLATORY VENTILATION

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INTRODUCTION. High Frequency Oscillatory Ventilation (HFOV) have been widely used in pediatric and neonatal patients with acute hypoxemic respiratory failure (AHRF) to limit lung injury and to improve oxygenation and CO2 epuration. Mortality associated with pediatric AHRF is also dependant on other organ failure rather than lung dysfunction. The objective of this study is to quantitate contribution of the nonpulmonary organ failure to poor outcome of pediatric patients with AHRF managed with HFOV.

METHODS. Forty two consecutive pediatric patients (median age : 4 months, IQR:2-10) with AHRF (pneumonia: 35, sepsis with ARDS: 3, Others: 4), failing conventional ventilation (alveolar-arterial oxygen difference (P(A-a)O2) of 580 torr (453–645), Oxygenation index (OI) of 30 (22,5–37)) were ventilated with HFOV. A prospective and repeated record of oxygenation parameters and ventilator settings was made. Assessment of hemodynamic, renal, hepatic, neurological and haematological organ function was performed at regular times.

RESULTS. Thirty four patients (81%) survived to hospital discharge without any oxygen dependency (group 1). Eight patients died (group 2). Nine patients (21%) had isolated respiratory failure and their mortality was 0%. Percentages of patients with 2, and 3 or more organ failure were 31%, 48% and their mortality was significantly higher, 7,6%, and 35% respectively. Patients with isolated respiratory failure demonstrated a significantly rapid and sustained improvement in oxygenation then patients of group 2. Severe shock requiring epinephrine or norepinephrine was associated to death (RR ratio of 8,5, CI[3,2–15,5]). Patients with 3 or more organ failure had a higher length of hospital stay than the other patients (13 vs 7 days, p:0,03).

CONCLUSION. Patients managed with HFOV for AHRF and with non pulmonary organ failure were significantly less likely to improve oxygenation on HFOV and had a significantly higher length of stay and mortality than patients with isolated respiratory failure. Children with such conditions must be identified early for other therapeutic considerations.

0554

LEUKOPHERESIS FOR SEVERE PERTUSSIS: A LIFESAVING THERAPY

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INTRODUCTION. The rate of severe pertussis infections has increased in recent decades. It mostly affects young children with the most severe cases and a highest mortality occurring in infants less than 6 months of age. Severe pertussis infections can cause respiratory and cardiovascular failure with an extremely high mortality rate (above 70%). The primary cause of death in severe pertussis is severe refractory pulmonary hypertension (PHT). PHT can progress very rapidly and in general is not responsive to any treatment modalities including extracorporeal support. The exact mechanism of PHT in pertussis is not completely known but hyperleukocytosis with leukostasis and leukocyte thrombi in pulmonary vasculature are thought to be contributing mechanisms.

METHODS. After IRB approval, the medical records of all patients admitted to our PICU with diagnosis of pertussis between 1997 and 2007 were reviewed. Patients with severe pertussis requiring intubation and mechanical ventilatory support and with a echocardiographic diagnosis of pulmonary hypertension were analyzed.

RESULTS. Six patients were identified who met the above criteria. We have previously described 4 of these patients who required ECMO support for severe pertussis and who all died from severe refractory pulmonary hypertension (Pediatrics 2003; 112:1274–78). Since 2003, we identified 2 subsequent cases of severe infantile pertussis with good outcome. Both patients were treated with leukopheresis to achieve leukoreduction. The first patient had significant respiratory and cardiovascular instability and was initially placed on ECMO for stabilization and then underwent leukopheresis. We previously reported this case in detail (PCCM 2006; 7:580–582). A second more recent unreported patient is now described in more detail. The patient was a 5 wk old male infant who was admitted to PICU on his 5th hospital day. Two days later he was intubated and placed on mechanical ventilatory support for respiratory failure and a presumed diagnosis (subsequently confirmed) of pertussis was made. Within following 2 days he had ECHO evidence of PHT and his WBC rose to 90.8K. He underwent leukopheresis. His WBC was reduced to 28.4K and follow up ECHO had no evidence of PHT. He survived and was discharged home.

CONCLUSION. Based on our recent experience and other previously published cases we propose an algorithm for approach in critically ill infants with severe pertussis.
Pertussis induced respiratory failure on mechanical ventilatory support and Evidence of pulmonary hypertension.
Or WBC > 100K if YES and cardiac and respiratory status stable than Leukopheresis or double volume exchange transfusion (DVET). If unstable place on ECMO (if available) to bridge for leukopheresis or DVET. If NO evidence of PHT and WBC< 100K continue support and monitor for PHT and WBC trend. PHT defined as RV pressure equal or greater than 1/2 sytemic.

0555

MILRINONE IN PAEDIATRIC SEPTIC SHOCK

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INTRODUCTION. Severe paediatric septic shock is frequently characterized by depressed myocardial function associated with high systemic vascular resistance. In these circumstances, milrinone may be a valuable tool for cardiovascular support of children with septic shock, owing to its inotropic effect (with low myocardial oxygen consumption) and vasodilator properties.

METHODS. We reviewed the clinical records of patients with septic shock admitted to our PICU from January 2005 to March 2008 who were treated with milrinone. Demographic, clinical and laboratory data were analysed.

RESULTS. Twelve patients received milrinone during the study period, but one patient was excluded due to infra-therapeutic milrinone dosage. The median age of the 11 patients included was 3 years and 3 months (3 months to 7 years). All patients were volume resuscitated to CVP > 10 cmH2O. Dopamine was the first inotropic agent used in all patients. Milrinone was the second agent used in 4 patients. The average interval between admission and milrinone administration was 15 hours. Only one patient received a milrinone loading dose (50mcg/Kg). The initial infusion dose varied from 0.25–0.75 mcg/kg/min; the maximum infusion dose was 0.82mcg/kg/min. The median duration of milrinone infusion was 72 hours. Nine patients needed 3 or more inotropic agents (7 received norepinephrine). Cardiac function was evaluated by echocardiography in 8 patients before and after milrinone was started: 5 improved, 2 had no change and 1 worsened cardiac contractility. Blood lactate level increased in 2 patients and decreased in 7 patients (a mean decrease of 20.1 mg/dL) after starting milrinone. Concerning the adverse effects of milrinone: mean arterial pressure decreased in 4 patients (a mean decrease of 10 mmHg); 5 patients needed norepinephrine or an increase of dosage after milrinone infusion started; heart rate increased in 7; none had disrythmia; 2 patients developed secondary thrombocytopenia. Seven patients needed mechanical ventilation, 4 needed renal replacement techniques, none had ARDS and 1 patient had severe ischemic sequelae leading to lower limb amputation. The median PRISM scale value was 23. Mortality rate was 18% (2/11).

CONCLUSION. Milrinone has shown promising results with very few adverse reactions. In our patients, despite insufficient haemodynamic monitoring, the results were encouraging in terms of cardiac function and peripheral perfusion. A randomized controlled trial of milrinone use in paediatric septic shock is needed.

0556

PERCUTANEOUS DILATIONAL TRACHEOSTOMY IN CHILDREN

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INTRODUCTION. Purpose of the study: To study safety and feasibility of percutaneous dilational tracheostomy (PDT) in children.

METHODS. PDT performed over the past ten years in 21 children, requiring prolonged mechanical ventilation admitted to the single intensive care unit (ICU), were analyzed. Institutional ethic approval was obtained.

RESULTS. Age of the children varied from 08 month to 12 years. Average mechanical ventilation and ICU days, respectively were 26 and 36. Seven children were below 06 years, smallest child was only 08 month old. All procedures were performed by a single operator experienced in adult PDT.

In all the children, modifications were required in the steps of Ciaglia technique namely 1) airway control, 2) identification of trachea, 3) stoma formation, and 4) tracheostomy tube insertion.

All children tolerated the procedure without any mortality or significant morbidity. In three children airway was lost transiently. No other complication was observed.

Average procedure time was 25 minutes and ranged between 15 to 40 minutes. Smaller children (less than 06 years)required more time as compared to older children.

CONCLUSION. Like adults, children requiring long term mechanical ventilation need tracheostomy. However, all ICUs providing care to children may not have surgical support to perform surgical tracheostomy.

No custom made introducer and dilational set or wire guides could satisfy the technical needs of procedure. Assorted items were selected from the broad range of products used for adult percutaneous tracheostomy, vascular access, and radiological interventions.

In the hands of experienced operator supported by an expert controlling airway, PDT can be performed safely in the ICU.

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0557

RESPIRATORY DENGUE DISEASE IN A BRAZILIAN PAEDIATRIC ICU POPULATION

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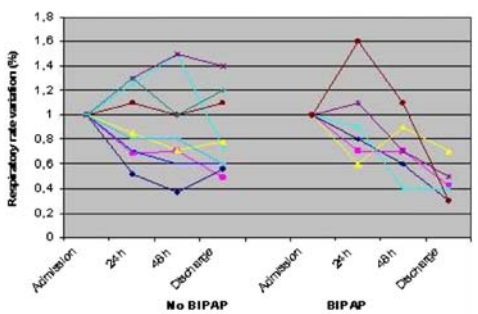
INTRODUCTION. Dengue epidemics results in new admission in paediatric critical care units in Rio de Janeiro. Low age is one risk-factor to severity in dengue fever and the occurence of secondary pleural effusions is a common alteration in a group of pediatric critical care patients.

METHODS. We reviewed the medical records of children admitted to the Pediatric Intensive Care Unit, with serologically confirmed dengue diagnosis, from march to april 2008. A specific protocol was filled out by physical therapists to obtain the following data: age, sex, vital signs, utilization of non-invasive ventilatory support, occurrence of pleural effusions, and Lenght-of-stay (LOS).

RESULTS. Among 15 patients, 7 were boys. Age was between 3m and 10y. All children came from Baixada Fluminense area, in Rio de Janeiro state. Sixty-seven percent of them presented pleural effusion on ICU admission, and 40% were submitted to non-invasive ventilatory support (BiPAP) during ICU. The mean LOS was 5,3 days (+- 1.45 days). Two patients were submitted to thoracentesis. The occurrence of secondary complications, necessity of invasive ventilatory support and death in this cohort were equal to zero.



CONCLUSION. Respiratory findings were common in this cohort, but were not associated to a LOS > 7 days, higher morbidity and mortality rates. There was an apparent trend in more consistent respiratory frequency reduction BiPAP group, in contrast to no-BiPAP. Further investigations are needed to study the effects of BiPAP in dengue respiratory manifestations.

0558

TELEPHONE INFORMATION PROVIDED TO PARENTS IN ITALIAN PEDIATRIC ICUS

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INTRODUCTION. Families of ICU patients need information, proximity to their loved ones and assurance [1]. This leads them to telephone frequently for news [2]. To date, no published data are available on telephone information provided to parents in Italy's pediatric ICUs (PICUs). We investigated this issue in the course of a national survey on visiting policies in Italian PICUs.

METHODS. An email questionnaire on visiting policies was sent to the heads of all 34 Italian PICUs, including questions about their policy on providing telephone information to parents.

RESULTS. The response rate was 100%. Daily meetings of doctors with parents were held systematically in almost all ICUs (97%).
Information was also given by phone (often or always, 70%; sometimes, 23%; never, 6%). Those authorized to give this information were mainly physicians (doctor on duty, 94%; charge nurse, 18%; nurses, 35%). Frequently (often or always, 85%) the family was given the ICU's extension number and 23% of ICUs had a specific time slot for taking relatives' phone calls. Not only reassurance (59%) and logistical information (44%) were given over the phone, but also generic clinical information (79%), e.g. regarding temperature or sleep. However, even detailed clinical data, e.g. on diagnosis, prognosis and treatment, was given in 23% of ICUs. To ensure confidentiality, 41% of ICUs arranged with the family for a single interlocutor to call at set times, 47% provided only generic information, and 6% gave the family an ID code.

CONCLUSION. Our findings suggest that in Italian PICUs the telephone plays a relatively important role in giving parents information, and that it is more widely used than in Italian adult ICUs [3]. Day-to-day information must be based on direct meetings between doctors and families; however, despite possible problems of confidentiality and disruption to the work of the ICU staff [2], the phone can represent a complementary tool in providing certain information to parents and, above all, in addressing their considerable need for reassurance [1].

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0559

THE IMPROVEMENT OF DYNAMIC COMPLIANCE USING FUROSEMIDE / NATRIUM CHLORIDE AEROSOLS IN MECHANICAL VENTILATED CHILDREN

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INTRODUCTION. Inhaled aerosols with Furosemide were used in many studies regarding mechanical ventilated preterm babies with chronic lung diseases (to reduce lung edema) and even in adults in order to improve dyspnoea. The proposed effects for Furosemide were related to lung mechanics improvement.

METHODS. The study included 30 children with normal lung function (FEV1 / FVC > 80%) aged between 8–12 years; sex ratio 1:1; no previous pulmonary disease; the patients have received during surgery anesthetics agents (Propofol 2.5 mg/kg.body weight, Fentanyl 1- 2 μg/kg.body weight, Esmeron 0.6 mg/kg). After surgery, they were mechanical ventilated in BIPAP mode (with PIPmaximum 15 cm H2O, PEEP 3 cm H2O, FiO2 =0.3–0.5, Ti/Te = 1 / 2, Tidal volume= 8–10ml/kg body weight) receiving constantly through a pressure nebuliser aerosols with Furosemide / Natrium chloride (2 mg Furosemide / ml). Dynamic compliance (Cd) and airflow resistance (Raw) were measured every minute for the first 10 minutes (M0 to M10)of ventilation with consequent measurements at minutes 15'(M15) and 20' (M20)respectively. The monitored parameters: SaO2>96%; pCO2=35–38 mmHg; pH= 7.35–7.45. To estimate potential electrolytes,ureea and creatinine imbalances,3 blood samples have been taken for each patient: the reference probe before commencing the ventilation, the second at minute 10' and the third one at minute 30'. The urine output was also measured.

RESULTS. We have noticed a decrease in Raw between 8–10% and an increase in Cd between 43 – 72% as compared to the baseline values of the patients for each parameter. The difference for each patient between the medium value of the starting moment (M0) and the medium value for M1 to M20 had a statistical significance (p value < 0.001).
The blood natrium, kalium, creatinine and ureea levels were maintained in normal ranges before and after ventilation with Furosemide aerosols.

CONCLUSION. The results were temporary related to the period of the administration of aerosols. The data are encouraging in the treatment of acute respiratory distress syndrome in order to ameliorate, even temporary, the specific pulmonary mechanics in this disease.

0560

USE OF MECHANICAL IN-EXUFFLATOR IN LONG TERM VENTILATED PAEDIATRIC PATIENTS: PRELIMINARY DATA FROM ITALIAN SURVEY

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INTRODUCTION. Children with neuromuscular disease (NMD) exhibit progressive muscle weakness and impaired cough. Ineffective cough can cause serious respiratory complications. Mechanical In-Exufflator (MI-E) can be used to improve clearance of airway secretions and therefore to reduce respiratory morbidity in children with NMD. The aim of the present study was to identify the number of children requiring MI-E in Italy, and to establish their underlying diagnosis, and the reason for MI-E use.

METHODS. Surveys were sent by mail to all centers thought to be involved in pediatric long term mechanical ventilation (LTV). The study included all patients aged less than 18 years on LTV on January 1, 2007.

RESULTS. Detailed informations were obtained on 67 children requiring LTV and MI-E use. Eighty seven % (n=58) of MI-E users were patients with NMD. Thirty six patients had spinal muscular atrophy. The most common indication for MI-E application are listed in Table 1. The distribution of the age of MI-E users is shown in Table 2. MI-E was applied via a facemask (88% of children) or via a tracheotomy (12% of children). In 96% of patients in our study population, MI-E was used at home.

TABLE 1 METHODS USED TO GUIDE DECISION TO INITIATE MI-E

Methods	Number of children
Clinical symptoms	56
Pulmonary function and respiratory muscle strength measures	10
Peak expiratory flow measure	7

TABLE 2 NUMBER OF MI-E USERS ACCORDING TO AGE

	Age interval			
	< 12 month	1 to 5 years	6 to11 years	12 to 17 years
N° of children	5	21	14	27

CONCLUSION. In the Italian pediatric population requiring LTV, identified in this study, the majority of patients requiring MI-E had NMD, more than 5 years of age, and applied MI-E via a facemask. The most common reason for MI-E application was the presence of clinical symptoms suggesting ineffective cough.

0561

CHANGES IN INFECTIOUS DISEASE MORTALITY AMONG CHILDREN IN THE NETHERLANDS

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INTRODUCTION. We regularly admit children with life threatening infections. In this study we examine the changes in mortality due to infectious diseases in childhood during the last decades.

METHODS. We analysed mortality data among those aged less than 20 years due to infectious diseases from 1969 till 2006, obtained from the Central Office of Statistics (CBS) in the Netherlands. We reviewed mortality data of all Dutch Paediatric Intensive Care Units (PICU's) in 2005 and infectious causes of death in all children, admitted to our PICU from 1997 to 2006.

RESULTS. This study shows a steep decline of infectious disease mortality in the seventies, followed by a relative stabilisation in the years thereafter. This steep decline was caused by an isolated decline in infectious disease mortality in infants (40 to 10 deaths per 100,000 children) and children between 1 and 5 years of age (7.9 to 2.6 per 100,000). In children over 5 years of age the infectious disease mortality remained stable over the whole study period. Analysis of mortality data of our PICU shows an increasing trend in mortality due to infectious diseases in children with underlying illnesses over the last ten years.

CONCLUSION. Infections in childhood remain a stable burden of mortality during the last decades, despite major improvements in therapeutic and preventive measures. This might be explained by increasing numbers of fatal infections in children with an underlying medical condition, known to increase the risk of severe infections.

0562

EPIDEMIOLOGICAL SURVEILLANCE OF POISONING IN CHILDREN

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INTRODUCTION. Poisoning represents one of the most common medical emergencies encountered in paediatric ages.

METHODS. We report the results of a ten years retrospective study for poisoning in children. Are included 218 children with poisoning exposures admitted at our PICU for the period 1998 – 2007. It has been evaluated the frequency the age the type of exposure route of exposure and the circumstances of poisoning iatrogenic intentional or unintentional. Patients are divided in three groups: 0–5 years 6–12 years over 12 years and variables were analyzed for each group.

RESULTS. Poisoning constituted 4.5 per cent of all admissions. The number of poisoning is increased after 2002 from 3.5 per cent to 5.5 per cent. The peak age of poisoning occur under 5 years old 70.1 per cent. 47.7 per cent of cases were related to medicaments poisoning, pursued par the pesticides 22.4 per cent of cases. Antidepressants represent the most common poisoning. Significant was in our study poisoning from pseudoephedrina 13.6 per cent of medicaments poisonig in children 1 year old and methoclopropamid iatrogenic. Poisoning from acetaminophen is increased after 2002. Poisoning in 84.7 per cent has been accidental. Suicidal poisoning 5.5 per cent are found only in girls older than 12 years old. The mortality rate is reduced less than 10 per cent. Lethal have been poisonings from Fostoksina and mushrooms.

CONCLUSION. Given the increased number of poisoning in children during last years it is necessary to intensify the level of prevention for poisonings.

0563

LONG TERM VENTILATION OF CHILDREN IN ITALY: PRELIMINARY DATA FROM QUESTIONNAIRE SURVEY

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INTRODUCTION. Long term mechanical ventilation (LTV) for children with chronic respiratory failure is an established supportive therapy that reduces morbidity and mortality. Home ventilatory support is the optimal option to satisfy child's psychological needs and therefore enhance quality of life. The aim of the present study was to identify the number of children requiring long term ventilation in Italy, and to establish their underlying diagnosis, ventilatory needs and hospital discharge rate.

METHODS. Surveys were sent by mail to all centers thought to be involved in pediatric LTV. The study included all patients aged less than 18 years on LTV on January 1, 2007.

RESULTS. Of the 611 initial surveys posted, 189 were returned, identifying 407 children requiring LTV. Detailed informations were obtained on 305 children. LTV users were classified in three disorder categories: neurological (n=229; 75%), thoracic (n=13; 4%), lung/upper airway (n=63; 21%). The age of institution of LTV according to disorder category is shown in Table 1. One hundred twenty two (40%) children were ventilated via a tracheotomy with the highest percentage (89%) being neurological patients (Thor 2%, Lung/airway 9%). The majority of non invasively ventilated children used nasal masks (87%). All of the LTV users had positive pressure ventilators. Pressure-limited and volume-limited modes were equally distributed among patients with neurological and thoracic disorders. Patients with lung/upper airway disorder preferred pressure-limited ventilation. Twenty one % of LTV users required mechanical ventilation for more than 20 hours per day, 20% were ventilated 12–20 hours per day, and 59% received ventilation only when asleep. The majority of LTV children requiring mechanical ventilation for more than 20 hours per day were neurological patients. Three hundred (98%) children were cared at home. Only five neurological patients remained in hospital.

TABLE 1 AGE OF INSTITUTION OF LTV ACCORDING TO DIAGNOSTIC CATEGORY

Disorder category	Number of children			
	<12 Month	1 to 5 yers	6 to 11 years	12 to 17 yers
Neurological	11	75	74	69
Thoracic	0	3	5	5
Lung/Upper airway	3	21	12	27

CONCLUSION. In the Italian pediatric population requiring LTV, identified in this study, neurological patients represented the category that needs more health care resources. Successful discharge home was possible for the majority of LTV children despite the very young age, the severity of disease and the need for technological care.

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PERCUTANEOUS TRACHEOSTOMY IN A DISTRICT GENERAL HOSPITAL

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INTRODUCTION. Percutaneous tracheostomy is a frequently performed procedure on the Intensive Care Unit. It's main indication is when mechanical ventilation is expected to be prolonged. However, optimal timing for tracheostomy insertion is unclear, and whilst it has traditionally been viewed as a minimally invasive procedure, serious complications can occur. The requirements for anaesthesia and necessity to teach trainees to become familiar with this procedure are further potential hazards.

METHODS. Retrospective data for all tracheostomies inserted in our intensive care unit at the Royal Bournemouth Hospital from 2006 – 2007 were analysed. The following data was collected: indication for tracheostomy, period from endotracheal intubation to insertion of a tracheostomy, quality of documentation of the procedure, level of supervision, use of fibre-optic bronchoscope, and early and late complications.

RESULTS. 36 patients had percutaneous tracheostomies in our unit between 2006 and 2007. The majority were indicated for respiratory and neuromuscular problems. 45% were inserted within 5 days of endotracheal intubation and 86% by day 10. Complete documentation of the procedure occurred in 91% of cases with bronchoscope guidance and full monitoring in 100%. A consultant (64%) and/or Specialist Registrar was directly involved in the procedure in all cases. If a consultant was not directly involved, they were present at the bedside.
We had one early complication of minor bleeding and late complications (at 1 year) in 8% cases (2 stomal infections and 1 symptomatic tracheal stenosis). There was no case of mortality related to tracheostomy insertion.

CONCLUSION. The results from our audit compare favourably with previous studies. A sound level of supervision was achieved in all cases and our complication rate was low. All procedures were successful, and subsequently during this period there were no surgical tracheostomies performed. The one case of tracheal stenosis did not require any intervention and continues to be followed up with no evidence of progressive sequelae.
Our level of documentation was below the gold standard as stipulated by the Royal College of Anaesthetists. Since this audit, we are in the process of addressing this, by producing a self-adhesive tracheostomy label to be inserted into the notes. We hope this will not only encourage a more complete documentation of this procedure, but also make identifying insertion details easier.

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0565

BEDSIDE ENDOSCOPICALLY GUIDED PERCUTANEOUS TRACHEOSTOMY: A FIVE YEAR ROUTINE USE OF PERCUTWIST (PDT) TECHNIQUE

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INTRODUCTION. Tracheostomy is one of the most usual procedures in intensive care units. Percutaneous tracheostomy offers advantages over operative tracheostomy, namely requiring less time to be performed and being less expensive.1 In addition, complications may be more frequent with surgical tracheostomy.2,3,4,5 Our objective was to determine the relative cost-effectiveness and outcome of PDT.

METHODS. Cohort study of 99 patients requiring an elective tracheostomy in a General Intensive Care Unit of a tertiary University Hospital from 2003 until January 2008. PercuTwist was performed in all cases who had no contraindication. All the procedures were endoscopically guided and held under general anesthesia. Patients were followed-up at six months after discharge or until death. Time of execution, early and late complications were registered.

RESULTS. Sixteen women and 83 men with a median age of 52 (25th–75th percentile: 35–70) years were included. As far as we know this is one of the biggest cohorts using this technique. The admission diagnosis were: trauma in 55% of these patients, medical in 32%, and emergency post-operative in 13%. Mean ± SD SAPS II score was 45 ± 12. Mean ± SD ICU length of stay was 23,6 ± 19,2 days. The motive of tracheostomy was airway protection in 50% and prolonged ventilation in another 50%. Procedures took 5–10 minutes in 36% of cases, 10–15' in 45%, 15–20' in 13% and 20–25' in 6%. Early complications occurred in 20% of the study population, with tracheal ring fracture being the most frequent (17%), followed by minor bleeding (2%) and loss of airway (1%). Late complications were seen in 3% of the group with one tracheal stenosis and two hoarseness cases. No stomal infection was registered and no mortality was associated with the technique.

CONCLUSION. PercuTwist technique is a quick execution, safe method, with low early and late complications.

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0566

ICU AND HOSPITAL MORTALITY IN ELDERLY PATIENTS WITH SEVERE SEPSIS AND SEPTIC SHOCK

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INTRODUCTION. Severe Sepsis and septic shock are an important problem in the growing group of the elderly. Although the higher incidence of sepsis in elderly patients was described [1], there is a lack of data in the intensive care unit. We conducted this study to gain more detailed information on this population.

METHODS. In a retrospective study, 563 patients of a university intensive care unit were included to analyze data between March 2003 and November 2006. Inclusion criteria were sepsis or severe sepsis as defined by ACCP/SCCM consensus conference. Patients were divided in two groups of age more than and less than 65 years. After verification of skewness, patient data were analyzed using Mann-Whitney-U-test and χ2-Test where appropriate. $P<0.05$ was considered significant.

RESULTS. Of 563 patients 52.2% were above 65 years. APACHE II score was significantly higher in elderly patients compared to those less than 65 years (28±10 (median±IQR) vs. 25±11; p=0.01). TISS score was similar in both groups (49±12 vs. 47±11). The incidence of peritonitis was non-significantly lower in the elderly (27.2% vs. 32.7%; p=0.154), whereas pneumonia was more frequent in elderly patients (45.2% vs. 30.9%; p= 0.0001). In elderly patients acute renal failure (ARF) occurred more frequently (60.7% vs. 39.3%; p=0.002). ICU mortality and hospital mortality was higher in patients >65 years compared to <65 years (37.4% vs. 24.5%; p=0.001 and 45.2% vs. 33.8%; p=0.006, respectively).

CONCLUSION. Elderly septic patients are more severely ill, but were treated to the same extend as patients of less than 65 years. Sepsis origin may change in the elderly and complicating ARF in the ICU is more common in this population. These factors may contribute to a higher mortality in the ICU and in hospital of patients > 65 years.

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0567

NOREPINEPHRINE DOSE AS A MARKER OF SEPTIC SHOCK SEVERITY

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INTRODUCTION. The hallmark of septic shock is hypotension refractory to fluid administration. Vasopressors are routinely administered to restore mean arterial pressure. Although it may be intuitive, limited data exists relating the dose of vasopressor to the severity of shock. Consequently, doses of vasopressors have been picked arbitrarily to classify septic shock severity. The present study was conducted to evaluate the prognostic value of the maximal dose of norepinephrine (NE) during the first day of septic shock in comparison to the APACHE II, SAPS II and SOFA scores from the same day.

METHODS. Retrospective analysis of a septic shock database compiled from three large academic hospitals. Patients were included in the study if they received NE as the main, but not the only, vasopressor agent to maintain goal MAP. An empirical receiver operating curve (ROC) of mortality was created for selected outcome predictors. The Hanley and McNeil non-parametric method was used to estimate the area under ROC curve. Additionally, correlation analysis was performed between NE dose and the other outcome predictors.

RESULTS. Ninety six patients were included. Mean APACHE II, SAPS II and SOFA scores were 29.6 ± 8.3, 63.2 ± 20.3 and 12.9 ± 3.7, respectively. Overall survival rate was 45% with a mean maximum dose of NE during the first 24 hrs of shock of 35.4 ± 32.1 mcg/min. Correlation analysis between APACHE II, SOFA, SAPS II, and NE revealed significance only for the NE-APACHE II pair (R2 0.04045, P 0.049).

TABLE 1 ROC FOR EACH OUTCOME PREDICTOR

Predictor [n]	Estimate of ROC Area (SE)	95% CI	P Value
Dose of NE (mcg/min) [96]	0.614 (0.058)	0.499–0.728	0.026
APACHE II [96]	0.683 (0.055)	0.576–0.79	< 0.001
SOFA [96]	0.670 (0.055)	0.562–0.778	0.001
SAPS II [73]	0.741 (0.058)	0.628–854	< 0.001

TABLE 2 DIFFERENTIAL THRESHOLDS

Predictor	Differential threshold	Sensitivity (95% CI)	Specificity (%95 CI)
Dose of NE (mcg/min)	29.9	0.547 (0.404–0.684)	0.651(0.491–0.790)
APACHE II	29	0.717 (0.576–0.832)	0.581(0.421–0.730)
SOFA	14	0.604 (0.460–0.736)	0.721(0.563–0.847)
SAPS II	68	0.641 (0.472–0.788)	0.735(0.556–0.871)

CONCLUSION. The maximal dose of NE during the first day of septic shock may help predicting outcome. Our data suggest a dose > 29.9 mcg/min indicative of higher mortality although the sensitivity is relatively low. A validation study with prospective data collection is warranted.

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THE PROTOCOL IN THE MASSIVE HAEMORRHAGE AT A THIRD LEVEL HOSPITAL

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INTRODUCTION. The massive haemorrhage is a vital emergency in which the multidisciplinary treatment presents a recommendation grade 1A (1). Our objective is to analyse the fulfilment grade of the clinical recommendations, just as establishing the improvement points, to be able to establish a suitable protocol for our hospital. Design of the intervention protocol, as well as the formative action which allows the homogeneity of knowledge among the different services.

METHODS. A collection data was designed in order to evaluate the admitted patients in our hospital with massive haemorrhage resistant to conventional treatment. These patients needed a specific treatment in 2004–2008. Items related to the quantity of transfused products, the specific products used, the hemodynamic parameters, the period of diagnosis and treatment, the monitorization, the coagulopathy, the complications and other analytic parameters were gather for that purpose. After analysing the improvement points, a formative programme was designed, which was based on the latest bibliographical recommendations. It included the designed intrahospitalary protocol, with a calendar which contained the different implicated services.

RESULTS. We identified 14 patients whose demographic data with a medium age of 50,5 years, the mortality per month was 28%. The average quantity of hemoderivated pre and post rFVIIa administration was: Concentrated red blood cells pre 3229 ml, post 1022 ml; Plasma pre 1446 ml and post 591 ml; Platelet pre 414 ml and post 167 ml. In the diagnosis of haemorrhage the 81,8% presented coagulopathy, the 42,8% had a shock, the 71,4% presented a temperature of $< 35,5$ °C and the 35,7% had a heart rate > 100. The 71,4% presented belated complications. Factor VII was administered in the 100% of the cases, fibrinogen and vitamin K in the 28,5% of the cases and amchafibrin in the 14,2%. The rewarming up with an electrical blanket was of 35,7%. The 64,2% and the 78,5% required inotropic and vasoactive drugs, respectively. The 50% needed continuous venovenous hemodiafiltration techniques. The average of SOFA in the admission was of 9.
The rewarming of fluids, the contribution of ions according to the protocol, the availability of specific products (Factor VII recombinant, fibrinogen, protromplex), the speed up of the analytical results, the monitorization of the shock with lactate levels were considered improvement points.
The reduction hemoderivates after the administration of specific products lowers the chances of having soon and belated complications.

CONCLUSION. The establishment of an intrahospitalary protocol of critical haemorrhage is necessary, the same as the analysis of the intervention and the evaluation of the improvement points.
The utilization of specific products to control the massive bleeding as the rFVII seems to diminish the cost of hemoderivates and the complications, from which we consider it should be protocolised.

0569

SEVERE ACUTE PANCREATITIS: CLINICAL STUDY OF 50 PATIENTS WITH MULTIORGAN DYSFUNCTION

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INTRODUCTION. Severe acute pancreatitis (SAP) with multiorgan dysfunction is associated with high morbidity and mortality. Management of these patients require multidisciplinary approach. We present here the results of a clinical study of 50 patients of SAP with multiorgan dysfunction.

METHODS. Records of all SAP patients admitted in ICU between June 2002 to July 2007 were analysed retrospectively. Data included important laboratory and clinical values. Patients were grouped as survivors and non-survivors. The values were expressed as mean +/- SD, median with range, and percentage. Statistical analysis was performed using SPSS 14.

RESULTS. Multiparametric scores like APACHE II and serial SOFA, referral pattern, CT severity index (CTSI), intra-abdominal pressure (IAP), interventions like percutaneous drainage and surgical debridement, renal and cardiovascular support, nutrition, mechanical ventilation, microbiology and transfusion requirements were analysed. Out of fifty, twenty patients survived. Survival was found to be influenced by (1) APACHE II at admission and 24 hour, (2)SOFA at admission, and day 3,7 and 14, (3) IAP, (4) CTSI and (4) referral pattern.

CONCLUSION. Early transfer of SAP patients to ICU and routine monitoring of IAP with timely management of intra-abdominal hypertension were found to be readily modifiable factors to improve outcome of SAP patients in the hospital setting where the study was conducted.

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0570

FAMILY PARTICIPATION IN CARE OF CRITICALLY ILL PATIENTS: OPINIONS OF FAMILIES, STAFF, AND PATIENTS

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INTRODUCTION. Participation of family members in the care of ICU patients, suggested as a component of family-centred care, has met with reluctance among families (1). Patients' opinions are not known. The aim of this study was to determine opinions of families, staff, and patients.

METHODS. Single-centre prospective study (March 1 to July 17 2006 and September 1 to December 31 2006) of consecutive patients with ICU stays more than 3 days. We evaluated opinions about 13 items of care: wiping the eyes, cleaning the oral cavity, moistening the oral cavity, hydrating the lips, aspirating secretions, cleaning the nose, preventing pressure sores, helping staff change patient's position, helping with bed baths, shampooing, washing the patient's feet, manicuring, and applying hydrating agents. We collected patient characteristics and ICU mortality. Between days 3 and 5, questionnaires were given to the nurse, physician, nursing assistant, and family. Patients were interviewed by phone after hospital discharge. Satisfaction and symptoms of anxiety/depression in families were measured using the CCFNI and HADS scores. Care items actually performed by families were collected by the nurses throughout the ICU stay.

RESULTS. Of 220 admitted patients, 129 were included, among whom 28 were not analysed (no family, n=3; refusal, n=3; not fluent in French, n=4; died on day 4, n=2, second admission, n=5; questionnaire not given, n=1). The remaining 101 patients (age, 64.4 y±16.1; SAPS II, 36.0±14.3) had ICU and hospital mortality rates of 24.7% and 30.6%, respectively. Questionnaires were returned by all staff members and 98% of families. 44 survivors were interviewed and 27 not (refusal,n=4; dementia, n=1; no fluent in French, n=4; current hospitalization, n=4, died, n=10; lost of follow up, n=4 after ICU discharge). Family participation in care was deemed desirable by all physicians, 95% of nurses, 91% of nursing assistants, 95% of families, and 77.2% of patients. Only 14 (13.8%) families actually participated in care (412 care items in all). The items viewed most favourably by families and patients were wiping the eyes (74.7 vs. 72%), moistening the oral cavity (87.8 vs. 76.7%), hydrating the lips (85.8 vs. 74.4%), preventing pressure sores (76.7 vs. 72.0%), and applying hydrating agents (77.6 vs. 72.0%). Family satisfaction was high (11.0±2.5 on a 0–14 scale). Symptoms of anxiety and depression were present in 58/101 (58.5%) and 26/101 (26%) families, respectively.

CONCLUSION. Families and ICU staff were strongly in favour of participating in care aimed at improving patient comfort. Family satisfaction was high, symptoms of anxiety were less than in many other studies, and actual participation in care by families was low. The willingness of patients to receive care from their families warrants an interventional study aimed at encouraging families to participate in care.

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WHAT ARE THE CAUSES OF DISCOMFORT IN INTENSIVE CARE?

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INTRODUCTION. In order to improve the well-being of patients in our intensive care unit, we have evaluated the sources of discomfort that were reported within discharge.

METHODS. This prospective study was approved by the local ethics committee. It was performed within a 15 beds intensive care unit of a teaching hospital. On the day of discharge, a questionnaire including 16 items was submitted to patients whose Glasgow score was higher than 13, and who spent more than 48 hours in the unit. For some items, we tried to precise if patients were more bothered at night. Besides, we looked for the main sources of pain and anxiety, and how they were relieved.

RESULTS. 50 patients were interrogated (36 men and 14 women, 53.9 ± 14.5 years old; SAPS II 34.7 ± 21.9; mean length of stay 7.7 ± 4.9 days), corresponding to 25.3% of the 197 survivors, over a time period of 154 days. Among these, 32 (64%) had been intubated, for a period of 5.9 ± 6.1 days and 24 (48%) had been sedated for a period of 4 ± 3.4 days. PHYSICAL DISCOMFORTS: the most frequently reported physical discomfort was thirst, mentioned by 56% of patients. 50% of patients complained about a lack of sleep, 48% about pain, most frequently back pain and throat pain caused by intubation (25%). 44% of intubated patients were bothered by the endotracheal tube, and 40% by the restraint. 40% of patients complained about infusion tubing and cables. The next cited sources of discomfort were cold (38%), noise (36%) and light (26%), mainly at night (61% for noise and 84.6% for light). Alarms were responsible for 72.2% and staff for 22.2% of the noise discomfort. Heat, saturometer sensor and hunger were less frequently reported (20%, 18% and 14%). PSYCHIC DISCOMFORT: The main psychic discomfort was anxiety (38%), which was relieved for 66% of the patient, mainly by the staff presence and support (64.2%), more rarely by families and drugs (14.2%). 28% of the patients suffered from a lack of information, 20% felt isolated from their family and 12% complained from a lack of privacy.

CONCLUSION. 43 patients reported at least 3 sources of discomfort, and 7 report 2. Thirst concerned more than half of the patients, despite the use of water sprays and wet compresses. The pain relief protocol is still insufficient, and analgesia alone does not resolve discomfort caused by decubitus or by the endotracheal tube. Noise and light, which are more bothering at night, participated to a lack of sleep that is often complicated by confusion and agitation. Different measures have to be taken in order to improve the well-being of intensive care patients: early screening of physical and psychological pain, changes in the patients environment and in our habits to preserve their nycthemeral rhythm. Once these measures will be built-up, we will evaluate their effect by further surveys.

0572

POST-ICU VISIT: FEASABILITY AND RESULTS IN PATIENTS WITH MULTIPLE ORGAN FAILURE

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INTRODUCTION. Follow-up and quality of life after ICU are not routinely integrated in the process of care. We present the results of the outpatient Post-ICU visit. It was systematically given for mechanically ventilated (MV) patients of more than 48 hours with at least another organ failure in our ICU.

METHODS. All consecutive Multiple organ failure (MOF) survivors from January 2007 to March 2008 were seen 3 months after ICU discharge. Psychiatric or bedridden patients were not invited to the visit. A team- dedicated attending physician performed clinical examination, chest-Xray and functional respiratory tests. Psychological symptoms and nutritional parameters were checked and quality of life was evaluated by SF-36 questionnaire.

RESULTS. 89 patients were asked to participate. 57 patients (40 men, 17 women, 51 medical, 5 unscheduled surgery, 58.4 yo +- 14.5, SAPS II 36.1 +- 17), ventilated for 7 days in median, who stay 13 days in median in the ICU went to consult. Before ICU stay, 13 were retired, 11 were severely disabled.
After a median delay of 104 days, 55 were at home and 2 in long term care facilities. The weight gain was 3kg in median. Only 2 patients returned to work. SF-36 was 66 in median. 23 present sleep disorders, 3 patients suffered severe anxiety/depression, 26 patients had no ICU recall, 31 remembered unpleasant recall (fear 7, hallucination 8, constraints 4, isolation 4). The main complain was weakness (11) and pain (13) and autonomy lost (11). Overall 67% patients felt their QOL good, but it decreased in 43% cases as compared to the last year. 4 patients suffered dyspnoea but functional respiratory tests revealed 19 obstructive, 8 restrictive syndromes and 17 CO diffusion abnormalities. Physiotherapy was achieved in 34 patients, ongoing in 19 and refused in 4. The visit lead to new therapy or specific care in 12 cases.

CONCLUSION. Follow-up of ICU patients is routinely feasible but require specific organisation. It unmasked frequent symptoms that required specific care. The information feedback to the ICU team could benefit in improving our routine ICU care.

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LONG TERM PROGNOSIS OF PEOPLE AGED 75 YRS ADMITTED TO A MEDICAL ICU

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INTRODUCTION. The mean age and the number of people > 75 yrs in ICUs is constantly increasing. Their long-term outcome is not well known.

METHODS. We performed a retrospective study in our 15-bed medical ICU in a university hospital : all patients aged > 75 yrs admitted in 1996 and between 2001 and 2006 included were eligible. For the latter, we recorded the number of deaths in the ICU, in the hospital, and survival up to April 2007 by asking for certificates of deaths in towns of residence.

RESULTS. All results are summarized in the two following tables.

TABLE 1 1) ADMITTANCE OF PEOPLE > 75 YRS

	total pts/died	pts >75 yrs (%)	ICU deaths >75 (% all deaths)	hospital death	total deaths > 75 yrs (%)
1996	461/128(27,8%)	48 (10,4%)	21 (16,4%)	13	34 = 70,8%
2001	331/80 (24,2%)	43 (13,0%)	18 (22,5%)	4	22 = 51,2%
2006	639/147(23,0%)	107 (16,7%)	40 (37,4%)	9	49 (45,8%)

TABLE 2 2) SURVIVAL UPON 04/20/2007

year	pts > 75 admitted	hospital survivor (% of admitted)	2007survivors (% of admitted)
2001	43	21=48,8%	4=9,3%
2002	50	17=34%	5=10%
2003	74	34=45,9%	16=21,6%
2004	87	41=47,1%	22=25,3%
2005	90	39=43,3%	26=28,9%
2006	107	58=54,2%	44=41,1%

CONCLUSION. The absolute number and percentage of patients > 75 yrs have increased over the past ten years. ICU and immediate intrahospital mortality have decreased. The percentage of survivors after ICU discharge decreased from about 40% 4 to 15 months after to 25% 27 to 39 months after and to 10% 51 to 75 months after. The annual "attrition rate" is about a third of survivors 3 years after ICU discharge. There is no sex- or age bracket-related mortality difference. This unexpected long term result leads to conclude that ICU admittance should not be performed on an age basis per se. Quality of life and functional status of surviving patients is under investigation to ascertain their real autonomy.

0574

LONG-TERM PROGNOSIS IN CRITICALLY ILL PATIENTS WITH LIVER CIRRHOSIS

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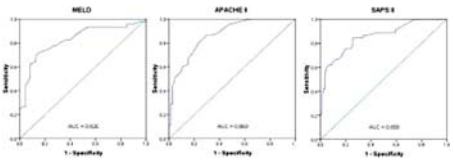
INTRODUCTION. The mortality among patients with cirrhosis, who require ICU treatment, is high. Depending on the degree of hepatic insufficiency and dysfunction of extrahepatic organ systems, mortality rates are reported up to 70%. ICU admission is frequently questioned because of poor prognosis and limited resources.

METHODS. 131 cirrhotic patients (118m, 13f) admitted to our ICU between 2002-2006 were retrospectively evaluated. ICU, in-hospital and 1 year mortality were recorded.

RESULTS. On admission, 60 Patients (45.8%) primarily presented with upper gastrointestinal bleeding (GI), 13.7% with hepatic coma, 9.9% with hepatorenal syndrome (HRS). Alcohol was the main reason for cirrhosis. The ICU mortality was 29.77% (overall ICU Mortality 11.3%), in-hospital mortality 34.35% and cumulative 1 year mortality 51.15%. MELD Score (30.89 vs. 16.05), APACHE II Score (13.22 vs. 25.04) and SAPS II Score (27.71 vs. 54.53) were significantly higher for hospital non-survivors than for hospital survivors ($p < 0.01$ - Mann-Whitney U-Test). Using the area under ROC curves, the three scores discriminated well between hospital survivors and non-survivors (AUROC: MELD 0.826; APACHE II 0.869; SAPS II 0.858) (Fig. 1). Patients admitted with upper GI bleeding had the lowest hospital mortality rate with 15%, whereas 69.2% died from HRS.



CONCLUSION. Cirrhotic patients admitted to our ICU have a higher in-hospital mortality rate (34%) than the average patient treated on an ICU. 22 patients died during the 1 year follow-up, hence the 1 year survival rate was less than 50%. High scores identified patients with a poor outcome and a high probability of death during treatment in hospital, e.g. nobody survived with a MELD score higher than 42. All patients that exhibited an APACHE II score lower than 11 or a SAPS II score lower than 21 were discharged alive. Furthermore, the MELD score discriminated significantly one year survival (18.36 in non-survivor vs. 14.52 in non-survivor; p=0.034-Mann-Whitney U-Test), APACHE II (15.14 vs. 12.44) and SAPS II (29.91 vs. 26.58) could not statistically differentiate in long-term survival.

0575

HEALTH-RELATED QUALITY OF LIFE 1 MONTH AFTER DISCHARGE FROM MORE THAN 3 DAYS INTENSIVE CARE

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INTRODUCTION. Quality of life is one of the most important outcome measures of survivors after critical illness. But physical and psychological sequelae have been described even 12 months after ICU discharge. Rehabilitation is therefore mandated as soon as possible after ICU to restore optimal health status. The Short Form 36 (SF 36) is a robust tool validated for quality of life assessment following critical illness (1). Therefore we studied SF 36 as soon as possible after critical illness and before attending the follow-up clinic.

METHODS. In a 6 beds mixed (predominantly medical) ICU in a community hospital, all adults (>18 years) ICU survivors during a 14 months period and with stay >3 days were included. One month after ICU discharge or soon after hospital discharge they were sent the SF 36 using regular mail. Results were compared with an age material matched control group drawn from Danish normative data. Values are expressed as mean (SD).

RESULTS. Among the 76 eligible patients, 49 (64,5%) answered the SF 36. The mean age was 61 years. Their mean SAPS II score was 38,1 and mean length of ICU stay was 6 days. 39 (79,6%) patients had mechanical ventilation during a mean duration of 7 days.

TABLE 1

	GH	PF	RP	SF	BP	VT	MH	RE
1 Month	50 (20)	38 (29)	13 (25)	68 (29)	60 (30)	46 (23)	71 (19)	43 (43)
Population	68 (22)	81 (24)	75 (36)	90 (19)	75 (25)	69 (23)	82 (18)	85 (24)

(GH General Health; PF Physical Functioning; RP Role Physical; SF Social Functioning; BP Bodily Pain; VT Vitality; MH Mental Health; RE Role Emotional. 0 = worst score, 100 = best score)

CONCLUSION. The comparison between the 1-month study sample and a control population of apparently healthy Danes of similar age revealed significant impairment in all items of the SF 36 with the greatest limitation for physical role.

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0576

ROUTINE DELIRIUM MONITORING IN A UK CRITICAL CARE UNIT IS FEASIBLE AND IDENTIFIES A HIGH INCIDENCE OF UNRECOGNISED DELIRIUM

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INTRODUCTION. Delirium is a common neurobehavioural syndrome associated with increased morbidity and mortality. Delirium goes unrecognised unless a screening tool is used as the majority of delirium is either motoric mixed or hypoactive. The confusion assessment method for the intensive care unit (CAM-ICU) is a validated delirium screening tool for critically ill intubated patients with sensitivity and specificity over 93%. The aim of this clinical audit was to determine the incidence and outcome of delirium using the CAM-ICU in a UK critical care unit.

METHODS. Routine CAM-ICU monitoring was implemented in our mixed critical care unit in January 2007 following two months educational and promotional campaign. Management of delirium guidelines were introduced but there was no change to sedation guidelines. During September and October 2007 the daily CAM-ICU was recorded by the bedside nurse for 50 consecutive level 2 and level 3 patients admitted to the mixed medical/surgical critical care ward in a district general hospital. This was repeated in January 2008 for 30 consecutive patients. Patient outcome was recorded.

RESULTS. It was not possible to assess for delirium in ten patients due to coma. The overall incidence of delirium was 26% (21 CAM-ICU positive). If elective post-operative patients were excluded the incidence was 37%. The mortality in the CAM-ICU positive group was 38% compared 26% for all patients. Nine of the ten patients who were unable to be assessed for delirium died.

TABLE 1

	Delirious	Not delirious	Unable to assess
Number of patients	21	49	10
Deaths	8	4	9
Mean % of Deaths (95% CI)	38% (20%–60%)	8% (3%–20%)	90% (55%–99%)

CONCLUSION. We have demonstrated that delirium screening is feasible in a UK intensive care population. The high incidence of delirium and the impact on outcomes in this UK cohort of patients is in line with previous reports from other countries studying a similar case mix. There is an urgent need to develop strategies to treat delirium in the critically ill.

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Ely et al JAMA 2001; 286: 2703–10.

0577

LONG-TERM OUTCOME AND PROGNOSTIC FACTORS FOR HEMATOLOGICAL PATIENTS ADMITTED TO AN ICU

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INTRODUCTION. The goal of our study was to find predictors for both ICU and long term outcome in patients admitted to the ICU with a hematological diagnosis. The possible predictors chosen were: ventilator treatment, CRRT, secondary infection during ICU stay, ICU length of stay (LOS), APACHE II score and in-hospital length of stay prior to ICU admission.

METHODS. Retrospective unicentric analysis of patients with a hematological disease admitted to the multidisciplinary ICU (6 beds) at a tertiary university hospital. The ethical issues involved in the individual ICU stay were also studied. We looked for decisions in the patient journals to withdraw or withhold resuscitation, ventilator, CRRT and inotrope therapies.

RESULTS. In this one-year period 65 patients with a hematological diagnose were admitted to the ICU. The decision to admit was taken by both a hematologist and an ICU-specialist in cooperation. The mean age was 56,9 years (range 16 – 84), mean LOS on the ICU were 6.4 days (range 1 – 52) and the mean APACHE II-score 26,4 (range 12–39).
In-ICU mortality was 30,7%, in hospital mortality 52,3% and one year mortality 70,7%.
A total of 20 patients died in the ICU. We found that secondary infection (10/20 50%), CRRT (11/20 55%), ventilator therapy (15/20 75%), ICU stay $\geq$ 7 days (11/20 55%) and a active ethical decision about therapy level (15/20 75%) all seem to correlate with a higher ICU mortality compared with a baseline mortality of 30.7%.
Only two out of the nineteen patients that had had a secondary infection were alive at 1 year.
Twenty-eight patients admitted to the ICU had had a prior stay at the hematological ward of $\geq$ 7 days. Only 5 of those were alive after 1 yr.
Secondary infection on the ICU ward and a long pre-ICU stay in the hematological ward both appear to be predictors for long term survival.

CONCLUSION. Even with a moderate ICU-mortality, the one year mortality of hematologic patients seems very high.
We find the referral of critically ill patients with hematological disorders to the ICU an increasingly complex task. Improved possibilities for treating malignancies which previously would have been incurable, now renders the task of an initial triage for the ICU difficult.
We suggest that the long term survival rate (1 yr) of the hematological disease be taken into account when considering ICU admission. A long ICU stay with very poor prognosis is possibly both unethical and costly, if we take long term outcome into consideration.
Another suggestion could be a critical evaluation after e.g. 7 days of ICU treatment. This suggestion is based on the high 7+ days ICU stay mortality.

Poster Sessions
Microcirculation in the critically ill: 0578–0591

0578

MICROCIRCULATION IS COMPROMISED IN EXTREME EXERCISE: A (PILOT) OBSERVATIONAL STUDY IN MARATHONRUNNERS

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INTRODUCTION. Microcirculatory dysfunction is thought to play a role in the development from shock to multiple organ dysfunction syndrome.The response to extreme exercise, such as marathon running, is in many aspects similar to the hemodynamic and inflammatory response seen in critical illness (1). In this study therefore we hypothesized that microcirculatory alterations would occur following a circulatory insult such as running a marathon.

METHODS. We studied 5 marathonrunners (2M/3F) participating in the marathon of Rotterdam. A microcirculatory assessment was performed before, on the finish-line and the following day after the marathon. Microcirculation was measured by sublingual sidestream dark field (SDF) imaging (2). Sublingual capillary blood flow was estimated using semi-quantitaive microvascular flow index (MFI) in small (diameter 10–25 \mum), medium (25–50 \mum) and large (50–100 \mum) sized microvessels (0 = no, 1 = sluggish, 2 = intermittent, 3 = continous flow).

RESULTS. MFI decreased in all groups of vessels after completion of the marathon race. These alterations persisted the following day in all subjects (P<0.05) (Table 1). We found a difference in weight (pre-race minus post-race) of −1.28 +/- 0.98 kg.

TABLE 1

	Before	After	>20 hours
Small	2.19 +/- 0.26	1.22 +/- 0.27	1.14 +/- 0.46
Medium	2.48 +/- 0.35	1.69 +/- 0.23	1.52 +/- 0.35
Large	2.88 +/- 0.14	2.20 +/- 0.15	2.43 +/- 0.56

CONCLUSION. Sublingual microcirculatory blood flow alterations were present in all participants after completion of the marathon race and persisted the following day. These alterations are consistent with the expected affect on the microcirculation of hypovolemia due to fluid loss and cytokine activation in marathonrunners.

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0579

DOES INCREASED PERFUSION PRESSURE IMPROVE GASTRIC TUBE MICROVASCULAR PERFUSION?

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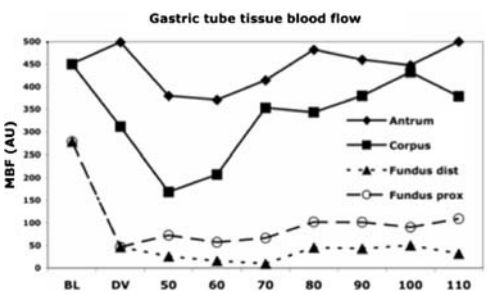
INTRODUCTION. Esophagectomy with gastric tube reconstruction is the surgical treatment for cancer of the esophagus. Following reconstruction perfusion of the distal part of the tube depends exclusively on the microcirculation, making it susceptible to hypoperfusion and anastomotic leakage. It is unknown whether an increase in arterial perfusion pressure can exert a beneficial effect on gastric tube tissue perfusion. For this purpose we developed an experimental model of gastric tube reconstruction.

METHODS. In 6 anesthetized and mechanically ventilated pigs, bodyweight 32 $\pm$ 2 kg (mean$\pm$SD), a midline laparotomy was performed. Formation of the gastric tube comprised ligation of all gastric arteries except the right gastro-epiploic artery. A gastric tube was formed by dissection of the lesser curvature and the gastro-esophageal junction.
Systemic hemodynamic monitoring was performed with an arterial line and a PA catheter. Microvascular blood flow (MBF) was assessed with laser Doppler flowmetry and microvascular HbO2 saturation (mHbSO2) with spectrophotometry (O2C, Lea Medizintechnik Giessen Germany). Measurements were made in antrum, corpus and fundus at increasing mean arterial blood pressures from 50 to 110 mmHg. For this purpose blood pressure was increased in steps of 10 mmHg with incremental infusion of noradrenaline.

RESULTS. Heart rate, cardiac output and PAOPs did not change significantly throughout the experiment. MBF measurements are shown below (BL-baseline, DV-devascularisation). mHbSO2 was significantly lower only in the fundus, and increased significantly at a higher MAP.



CONCLUSION. We were able to establish a animal model for gastric tube reconstruction. In this model we demonstrated that although gastric perfusion is severely compromised following creation of the gastric tube, tissue perfusion could be improved significantly by increasing perfusion pressure with noradrenaline. On the other hand, this impairment in tissue blood flow was aggravated by hypotension. Whether these results should have consequences for the clinical setting remains to be investigated.

0580

EARLY MICROVASCULAR CHANGES IN SEPSIS, SEVERE SEPSIS AND SEPTIC SHOCK

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INTRODUCTION. Improvements in the early management of sepsis may result in improved outcomes. This has led to increased interest in the pathophysiology of the early stages of this disease process. Microvascular derangements are well described in patients with established sepsis but little data is available from patients in the early stages of hospital care.

METHODS. Following local research ethics committee approval, observational data were collected in patients with sepsis, severe sepsis and septic shock within six hours of presentation. Patients received usual clinical care (not including early goal directed therapy). Microvascular flow index (MFI) was calculated from video images of the sublingual microcirculation (sidestream darkfield imaging) whilst cardiac index (CI) and oxygen delivery (DO_2I) were measured non-invasively using a supra-sternal Doppler method. Additinal data included mean arterial pressur (MAP) and serum lactate.Data are presented as mean (SD) or median (IQR). Data were tested with the t-test where normally distributed and the Mann-Whitney U test where not normally distributed.

RESULTS. 48 patients were recruited. Data are presented in Tables 1 and 2.

TABLE 1 PATIENT DATA FOR STUDY GROUPS

	Sepsis n=20	Severe Sepsis n=18	Septic Shock n=10
Age (years)	42 (28–64)	50 (30–70)	52 (30–68)
Gender	12 female	10 female	2 female
APACHE II score	6 (4–9)	13 (9–16)	21 (17–26)
Lactate (mmmol/l)	2.0 (1.7)	2.1 (0.9)	3.1 (2.2)
Mortality (%)	0 (0%)	2 (11%)	5 (50%)

TABLE 2 HAEMODYNAMIC AND MICROVASCULAR DATA

	Sepsis	Severe sepsis	Septic shock
MAP t=0 (mmHg)	90 (16)*	79 (15)*	68 (16)
MAP t=4 (mmHg)	82 (16)*	81 (15)*	65 (16)
DO_2I t=0 hours	620 (187)*	519 (224)	349 (244)
DO_2I t=4 hours	617 (184)*	408 (186)*	266 (142)
MFI (<20μm) t=0	3.0 (2.5–3.0)*	2.9 (2.5–3.0)	2.5 (1.9–3.0)
MFI (<20μm) t=4	3.0 (2.8–3.0)	3.0 (2.5–3.0)	2.8 (2.5–3.0)

$p < 0.05$ vs septic shock. DO_2 units: ml/min/m^2

CONCLUSION. Characteristic sepsis related derangements of both global haemodynamics and microvascular flow can be readily identified early after presentation. The severity of these abnormalities correlates with the severity of sepsis. This data supports early commencement of treatments intended to restore microvascular perusion deficits in septic patients.

GRANT ACKNOWLEDGEMENT. This research was supported by a European Union Leonardo Da Vinci Award.

0581

EFFECT OF INCREASING DOSES OF NOREPINEPHRINE ON MICROVASCULAR PERFUSION AND TISSUE OXYGENATION IN SEPTIC SHOCK

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INTRODUCTION. Vasopressor therapy is routinely used to maintain an adequate mean arterial pressure (MAP) in patients with septic shock. Previous studies suggest that a MAP of 65mmHg provides adequate tissue perfusion and oxygenation. However, these studies utilised only indirect measures of microvascular flow and did not evaluate tissue oxygenation. The aim of this study was to determine the effects of various doses of norepinephrine (NE)on microvascular flow and tissue oxygenation.

METHODS. Following approval by the local research ethics committee and the medical and healthcare products regulatory agency, data were collected from patients receiving NE infusion for the treatment of septic shock. The dose of NE was adjusted to achieve a MAP of 60 mmHg in the first instance and then MAPs of 70, 80 and 90 mmHg. Patients otherwise received usual clinical care. The following were determined after a 45 minutes stabilisation period at each MAP: cutaneous PtO_2 (Clark electrode), mean red cell flux (laser Doppler), Microvascular Flow Index (MFI) from sublingual microcirculation images (sidestream darkfield imaging) and DO_2I (lithium indicator dilution). Significance was tested using repeated measures ANOVA for parametric data or Friedman's test for non-parametric data. Data are presented as mean (SD) or median (IQR).

RESULTS. 16 patients were recruited (9 males, age 67 [55–72], APACHE II 23 [17–30]) of whom ten (63%) subsequently died. Significant changes were identified in global haemodynamics, red cell flux and tissue oxygenation. There was no difference in MFI (Table). No adverse effects of NE were noted.

TABLE 1 CHANGES IN HAEMODYNAMICS AND MICROCIRCULATION WITH INCREASING DOSES OF NOREPINEPHRINE

MAP (mmHg)	60	70	80	90	p
DO_2I (ml/min/m^2)	487 (418–641)	536 (446–720)	550 (474–800)	662 (498–829)	0.0055
$ScvO_2$ (%)	71 (6)	72 (7)	73 (7)	74 (7)	0.03
MFI (<20μm)	2.3 (1.9–2.7)	2.5 (2.5–2.8)	2.5 (2.3–2.7)	2.4 (2.0–2.7)	0.45
PtO_2 (kPa)	5.9 (1.7)	6.7 (2.4)	7.1 (2.0)	7.3 (2.0)	<0.0001
Red cell flux (flux units)	26 (16–42)	27 (18–44)	27 (20–47)	33 (20–47)	0.04
NE (μg/kg/min)	0.18 (0.18)	0.25 (0.22)	0.35 (0.27)	0.41 (0.26)	<0.0001

CONCLUSION. In patients with septic shock, significant improvements in global haemodynamics, tissue oxygenation and cutaneous blood flow assessed by laser Doppler were seen when the dose of NE was increased to achieve higher MAPs. No differences in sublingual microcirculation were observed. These findings appear to contradict previous findings. The clinical significance of our observations is uncertain.

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0582

ALTERATIONS IN TISSUE OXYGENATION AND MICROVASCULAR FLOW DURING AND AFTER MAJOR ABDOMINAL SURGERY

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INTRODUCTION. Deranged microvascular flow and tissue oxygenation have been demonstrated in patients undergoing major surgery. However, there is little data describing how these parameters relate to each other or to clinical outcome.

METHODS. Following approval by the local research ethics committee, observational data were collected prior to and for eight hours after major elective abdominal surgery. Patients received routine clinical care. Data included cutaneous tissue PtO_2 (Clark electrode), sublingual microvascular flow index (MFI) and the proportion of perfused vessels (PPV) in small (<20μm) and large (>20μm) vessels (sidestream darkfield imaging), mean red cell flux (laser Doppler flowmetry), systemic oxygen delivery index (DO_2I) (lithium indicator dilution) and mean arterial pressure (MAP). Data are presented as mean (SD) or median (IQR).

RESULTS. 25 patients were recruited (11 males; age 69 years [63–72]; P-POSSUM score 35 [31–40]) with two deaths. Following surgery, significant reductions were seen in PtO_2:FiO_2 ratios but there were no significant changes in mean red cell flux, PPV or MFI (Table 1). Postoperatively, small vessel MFI and PPV were significantly lower in patients who developed complications (Table 2) despite there being no difference in PtO_2:FiO_2 ratio or global haemodynamics between those with or without complications.

TABLE 1 MICROVASCULAR CHANGES BEFORE AND AFTER MAJOR ABDOMINAL SURGERY

	Before surgery	After surgery
MAP (mmHg)	90 (10)	83 (15)
MFI (<20μm)	3.0 (2.5–3.0)	2.1 (2.5–2.8)
PPV (<20μm) (%)	85 (74–93)	74 (61–90)
PtO_2:FiO_2 ratio	30 (27–35)	22 (18–27)*

$p < 0.0001$. Wilcoxon matched pairs test

TABLE 2 POST-OPERATIVE DO_2I AND MICROVASCULAR HAEMODYNAMICS ACCORDING TO OUTCOME

	Complications (n=14)	No complications (n=11)
DO_2I (8 hour mean)	384 (289–440)	360 (291–390)
MFI (<20μm) t=0 hrs	2.50 (2.00–2.75)	2.63 (2.13–3.0)
MFI (<20μm) t=4 hrs	2.5 (2.0–3.0)	3.0 (2.3–3.0)*
MFI (<20μm) t=8 hrs	2.75 (2.38–2.78)	3.0 (2.8–3.0)*
PPV (<20μm) t=0 hrs (%)	76(50–100)	89 (50–100)*
PPV (<20μm) t=4 hrs (%)	75 (53–100)	90 (67–100)**
PPV (<20μm) t=8 hrs (%)	100 (78–100)	100 (82–100)

*$p < 0.05$, **$p < 0.01$Mann-Whitney test. DO_2I units = ml/min/m^2*

CONCLUSION. After major abdominal surgery tissue oxygenation was impaired. Heterogeneity of small vessel flow was more marked in those patients who developed complications although there was no significant difference in tissue oxygenation. Large vessel flow remained unaffected suggesting microvascular shunting.

GRANT ACKNOWLEDGEMENT. ESICM Spacelabs Intelligent Monitoring Award.

0583

OXIDATIVE STRESS GENERATED BY IRON SUPPLY IN MICRO CIRCULAR ENDOTHELIAL CELLS

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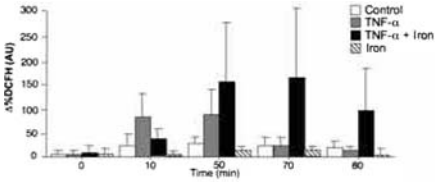
INTRODUCTION. Anemia occurs in more than 70% of intensive care patients, and is an independent risk factor of morbidity and mortality. Intra venous iron supply can be suggested, but iron may induce reactive oxygen species (ROS) production, in particular in inflammatory context. The aim of the study was to assess the effect of iron supply on ROS production with a model of human pulmonary micro circular endothelial cells (HPMEC), and to evaluate a possible potentialization of this oxidative stress first induced by a prior exposition to TNF/alpha.

METHODS. Confluent HPMEC in monolayer conformation have been placed in a perfusion chamber mounted on an inverted microscope equipped with a digital camera. Cells were perfused with Krebs buffer containing a fluorescent probe (2'7' DCFH), which permitted to assess the ROS production, mainly H2O2. 4 groups have been studied: control, iron (iron hydroxide saccharose), TNF/alpha, TNF/alpha + iron. Oxidative stress level was evaluated with DCFH fluorescence variation compared to level at TNF/alpha introduction, after 40 minutes of stabilization. Statistics analysis was performed with ANOVA for repeated measure.

RESULTS. Exposition of HPMEC to iron does not induce intracellular ROS production. On the other hand, after 20 minutes of stimulation with TNF/alpha, iron supply leads to a significant increase of ROS production (p=0.03), which persists despite iron exposition ending (Fig 1).



CONCLUSION. Iron exposition of endothelial cells first exposed to TNF/alpha potentializes ROS production induced by this inflammatory mediator. Intravenous iron supply could be deleterious in patients in inflammatory state.

0584

LASER SPECKLE IMAGING OF NAILFOLD MICROCIRCULATION DURING DOBUTAMIN INFUSION IN PATIENTS SUSPECTED OF CARDIAC ISCHEMIA

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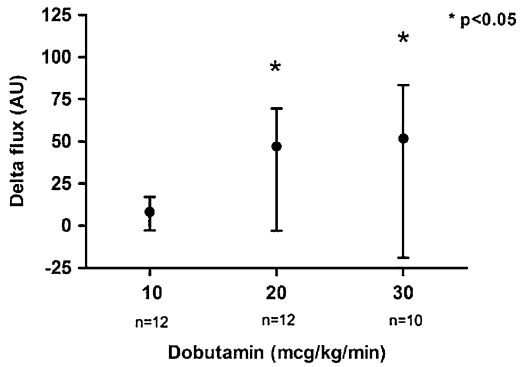
INTRODUCTION. The aim of the study was to investigate whether peripheral microcirculatory flow increases by administration of dobutamin, measured with Laser Speckle Imaging (LSI). LSI is a new technique which exploits the fact that the random speckle pattern that is generated when tissue is illuminated by laser light changes when blood cells move within a region of interest. The contrast image is processed to a color-coded image that correlates with blood flow in tissue.

METHODS. We used LSI for evaluation of the microcirculation in the nail fold area. 12 Patients scheduled for dobutamin stress scintigram in order to evaluate cardiac ischemia in the out patients clinic of the cardiology department were included in the study. Patients received increasing dosages of dobutamin (10–20–30 mcg/kg/min) or until target heart rate was reached. Microcirculatory flow was measured during the whole experiment. We determined the change in flow for each step compared to baseline flow (delta flux) in arbitrary units (AU).

RESULTS. Data are presented as median [interquartile range]. Heart rate increased from a baseline value of 70 bpm [62–85] to 79 bpm [68–85], to 95 bpm [80–119], to 114 bpm [98–126] after the subsequent dobutamin dosages. There were no significant changes in blood pressure observed. At a dobutamin dosage of 20 mcg/kg/min there was a significant increase in peripheral flow seen as compared with baseline. 2 patients reached the target HR at 20 mcg/kg/min and no subsequent dose was administered.



CONCLUSION. We found that dobutamin in a dosage of 20 mcg/kg/min increases peripheral blood flow measured with LSI at the nailfold area.

0585

LOW-DOSE NITROGLYCERIN IMPROVES SUBLINGUAL MICROCIRCULATION IN ACUTE HEART FAILURE

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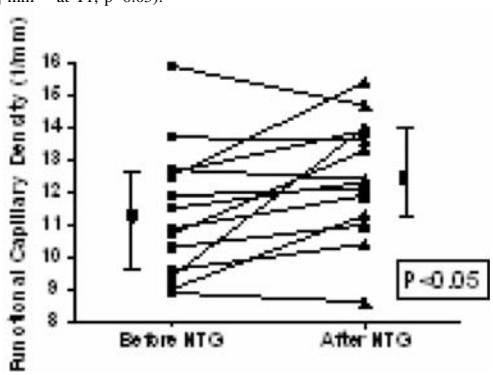
INTRODUCTION. Nitroglycerin (NTG) is frequently administered to patients with acute heart failure to reduce ventricular afterload. We tested the hypothesis whether NTG promotes microcirculatory blood flow due to its vasodilating action.

METHODS. We included acute heart failure patients who were admitted to the Intensive Cardiac Care Unit. In each patient, an intravenous loading dose of 0.5 mg NTG was given followed by continuous NTG infusion (2 mg/h). Using Side-stream Dark Field imaging, sublingual micro-vascular perfusion was evaluated before NTG administration (T0) and 15 minutes after initiation of NTG (T1). At least three video sequences of the microcirculation were recorded and analyzed. Microscan Analysis Software was used to measure Functional Capillary Density (FCD), an indicator of tissue perfusion. Capillaries were defined as the micro-vessels with a diameter of <25 mum. Values are expressed as median [P25-P75].

RESULTS. Fourteen patients were included in this study. Mean arterial pressure (MAP) decreased after NTG administration (81 [73–85] mmHg at T0 vs. 76 [65–84] mmHg at T1, p=0.02), whereas central venous pressure (17 [14–19] mmHg at T0 vs. 16 [13–18] mmHg at T1) and heart rate (89 [62–108] bpm at T0 vs. 85 [65–109] bpm at T1) did not change significantly. Nitroglycerin improved FCD (figure: 11.2 [9.6–12.6] mm^{-1} at T0 vs. 12.4 [11.2–13.9] mm^{-1} at T1, p=0.03).



CONCLUSION. Micro-vascular perfusion can be improved by low-dose NTG in patients with acute heart failure.

0586

THE EFFECTS OF RED BLOOD CELL TRANSFUSIONS ON SUBLINGUAL MICROVASCULAR PERFUSION IN PATIENTS UNDERGOING ON-PUMP CARDIAC SURGERY

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INTRODUCTION. Red blood cell transfusions are often given in a number of clinical conditions in order to correct the diminished tissue oxygenation by primarily increasing systemic hemoglobin concentration. However it is controversial whether the increase in systemic hemoglobin concentration also leads to an improvement of microcirculatory oxygenation and corrects tissue hypoxia. In this study we investigated the efficacy of red blood cell transfusions in patients undergoing on-pump cardiac surgery and whether blood transfusions improve microcirculatory parameters and oxygen delivery to the tissues.

METHODS. In 8 patients (group A) sublingual microcirculation and perfusion was imaged using Sidestream Dark Field (SDF) (Microscan, Microvision Medical, Amsterdam, Netherlands). This device is a handheld microscope using green light-emitting diodes (LEDs) of a wavelength of 530 nm. This wavelength of light is absorbed by the hemoglobin in erythrocytes, so these cells can be clearly observed as flowing cells. In 11 patients (group B) sublingual reflectance spectrophotometry (O2C®; Lea Medizintechnik, Germany) was used to measure microcirculatory hemoglobin concentration and hemoglobin oxygen saturation. Both measurements were performed 15 minutes before and 30 minutes after blood transfusion during on-pump cardiac surgery.

RESULTS. In group A (n=8) 5 male, 3 female, 64±11 red blood cell transfusions increased hemoglobin concentration from 4.4±1.03 mmol/L to 5.3±0.82 mmol/L ($p < 0.01$), mean arterial pressure from 60.1±10.9 mmHg to 66.1±7.7 mmHg ($p < 0.03$), vessel density from 10.5±1.1 mm/mm2 to 12.8±1.1 mm/mm2 ($p < 0.001$). Microvascular flow index (MFI) was analyzed according to the method described before and was not significantly altered by red blood cell transfusion. Red blood cell storage time did not have a statistically significant influence on microvascular perfusion and oxygenation.

In group B (n=11) 10 male, 1 female, 64±12 years, following red blood cell transfusions systemic hemoglobin concentration increased in each patient, from 4.9±0.7 mmol/L to 5.6±1.0 mmol/L. Similarly, sublingual microcirculatory hemoglobin concentration increased in each patient following blood transfusion from an average of 62.3±10.8 units to and 70.2±8.9 units ($p < 0.001$) whereas microcirculatory hemoglobin oxygen saturation increased from 64.9±11.6% to 67.7±10.2% ($p < 0.05$) respectively.

CONCLUSION. Microcirculatory perfusion and oxygenation, parallel to systemic variables, increased following transfusion of red blood cells. Combining these two methods together gives an integrative and comprehensive monitoring of the functional activity of the microcirculation at the bedside by providing information about microcirculatory oxygen delivery by the RBC and oxygen availability.

0587

LOW INCIDENCE OF RECTAL MICROCIRCULATORY FLOW ALTERATIONS AFTER ELECTIVE CARDIAC SURGERY

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INTRODUCTION. During on-pump cardiac surgery patients are subject to a number of hemodynamic changes such as hypotension, hemodilution, hypothermia, shifts from pulsatile to continuous bloodflow and inflammation. These insults have been associated with microcirculatory alterations especially in the gastro-intestinal tract. We tested the hypothesis that cardiac surgery induces microcirculatory alterations in the rectal mucosa, directly observed by Sidestream Darkfield (SDF) imaging.

METHODS. In a single center observational study in 26 elective on-pump cardiac surgery patients SDF imaging of the rectal mucosa was performed in the first hour after ICU admittance. Fecal contamination of the rectal pouch was a contra indication for enrolment. Semi-quantitative analysis was performed as described in detail elsewhere[1]. The percentage of well-perfused capillaries was predefined as the number of rectal crypts with a flow score >1 divided by the total number of crypts x 100%. Data are expressed as medians and inter quartile ranges (IQR,[P25-P75]).

RESULTS. Baseline characteristics of the study population are summarized in Table 1. 23 patients underwent a CABG procedure, 2 heartvalve surgery and 1 CABG + heartvalve surgery. All patients survived to hospital discharge. Microvascular Flow Index was 3[3–3] and the percentage of well-perfused capillaries 84.5%[72–92.5].

TABLE 1 BASELINE CHARACTERISTICS STUDY POPULATION (N=26)

Variable	Median [IQR]
Age	63 [59–73]
EuroSCORE	3.5 [2–6]
Cardio Pulmonary Bypass duration (min)	127 [88–143]
Aortic Cross Clamping time (min)	82 [59–90]
Lowest Hematocrit (%)	25 [23–27]
Mean Arterial Pressure (mmHg)	82 [75–91]
Central Venous Pressure (mmHg)	10 [7–12]
Central Venous Oxygen Saturation (%)	72 [67–75]
Lactate (mmol/L)	2.4 [1.7–3.2]

CONCLUSION. Despite significant hemodynamic insults during elective on-pump cardiac surgery, rectal microcirculatory flow alterations during the first hour of ICU admittance could not be demonstrated.

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0588

LOW OXYGEN DELIVERY IS ASSOCIATED WITH CELLULAR DAMAGE OF THE GUT LUMEN AS SHOWN BY ELEVATED INTRA LUMINAL GLYCEROL LEVELS

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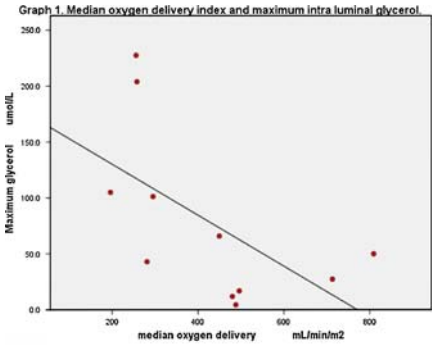
INTRODUCTION. Intra operative goal directed therapy is associated with better outcome. This maybe related to splanchnic flow preservation which prevents gut wall damage and bacterial translocation. This study utilises microdialysis to measure intra luminal glycerol, which was shown previously to be associated with the degree of cellular damage [1], to assess the impact of changes in oxygen delivery during major surgery on large bowel.

METHODS. An observational study conducted on patients undergoing major abdominal surgery. Intra operative oxygen delivery is derived from oesophageal Doppler monitoring (Deltex Doppler). A CMA 61 microdialysis catheter is placed in the ascending colon and continuously flushed with 2uL/min. Samples are obtained every 6 to 8 minutes if clinically permitted.

RESULTS. Data from eleven adult patients undergoing major abdominal surgery were collected. The number of samples obtained from microdialysis was between 4 and 14 depending on the duration of surgery. Maximum intra luminal glycerol level attained correlates inversely to the median oxygen delivery of each patient (rho r = −0.709, p=0.015 graph 1).



CONCLUSION. Low oxygen delivery is associated with high intra luminal glycerol level indicating cellular damage.

REFERENCE(S). 1.Solligård E et. al.: Gut luminal microdialysis of glycerol as a marker of intestinal ischemic injury and recovery. CCM 2005, 33(10):2278–2285.

0589

TRANSCUTANEOUS OXYMETRY IN SEPTIC SHOCK : PRONOSTIC VALUE OF AN OXYGEN CHALLENGE TEST

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INTRODUCTION. Alterations of tissue oxygenation and perfusion during septic shock (SS) is a crucial issue. Monitoring peripheral perfusion could be an early and sensitive way to detect vital organ hypoperfusion (1). Transcutaneous oxymetry (TO) allows a non invasive measurement of oxygen trancutaneous pressure (PtcO2) which is related to arterial oxygenation pressure (PaO2) and circulatory status (2). A recent study emphasizes the pronostic value of parameters from TO in patients in SS (3). We hypothesized that variations of PtcO2 (DeltaPtcO2) induced by variations of oxygen arterial content estimated by PaO2 (DeltaPaO2) during an oxygen challenge test could be related to outcome in SS.

METHODS. We conducted a prospective, observational study, in a universitary hospital. From January to August 2007, all consecutive patients admitted for severe SS requiring mechanical ventilation and vasopressor therapy after early hemodynamic optimisation were included. PtcO2 was measured (Tina 4, Radiometer®, Copenhagen, Denmark) in basal condition and at the end of an oxygen challenge test (OCT: FiO2 1.0 during 15 min.). Arterial blood gaz were performed before and after OCT. DeltaPtcO2/DeltaPaO2 (%) during OCT was calculated 3 times during the first 2 days of hospitalization (H0, H24, H48). The time course of DeltaPtcO2/DeltaPaO2 was analysed and compared between survivors (S) and non survivors (NS) at day 28th (D28), as well as usual hemodynamics and metabolic parameters: mean arterial pressure (MAP), cardiac index (CI), central venous oxygen saturation (ScvO2), norepinephrine infusion amount and lactatemia.

RESULTS. Twenty one patients were included. Eight of them had died at D28 (NS: n=8; S: n=13). Hemodynamic parameters (MAP, CI, ScvO2), infusion of vasopressor and lactatemia were similar between S and NS at H0, H24 and H48. There was no significant difference in the oxymetric index between the 2 groups at H0 (DeltaPtcO2/DeltaPaO2: S:57±31% vs NS:36±38%, p=0.17). However, at H24 and H48, patients showed a DeltaPtcO2/DeltaPaO2 index significantly higher in group S compared with NS (S:83±40% vs NS:37±22%, p=0.01 at H24; S:105±54% vs NS :43±34%, p=0.02 at H48).

CONCLUSION. These preliminary results suggest that increase in DeltaPtcO2/DeltaPaO2 seems to predict better outcome in severe septic shock while circulatory and metabolic parameters such as ScvO2 or lactatemia during the first 2 days of resuscitation remain similar. OCT could help us to early detect patients who will undergo pejorative outcome in septic shock but further analysis is needed.

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0590

THE EFFECT OF VASOACTIVE AMINES ON THE GUT MICROCIRCULATION OF RATS WITH ENDOTOXEMIA

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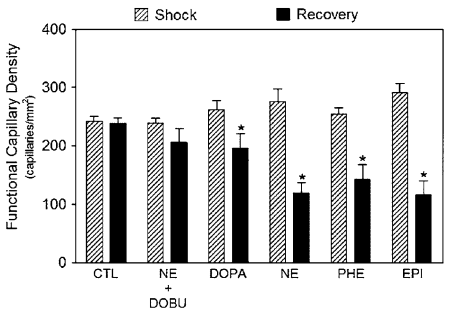
INTRODUCTION. The choice of catecholamines in septic shock patients has been an ongoing debate for several years. Because vasopressors can accentuate mesenteric hypoperfusion secondary to circulatory shock, gut circulation is a major consideration in supporting hemodynamics. The objective of our study was to determine the influence of dopamine, norepinephrine, phenylephrine, epinephrine, and an association between norepinephrine and dobutamine on mesenteric microcirculation in a rat model of endotoxemia.

METHODS. Sixty Wilstar rats (250–350 g) were divided into 6 groups of 10 rats. The animals in groups 2, 3, 4, 5, and 6 received 2 mg/Kg of LPS from Escherichia coli – LPS serotype 055:B5. After a 40% reduction in MAP, the animals were treated by the administration of dopamine, norepinephrine, phenylephrine, epinephrine, or the association of norepinephrine with dobutamine. The functional capillary density (FCD) of the intestinal mucosa was estimated with intravital fluorescence videomicroscopy using an epifluorescent microscope. The FCD was estimated before the administration of LPS, after a 40% decrease in MAP, and after the normalization of the blood pressure with vasoactive amines.

RESULTS. The results are shown in the figure (* = p < 0.005).



CONCLUSION. 1) Vasoactive amines normalized blood presure of endotoxemic rats; 2) Vasoactive amines reduced FCD of gut mucosa; 3) When used in association with norepinephrine, dobutamine might have protective effect on gut microcirculation.

0591

HYPERCAPNIC AND METABOLIC ACIDOSIS AND THE EFFECT ON PERFUSION OF GUT AND RENAL SYSTEM

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INTRODUCTION. To reduce the ventilator induced lung injury (VILI) in acute lung injury (ALI) protective ventilation with low tidal ventilation is used. During this low-tidal-ventilation in critical ill patients hypercapnic acidosis (HA)can accur. Hypercapnia has direct effects on the regulation of the vascular bed, which may change organ perfusion. The influence of hypercapnia and acidosis on the regional perfusion (RP) is not exactly known.

METHODS. 16 anesthetised pigs were intubated, mechanically ventilated and recieved an experimental ALI by acid aspiration. To achieve HA pigs were randomized into two groups: group 1) Hypoventilation leading to HA and 2) acid infusion for metabolic acidosis (MA). The regional perfusion was measured with the coloured microspheres technique (Dye Trak®, Triton Technology, San Diego, CA), while systemic paramaters were measured with the PICCO®-system. Measurements were taken under baseline (BL), HA and MA. Statistics: repeated measures ANOVA and Tukey HSD.

RESULTS. Cardiac output (CO) tended to be higher during HA. While the perfusion of the gut and the spleen was increased, the stomach- and renalperfusion remained unchanged. In contrast MA did not affect global or regional perfusion.

Statistic declaration in Table 1: time + $p < 0.05$ ++ $p < 0.01$ +++ $p < 0.001$; interaction * $p < 0.05$ ** $p < 0.01$ ***$p < 0.001$; post hoc $ $p < 0.05$ $$$ $p < 0.001$ vs bl, $p < 0.001$ HA vs MA.

TABLE 1

mean (SD) RBF (ml/g/min)	hypercapnia baseline	hypercapnia hypercapnia	metabolic acid baseline	metabolic acid metabolic acid.	ANOVA
stomach	0,4(0,2)	0,5(0,2)	0,4(0,2)	0,3(0,1)	
duodenum	0,4(0,2)	0,8(0,3)	0,5(0,2)	0,5(0,2)	+ *
jejunum	0,6(0,2)	1,1(0,6) $	0,5(0,3)	0,6(0,3)	++ *
colon	0,4(0,4)	0,6(0,4) $	0,3(0,2)	0,3(0,1)	+ *
spleen	2,3(1,0)	4,4(1,9) $ §	2,6(1,0)	2,1(0,8)	**
kidney	3,7(1,4)	4,3(1,7)	3,2(0,9)	2,9(0,6)	
$PaCO_2$ (mmHg)	41(4)	82(3) $$$§§§	43(3)	46(7)	+++ ***
pH	7,44(0,02)	7,19(0,04) $$$§§§	7,4(0,08)	7,19(0,04) $$$§§§	***
CO (l/min)	4,4(0,7)	5,6(2,3)	4,9(1,2)	4,3(1,1)	p0,07

CONCLUSION. Not acidosis but hypercapnia leads to increased RP in several intestinal organs. Maybe this is a protective effect of hypercapnia.

GRANT ACKNOWLEDGEMENT. Departmental funding and NOVALUNG.

Poster Sessions
Sepsis therapies: 0592–0605

0592

NEWLY DEVELOPED CYTOKINE ADSORPTION COLUMN CTR-001 IN SEPSIS

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INTRODUCTION. Sepsis is a common cause of morbidity and mortality in intensive care unit, and delayed diagnosis and therapy is associated with increased mortality. Continuous hemodiafiltration (CHDF) and polymyxin-B immobilized fiber (PMX) have recently been widely performed mainly in critical care. To study effects of newly developed cytokine absorption colmu CTR-001 (Kanaka Co. Osaka, Japan), RCT was performed in patients with sepsis.

METHODS. A total of 18 patients with early septic shock or septic organ dysfunction was enrolled.. Nine of 18 were randomized to direct hemoperfusion (DHP). All patients received supportive intensive care, and those randomized to DHP received direct hemoperfusion for 4 hours more than two times up to 14 times during 14 days. MEASUREMENTS(1): We measured the plasma concentration of interleukin 6, 8, 1-beta, tumor necrosis factor alpha. APACHE II score was evaluated for each patient 1st, 7th, and 14th day after starting treatment before the treatment in the morning.

RESULTS. The decrease of APACHE II score from the pretreatment level at 7th day was significantly larger in the treatment group than in the control group (p=0.0189; Mann-Whitney test). Adsorption column related serious adverse events were not observed in DHP group. The concentration of interleukin 6 and interleukin 8 in the plasma decreased from the pretreatment level in the DHP group significantly (p=0.0464, 0.0464 respectively; Wilcoxon test).

CONCLUSION. Newly developed direct hemoperfusion column improved the septic shock better than the ordinary supportive intensive care.

0593

EFFECTS OF ENDOTOXIN ADSORPTION THERAPY ON HEMODYNAMICS, PROCALCITONIN AND C-REACTIVE PROTEIN IN PATIENTS WITH SEPTIC SHOCK

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INTRODUCTION. Despite of antibiotic therapy, fluid therapy and vasopressive/inotropic therapy, the mortality rate of septic shock remains high. In the pathogenesis of septic shock, endotoxin plays an important role. Recently, endotoxin adsorption therapy, polymyxin B-immobilized fiber column (PMX) hemoperfusion, has been widely used in patients with septic shock in Japan. PMX tretment has been based on the binding property of polymxin B to lipid A of endotoxin. Endotoxin induces excessive generation of cytokines which increase systemic inflammatory response and cause tissue damage. Although decrease in concentration of endotoxin has been reported, the detailed mechanism of PMX treatment is not known. Therefore, we investigated the effects of PMX on hemodynamics and plasma concentrations of procalcitonin and C-reactive protein in patients with septic shock.

METHODS. Patients with septic shock (ACCP/SCCM-criteria) were included. Demographic data, routine biochemistry, microbiological data, infection focus, the acute physiology and chronic health evaluation (APACHE) II score, the Sequential Organ Failure Assessment (SOFA) score, and 28-day mortality were recorded. PMX treatment was performed 2 $\sim$ 27 hr (mean 12 hr) for each application once or twice. Blood concentrations of endotoxin, procalcitonin, and C-reactive protein (CRP) were measured before and after PMX treatment. Blood concentrations of endotoxin were measured using the high-sensitivity endotoxin assay based on the kinetic turbidometric Limulus assay (Toxinometer). Changes in hemodynamic parameters and PaO2/FIO2 ratio were also evaluated.

RESULTS. Sixteen patients (11 men and 5 women, mean age 65 years old) with septic shock were studied. The 28-day mortality rate was 50%. PMX treatment significantly ($P<0.05$) increased mean arterial pressure and significantly ($P<0.05$) decreased body temperature, and tended to improve PaO2/FIO2 ratio. Blood concentrations of endotoxin, procalcitonin and CRP were markedly high in all patients before PMX treatment. In the survivors, blood concentrations of endotoxin significantly ($P<0.05$) decreased, and those of procarcitonin and CRP tended to decrease after PMX treatment.

CONCLUSION. These findings showed that PMX treatment improved hemodynamics and tended to suppress inflammatory response, suggesting that PMX treatment might be a useful strategy in septic shock by reducing systemic inflammatory responses.

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GRANT ACKNOWLEDGEMENT. Grants-in-Aid for Scientific Research from the Ministry of Education, Culture, Sports, Science and Technology of Japan.

0594

THERAPEUTIC EFFECT OF XIGRIS ON SEPSIS-ASSOCIATED ENCEPHALOPATHY

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INTRODUCTION. Xigris^R has been shown to improve cardiovascular and respiratory failure in severe sepsis. Sepsis-associated encephalopathy (SAE) is a diffuse cerebral dysfunction induced by the inflammatory response to infection. SAE has an unknown incidence but its occurrence is related to an increased mortality rate. We have previously described high levels of the brain-specific S-100\beta protein in 42% of patients with severe sepsis and septic shock(1. Distinct cerebral lesions were found with S-100\beta > 4 µg/L. S-100\beta levels between 0.06 and 2 µg/L, however, were typically associated with white matter lesions which are thought to represent the pathological substrate of SAE. We studied whether Xigris^R influenced S-100\beta in patients with acute septic shock who presented with increased baseline levels of this biomarker.

METHODS. Patients with septic shock who required mechanical ventilation were recruited. All received standard and goal-directed resuscitation. Glasgow coma scale (GCS) was calculated before start of sedation. Contrast computed tomography (CCT) of the brain was performed in all patients with a GCS < 14 to exclude significant pre-existing or acute neurological disease. Xigris^R was given as a continuous infusion of 24 µg/kg/h for 96 h. Patients who did not receive Xigris^R had a known contra-indication for the drug. S-100\beta was measured before sedation and start of Xigris^R (d1) and then daily during Xigris^R infusion. The lower limit of normal was < 0.5 µg/L.

RESULTS. Sixty-six patients were consecutively enrolled.Twelve patients were excluded from follow-up due to death within 4 days after admission (n=5) baseline S-100\beta values > 4 µg/L (n=2), and a pathological brain CTT (n=5).24 patients had S-100\beta levels < 0.5 µg/L upfront that did not increase thereafter. Of the remaining 30 patients, 16 received Xigris^R. In this group, S-100\beta values - though higher on d1 than in untreated subjects (1.3 +/- 0.8 µg/L vs. 0.9 +/- 0.4 µg/L; p = 0.16) - progressively and significantly decreased (1.0 +/- 0.8 µg/L at d2, 0.9 +/- 0.6 µg/L at d3, and 0.8 +/- 0.7 µg/L at d4; all p < 0.05 vs. d1). S-100\beta tended to increase in the untreated group.In both treatment groups, no correlation was found between GCS and S-100\beta at baseline.

CONCLUSION. S-100\beta is increased in almost half of the patients with acute sepsis-induced cardiovascular and respiratory failure. S-100\beta levels that are likely to correspond with the presence of SAE decrease during treatment with Xigris^R.

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0595

EFFECTS OF HEMOPERFUSION WITH IMMOBILIZED POLYMYXIN-B FIBER COLUMN ON CYTOKINE PLASMA LEVELS IN PATIENTS WITH INTESTINAL SEPSIS: RESULTS OF A SINGLE CENTRE EXPERIENCE

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INTRODUCTION. Endotoxin (ET) is considered one of the most important pathogenetic factor involved in sepsis/septic shock. A potential beneficial role of hemofiltration with an immobilized polymyxin-B fiber (PMX) column (Toraymyxin®, Toray Industries, Tokyo, Japan) has been proposed, especially in Gram-negative sepsis. However, the effect of PMX on cytokines plasma levels (IL-6, IL-10, TNF-alfa) remain to be clarified.

METHODS. Eight patients (mean age: 43.6) with diagnosis of severe sepsis/septic shock from intestinal sources admitted in our Intensive Care Unit from Octr 2006 to Dec 2007 have been treated with PMX cartridge hemofiltration. Data were collected 24h before and 24h after the PMX-treatment, as determinations of plasma levels of IL-6, IL-10 (Bender MedSystem, CA), and TNF-alfa (Biosource Europe, BE). Patients were followed up for 28 days.

RESULTS. Data of all patients and subgroups are represented in Tables 1–2. No adverse events have been reported.

TABLE 1 CLINICAL AND LABORATORY DATA OF ALL PATIENTS

	Pre-treatment	Post-treatment
SOFA	17.1±1.1	13.1±1.6*
IL-6 (pg/ml)	272.3±66.2	120.1±20.4*
IL-10 (pg/ml)	148.0±38.7	37.57±13.2*
TNF-alfa (pg/ml)	73.3±14.6	19.9±6.2*
Procalcitonin (ng/ml)	41.7±19.5	20.5±14.5
Norepinephrine (µg/Kg/min)	0.6±0.2	0.2±0.08*
PaO2/FiO2 ratio	115±16.7	227±26.2*

*Statistical analysis: Student's t-test (*P < 0.05). Values are reported as mean±SEM*

TABLE 2 CLINICAL AND LABORATORY DATA OF SURVIVING (4) AND DECEASED PATIENTS (4).

	Surviving patients Pre-treatment	Surviving patients Post-treatment	Deceased patients Pre-treatment	Deceased patients Post-treatment
SOFA	17.5±0.9	12.5±1*	16.7±2.4	14±4
IL-6 (pg/ml)	304.5±84.1	82.8±16.3*	229.3±64.4	170.0±53.9
IL-10 (pg/ml)	88.5±18.02	8.3±1.4*	227.3±58.9	76.7±19.0*
TNF-alfa (pg/ml)	41.5±11.1	11.0±3.3	115.7±57.2	31.7±11.2
Procalcitonin (ng/ml)	39.8±24.8	27.0±22	44.4±37.9	11.8±7.5
Norepinephrine (µg/Kg/min)	0.85±0.34	0.14±0.09*	0.32±0.04	0.28±0.16
PaO2/FiO2 ratio	133±23.2	277.5±13.2*	91.67±19.65	159.3±21.3*

*Statistical analysis: Student's t-test (*P < 0.05). Values are reported as mean±SEM*

CONCLUSION. PMX-hemofiltration significantly reduces plasma levels of IL-6, IL-10, and TNF-alfa (Table 1), especially in patients with a better outcome at 28 days (Table 2). These data suggest a possible correlation between the post-treatment IL-6 levels and a more favourable outcome, whereas pre-treatment IL-6 levels do not seem to be predictive. In contrast, high pre-treatment levels of IL-10 and TNF-alfa appears to be related with a poor outcome (Table 2). Finally, significant reduction in cytokine levels seems to be linked with an improvement of hemodynamic and respiratory parameters (Tables 1–2), according with literature.

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0596

POLYMYXIN B TREATMENT IN SEPTIC PATIENTS WITH PERITONITIS DEVELOPED AFTER ABDOMINAL SURGERY

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INTRODUCTION. Polymyxin B (PMX) bound and immobilized to polystyrene fibers is a medical device that aims to remove circulating endotoxines by adsorption, theoretically preventing the progression of the biological cascade of sepsis. The aim of this study was to evaluate the effects of the haemoperfusion with PMX (HP-PMX) on organ function and mortality in septic patients undergoing surgical abdominal toilette for peritonitis developed after abdominal surgery.

METHODS. 12 septic patients (age 63±12, male/female 6/6)were studied. Inclusion criteria were: peritonitis due to gut perforation and/or anastomotic leakage after abdominal surgery, and diagnosed organ failure (two or more organs). Exclusion criteria were: age<18, thrombocytopaenia, hemophilia, PMX allergy. After the intensive care unit (ICU) admission, wound, blood, and peritoneal liquid cultures were performed. At the same time, a single 2-hours-cycle of HP-PMX with the Aquarius haemofiltration machine (Edwards, Edwards Lifesciences) was started at 80ml/min. Haemodynamic parameters were derived with a minimally invasive pulse contour monitoring system (Vigileo, Edwards Lifesciences). Several haemodynamic, respiratory, renal and liver data were collected before starting the HP-PMX (T0), at the end of the HP-PMX (T1), at 24 (T2), and at 48 (T3) hours. T-test and analysis of variance for repeated measures were applied.

RESULTS. Haemodynamic data: a significant increase in systolic arterial pressure from T0 to T3 (121±15 vs 145±10) was observed. From T0 to T2, a significant reduction in norepinephrine infusion occured (0,26±0,07, 0,14±0,09, 0,09±0,04 mcg/Kg/min, T0, T1,T2, respectively). A T3, only two patients received norepinephrine infusion (0,1 and 0,14 y/Kg/min). Central venous pressure (CVP, mean at T0 =12,7±1,5) and stroke volume variation (SVV%, mean at T0 = 4,5%) did not show significant difference over the time of the study. Respiratory data**.** a significant increase in PaO2/FiO2 ratio from T0 to T1 (180±42,1 vs 295±43, $p < 0.05$), and from T2 to T3 (304±65 and 298±60, $p < 0.05$) was found. The average time of mechanical ventilation was 10,2±8 days. Renal data: serum creatinine values decreased from T0 to T1 (3,1±0,6 vs 2,3±0,7, $p < 0.05$) and from T1 to T2 (2,3±0,7 vs 1,9±0,6 $p < 0,05$). Continuous renal replacement therapy (CRRT) was applied for 3 patients at T3. Only one of them underwent CRRT up to the fifth day because he had chronic renal failure requiring preoperative dialysis. No statistical significance was found for liver function indexes. The ICU stay resulted 15,8±8 days. The 28 days mortality rate was 25%. The cultures confirmed the presence of Gram- bacteria in each patient.

CONCLUSION. In our institution the mortality rate of this kind of patients was about 65%. An optimal timing about the use of the HP-PMX depends on the pathology. In septic patients, with peritonitis due to perforation and/or anastomotic leakage after abdominal surgery, the presence of Gram- bacteria is actually a common condition. Our findings demonstrated that a single 2-hours-cycle of treatment with HP-PMX seemed to reduce the incidence of organ dysfunction and mortality. An earlier surgical toilette of the infected site, combined with a treatment with HP-PMX, may significanlty improve the outcome in these critically ill subjects.

0597

PMX TREATMENT OF SEPTIC PATIENTS IMPROVED VIABILITY OF PULMONARY EPITHELIAL CELLS

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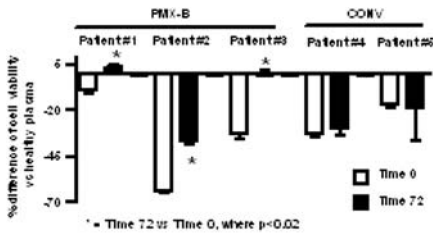
INTRODUCTION. Lipopolysaccharide (LPS) is the key element inducing acute respiratory failure during sepsis. Removal of circulating LPS via hemofiltration through a polymyxin-B (PMX-B) filter has recently been tested, and a meta analysis has confirmed that this treatment is effective at reducing circulating endotoxin levels, improving organ function and decreasing overall mortality. Particularly, the lung was observed to have improved gas exchange following treatment; however, the cellular mechanism for this improved pulmonary function remains unknown. The aim of this study is to investigate the effect of PMX-B treatment of septic patients on pulmonary epithelial cell viability. We hypothesize that PMX-B hemofiltration of septic patients will reduce the cytotoxicity of their plasma on pulmonary epithelial cells.

METHODS. Five consecutive patients with gram negative sepsis with at least three criteria of SIRS and one organ dysfunction were randomized to either conventional (CONV) treatment or conventional treatment in addition to two extracorporeal PMX-B hemofiltration treatments, the first upon inclusion and the second after 24hrs. Plasma was collected and blood gases were analyzed at time 0 and time 72. Plasma from healthy volunteers was used as a negative control. A 20% dilution of this plasma was then utilized to stimulate A549 pulmonary epithelial cells in culture for 72 hours, following which cell viability was determined using an XTT assay.

RESULTS. PiO2/FiO2 ratios were significantly improved following PMX-B treatment (219±39 at time 0 to 308±35 at time 72), while remained unchanged following conventional treatment (231±49 at time 0 to 245±31 at time 72). Plasma from each patient at time 0 induced a significant decrease in pulmonary epithelial viability compared to healthy plasma. After 72 hours, plasma from PMX-B treated patients had a significantly less cytotoxic effect on A549 cells compared to time 0, while plasma from conventionally treatment patients showed no improvement in cell viability.



CONCLUSION. PMX-B hemoperfusion treatment of septic patients significantly decreases the cytotoxic effect of plasma on pulmonary A549 epithelial cells, which may contribute to the improvement in pulmonary function following PMX-B treatment.

0598

ACUTE KIDNEY INJURY (AKI) COMPLICATING SEPTIC SHOCK : DOES XIGRIS MAKE A DIFFERENCE?

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INTRODUCTION. Treatment with Xigris^R improves mortality in patients with severe sepsis, mainly by faster resolution of cardiorespiratory failure. AKI complicating septic shock is associated with a 70% mortality. Any beneficial effect of Xigris^R on sepsis-induced AKI remains speculative.We investigated the effect of Xigris^R on outcome and evolution of AKI complicating severe cardiorespiratory failure in a group of patients with septic shock.

METHODS. Patients with bilateral pneumonia who developed septic shock were divided in two groups according to the presence (group A; n = 17) or absence (group B; n = 15) of AKI. All patients were fluid-resuscitated, mechanically ventilated and received norepinephrine (NE) treatment. Xigris^R was given as a continuous infusion of 24 µg/kg/h for 4 days. Continuous venovenous hemofiltration at a rate of 35 ml/kg/h was started upfront in all patients of group A. Immediate autopsy with kidney prelevation was performed in group A patients who died within 7 days after start of Xigris^R infusion. Microscopic findings were compared with those of a matched group of patients with pneumonia-induced septic shock who were not treated with Xigris^R.

RESULTS. Mean APACHE II score was 30.9 +/- 9.9 in group A and 29.7 +/- 7.8 in group B. Mean daily NE dose decreased significantly in group A (from 0.28 +/- 0.28 at d0 to 0.05 +/- 0.10 µg/kg/min at d4; $p < 0.001$) and in group B (from 0.38 +/- 0.42 at d0 to 0.09 +/- 0.17 µg/kg/min at d4; $p = 0.002$). The AKI group had a more rapid and pronounced decrease in NE need. PaO2/FiO2 index increased markedly in both groups (from 119.2 +/- 36.6 to 225 +/- 65.5 mmHg in group A and from 128.5 +/- 45.4 to 231.8 +/- 75.9 mmHg in group B; both $p < 0.001$). ICU mortality was high and similar between groups (70.6% vs. 73.3%). Six patients in group A were autopsied. Microscopy showed a preserved global renal architecture. Glomerular, tubulo-interstitial and blood vessel alterations were all grossly similar between Xigris^R -treated and untreated patients.

CONCLUSION. We confirmed previously described beneficial effects of Xigris^R on respiratory and cardiovascular dysfunction in septic shock. ICU mortality was high and unaffected by concomitant occurrence of AKI. No histological differences at the kidney level were observed between Xigris^R -treated and - untreated patients. Whether Xigris^R beneficially influences sepsis-induced AKI remains to be proven.

0599

HIGH DOSIS OF SELENIUM IN SEVERE SEPSIS

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INTRODUCTION. There are several mechanisms of endothelial damage in sepsis, being one of them, the presence of free radicals due to oxidation. Selenium in high doses has demonstrated a better survival in septic patients.

METHODS. Prospective, longitudinal, experimental study from October 2007 to March 2008 where 68 consecutive septic patients were included and randomly assigned to one of the following groups: Treatment group received high doses of Selenium (1000 mcg of selenium on the first day, 500 the second day and 200 daily up to day 14); control group received 100 mcg on daily bases for 14 days. Inflammatory markers (Sedimentation rate: SR, C-reactive protein: CRP, and lymphocytes) were measured on day 0, 5 and 10. Results are expressed in median (25–75th interquartile interval) and groups were compared with U Mann-Whitney.

RESULTS. SR diminished from 20(18–28) to 2 (1–6) in treatment group vs. control group where it diminished in a minimal amount: 20 (15–29) to 17 (10–19) with $p < 0.01$ when both groups were compared; CRP behaved in a similar way, diminishing in the treatment group and not much in the control group: 15 (10–19) to 10: 2 (1–5) and 15 (10–18) to 10 (8–14) respectively ($p < 0.01$). Lymphocytes increased in both groups, reaching normal values in both groups without statistical difference: treatment group on day zero: 0.4 (0.3–0.5) and day 10, 1.2 (1.2–1.4) vs. 0.6 (0.4–0.7) and 0.9 (0.8–1) respectively in control group. Length of stay was shorter in treatment group: 12 (12–14) days vs.17 (14–20) days in control group ($p < 0.01$). Mortality was similar for both groups: 17.6% in treatment group vs. 23.5% for control group with out statistical difference.

CONCLUSION. Selenium modulated inflammatory response diminishing length of stay, mortality is similar.

0600

ANTI-INFLAMMATORY THERAPY WITH STATINS FOR SEPTIC PATIENTS

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INTRODUCTION. Statins have anti-inflammatory, immune modulator, antioxidant, anti thrombotic effects and endothelium stabilizer. Statins have been suggested as a therapeutic tool for septic patients. Our objective was to determine their usefulness in the inflammatory process induced by sepsis.

METHODS. Prospective, longitudinal, experimental study from November 2007 to March 2008 of 40 consecutive septic patients who were randomly assigned to one of the following groups: treatment group (received 80 mg of daily simvastatin for 14 days) or control group who did not receive it. Inflammatory markers (Sedimentation rate: SR, C-reactive protein: CRP, and antitrombin III) were measured on day 0, 5, 10 and 14. Results are expressed in median (25–75th interquartile interval) and groups were compared with U Mann-Whitney.

RESULTS. SR diminished from 34 (21–45) to 19 (14–23) in treatment group vs. control group where it increased: 28 (21–40) to 36 (27–50) with $p < 0.01$ when both groups were compared; CRP behaved in a similar way, diminishing in the treatment group and increasing in the control. On day 14, SR and CRP reached normal values (4 (2–6) and 1 (0–2) respectively in treatment group vs. control group 22 (19–36) and 8 (4–14) respectively ($p < 0.001$). Antitrombin III increased in both groups from 33 (28–50) to 90 (88–98) in treatment group and 33 (29–50) to 50 (48–55) in control group ($p < 0.01$). Length of stay was longer in control group: 22 (18–26) days vs. 15 (14–16) in treatment group ($p < 0.01$). Treatment group survival was 80% and control group 75% with multivariate analysis to be done.

CONCLUSION. Statins diminish inflammatory systemic response and length of stay. Mortality was not different.

0601

EFFECT OF MAGNESIUM ON SEPSIS ASSOCIATED DELIRIUM

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INTRODUCTION. Sepsis associated delirium is a common complication of sepsis. An increase in permeability of the blood brain barrier has been shown to be a potential mechanism of action. Relating to our previous experimental study showing protective effects of magnesium on blood brain barrier permeability in a sepsis model 1, we designed a randomized controlled trial to evaluate the effects of magnesium on the occurrence of sepsis associated delirium in patients with severe sepsis.

METHODS. 30 adult mechanically ventilated, medical and surgical ICU patients with severe sepsis were randomized to receive magnesium (n=14) (2g bolus IV, continued by 16 g/day infusion, target range - 1.02.0 mmol/L) or saline (n=16,). Patients were sedated with remifentanil and midazolam titrated to achieve the desired level of sedation measured by the Richmond Agitation and Sedation Scale (RASS). Patients were monitored daily for delirium using the Confusion Assessment Method for the ICU (CAM-ICU). Incidence of delirium and daily remifentanil consumption were compared between groups.

RESULTS. Magnesium was well tolerated and no complication was recorded. The incidence of delirium occurrence was 33.3% in the magnesium group and 42.9% in the control group. Addition of magnesium resulted in less days with delirium compared with control group (1.0 ± 2.6 vs 2.5 ± 5.6). The reduction in the daily remifentanil consumption in the magnesium group was nearly significant ($p= 0.105$).

CONCLUSION. Incidence of delirium assessed by CAM-ICU was high among our severe septic patients. Addition of magnesium to the sedation protocol of septic patients caused reduction in the daily remifentanil consumption and decreased the incidence of delirium.

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0602

MILD HYPOTHERMIA DURING SEPTIC SHOCK: A PROSPECTIVE, PHYSIOLOGIC, RANDOMIZED STUDY

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INTRODUCTION. Mild therapeutic hypothermia (MTH) is frequently performed to protect patients from ischemia-reperfusion lesions. Several experimental data exists to suggest its use during sepsis [1,2]. The aims of this prospective randomized study were to evaluate the effects of MTH on physiologic parameters, and to assess its feasibility and safety during septic shock.

METHODS. All sedated and ventilated patients with septic shock were eligible for inclusion. Exclusion criteria were bradycardia and severe cardiac rythm disturbance, pregnancy, needs for surgery and/or transport within the next six-hours, decision to withdraw/withhold life support, early predictable death. The study was approved by the regional commitee on human biomedical research, and written informed consent was requested for all patients' next-of-kin. Patients were randomly assigned to control group (no intervention on temperature), or to the MTH group (32–34°C), for the next 36-hours. Sedation towards a Ramsay 4–6 was required prior to continuous paralysis using cisatracurium. MTH was induced using an external water-cooling blanket (Meditherm II, Gamida, Eaubonne). Medical treatments and ventilatory settings were standardized according to both the Survival Sepsis Campaign and the ARDSnetwork guidelines. Mean arterial blood, right heart pressures, cardiac index, systemic vascular resistance index, mixed oxygen venous saturation (SVO_2), co-oxymetry were collected at H_4, H_{12}, H_{24}, H_{36}, and each day until day 28. Biological parameters (hemostasis, platelets count, renal function, kaliemia…), nosocomial infections, bleedings, and outcome were specifically monitored. Mean inotropic and vasopressive agents doses, cumulative fluid infusions were also collected.

RESULTS. Twenty patients were included (9 MTH/11 control). Hypothermia was easily obtained (33 ± 1°C) for all patients between H_4 and H_8, except for two patients who died within 3-hours following inclusion. MTH was easily maintained for the 36-hrs period. Once passive rewarming was initiated, normothermia was achieved within 12-hrs. Post-rewarming rebound hyperthermia was observed in 2 patients. No severe complication attributable to MTH was observed, and no difference concerning neither hemostasis, bleedings, nosocomial infections, nor mortality was observed between groups. MTH resulted in decreased cardiac index and heart rate, and increased systemic vascular resistance index. No difference was observed between MTH and controls for MAP, inotropic and vasopressive agents doses, or cumulative fluids infusion. A significant rewarming increased dose was observed for vasopressive agents. No difference in terms of oxygenation parameters was observed between groups.

CONCLUSION. MTH is easily feasible in septic shock patients. Several important hemodynamic variations are observed, but without oxygenation parameters variations. Clinical significance of such variations remains unclear.

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0603

ASSESSING RESPONSE TO USE OF XIGRIS IN AN INTENSIVE CARE UNIT AT DISTRICT GENERAL HOSPITAL

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INTRODUCTION. The use of Xigris (Doctrecogin) is indicated in patients with sepsis, and with the presence of two or more organ failures requiring full intensive care support.This study aims to assess response to basic parameters regularly measured in intensive care whilst reviewing patient demographics associated with the use of Xigris and causes of sepsis indicating its use.

METHODS. 41 Patient response to Xigris was assessed between 2004 and 2006 in the intensive care unit at Kingston Hospital. Outcome measurements were studied before and after a 96-hour infusion of those selected for use of xigris. This included studying the response of base excess, inflammatory markers, PaO2/FiO2 ratios and inotropic doses post xigris infusions.

RESULTS. 62% of patients receiving xigris in the study were male. The respiratory system was the commonest organ associated with sepsis among patients receiving xigris 51% (21 out of 41).The mortality rate was 33% in the xigris group as compared to 40% in the non-xigris group. The xigris group had a higher mean length of stay in the intensive care unit compared to the non-xigris group (22.2 vs 12.2 days respectively) amongst non-survivors and survivors. Base excess is improved following a 96-hour infusion of xigris. 72.5% (29 out of 40) patients had base excess more positive than –2 post xigris infusion as compared to 10.0%(4 out of 40) patients having a base excess more positive than -2 prior to the infusion (Table 1)·CRP response to Xigris was improved where 56.4% (22 out 39) patients had CRP of less than 100 following Xigris as compared to 10.2% (4 out 39). No clear improvement was shown with WBC response.There was a higher proportion of patients post-xigris infusion with PaO2/FiO2 ratios greater than 300 compared to before xigris was infused.14 out of 19 surviving patients started on Norepinephrine were completely weaned off following the xigris infusion.

TABLE 1 PARAMETERS AND TREATMENT IN RESPONSE TO XIGRIS INFUSIONXIGRIS INFUSION

	No.pts Before Xigris Infusion	No. pts After Xigris 96hr infusion
CRP <100	5	24
>300	13	1
PaO2/FiO2ratio <200	21	16
>300	4	10
BE > -2	4	29
<-15	11	0
Nor epinephrine dose mic/kg/min 0	0	14
>0.4	10	1

CONCLUSION. The difference in mortality between xigris and non-xigris groups at 7% was similar to that shown in the PROWESS STUDY.
A study consisting of a larger cohort of patients may be able to identify response to xigris with outcome measurements assessed in this study more closely.
Some parameters showed a positive response to xigris notably CRP response, base excess reponse, PaO2/FiO2 ratios and noradrenal reduction amongst surviving patients.

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0604

COUPLED PLASMA FILTRATION ADSORPTION (CPFA) – USEFUL TOOL IN SEPSIS MANAGEMENT

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INTRODUCTION. Severe sepsis remains the main cause of mortality in intensive care unit (ICU) (1). During sepsis elevated levels of pro- and anti-inflammatory cytokines circulate in blood (2). CPFA is a new resin-based blood purification technique in clinical practice (3). After purification of plasma in a first resin filter, a second blood filter could be used for the removal of excessive fluid and small molecular weight substances. The resin cartridge non-selectively removes circulating inflammatory mediators. This reduction in cytokine load could possibly attenuate their negative effects on organ function and restore leukocytes function (3). CPFA could be therefore used in the treatment of severe sepsis or septic shock to reduce the levels of circulating cytokines and preserve organ function.

METHODS. Description of series of five patients with sepsis/septic shock treated with CPFA. Laboratory data, hemodynamics and vasopressor support were followed at start and 48 hours after CPFA treatment.

RESULTS. There were 4 men, 1 woman with average age 51 yrs. The leading ICU admission diagnoses were pneumonia, meningitis, SIRS and in two patients severe acute pancreatitis. The time between ICU admission to CPFA start was 1 day in 4 patients, 1 patient was treated after 2 days. 4 patients survived, 1 patient had died 24 hours after ICU admission. In surviving patients there was a marked decrease in IL-6 and procalcitonin levels within 48 hrs after CPFA treatment. This was followed by reduction in serum lactate levels and relevant decrease in vasopresor need. CRP levels decreased in two surviving patients (Table 1). All patients were on citrate dialysis. There were no bleeding or thrombotic complications during CPFA treatment. Interestingly, heparin-induced thrombocytopenia was diagnosed in 2 patients.

TABLE 1 SURVIVING PATIENTS

	Leu (x109/L)	CRP (mg/L)	IL-6 (ng/L)	Procalcitonin (mcg/L)	Lactate (mmol/L)	Norepinephrine (mcg/kg/min)
Pt1 - Hr 0	4.8	180	-	65	1.6	0
Hr 48	8	18	-	10	0.6	0
Pt3 - Hr 0	10.8	173	642	96	4.8	0.8
Hr 48	10.6	146	63	18	0.7	0.06
Pt4 - Hr 0	10.4	182	180	80	0.9	0.14
Hr 48	11.6	231	80	4	0.6	0.07
Pt5 - Hr 0	15.8	240	1500	80	7.6	0
Hr 48	66	280	26	19	1.5	0

CONCLUSION. CPFA treatment was effective in reducing IL-6 and procalcitonin levels in 4 out of 5 patients. This was followed by improvement in hemodynamic situation.

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0605

LOW DOSE CORTICOSTEROIDS IN THE TREATMENT OF SEPTIC SHOCK

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INTRODUCTION. To examine the effects of low dose corticosteroids on mortality and reversal of shock in patients with septic shock.

METHODS. A computerized search of MEDLINE (February 2008), EMBASE (February 2008), CINAHL (February 2008) and the Cochrane Central Review of Controlled Trials (February 2008) was conducted. Reference lists of retrieved articles were also searched. Randomized controlled trials of low dose corticosteroids versus in patients with septic shock were selected. Two reviewers agreed on the eligibility of the trials. Any disagreement was resolved by consensus. Data and validity of trial methodology were extracted independently by two reviewers utilizing a standardized data abstraction form.

RESULTS. Seven relevant trials evaluating 999 patients were identified. There was a trend towards a lower 28-day mortality (RR 0.85, (95% CI 0.70 to 1.04) in patients given low dose corticosteroids but not ICU mortality (RR 0.97, 95% CI 0.79 to 1.21). Low dose corticosteroids also did not reduce the proportion of patients with persistent shock at 7 days. (RR 0.97, 95% CI 0.79 to 1.21).

CONCLUSION. Low dose corticosteroids did not change 28-day mortality or ICU mortality in septic shock.

Poster Sessions
Physiotherapy and patient's outcome: 0606–0614

0606

DISCHARGE FROM PHYSICAL THERAPY IN THE POSTOPERATIVE PERIOD

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INTRODUCTION. Introduction: No study evaluated the effectiveness of physiotherapy associated with objective criteria incorporated into discharge. The criteria used to define discharge of physiotherapy also are controversial and not coincide with the medical practice. Objective: Set criteria for discharge in postoperative cardiac surgery and assess its impact on the rate of pulmonary complications in patients undergoing cardiac surgery.

METHODS. Design: Study prospective, randomized and controlled.

The study was conducted with 159 patients were undergoing elective heart surgery. Were included, patients over 18y, who carried out the gait (walking) independently and that had SpO2 92% in ambient air or oxygen with support of up to 2 l / min at the time of discharge the ICU. All patients were evaluated by physical therapists trained at the time of discharge from ICU. After randomization, patients in group I (observation) were discharged from physical therapy at the time of discharge from the medical ICU, the patients in group II (intervention) received treatment after discharge from the ICU in accordance with the routine of Physical Therapy - Method Functional Approach.

RESULTS. Results: The length of stay in ICU, 2.46 ± 0.87 days. The length of hospital stay was 6.58 ± 1.69 days. There was no statistically significant difference between the groups studied. 94.68% of the patients did not show any type of pulmonary complication, regardless of the group in which they were. 2.12% had a diagnosis of atelectasis and were in Group II, 1.06% presented diagnosis of pneumonia and was hired in group I. Patients in group II, 91.9% of the interventions made was kinesiotherapy, appear drills active and ambulation, 5.4% CPAP 20 cm/H2O, as a form of treatment for atelectasis, 2.7% EPAP 20 cm/H2O since, not coordinated measure of vital capacity. The frequency of ambulation was similar between groups.

CONCLUSION. Conclusion: Functional independence of motion (walking), and SpO2 92% criteria are safe and effective that can be used by physiotherapists, to determine discharge from physical therapy in the postoperative period, cardiac surgery.

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0607

ALTERNATIONS IN RESPIRATORY MECHANICS IN MECHANICALLY VENTILATED PATIENTS FOLLOWING BRONCHOALVEOLAR LAVAGE

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INTRODUCTION. Bronchoalveolar lavage (BAL) is a frequently used procedure for quantitative bacteriological diagnosis in mechanically ventilated patients suspected of lower respiratory tract infection. BAL may lead to changes in respiratory mechanics (including increased respiratory resistance and elastance)[1]. However, risk factors leading to these changes remain unknown. The current study tried to identify risk factors contributing to changes in respiratory mechanics following BAL.

METHODS. Changes of respiratory mechanics were measured before and after BAL in fifty-six mechanically ventilated patients by using interrupter method under constant flow. Measurement of minimal resistance (Rmin), delta resistance (delta R), maximal resistance (Rmax) and elastance were done before, immediately after and 10 minutes, 30 minutes after BAL. Several parameters including peak airway pressure, airway pressure at zero flow, plateau pressure, intrinsic PEEP (PEEPi), tidal volume, flow rate before BAL were used to correlate with the changes in respiratory mechanics after BAL.

RESULTS. PEEPi level before BAL was found to be significantly correlated with changes in Rmax ($p = 0.0093$), delta R ($p = 0.005$) and elastance ($p = 0.0221$). In patients with significant PEEPi (>1 cmH_2O, n=14), Rmax before BAL was 22.0 ± 6.8 $cmH_2O/L/S$. Rmax increased to 31.6 ± 8.5 $cmH_2O/L/S$ immediately after BAL and by the end of 30 minutes, Rmax remained high (28.4 ± 7.5 $cmH_2O/L/S$). The changes in Rmin, delta R and elastance followed the trend of Rmax. In patients without significant PEEPi (<1 cmH_2O), Rmax before BAL was 15.5 ± 3.5 $cmH_2O/L/S$. It increased to 17.6 ± 4.6 $cmH_2O/L/S$ immediately after BAL and by the end of 30 minutes, Rmax approached the level before BAL (16.6 ± 4.3 $cmH_2O/L/S$). The changes of Rmin, delta R and elastance followed the trend of Rmax, too. The tidal volume and flow rate were similar between patients with significant PEEPi and patients without significant PEEPi.

CONCLUSION. Patients with significant PEEPi experienced greater changes in respiratory mechanics than those without significant PEEPi. Physicians should be more cautious when performing BAL in mechanically ventilated patients with significant PEEPi.

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0608

MASSOTHERAPY IN THE POSTOPERATIVE ONE OF CARDIAC SURGERY: IMPACT IN PHYSIOLOGICAL VARIABLES, PAIN AND SLEEP QUALITY

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INTRODUCTION. Introduction: Disorders in cognitive functions, memory, emotional state and overall performance, are common and can occur in 60–80% of patients in the postoperative period immediately, and in most cases they disappear over time. Changes of sleep can enhance these disturbances and also affect the quality of life of patients. Changes of sleep problems are common during the first week in post-operative cardiac surgery. In the period that immediately follows the surgery, there is reduction in the duration of sleep nightly offset by the increase in the daytime sleep. Given that, he was shown the importance of careful evaluation of sleep and its disorders, to establish individualized attention to improve the quality of sleep of patients in the postoperative period.
Objective: to evaluate the impact of the massage on physiological variables, pain intensity and sleep quality of patients in the postoperative one of cardiac surgery.

METHODS. Method: a randomized and controlled study with adult individuals of both sexs that had carried through cardiac surgery. Massage was carried in the intervention group in the dorsal region of trunk for 15 minutes each day during the permanence in the Cardiovascular Postoperative Unit. Sleep quality of the patients was evaluated before and after surgery through PSQI (Pittsburgh Sleep Quality Index) and subjective questions, and daily the physiological variables and visual analogical scale of pain were measured.

RESULTS. In the post-operative cardiac surgery there is a worsening of the quality of sleep, but the massage group showed better quality of sleep (9,66 ± 4,36) that the control group (11,87 ± 3,22) ($p < 0.05$). The mean pain on the first post-operative day of the group intervention has reduced from (45.0 ± 27.74mm) to (7.16 ± 6.58mm) ($p < 0.05$) after the massage. Of the patients who received back massage, 66% reported feeling of comfort during the day, whereas in the control group, 63% felt it is tired. No significant change was found between the physiological variables. The SpO2 tends to increase with the time in the group massage.

CONCLUSION. The gotten findings suggest that the massage minimized the worsening of sleep quality in the postoperative of cardiac surgery, reduced the intensity of pain and promoted comfort sensation.

0609

THE ROLE OF THE PHYSIOTHERAPIST IN THE DECANNULATION OF TRACHEOSTOMY PATIENTS

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INTRODUCTION. Tracheostomies are becoming one of the more common surgical procedures performed in the Intensive Care (Needham et al 2005). The ongoing management of these patients requires professionals competent to identify when the tracheostomy can be removed safely. Respiratory Physiotherapists feel well placed as professionals to be able to make these decisions and then subsequently perform the decannulations safely.

METHODS. Prospective data was obtained from 5 centers and collected via a standardized audit tool. All tracheostomy patients were included irrespective of location or anticipated Physiotherapy input.

RESULTS. Data was collected on 104 patients over a 13 week period (19/3/07-15/6/07), 65 patients were successfully decannulated over this time, however data from 4 subjects was incomplete (n=61).Time taken between tracheostomy insertion and decannulation, as well as time between tracheostomy capping and decannulation was compared across three separate groups, ENT/Max Fac patients (n=13), Physiotherapists requesting decannulation (n=22) and Non-Physiotherapists requesting decannulation (n=26).
The data was analyzed using the Kruskall-Wallis test. There was no significant difference between the three groups for capping to decannulation - $p = 0.6449$. However using Mann Whitney test there was significant difference between the 3 groups in total time between tracheostomy insertion and decannulation, ENT v physio $p < 0.0001$, ENT v non-physio $p = 0.0370$, physio v non-physio $p = 0.0174$.
Data was obtained regarding the professional involved with the actual procedure of decannulation. Physiotherapists successfully performed 58%(28/48) of decannulations with the Non-ENT/Max Fac patients irrespective of whether they had requested them. Physiotherapists also requested the majority of their decannulations when the patient had reached a ward environment with 86% (19/22) of patients, compared to 38% (10/26) in the Non-Physiotherapy requesting group (p=0.001).

CONCLUSION. There does not appear to be a significant difference between the professionals requesting the decannulation once capping has begun.
However, physiotherapists do appear to be performing the majority of decannulations in the Non-ENT/Max Fac patients, with the majority of these requests happening when the patient reaches the ward environment.
This has implications for advancing Physiotherapy competencies in line with workforce planning, and possible implications for length of stay.

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0610

EVALUATION OF AN EMERGENCY ON CALL TRAINING PROGRAMME FOR RESPIRATORY PHYSIOTHERAPISTS

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INTRODUCTION. Emergency on call duties are often a source of stress for physiotherapists (1,2). Due to the rotational nature of junior physiotherapy posts day to day experience of the management and treatment of respiratory patients is not guaranteed, sometimes for periods of up to 12 months. Although yearly on call training was established in this trust some staff members still felt their skills were not adequate to remain on the on call rota. It was therefore decided to devise a questionnaire to determine gaps in knowledge and any particular areas of concern, plan a new on call training programme and evaluate any changes in perception of confidence and competence.

METHODS. A questionnaire was sent via email to all physiotherapists participating in the respiratory out of hours rota (n=25). This asked about year of qualification, last respiratory rotation, regualarity of on call commitments, suggestions for appropriate training methods, feelings of competency and confidence regarding evening and weekend working, equipment used and treatment modalities used. Results were collated and a training programme devised consisting of theoretical and practical components in the form of role playing scenarios with hands on experience of equipment commonly used by physiotherapists. This included continuous positive airways pressure (CPAP), intermittent positive pressure breathing (IPPB), non invasive ventilation (NIV) and manual hyperinflation (MHI).The new programme was then evaluated at the end of the session using similar criteria to the original questionnare.

RESULTS. Received 17/25 responses to the questionnaire.

16 attended for training (9 were unable to attend on the given day, a further session was arranged).
Mean time since last respiratory rotation 11.9 months (range 1 - 48)
Areas of concern: setting up equipment (65%), isolation (30%), inexperience (24%)
Average score for confidence/competence (out of 5)
weekends: before training 3.7
after training 4.7
on calls: before training 3.0
after training 4.2.

CONCLUSION. Evaluation of an established on call training programme for respiratory physiotherapists lead to a change in practice that helped improve staff members confidence and competence in emergency on call situations. The programme used consisted of a combination of theory and practical components allowing the participants the opportunity to work through role playing scenarios and gain valuable hands on experience with common pieces of respiratory equipment.

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0611

AUDIT OF PHYSIOTHERAPY REHABILITATION IN A LARGE GENERAL INTENSIVE CARE UNIT

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INTRODUCTION. Many patients develop signs of muscle weakness following a prolonged ICU admission and present rehabilitation challenges. A previous audit of early rehabilitation in the ICU setting found that early activity is feasible and safe in patients with respiratory failure (Bailey et al, 2007). The objectives of this study was to detail the early rehabilitation programme in a large acute ICU, quantify the occurrence of adverse incidents and establish which techniques pose the greatest risk.

METHODS. Between July and December 2007, the treating physiotherapist completed a comprehensive checklist of rehabilitation interventions and adverse incidents that occurred during physiotherapy sessions. Data was collected at the end of each weekday for all patients who were mechanically ventilated. Patients who were ventilated for less than five days were excluded at the time of data entry. The end point for data collection was when the patient was weaned from mechanical ventilation for more than 24 hours, was transferred to another hospital or died.

RESULTS. Eighty patients met the inclusion criteria during the study period (mean age 62.1 years [SD 16.7]; male n=49, female n=31); 75% had tracheostomies. In total, 814 physiotherapy interventions were carried out during 498 treatment sessions (Table 1). Twenty-four adverse incidents occurred during rehabilitation interventions (2.9%). The most common adverse incidents were patient anxiety (n=16[67%]) and increases in systolic blood pressure (n=5 [21%]). Out of bed techniques, such as sit to stand practice (436 in total) incurred the highest number of adverse incidents (n= 12 [2.8%]), however 11 of these 12 adverse incidents were anxiety related. The 24 adverse incidents occurred in 11 patients (range of adverse incidents per patient 1–6). Of these 11 patients, 10 were successfully weaned and 1 died while ventilated in the ICU.

TABLE 1 INTERVENTIONS PERFORMED DURING REHAB IN ICU

Technique	No of Interventions (%)
AAROM/AROM	297 (36.5)
SOEOB	22 (2.7)
SOOB (hoist)	143 (17.6)
SOOB (STS)	103 (12.7)
Arjo stand	53 (6.5)
STS practice	69 (8.5)
MOS	64 (7.8)
MOB with Vent	4 (0.5)

CONCLUSION. From this data it appears that physiotherapists in this large acute general ICU are safely performing a variety of interventions when rehabilitating the ventilated patient. Many of these interventions involve functional tasks such as sitting and standing. While the percentage of adverse incidents was higher in this study (2.9%) than in previous studies this is due to the inclusion of patient anxiety. There were no episodes of physical injury to patients during ICU rehabilitation.

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0612

EARLY INTENSIVE CARE UNIT (ICU) MOBILITY : LEVEL OF AGREEMENT AMONG MULTIDISCIPLINARY TEAM

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INTRODUCTION. The practice and pattern of early mobility in ICU remain unclear. Current review of practice is a vital starting point to understand how responsibility for early mobility is prescribed, and how it relates to local opinion on the utility, resource availability, and local expertise. Delivery of ICU mobility may be variable across allied health professionals. The aim of this study is to determine the agreement on early mobility in an ICU by a critical care multidisciplinary team.

METHODS. A critical care multidisciplinary team (7 physicians, 10 nurses, 12 physiotherapist) at a medical surgery ICU participated in the study. Professionals were instructed to determine if mobility should be delivered to different critically ill patients. Kappa values were used to measure agreement for each profession.

RESULTS. Sixty patients were evaluated. The mean age was 65, mean Apache score was 18, mean ICU stay was 5 days. Sixty-five percent of them were on mechanical ventilation, thirty-five percent of them were on vasopressor drugs, twelve percent of them were on renal replacement therapy. A low level of inter-professional agreement was seen [0.41 (95% CI 0.39–0.43)], most discrepancies were between nurses and respiratory therapists [0.27 (95% CI 0.26–0.28)]. Mean kappa for agreement were lower in patients during renal replacement therapy, on vasopressor drugs and mechanically ventilated (0,15, 0,22, 0,17 respectively).

CONCLUSION. The concept of early mobilization during an episode of critical illness is variable in a critical care multidisciplinary team. The addition of mobility care will need to be supported by data to priorize its inclusion as part of daily care.

0613

EFFECTIVENESS OF PHYSIOTHERAPEUTIC INTERVENTIONS GUIDED BY RESPIRATORY SYSTEM'S MECHANICAL PROPERTIE

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INTRODUCTION. There are many controversies and the evidence is limited on the efficacy of shares used in physiotherapy in the respiratory intensive care unit and little information with regard to physical therapy in patients undergoing mechanical ventilatory support. More recently, we suggest that the fan is action beyond the ventilation, which means to extend the discussion about the use of the ventilator focusing specifically for the physiotherapist action, developing three possibilities: a) as a tool of evaluation, b) as a tool for the therapy c) in monitoring. In this protocol evaluate the impact of manoeuvres carried out with the mechanical ventilator on the mechanical properties of the respiratory system.

METHODS. Functional changes were characterized by: (1) increase the resistance - by increased pressure resistance in relation to measure up, (2) reduction of compliance - by the reduction of static compliance regarding the measure taken before the specific ventilator intervention.

RESULTS. Bronchial hygiene therapy got up following results of variation in the mean values before and after the application of techniques: tracheal pressure (41,48±4,9 and 26,98±4,4 cmH2O, respectively); for resistive pressure (19,34±5,1 and 8,0±1,8 cmH2O, respectively. $p < 0,05$). For lung expansion, the following results of variation in the mean values before and after the application of techniques: tracheal pressure (30,15±6,7 e 26,92±5,7 cmH2O) and to the resistive pressure (7,15±2,9 and 7,15±1,9 cmH2O, respectively); for static compliance (32,32±10,3 and 42,25±13,6 ml / cmH2O, respectively); for dynamic compliance (24,04±7,1 and 28,31±8,7 ml / cmH2O; $p < 0.05$).

CONCLUSION. The results provide a new option of decision making to the physiotherapeutic intervention in artificially ventilated patients. In this new focus, the functional impact of the disease, defined by biomechanical markers and gas exchange, in our usual way, is tools that respond to important issues of respiratory physiotherapy on what deal, when and how to perform the intervention. The artificial ventilator is able to meet these demands. The effectiveness of the intervention to change the impedance of the respiratory system has been established.

0614

THE REPERCUSSION OF THE MOTOR PHYSICAL THERAPY IN PATIENTS WITH INTRA-ABDOMINAL PRESSURE MEASUREMENT SUBMITTED TO MECHANICAL VENTILATION

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INTRODUCTION. High intra-abdominal pressure in patients submitted to abdominal surgeries or trauma can cause a lot of systemic damages, with temporary or lasting side-effects on different organs. Motor physical therapy acts on patients′ rehabilitation at the intensive care units benefiting muscular and cardiorespiratory systems, but it can change PIA values. The aim of this study was to evaluate the repercussion of the motor physical therapy in the intra-abdominal pressure and in the mechanical ventilation.

METHODS. This research was developed at some ICU′s from Curitiba-PR, Brazil, done in patients with IAP monitoring and submitted to mechanical ventilation. Four protocols were elaborated by the authors to valuate the IAP and MV values before and after their applications, and the protocols were the Hip Flexion Protocol, Bedside Elevation, Triple Hip Flexion and the Deep Venous Thrombosis Prevention. The collected data were the vital signs, IAP values, the pulmonary static compliance and air way resistance. The statistic used was ANOVA to IAP variables and Student "t" Test to the MV ones.

RESULTS. Forty-six protocols were done, the first had an n=13, the second an n=11, the third an n=12 and the fourth an n=10. About 74% were male and the mean age was 32,75. APACHE mean was 7,4. Of all the protocols used, just two of them showed expressive alteration on the IAP values: the Hip Flexion Protocol (p=0,01) and the Bedside Elevation (p=0,02). About the MV variables, only one protocol caused an expressive increase of the air way resistance, the Hip Flexion Protocol (p=0,03).

CONCLUSION. We could conclude that we have to be careful about the motor physical therapy on the inferior member of the patients with IAP monitoring, because the positioning can increase its value, such as the hip flexion. We could also check that about the MV variables, we only had alteration of the air way resistance on the hip flexion.

Poster Sessions
Determination of cardiac function: 0615–0627

0615

REDUCED RIGHT VENTRICULAR PERFORMANCE IN SEVERE RESPIRATORY SYNCYTIAL VIRUS BRONCHIOLITIS

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INTRODUCTION. Previous studies demonstrated myocardial damage and hepatitis in infants with severe respiratory syncytial virus (RSV) infection. We hypothesized that myocardial damage and ischaemic hepatitis were related to right ventricular failure. Objectives: To assess right ventricular performance in infants with severe RSV disease and an association with disease severity, myocardial damage, and hepatitis.

METHODS. Prospective observational study of consecutive infants ventilated with severe RSV infection without congenital heart disease. Pulse wave Doppler echocardiographic assessment with calculation of the right ventricular function (Tei index), left ventricular ejection fraction and diameters; cardiac troponin T levels; transaminase levels and C-reactive protein levels were performed on admission. Additional data were collected on age, oxygenation and ventilation indices and duration of ventilation.

RESULTS. Thirty four ventilated infants with confirmed RSV bronchiolitis were enrolled - median age [range] 1.4 months [0.4 - 11.7], median length of ventilation 5 days [2 - 10]. Seven (20%) infants had an elevated right ventricular Tei index indicating significantly reduced right ventricular function. Left ventricular function including ejection fraction, left ventricular end diastolic and systolic volume, left atrial diameter, as well as C-reactive protein and transaminase levels were not different between patients with and without right ventricular dysfunction. Cardiac troponin T was raised in 14 (41%) - 3/7 with elevated and 11/27 with normal Tei index ($p = 1.0$). Ventilation and oxygenation indices and duration of mechanical ventilation were not different between groups.

CONCLUSION. Right ventricular dysfunction is common in severe RSV disease and not related to disease severity. Myocardial and hepatocellular damage occurs in infants ventilated with RSV bronchiolitis with normal right and left ventricular function.

0616

RELIABILITY OF THE CARDIAC OUTPUT MEASUREMENT BY PARTIAL CO2 REBREATHING IN ARDS PATIENTS RECEIVING LUNG PROTECTIVE MECHANICAL VENTILATION

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INTRODUCTION. Partial CO2 rebreathing measure non-invasively the pulmonary capillary blood flow and estimate the cardiac output. Large pulmonary shunt or reduce tidal ventilation may minimized the accuracy of the technique (1,2). The aim of this prospective controlled study was to investigate the agreement between partial CO2 rebreathing and thermodilution for the determination of cardiac output in patients with acute respiratory distress syndrome (ARDS), and to test the effect of shunt on the accuracy of the method.

METHODS. Twenty patients meeting the American-European Consensus Conference (AECC)criteria for ARDS and receiving low tidal ventilation (VT = 6 ml.kg-1 predicted body weight) with PEEP > 7 cmH2O were enrolled. All patients had a pulmonary artery catheter (Edwards Vigilance Monitor, Irvine, USA) and a NICO2 monitor (Novametrix Medical System, Wallingford, CT). Seven measurements were performed every 20 min over a 2-h period of haemodynamic stability. A total of 140 pairs of cardiac output values were available. Pulmonary shunt was determined at FIO2 1 at the end of the protocol. We used Bland-Altman method's to calculate bias, precision, limit and percentage error of agreement in the whole population and according to the shunt fraction (higher or lower than 30%). Data are mean±SD.

RESULTS. Overall cardiac output was 6.6±0.9 L.min-1 with thermodilution and 5.8±1.7 L.min-1 with partial CO2 rebreathing (r=0.68). Bias was 0.8±1.5 L.min-1 and limit of agreement −2.1 to 3.7 L.min-1. In the 11 patients with shunt <30%, values were 0.4±1 L.min-1 (r=0.86) and −1.6 to 2.5 L.min-1, respectively. In the nine patients with shunt >30%, values were 1.4±1.7 L.min-1 (r=0.41) and −2.2 to 4.8 L.min-1, respectively. The percentage error of agreement was 48% in the whole population, 32% in the low shunt group and 55% in the high shunt group.

CONCLUSION. In ARDS patients receiving lung protective ventilation, determination of cardiac output by the partial CO2 rebreathing technique provides relevant information only in less severely hypoxemic patients. In all other patients, the percentage error of agreement largely exceeds 30%, indicating that partial rebreathing cannot substitute for thermodilution.

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0617

EFFECT OF RESTORATION OF SINUS RHYTHM OF AF ON REGIONAL LV CONTRACTILE FUNCTION A MULTIGATED RADIONUCLIDE STUDY

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INTRODUCTION. Left ventricular (LV) function alterations in atrial fibrillation (AF) are due to lack of atrial kick, reduced diastolic filling, irregular cycle lengths, but may also reflect an intrinsic form of tachy cardiomyopathy. Whether impairment of LV systolic function is global or regional is an attractive hypothetical question that needs to be answered and the present study is an attempt to address this issue. We studied 20 patients (13 males, mean age 41± 16 years) all had persistent (preceeded by paroxysmal) AF that was resistant to pharmaceutical therapy. One patient (pt) had rheumatic heart disease, five had dilated cardiomyopathy, two had old myocardial infarction and one had Ebstein anomaly.

METHODS. Following clinical, ECG, and echocardiographic evaluation, all pts were subjected to radiofrequency (RF) ablation of pulmonary vein potentials, followed by 3 weeks of oral anticoagulant therapy, Fourteen pts had successful ablation, 3 had failed ablation, 2 pts returned to AF, and one pt died. Nuclear multigated radionuclide angiography (MUGA) using in vivo method was performed for all pts before and 3 months following ablation.

Besides scintigraphic assessment of global LV ejection fraction (%EF), regional %EF was assessed by 6 segment scoring system of standard MUGA.

RESULTS. Comparing the baseline readings (i.e. before RF-ablation) to readings after 3 months: (1) global %EF showed significantly greater percentage increase (37%) than the baseline readings (from 48%±7.2 to 65.9%±5.9, p≤.001). (2) Significant increases in regional %EF in the high lateral segment (36%, p≤0.01), the lower septal segment (53%, p≤0.001) and high septal segment (64%, p≤0.001). The mid-lateral, inferolateral and inferoapical segments showed significantly lesser increases in regional %EF (20%, P≤0.5), (18% P≤0.5) and (15%, P≤0.5) respectively. (3) Failed cases with persistent AF showed insignificant increases in both global %EF and regional %EF 3 months after RF-ablation.

CONCLUSION. Termination of AF restores global %EF (37%), as well as regional contractile LV function thus restoring synchronization of previously asynchronous LV during AF. Greatest improvements in regional EF (64%, 53% and 36%) were exhibited by the high septal, lower septal and upper lateral segments respectively compared to the inferoapial, mid and lower lateral segments which exhibited less than 30% improvement.

Improvement of LV hemdoynamics after restoration of sinus rhythm and increases in both global and regional LV contractile functions could therefore be partly ascribed to the LV resynchronization achieved by AF termination.

0618

B-TYPE NATRIURETIC PEPTIDE AND CONTINUOUS POSITIVE AIRWAY PRESSURE IN HEALTHY MALE VOLUNTEERS

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INTRODUCTION. B-type natriuretic peptide (BNP) and its precursor NT-proBNP are biochemical markers of ventricular stress. Raised levels of these makers contribute to diagnosis and prognosis in a number of pathological states [1,2] commonly encountered in critical care medicine. However, the effects of introducing or removing positive airway pressure on BNP or NT-pro-BNP levels are largely unknown. We investigated the effects of introducing and removing continuous positive airway pressure (CPAP) on the plasma BNP and NT-proBNP levels of healthy male volunteers.

METHODS. Following ethics committee approval 15 healthy male volunteers were recruited. After resting semi-recumbent for 1 hour a blood sample for BNP/NT-proBNP assay was taken (T1). Thereafter CPAP of 15cm H_20 ($Fi0_2$ =0.21) was applied via facemask for 1 hour after which time a futher sample was drawn. (T2). A further hour was spent resting semi-recumbent before a final BNP/NT-pro-BNP sample (T3) was taken. ECG, non-invasive blood pressure, heart rate, respiratory rate and pulse oximetry were monitored continuously.

RESULTS. The mean baseline value for NT-proBNP at T1 was 12.6 pg/ml (SD ±6.95), and for BNP was 6.49 pg/ml (SD ±5.17). NT-proBNP plasma levels were significantly higher after the removal of CPAP. BNP levels were also raised after CPAP removal although this did not reach statistical significance. There was a trend toward a decrease in both NT-proBNP and BNP plasma levels with the initiation of CPAP. See Table.

TABLE 1 COMPARISON OF MEAN NT-PROBNP AND BNP LEVELS WITH INITIATION AND REMOVAL OF CPAP

	NT-proBNP pg/ml (95% CI)	P value	BNP pg/ml (95%CI)	P value
T1 – T2 (Initiation of CPAP)	- 1.20 (−2.86 to 0.46)	0.14	- 0.96 (−2.41 to 0.49	0.18
T2 - T3 (Removal of CPAP)	+ 2.13 (1.13 to 3.13)	0.004	+ 2.56 (−1.05 to 6.17	0.15
T1 - T3	+ 0.93 (−1.02 to 2.89)	0.32	+ 1.60 (−2.61 to 5.81	0.43

CONCLUSION. The results suggest that there are changes in ventricular stress following the introduction and removal of CPAP which are reflected in changes in the levels of brain natriuretic peptides measurable in blood. The raised brain natriuretic peptide levels seen in pathological conditions may also prove susceptible to changes in CPAP and this would be an area for further research.

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0619

TISSUE DOPPLER IMAGING IN PREDICTION OF REVERSE REMODELING AFTER CARDIAC RESYNCHRONIZATION THERAPY

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INTRODUCTION. The selection criteria for Cardiac Resynchronization Therapy (CRT) for heart failure patients has been debated as non responders to this novel therapeutic modality are 20–30%.Different Echocardiographic techniques have been used for both selection & prediction of effectiveness of CRT. We studied the feasibility of Tissue Doppler Imaging (TDI) to assess and predict reverse remodeling (RR),defined as decrease in end systolic volume (LVESVd by > 15% and /or increase in ejection fractions (EFd) by> 10% in HF pts.

METHODS. Twenty eight HF patients were enrolled (20 males, mean age= 46.4+ 14 Ys. range 18–65ys.) for whom CRT was implanted (2 pts with ICD function, 1 epicardial). M-mode, 2 D & TDI were performed at baseline and at 3-months follow-up. Seven parameters of interventricular (Rt. to Lt.delay measured by Doppler at pulmonic & aortic valves respectively) and intraventricular (M-mode delay) asynchrony based on the time to peak myocardial contraction were compared. TDI Quantitative analysis of peak systolic velocities at 4 LV segments(basal & mid cavity of both Septal & post.lateral walls) Q-basal, Q-mid,respectively, were compared.

RESULTS. Twenty one pts,75% (responders or group 1) showed significant clinical improvement & RR compared to non responders (group 2,7 pts).Group 1 showed significant improvement of all ECHO parameters over group 2. At baseline, responders had a significant M-mode Delay, Rt. to lt. delay than nonresponders (234.5 + 67.8 vs. 188.6+30 msec., P<0.05 and 67.4 +34 vs. 27.9 +26.6 msec.,P<0.01 respectively). Also Q-basal & Q-mid were significantly higher in gp.1 than gp.2 (113.8+42.891vs. 91.4.4+26.1 msec, P<0.05and 183.3+98 msec. vs 118.6+49.8 msec,P<0.01 respectively) at baseline. LVESVd correlated significantly with Rt.-Lt delay (r=0.5, P<0.005), Q-basal (r=0.4, P<0.05),and Q-mid (r=0.45, P<0.01). Using multivariate regression analysis, the independent parameters included Rt.-Lt.delay and Q-mid (r=0.5, P< 0.01) in both groups.

CONCLUSION. Rt.-Lt.delay and Q-analysis of peak systolic velocity at mid LV cavity measured by TDI are the most powerful predictors of LV reverse remodeling and can be useful for pts selection for CRT.

0620

ACCURACY OF NON-INVASIVE ESTIMATES OF CARDIAC OUTPUT USING BIOREACTANCE AND PULSE CONTOUR ANALYSIS IN CRITICALLY ILL PATIENTS

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INTRODUCTION. We analyzed the correlation between estimates of cardiac output (CO) amongst minimally invasive devices using pulse contour analysis. (LiDCO®plus, FloTrac® and PiCCO®) and bioreactance (NICOM®).

METHODS. Continuous or bolus thermodilution CO measures from a pulmonary artery catheter (PAC) were simultaneously compared to estimates of arterial pulse contour-derived CO using the LiDCOplus®, FloTrac®, and PiCCOplus® and to CO measured by the NICOM® in 20 cardiac surgery patients during the first 2 post-operative hours. Mean and absolute values for CO across all devices were compared by ANOVA, Bland-Altman and linear regression analysis.

RESULTS. Mean PAC CO (5.6±1.8 L/min) was similar to LiDCO, FloTrac and PiCCO (5.9±1.7, 5.9±1.4, 5.4±1.7 L/min, respectively), but higher than NICOM (5.1±1.3 L/min, $p < 0.05$) values. Bias ± SD between PAC-CO and LiDCO (n=18), FloTrac (n=41), PiCCO (n=23) and NICOM (n=50) CO values were 0.32±0.56, −0.33±1.25, 0.02±0.52 and −0.50±1.37 L/min, respectively, with limits of agreement of −0.78 to 1.42, −2.80 to 2.10, −1.01 to 1.05 and −3.20 to 2.20 L/min, respectively, and LiDCO, FloTrac, PiCCO and NICOM CO values correlated with PAC-CO values (r2=0.88,0.46, 0.89 and 0.41, respectively). The Bias ± SD of dynamic changes (Δ) between ΔPAC-CO and ΔFloTrac (n=17) and ΔNICOM (n=19) were 3±12% and 2±23% respectively. LiDCO and FloTrac stroke volume variation (SVV) correlated (r2=0.58, bias −0.40±6.50%, precision −13 to 7%).

CONCLUSION. Arterial pulse contour analysis and bioreactance devices estimated CO with different bias and precision relative to PAC derived CO values. Thus, the results of prior studies using LiDCO®, FloTrac®, PiCCO® and NICOM® -derived estimates of CO cannot be compared to each other, nor can absolute values be used to drive similar resuscitation protocols.

GRANT ACKNOWLEDGEMENT. This work was supported in part by NIH grants HL67181 and HL76157.

0621

THE EFFECT OF PROPOFOL AT CLINICALLY RELEVANT CONCENTRATIONS ON THE LEFT VENTRICULAR FUNCTION OF RATS UNDER KETAMINE ANESTHESIA

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INTRODUCTION. Propofol is associated with a certain degree of cardiovascular depression, which is mainly manifested by a reduction in the arterial blood pressure. However, the effects of propofol on myocardial contractility remain debatable. This study aimed to investigate whether under in vivo conditions, propofol at clinically relevant concentrations has negative inotropic effects. It also aimed to investigate whether these negative inotropic effects persisted with continuous propofol infusion.

METHODS. Experiments were conducted with rats instrumented for measurement of left ventricular hemodynamic function. We assessed the hemodynamic effects under the following conditions of propofol administration: 1 mg/kg bolus followed by infusion at a constant rate of 100 ug/kg/min (Propofol 100), 2.5 mg/kg bolus followed by infusion at a constant rate of 200 ug/kg/min (Propofol 200), and 0.3 ml intralipid bolus followed by infusion at a constant rate of 1.5 ml/h.

RESULTS. The peak rates of ventricular pressure rise (+dP/dtmax) ($P = 0.001$) and intraventricular pressure decline (-dP/dtmin) ($P = 0.026$) of the Propofol 200 group were significantly decreased compared to those the control group. This decrease in +dP/dtmax and -dP/dtmin improved soon after, and no difference was observed between and within groups.

TABLE 1 THE CHANGES OF +DP/DTMAX BEFORE AND AFTER DRUG INFUSION

	Before Infusion	After Infusion	After 1 min	After 2 min	After 3 min	After 4 min	After 5 min
Control (N=10)	3567±72.5	3512±87.7	3437±89.5	3352±110.8	3419±124.2	3354±110.4	3389±102.2
Propofol 100 (N=10)	3514±110.3	3252 ± 95.7	3341±89.3	3444±99.9	3382±103.3	3321±74.5	3296±58.8
Propofol 200 (N=10)	3583±109.8	2967±121.7*	3400±104.0	3510±99.2	3519±107.2	3498±92.9	3445±80.2
Intralipid (N=10)	3505±41.5	3458±63.7	3481±105.2	3463±105.7	3501±119.5	3506±133.2	3493±131.8

**P < 0.05 compared with before drug infusion*

CONCLUSION. With regard to the left ventricular function of rats under ketamine anesthesia, propofol administrated at a clinically relevant concentration (2.5 mg/kg bolus followed by infusion at a constant rate of 200 ug/kg/min) decrease left ventricular contractility. However, its negative inotropic effects on the left ventricle are only temporary, even if it is continuously infused.

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0622

CLONIDINE PRE-TREATMENT INHIBITS MITOCHONDRIAL KATP CHANNELS AND MODULATES THE CARDIAC TRANSCRIPTOME TO AUGMENT ACUTE MYOCARDIAL ISCHAEMIA REPERFUSION INJURY: A BIPHASIC RESPONSE

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INTRODUCTION. Pre-treatment with clonidine affords protection against acute cerebral ischaemia-reperfusion injury. We hypothesised that clonidine might also protect against regional myocardial ischaemia-reperfusion (I/R) injury.

METHODS. Anaesthetised male wistar rats were subjected to I/R by 25 min of left anterior descending coronary artery occlusion followed by 2 h of reperfusion. The region of the left ventricle subjected to I/R injury was analysed for: (1) infarct size (2) degree of cardiomyocyte apoptosis, necrosis, and caspase activation (3) cardiomyocyte mitochondrial inner membrane potential changes (4) global changes in the cardiac transcriptome.

RESULTS. Pre-treatment with clonidine (90 microgrammes/kg, i.v.) 30 min prior to I/R augmented: (1) infarct size [56 ± 3% (vehicle) versus 73 ± 4% (clonidine), $P < 0.01$] (2) cardiomyocyte apoptosis [30 ± 2% (vehicle) versus 42 ± 2% (clonidine), $P < 0.01$] (3) mitochondrial membrane potential [198 ± 16 mV (clonidine) versus 216 ± 13 mV (5-hydroxy decanoate), $P > 0.05$]. The pro-apoptotic effects of clonidine were abolished by efaroxan, a mixed α2-adrenoceptor blocker and imidazoline-1-receptor blocker (26 ± 2%, n = 6), but not by the selective α2-adrenoceptor blocker yohimbine (46 ± 3%, n = 6). Pre-treatment with clonidine also abolished the cardioprotection afforded by ischaemic preconditioning (apoptosis, 47 ± 3%, $P< 0.01$, n=3) but not that by morphine (apoptosis, 9 ± 1%, $P< 0.05$, n = 3). Moreover, pre-treatment with clonidine decreased the transcription of cardioprotective genes, e.g. transforming growth factor beta-1, and increased the transcription of pro-apoptotic genes.

CONCLUSION. In conclusion, pre-treatment with clonidine significantly increased the degree of I/R injury. This detrimental effect of clonidine appears to be secondary to (1) activation of imidazoline-1-receptors (2) inhibition of mitochondrial KATP channels (3) decreased transcription of cardioprotective genes, and (4) increased transcription of pro-apoptotic genes.

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0623

MAJOR SURGERY ALTERS IN-VITRO CONTRACTILE AND RELAXANT PROPERTIES OF SPLANCHNIC VESSELS

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INTRODUCTION. Surgical stress and prolonged anesthesia are related to postoperative organ dysfunction, especially in the gastrointestinal tract. One explanation is inadequate tissue perfusion. In this study, we evaluated the effects of mild vs. moderate surgical stress on ex vivo splanchnic vascular reactivity.

METHODS. 15 anesthetized pigs were allocated to mini-laparatomy (mild stress) with placement of drains (n=8) or full laparatomy (moderate stress) with exposure of the major abdominal vessels, gastrostomy and jejunostomy (n=7). After a total of 14 hours (mini-laparatomy) or 36 hours (full laparatomy) of anesthesia, slices of superior mesenteric and hepatic arteries were analyzed with the tissue bath method. Contractility was assessed using norepinephrine (NE) from 0.1 uM to 10 uM (dose response curve), and relaxation using adenosine and sodium nitroprusside (SNP, percent of peak contraction, baseline 100 ± 0%). Results are expressed as mean ± SD. ANOVA for repeated measurements and the unpaired t test were used for statistical analysis.

RESULTS. After surgery, cardiac output decreased from 102 ± 13 ml/kg/min to 86 ±12 ml/kg/min in animals with mild stress and increased from 90 ± 14 ml/kg/min to 103 ± 24 ml/kg/min in the group with moderate stress (time-group interaction: $p = 0.004$). Data on vessel contractility and relaxation are shown in the Table. NE dose-response contraction in the hepatic and superior mesenteric arteries was lower in the moderate stress group (dose–group interaction $p < 0.001$ in both arteries). SNP and adenosine dose response relaxation was reduced in the moderate stress group in both arteries (dose-group interaction $p < 0.04$ in both arteries).

TABLE 1 DOSE RESPONSE MAXIMUM EX VIVO VASCULAR REACTIVITY VALUES

	NE(g)		SNP(%)		Ade (%)	
	HA	SMA	HA	SMA	HA	SMA
Mild stress	7±3*	12±6*	42±17*	27±10*	38±19*	64±32*
Mod. stress	3±2	3±2	57±22	48±32	71±23	84±16

** p <0.05 vs moderate stress. Units: grams for NE and % of contraction for SNP and Ade*

CONCLUSION. Major surgery impairs in-vitro vascular reactivity by decreasing both contractile and relaxant properties of splanchnic vessels. This may have consequences for in-vivo management of circulatory failure.

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0624

LEFT ATRIAL FUNCTION FOR OUTCOME PREDICTION IN SEVERE SEPSIS AND SEPTIC SHOCK. AN ECHOCARDIOGRAPHIC STUDY

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INTRODUCTION. In the view of adverse consequences of sepsis, myocardial depression is a known phenomenon, left ventricular function and brain natriuretic peptide assessment (BNP) had been used to predict mortality in septic patients. No previous studies reported the changes in atrial function and its relation to mortality in patients with sepsis.The present work addresses the latter issue through studying left atrial function which is expressed as atrial ejection force (AEF) in patients with severe sepsis and septic shock and links it to mortality.

METHODS. We studied 30 patients with severe sepsis or septic shock. Echocardiographic parameters were measured on admission, they comprised left ventricular ejection fraction (EF), and AEF, with AEF defined as the force that the atrium exerts to propel blood into the LV. All patients were subjected to BNP as well. Multivariate analyses adjusted for APACHE-II score was used.

RESULTS. ICU mortality was 30% overall in the studied group. Recovery from severe sepsis or septic shock occurred in 21 patients (70%) which resulted in significant improvement of atrial function (14.8 ± 3.4 versus 11.4 ± 3.1kdyn, $p < 0.01$). The other group had more frequent moderate to severe left ventricular dysfunction (35.9% versus 11.1%; $P < 0.01$) and abnormal BNP levels (38.3% versus 9.3%; $P < 0.001$).

CONCLUSION. As echo parameters revealed that the atrial function showed changes similar to the ventricular function and BNP changes, atiral function may be used as independent predictor of mortality.

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0625

LEFT ATRIAL STUNNING AFTER AF TERMINATION SCINTIGRAPHIC EVIDENCE OF DELAYED FUNCTIONAL RECOVERY AFTER RF ABLATION

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INTRODUCTION. Termination of atrial fibrillation (AF) by radiofrequency (RF) ablation, is not necessarily followed by prompt restoration of left atrial (LA) mechanical activity. The latter lags behind for a variable period (1–4 weeks) during which anticoagulant therapy has to be maintained, a phenomenon known as Atrial Stunning. this may be reflected in delayed amelioration of symptoms in terms of restoration of atrial function.

METHODS. our work here to assess LA function after ablation using scintigraphic imaging of both LA emptying and left ventricular (LV) filling in 20 patients all had paroxysmal AF that resistant to pharmaceutical therapy.All pts were subjected to radiofrequency (RF) ablation of pulmonary vein potentials, followed by 3 weeks of oral anticoagulant therapy. Fourteen pts had successful ablation, 3 had failed ablation, 2 returned to AF, and one died.

Nuclear multigated radionuclide angiography (MUGA) using in vivo method was performed for all pts before, one month and three months following ablation. Scintigraphic parameters assessed comprised**.** LV ejection fraction (%EF), LV-peak emptying rate (PER), LV-peak filling rate (PFR), LV-time to peak emptying (TPE) and LV-time to peak filling (TPF). Each pt was later subjected to 2D & M mode echocardiography before,one month and 3 months after ablation to assess the following parameters:- LV ejection fraction EF %, LV end diastolic diameter (EDd mm), LV end systolic diameter (LVESd mm) and LA diameter.

RESULTS. Compared to the baseline readings,readings one month after RF-ablation and three months reading showed**.** 1- Significantly greater percentage reduction in the mean PER (16%, $p < 0.05$) than the one month reading (8%, p**.** NS), 2- Significantly greater percentage increase in the mean PFR (36%, $p < 0.01$ vs 27%, $p < 0.05$), 3-Significantly greater percentage reduction in the mean TPE (26%, $P < 0.05$) than the one month reading (16%, P: NS) and 4- Significantly greater percentage reduction in the mean TPF (20%, $p < 0.05$ vs 13%, p: NS).
Compared to the baseline readings, %EF exhibited significantly greater percentage increase in the mean global %EF (37%, $p < 0.001$) after 3 months versus (18.5%, $p < .05$) after one month. Using the technique of echocardiography, the global %EF showed significantly greater percentage increase (37.5%) than the baseline readings (from 50.9%±6.4 to 70%±6, $p < 0.001$). ECHO dimension showed statistically significan<t reduction after three months in mean LVEDd (5.31 ± 0.57 vs. 4.51 ± 0.52mm), i.e 15%, ($P < 0.05$), mean LVESd (3.9 ±0.6 vs. 3.3±0.6mm), i.e 15%, ($P < 0.05$) and mean LA diameter (4.4 ±0.4 vs. 3.9±0.6mm), i.e 11% respectively.

Failed cases with persistent AF showed, less significant increases in global EF% and empting and filling data after 3 months from RF ablation.

CONCLUSION. Our data prove the phenomenon of LA stunning through scintigraphic evidence of delayed changes in various parameters of LA filling and emptying. Despite atrial stunning, the improvements in ejection fraction observed, however might reflect the significant reduction in heart rate with improved atrial filling rather than the improvement in LV contractile function.

0626

THE EFFECTS OF LOAD ON SYSTOLIC MITRAL ANNULUS MOUVEMENTS BY TISSUE DOPPLER IMAGING IN CARDIAC SURGERY PATIENTS

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INTRODUCTION. The systolic velocity of mitral annulus (SM) has been correlated with "peak positive dP/dt", and with ejection fraction. Also myocardial acceleration during isovolumic contraction (SIVA) has been experimentally correlated with peak dP/dt, demonstrating independence from the ventricular load.
The aim of our study was to verify if SM e SIVA were modified by abrupt increase of ventricular load in patients undergoing coronary bypass grafting.

METHODS. Twenty-three patients undergoing coronary bypass grafting have been included in this study. Exclusion criteria were: low preoperative ejection fraction, mitral anular calcifications, hemodynamic instability. Tissue Doppler imaging has been measured on the lateral mitral annulus, using transesophageal echography. The first determination has been carried out in basal conditions, the second determination has been executed after rapid administration (in 10 min.) of 7 cc/kg of Voluvent®.

RESULTS. SM e di SIVC vary in meaningful way after load, while SIVA does not appear modified after load.
basal after load
Sivct cm/sec 5,65±1,95 6,75±1,53 0,03
Sm cm/sec 8,7±1,04 9,99±0,88 0,04
SIVA cm/sec^2 203,45±45,69 211,41±71,28 0,81.

CONCLUSION. We know that the most utilized indices of ventricular function are influenced by load conditions of ventricle, for this reason would be important find a load independent index of ventricular contractility.
SIVA appears to be a load independent index of cardiac functionality and appears to be an optimal index in the clinical evaluation of these patients.

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0627

CARDIOGENIC SHOCK AND EARLY REVASCULARISATION-A DISTRICT GENERAL HOSPITAL PERSPECTIVE

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INTRODUCTION. Cardiogenic shock occurs in 7–10% of patients after acute myocardial infarction (AMI). Untreated, it is responsible for an early mortality of approximately 80% and is the leading cause of death among patients hospitalised with AMI. Evidence from studies such as SHOCK (Should we emergently Revascularise Occluded Coronaries for Cardiogenic Shock?) have demonstrated a survival benefit from early revascularisation compared to medical therapy, however this is most beneficial in <75 years old. We audited the management of cardiogenic shock in our district general hospital to see the comparison with recommended practice.

METHODS. Retrospective review of case notes of 46 patients either presenting with or later developing cardiogenic shock in a district general hospital over a 5 year period from August 2002 to August 2007. Cardiogenic shock was defined by a systolic blood pressure of 90 mm Hg for > 1 hour, unresponsive to fluid challenge, thought to be secondary to cardiac dysfunction, and associated with signs of hypoperfusion.

RESULTS. Of the 46 patients included in the study, 65% were male and 35% female. The average age was 75 (range 40–90). 20 people were aged <75, and 26 above. There were 28 STEMIs and 18 NSTEMIs. Of the 28 STEMIs, 22 were thrombolysed, those not thrombolysed were due to contraindication or late presentation. In the <75 group, 9 (45%) patients were considered for urgent revascularisation and were discussed with tertiary centre. 3 were transferred acutely (within < 24 hours), all received intervention and were alive at both 30 days and subsequently at 1 year. The remaining 6 patients were managed aggressively with medical therapy on ITU but were thought to be clinically unstable/unsuitable for acute transfer so were planned for intervention at a later date. 11 patients <75 were not considered for early revascularisation due to co-morbidity, instability and poor pre-morbid function. Total of 3/20 (15%) of patients <75 underwent early revascularisation in target group. In Hospital Mortality (IHM) for <75s was 13/20 (65%). In patients >75, 2/26 (8%) patients were considered for urgent revascularisation, however neither was transferred, meaning there was 0% early revascularisation in >75s. IHM for >75s was 25/26 (96%) resulting in a total IHM of 38/46 = 83%.

CONCLUSION. Cardiogenic shock is a major cause of mortality from acute myocardial infarction, current guidance is for urgent revascularisation in patients <75 with a selective approach adopted in older age groups. This audit highlights poor utilisation of revascularisation as an option in these patients, as is reflective/representative of DGH in the UK. Transfer time makes early revascularisation difficult in a DGH without on-site angiographic facilities. Regional care centres that are experienced in the management of shock should be designated and protocols developed for the rapid transport of critically ill patients.

Poster Sessions
Recruitment maneuvers in ALI and ARDS: 0628–0641

0628

EARLY ARDS: WHICH METHOD OF RECRUITMENT MANEUVER SHOULD BE USED?

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INTRODUCTION. To assess the effect of three different recruitment maneuvers (RM) on gas exchange and respiratory mechanics in patients with early ARDS.

METHODS. Arterial blood gases and static compliance of respiratory system (Cst,rs) were measured in 25 patients (17 males) during the first 3 days after ARDS diagnosis before (pre-), immediately (0 min) and 30 min after three different RMs applied in random order; RM-1: pressure control ventilation for 1min with inspiratory pressure of 40 cmH2O, PEEP of 5 cmH2O and inspiration to expiration time 1:1, RM-2: two hyperinflations using CPAP of 45 cmH2O for 20 sec each and in meantime 1 min of lung-protective strategy, RM-3: three consecutive 'sighs' with such tidal volume to reach a plateau pressure of 45cmH2O. Data were analyzed using paired t-test.

RESULTS. Patient's mean age was 59.9±16.5 years and APACHE II on day of study 20±7.4 Causes of ARDS included pneumonia (12), septic shock (9), aspiration (2), TRALI (1) and reperfusion syndrome (1). None of the patients suffered from barotrauma after the implementation of RM. No statistically significant decrease in the mean arterial pressure was observed. The effect of the three RM is shown in Table 1.

TABLE 1

	PaO2/FiO2 mmHg			Cst,rs ml/cmH2O		
	Pre-RM	0 min	30 min	Pre-RM	0 min	30 min
RM-1	141±40	195±91°	142±51	34±12.2	36.1±15.9	34±11.4
RM-2	143±45	168±58°	155±52°	34±11.5	35.7±12.8°	34.1±12
RM-3	145±53	194±69°	150±51	33.9±12.1	36.9±13°	34.4±12.1

Values are mean ±SD, °: significant compared with pre-RM values

CONCLUSION. These preliminary results suggest that all RM improve the oxygenation promptly but the effect of RM-2 has longer duration (30 min). The effect of RM-2 and RM-3 on Cst,rs was only temporal. Among our study population no major complications were observed.

0629

RELATIONSHIP OF STRESS INDEX, LUNG RECRUITMENT AND GAS EXCHANGE IN PATIENTS WITH ACUTE RESPIRATORY DISTRESS SYNDROME

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INTRODUCTION. To investigate the relationship of stress index and positive end-expiratory pressure (PEEP) in patients with acute respiratory distress syndrome (ARDS). To determine the relationship of stress index, lung recruitment, oxygenation and respiration mechanics.

METHODS. Fourteen patients with ARDS were enrolled in the study.During volume control ventilation with constant inspiratory flow,the pressure-time curve was fitted to a power equation: P=a x timeb + c, where coefficient b (stress index) describes the shape of the curve: b=1,straight curve;b<1, progressive increase in slope, and b>1, progressive decrease in slope. Positive end-expiratory pressure (PEEP) was set to obtain b value between 0.9 and 1.1 after application of a recruiting maneuver (RM). PEEP was changed to obtain 0.6<b<0.8 and 1.1<b<1.3. Experimental conditions sequence was random. Recruited volume (RV) was measured by static pressure-volume curve method. Hemodynamics,pulmonary mechanics and gas exchange were observed at the same time.

RESULTS. The PEEP at b<1, b=1 and b>1 were (8.3±1.5) cmH2O, (15.0±1.9) cmH2O and (18.4±1.9)cmH2O respectively, which were significant difference (P<0.001). At the b=1 and b>1, PaO2/FiO2 [(350.1±113.0) mmHg, (338.3±123.8 mmHg)] were higher than that [165.1±59.9) mmHg] of pre-RM (P<0.05). The plateau pressure (Pplat) at b=1 [(29.0±3.5) cmH2O] and b>1 [(32.9±7.3) cmH2O] post-RM were significant higher than that at b<1 [(21.9±4.3) cmH2O] (P<0.05); The Pplat at b>1 was higher than that [(25.3±15.9) cmH2O] pre-RM (P<0.05). Compared with the static pulmonary compliance (Cst) at b=1 [(38.6±10.9) ml/cmH2O], the Cst at b>1 [(26.4±6.5)ml/cmH2O] decreased significantly (P<0.05). The RV at b=1 and b>1 [(401.6±204.0) ml, (588.3±269.1) ml] were significant higher than that at pre-RM and b<1 [(135.9±111.1) ml, (175.2±122.4) ml] (P<0.05). At pre-RM, b<1, b=1 and b>1, the HR, mean arterial pressure (MAP) and lactate were not significant difference (P>0.05)

CONCLUSION. Stress index at post-RM could be a good method of PEEP titration for ARDS patients.

0630

FRC MEASUREMENTS DURING MECHANICAL VENTILATION IN ICU PATIENTS

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INTRODUCTION. Recently, an automated nitrogen washout technique has been introduced to measure end expiratory lung volume (EELV) that could be of special interest for the determination of optimal PEEP. Ibanez et al. (1)have shown that EELV decreased with 25% after changing the patient's position from sitting to supine during spontaneous breathing in healthy young volunteers. The objective of this study was to measure EELV in ICU patients with different lung disorders and to compare it with the currently available reference values.

METHODS. We examined 45 sedated mechanically ventilated patients at a mixed ICU of a university hospital. Patients were divided into three groups: normal pulmonary function (group N), respiratory failure due to primary lung disorders (group P) and respiratory failure due to secondary lung disorders (group S). In all patients EELV measurements were performed at 3 PEEP levels (15-10-5 cm H2O). EELV values were compared with predicted sitting FRC values(2) and with the supine FRC reference values according to the findings of Ibanez et al. (1)

RESULTS. In patients without lung disorders, EELV was reduced with 34% compared to predicted sitting FRC values and with 12% compared to the predicted supine FRC values at a PEEP of 5 cm H2O. In patients with primary and secondary lung disorders, EELV was further reduced and did not reach the supine reference values even at a PEEP of 15 cm H2O.

CONCLUSION. If one accepts that ventilation of 'healthy' lung at a PEEP of 5 cm H2O occur at FRC level, then we found a reduction of 35% in group N. This extra reduction of EELV is probably due to loss of muscle tension attributed to the use of sedation in our ICU patients. Whether the increase in EELV due to increase of PEEP is due to recruitment of collapsed alveoli or overdistention of already open lung needs further research.

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0631

END EXPIRATORY LUNG VOLUMES CHANGE AND LUNG RECRUITMENT

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INTRODUCTION. Positive End-Expiratory Pressure (PEEP) may prevent Ventilator Induced Lung Injury (VILI) by recruiting to aeration previously collapsed lung regions reducing global stress and strain, intratidal opening and closing and over-straining of the boundary regions between collapsed and non-collapsed lung areas.

We investigated the relationship between the increase the gas lung volume and the anatomical recruitment at two level of PEEP.

METHODS. A retrospective analysis of sixty-eight ALI/ARDS patients who underwent a whole lung CT scan at 5 and 15 cmH2O PEEP at end expiration. Lung outlines were manually delineated and gas - tissue volumes were computed with dedicated software. Tissue volumes were classified according to the gas/tissue ratio.

RESULTS. The increase in gas volume from PEEP 5 to PEEP 15 was not related to the decrease in the volume of not inflated tissue ($r2 = 0.01$, $p=0.91$). The increase in gas volume was well correlated with the increase of the gas volume associated with the well inflated tissue (Increase in gas volume going from PEEP 5 to PEEP 15 cmH2O = 229 + 0.77*Increase in gas volume associated to the well inflated tissue going from PEEP 5 to PEEP 15 cmH2O (ml), $r2 = 0.39$, $p < 0.0001$). The decrease in the not inflated tissue was related to the increase in the poorly inflated tissue (Increase in poorly inflated tissue (g) going from PEEP 5 to PEEP 15 = −95 + 0.53*Decrease in not inflated tissue (g) going from PEEP 5 to PEEP 15, $r2 = 0.42$, $p < 0.0001$).

CONCLUSION. The CT analysis suggest that near all the increase in gas volume due to the increase in PEEP was distributed to already inflated lung regions. Our data suggest a caution to use the EELV changes to estimate PEEP-induced lung recruitment.

REFERENCE(S). Gattinoni L. N Engl J Med. 2006 Apr 27;354(17):1775–86.

0632

RECRUITMENT MANEUVERS IN EARLY ARDS: DOES BODY MASS INDEX MAKE THE DIFFERENCE?

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INTRODUCTION. To assess if body mass index (BMI) has any impact on the effect of three recruitment maneuvers (RM) on oxygenation in patients with early ARDS.

METHODS. Prospective clinical study in a multidisciplinary intensive care unit. Twenty-five consecutive patients stratified into two groups according to their BMI: Group A, included patients with BMI < 27 kg/m2 (n=11), while Group B, patients with BMI ≥ 27 kg/m2 (n=14). Arterial blood gases were measured before (pre-), immediately (0 min) and 15 min after three different RMs applied in random order; RM-1: pressure control ventilation for 1min with inspiratory pressure of 40 cmH2O, PEEP of 5 cmH2O and inspiration to expiration time 1:1, RM-2: two hyperinflations using CPAP of 45 cmH2O for 20 sec each and in meantime 1 min of lung-protective strategy, RM-3: three consecutive 'sighs' with such tidal volume to reach a plateau pressure of 45cmH2O.

RESULTS. On day of study, oxygenation was similar in the two groups, while a significant difference in intrinsic PEEP was identified (0.9±0.5 vs 3±2.9, p=0.029, in Group A and B, respectively). The effect of the three RMs on both groups is shown in Table.

TABLE 1

	PaO2/FiO2 (mmHg)					
	Group A			Group B		
	Pre-RM	0 min	15 min	Pre-RM	0 min	15 min
RM-1	157±35	200±51°	166±38	128±39	190±115°	129±40
RM-2	166±39	202±48°	183±39°	126±42	142±52°	125±40
RM-3	177±47	213±51°	178±41	119±43	180±80°	128±46°

Values are mean ±SD, °: significant compared with pre-RM values

CONCLUSION. These preliminary results suggest that all RM improve the oxygenation immediately after implementation in both groups. Concerning the duration of their effect (15 min), RM-2 was more beneficial in Group A, while in obese patients RM-3 appears to be more effective.

0633

ELASTIC PROPERTIES OF RECRUITED LUNG TISSUE IN EXPERIMETAL ARDS: A CT SCAN STUDY

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INTRODUCTION. The open lung theory states that maximizing alveolar recruitment would minimize tidal alveolar hyperinflation. However, ARDS actelectasis are areas of intense inflammatory reaction. We tested the hypothesis that recruited lung areas have different elastic characteristics than the areas that were already normally aerated at ZEEP.

METHODS. At constant transpulmonary pressure (PTP), distrettual inflation at CT scan is expression of the distrettual elastance. In 21 lung-damaged pigs (intravenous LPS administration, # 7; Hcl inhalation, #7; alveolar lavage, #7) and in 5 healthy pigs, thoracic CT scan were obtained at zero end expiratory pressure (ZEEP) and during a lung recruiting maneuver aiming at a PTP of 35 cmH2O.

RESULTS. Data are mean +/- standard deviation; *) $p < 0.01$ healthy versus lung-damged.

TABLE 1

	Healthy ZEEP	Healthy LRM	Lung-damaged ZEEP	Healthy LRM
Hyperinflated (%)	1 ± 2	84 ± 4	0 ± 1	10 ± 7 *
Normally aerated (%)	86 ± 5	14 ± 6	29 ± 15	68 ± 11 *
Poorly aerated (%)	11 ± 5	1 ± 3	41 ± 12	18 ± 12 *
Non aerated (%)	1 ± 1	1 ± 1	30 ± 17	4 ± 3 *

CONCLUSION. The CT scan attenuation properties and hence the distrettual elastances of the aerated compartment were significantly different than those of healthy lung tissue at the same PTP. Moreover we found a highly significant correlation (R^2 0,8779, $p < 0.001$) between normally aerated areas at ZEEP and hyperinflated tissue during the LRM, suggesting that these areas are at high risk of hyperinflation, regardless alveolar recruitment.

GRANT ACKNOWLEDGEMENT. University of Bari.

0634

PEEP OPTIMIZATION WITH FORCED OSCILLATION TECHNIQUE (FOT) REDUCES VENTILATION ASSOCIATED LUNG INJURY IN SALINE LAVAGE ALI IN PIGS

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INTRODUCTION. Atelectasis related alveolar collapse is a common finding in acute lung injury (ALI), leading to increased shunt and hypoxemia. Current treatment strategies aim to recruit alveoli. Collapsed alveoli opened by a recruitment manoeuver (RM) tend to recollapse without adequate positive end- expiratory pressure (PEEP). RMs followed by inadequate PEEP permits unstable alveoli. The resulting cyclic recruitment/derecruitment during mechanical ventilation may contribute to ventilator associated lung injury (VALI) despite improved oxygenation. Results from a previous animal study suggest that total input reactance (Xrs) measured by the forced oscillation technique (FOT) at 5 Hz can be used to assess at the bedside the development of atelectasis and to monitor the efficacy of RM. The aim of this study was to evaluate whether a strategy of RMs followed by "optimal" PEEP titrated according to optimal reactance measured by FOT could reduce VALI compared to a standardized strategy.

METHODS. In 14 anesthetized and mechanically ventilated pigs, ALI was induced by saline lavage, and the degree of damage was assessed by whole-lung computed tomography. The animals were then studied for 12 hours by continuous monitoring of lung mechanics, gas exchange, FOT and hemodynamics. The animals were randomized into two groups: group A was treated with RMs and PEEP titrated according to optimal reactance measured by FOT every two hours. Titration of PEEP was performed by continuously monitoring reactance during RMs with stepwise reduction of PEEP from 20 cm H20 by steps of 2 cm H2O. PEEP was considered optimal at the step before which the reactance started to decrease. Group B was treated with RMs every two hours and PEEP was adjusted according to the ARDSnet protocol. Plasma TNF-alfa, IL6 and IL8 were measured at baseline and at the end of the experiment.

RESULTS. At the beginning of the ventilation trial the PEEP level determined by the two approaches were very similar (9.5±2.7 and 8.8±3.0 for group A and B, respectively). After 10 hours of ventilation, PEEP titration by FOT resulted in higher levels of PEEP (9.0±2.1 cm H2O) compared to PEEP set according to the ARDSnet protocol (5.0±0.0 cm H2O) (p=0.01). However, these higher levels of PEEP improved respiratory mechanics as shown by the lower peak inspiratory pressure (14.3±1.9 cm H2O) in group A compared to group B (23.0±6.1 cm H2O) ($p < 0.05$). This lower peak pressure was associated with a significantly smaller increase of IL6 in the A group ($p < 0.05$).

CONCLUSION. We conclude that in lavage-induced ALI, FOT can be used as a bedside tool to non-invasively optimize positive-pressure ventilation. The strategy used to optimize PEEP by FOT in this study may attenuate ventilator associated lung injury.

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0635

EFFECT OF VERTICAL POSITIONING ON LUNG VOLUME AND OXYGENATION

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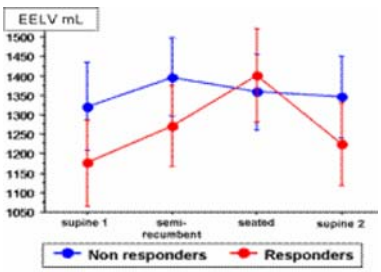
INTRODUCTION. Supine position may contribute to the reduction of aerated lung volume of patients with ARDS. Trunk verticalization is a simple technique that may improve oxygenation. We looked for a relationship between change in lung volume, oxygenation and compliance during this manoeuvre. We used an automated measurement of end expiratory lung volume (EELV) using nitrogen (N2) washout/washin, available in an ICU ventilator (Engstrom, GE).

METHODS. 35 patients with ARDS (PaO2/FiO2= 151 ±53 mmHg) were ventilated in volume controlled (Vt 6mL/kg PBW and flow=60L/min). We evaluated four 45 min successive epochs varying trunk position (Supine, Semi recumbent: trunk elevated at 30°, Seated: trunk elevated at 45° and legs down at 45° with Hill-Rom® beds, and back to Supine). Arterial blood gas, EELV, and static compliance were measured at the end of each epoch.

RESULTS. Increases in PaO2/FiO2 ratio (12±28% p=0.03 and 18±44% p=0.01) and EELV (13±29% p=0.01 and 16±28% p=0.006) were observed during semi-recumbent and seated positions but did not remain when patients get back to supine position. Patients increasing their PaO2/FiO2 ratio higher than 10% (median, responders) had significant variations of EELV when seated ($p < 0.001$) by contrast with non responders. Non responding patients had little or no variations of EELV induced by position. Static compliance significantly decreased during semi-recumbent and seated positioning (p=0.001 and 0.0001) but this decrease was lower for responding patients. Origin of ARDS, duration before inclusion and shock were not associated with variations of lung volume or oxygenation.



CONCLUSION. Sitting position ("verticalization") increases PaO2/FiO2 ratio and EELV in approximately half of patients with ARDS. An association between lung volume and oxygenation increase seemed to explain the difference between responders and non responders. Seated position was more efficient than semi-recumbent.

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0636

OPTIMAL DURATION OF THE RECRUITMENT MANEUVERS IN ARDS PATIENTS

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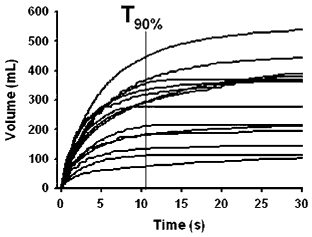
INTRODUCTION. Recruitment maneuvers (RM) are used to open lung units with high opening pressure before setting PEEP in ARDS patients [1]. The optimal duration of RM is a risk/benefice ratio between effectiveness and cardiovascular compromise. This prospective study was designed to measure the kinetic of recruitment and the hemodynamic tolerance in order to determine the optimal duration for the RM in ARDS.

METHODS. 25 early onset ($\leq$ 24 h) ARDS patients were included (age = 69 [54 – 82], SAPS II= 50 [40 - 53]), LIS = 2.7 [2.5 – 3.2]). Patients were sedated and paralysed throughout the study. After ensuring adequate hemodynamic state and the tightness of the ventilatory circuit, a 40 cmH2O sustained inflation RM for 30 seconds was performed (P/V tool 2. Hamilton medical). Pressure and flow were recorded at 67 hertz by a proximal pneumotachograph. The volume increase during the RM (VRM) was calculated by integration of the flow required to maintain the pressure during the RM. Patients with a VRM $\leq$ 100 and $>$ 100 mL were considered as non-recruiters and recruiters respectively. Heart rate (HR), systolic arterial pressure (PAs), mean arterial pressure (PAm) and SpO2 were monitored throughout the RM. A repeated measure ANOVA on ranks was used to compare HR, PAs, PAm and SpO2 at 0, 10, 20, 30 seconds (s) after the beginning of the RM and 30 s after the end of the RM. Results are given with median [25th – 75th quartiles].

RESULTS. No incident was reported during the RM. 11 patients were non-recruiters (VRM= 32 [20 – 49] mL) and 14 patients were recruiters (VRM= 319 [195 – 380] mL). In recruiters, 90% of VRM (T90%) was achieved after 10.6 [8.3 – 14.3] seconds (figure). PAs and PAm decreased significantly at 20 and 30 s after the beginning of the RM with a normalisation at 30 s after the end of the RM. HR and SpO2 were not modified throughout the RM.



CONCLUSION. These results suggest that the optimal duration of the RM is between 10 and 15 s to achieve the maximal recruitment and to avoid cardiovascular compromise.

REFERENCE(S). [1] Kacmarek. Resp Care 2007.

0637

PULMONARY HOMOGENICITY CHANGES DURING RECRUITMENT MANEUVERS AND POSITIVE END-EXPIRATORY PRESSURE IN DOGS WITH ACUTE RESPIRATORY DISTRESS SYNDROME

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INTRODUCTION. To investigate pulmonary homogenicity changes during recruitment maneuvers (RM) and positive endexpiratory pressure (PEEP) in dogs with pulmonary acute respiratory distress syndrome (ARDSp) or extrapulmonary acute respiratory distress syndrome (ARDSexp).

METHODS. After induction of saline lavage–injured ARDS (ARDSp, n=8) or oleic acid–injured ARDS (ARDSexp, n=8), PEEP was set at 20cmH2O and RM was performed (40/30-maneuver). RM was repeated every 5 mins until reaching sufficient alveolar recruitment (PaO2/FiO2>400mmHg), then tidal volume was set at 10 ml/kg and PEEP was lowered by 2cmH2O in every 10 mins. Optimal PEEP was defined at 2cmH2O above the PEEP where PaO2/FiO2 dropped blow 400 mmHg. Computed tomography (CT) scans were done before and after induction of ARDS and at each pressure level. By the changes in the CT-values, lung was divided into hyperinflated, normally, poorly and nonaerated region. Lung volumes were calculated by Pulmo software.

RESULTS. After RM, total lung volume and air volume were significantly increased than before and after induction ofARDS in tow models ($p < 0.05$). At optimal PEEP, poorly and nonaerated lung areas decreased and normally lung areas increased sharply but was accompanied by significant alveolar hyperinflation in two models ($p < 0.05$). Compared with ARDSexp models, the changing of hyperinflated lung areas was markedly more in ARDSp models at optimal PEEP ($p < 0.05$). And after three-dimensional renderings of computed tomography scan, alveolar hyperinflation occurred mainly in nondependent lung regions, whereas alveolar recruitment occurred in dependent regions.

CONCLUSION. Alveolar hyperinflation increase and pulmonary heterogeneity climb during RM and at optimal PEEP. A focal distribution of lung injury in ARDSp may be more susceptibility to alveolar hyperinflation with optimal PEEP.

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NON-INVASIVE ASSESSMENT OF OPTIMAL PEEP AND RECRUITMENT MANEUVERS EFFICACY

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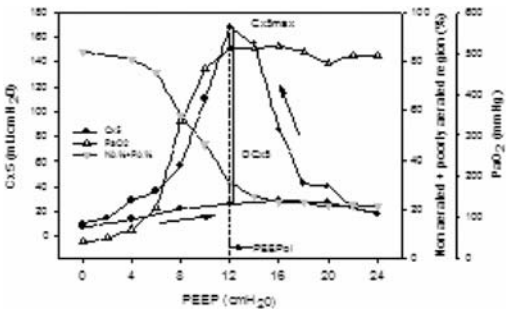
INTRODUCTION. A non-invasive tool to identify optimal PEEP and to evaluate the efficacy of recruitment manoeuvres (RM) is still missing. We investigated the sensitivity of an index (Cx5) derived from total respiratory reactance (Xrs) measured by Forced Oscillation Technique at 5 Hz in: 1) identifying lung collapse 2)evaluating the efficacy of RMs.

METHODS. We studied 5 ventilated pigs after lung lavage. PEEP was increased to 24cmH2O and then reduced to ZEEP. PaO2, Cx5 and CT scans were measured. Cx5 was expected to increase with decreasing PEEP to a maximum (Cx5max) and to decrease as the lungs collapse. PEEPol was defined as the PEEP at Cx5max. The efficacy of RMs was defined as the difference between Cx5 in inflaction and deflection (DCx5).

RESULTS. PEEPol was 12±2SD cmH2O. In the following steps PaO2 decreased by 23.4±16.3SD% confirming that Cx5 identified the beginning of collapse. Cx5 at PEEPol was significantly greater during the decremental compared to the incremental trial (64.3±26.7 and 29.3±10.0 mL/cmH2O, $p < 0.05$) with a difference between the two (DCx5) of 63.8±44.6 mL/cmH2O.



CONCLUSION. Cx5 could be useful for identifying the optimal PEEP value. DCx5 can provide information about the efficacy of a RM.

0639

OXYGENATION RESPONSE DURING CONTINUOS LONG TERM PRONE POSITION VENTILATION IN PULMONARY ARDS PATIENTS IS HIGHER AND MORE SUSTAINED IN SURVIVORS THAN IN NON SURVIVORS

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INTRODUCTION. Prone position ventilation (PPV) is used to treat respiratory failure. Mortality has been related to the disease itself and not to the physiologic response of PPV. We hypothesized that the oxygenation response during long term prone position ventilation in pulmonary ARDS can discriminate between survivors and non survivors.

METHODS. Design: observational study. We studied 41 pulmonary ARDS patients. Patients were followed from day 1 when prone position was implemented until prone position was resumed. Values were recorded before prone position ventilation started and then 1, 12, 24, 48, 96 hours of prone position ventilation. The last value recorded in prone position ventilation was also recorded. Oxygenation response (%) was calculated as the percentage of change of the PaO2/FIO2 ratio in relation with the pre prone position ventilation value ((pre prone position value – each time recorded value/pre prone position value). Values were expressed as means and standard deviations. Normality of distribution was tested with Kolmogorov-Smirnov test. Baseline groups characteristics were compared by independent t test. Oxygenation response was compared between survivors and non survivors with the unpaired t-test for each time interval.

RESULTS. There were 18 non survivors and 23 survivors patients. ICU mortality was 44%. Baseline characteristics were not statistically different between non survivors and survivors. Age was 42±16 and 44±16, APACHE II was 19±1 and 16±6, lung injury score was 3±1 and 3±1, multiple organ dysfunction score was 9±3 and 7±3 for non survivors and survivors respectively. Days in mechanical ventilation before PPV were 5±6 and 2±2 days, length of PPV was 100±62 and 82±39 hours in non survivors and survivors respectively (non significant differences). Oxygenation response was higher in survivors versus non survivors:1 hour (76 ± 66 vs 66 ± 76, p= 0.7), 6 hours (89 ± 68 vs 83 ± 75, p= 0.8), at 12 hours (150 ±142 vs 76 ± 67, p= 0.047), 24 hours (151±113 vs 77±69, p= 0.0021), 48 hours (163±161 vs 87±87, p= 0.016),72 hours (161±81 vs 63 ± 60, p=0.005), 96 hours (242±106 vs 51 ± 48, p=0.005), last value (163± 95 vs 92 ± 94,p=0.027),respectively.

CONCLUSION. Pulmonary ARDS patient survivors improve oxygenation and were able to sustain this improvement when prone position was implemented. Absence of response and the lack of a sustained response of oxygenation to prone position can be associated with bad prognosis in ARDS.

0640

LUNG WEIGHTS IN MECHANICALLY VENTILATED TRAUMA PATIENTS WITH NORMAL LUNGS

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INTRODUCTION. The weight of the lung can be calculated by densitometric analysis of computed tomography (CT) data and may help to clarify the pathophysiology of acute respiratory failure, e.g. to distinguish edema from atelectasis. So far, data from mechanically ventilated (MV) patients have been compared with normal lung weights obtained in spontaneously breathing (SB) subjects. However, lung weights of SB patients with normal lungs may differ from those of MV patients with normal lungs because of factors such as raised intrathoracic pressure or intravenous volume-expansion. Thus, we analyzed the lung weights of MV multiple trauma patients with normal lungs, which offered a unique opportunity to provide normal values for comparison with other MV patients.

METHODS. Total lung weight was calculated by densitometry of segmented CT images of the entire lung in 44 MV multiple trauma patients and, for comparison, in 29 SB trauma patients. Results are presented as mean value (95% confidence interval). ANOVA was used to compare lung weights of MV and SB patients, and the normal lung weights reported by Gattinoni et al., i.e. 850 (785–915) g [Gattinoni NEJM 2006].

RESULTS. PEEP during CT acquisition was 10 cm H_2O in all MV patients. Before CT acquisition, MV patients received 1293 (989–1597) ml of intravenous fluids. The PaO_2:FiO_2 ratio was 551 (528–574) mmHg in MV patients. Lung weight was 873 (835–910) g in MV, and 867 (802–933) g in SB patients, respectively. No significant differences (p=0.81) were found between lung weights of MV, SB, or the normal patients studied by Gattinoni et al.

CONCLUSION. Our results suggest that lung weights of mechanically ventilated multiple trauma patients with normal lungs do not differ significantly from those of spontaneously breathing patients with normal lungs. Thus, the influence of MV on the weight of normal lungs seems to be limited.

REFERENCE(S). Gattinoni L, Caironi P, Cressoni M, et al. Lung Recruitment in Patients with the Acute Respiratory Distress Syndrome. N Engl J Med 2006;354:1775–86.

0641

CAN EXPIRATORY LUNG IMPEDANCE CHANGE BE USED TO CALCULATE END EXPIRATORY LUNG VOLUME ADEQUATELY DURING PEEP CHANGE?

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INTRODUCTION. Electrical impedance tomography (EIT) has the potential to become a promising new tool for bedside monitoring of regional lung ventilation and lung volume changes. EIT calibrated with tidal volume changes at one end expiratory lung volume (EELV) level has been used in different studies to predict dynamic change in EELV during various procedures. The aim of our study was to evaluate the relationship between lung volume changes measured with a multibreath nitrogen washout technique and lung volume changes calculated from end expiratory lung impedance changes.

METHODS. We evaluated 25 mechanically ventilated patients. Lung volume was measured at different PEEP levels with a nitrogen washout/in technique (Engstrom Carestation, GE Healthcare). At all PEEP levels end expiratory lung impedance (EELI) and mean impedance tidal change were measured. EELV change derived from EELI changes, was calculated assuming a linear relation between tidal impedance change divided by tidal volume and zero impedance / volume change. EELI change was divided by the resulting tidal impedance change / tidal volume ratio to calculate the EELV (ml) change.

RESULTS. Decreasing the PEEP stepwise from 15 to 0 cm H2O PEEP resulted in a significant, but low correlation (R2 = 0.45) between EELV calculated from EELI changes and EELV measured with a multibreath nitrogen washout. Mean tidal impedance change divided by tidal volume used to calculate EELV change from EELI change, was different at the used PEEP levels.

CONCLUSION. EELV calculated from EELI calibrated with the tidal impedance change / tidal volume ratio does not adequately reflect EELV measured with a nitrogen washout/in method.

Poster Sessions
Clinical outcome II: 0642–0654

0642

OUTCOME OF ACUTE RENAL FAILURE PATIENTS REQUIRING RENAL REPLACEMENT THERAPY IN INTENSIVE CARE: AN 8 YEAR SURVEY

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INTRODUCTION. Acute renal failure has an incidence of up to 25% amongst critically ill patients and mortality rates range from 23–80%. The study aim was to analyse the long term outcome and quality of life(QOL) amongst the survivors of our critically ill patients requiring renal replacement therapy(RRT).

METHODS. A Short Form-36 and an additional questionnaire were sent to survivors after ascertaining their fitness to participate from their GP. The patients were from two teaching hospital ICUs with a total of 11 ICU beds and 1270 acute operational beds. A database of relevant patients over a period of eight years was acquired.

RESULTS. From 325 patients 138(42.5%) survived to be discharged from hospital, 53 females(44.5%) and 66 males(55.5%), mean age of 57.87, mean duration of ICU stay 13.7 days, mean duration of RRT 5.7 days, mean APACHE II score 25.68 and mean SAPS score 46.75. In-hospital mortality was 63.3%. At the time of the study, 82 of 119 survivors were available to participate. There were 26 responders(31.7%) none of whom were on long term RRT. 19% had returned to their previous level of QOL, 27% had 90% of their previous QOL and a further 19% had attained 70% or more of their previous level of QOL. 30.8% managed only between 30 and 60% of their previous level of QOL. 24 out of 26 responders consented to readmission to ICU in the future if required, 2 had no preference and none refused re-admission. The analysis of SF-36 revealed a statistically significant reduction in the physical component summary (p=0.000001) of these patients compared to the general UK population. When compared to the congestive heart failure group and the chronic obstructive pulmonary disease group, responders had comparable mental component summary scores but the former group had a poorer physical component summary (p=0.009 and p=0.04) which is statistically significant.

CONCLUSION. The responders appear to have a reasonable QOL with better scores than some chronic condition patients. The majority must have found their treatment worthwhile to have consented to undergo the same interventions again. 65.4% have more than 70% of their previous level of QOL which is remarkable. This may guide us in future prognosis in this patient group if they survive to discharge.

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0643

PROLONGED MECHANICAL VENTILATION (PMV): USING INCIDENCE AND PREDICTORS TO ASSESS FEASIBILITY OF A WEANING UNIT IN SCOTLAND

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INTRODUCTION. Patients requiring PMV currently use a disproportionate amount of expensive ICU resources. These patients can be cared for in a weaning unit, a cost-effective alternative. The UK Department of Health has recommended that Trusts should review the need for such a service on a regional basis. We used a retrospective cohort of ICU admissions in Lothian, a region of Scotland, to characterise the PMV population, report incidence and outcomes, and define predictors of PMV. These data were used to model a weaning unit.

METHODS. The study population comprised ICU admissions to the three adult ICUs in Lothian recorded in the Scottish Intensive Care Society Audit Group (SICSAG) database. The study period was from Jan 2002 to Dec 2006. Exclusions were: transfers to or from other ICUs, readmissions and those aged <16. Patients ventilated for >=21 days were defined as the PMV group and <21 days the non-PMV group. Baseline characteristics were compared between groups. Annual incidence was determined and outcomes compared between groups. Trend in mortality was assessed adjusting for age, sex, APACHE II score, hospital site and operative status. Predictors for PMV were assessed at both day 1 and day 7 of ICU stay using binary logistic regression. Weaning unit models were defined assuming PMV patients would be transferred to the weaning unit following 21 days of ventilation and a period free from vasoactive and renal support.

RESULTS. 7419 patients fulfilled inclusion criteria. In comparison to the non-PMV group (n=7094), PMV patents (n=325) were older (59.6 vs 56.9, p=0.007), had a higher APACHE II score (20.9 vs 18.8, $p < 0.001$), and were more likely to have a non-operative diagnostic code (79.6% vs 63.7%, $p < 0.001$). Incidence of PMV was 4.4 per 100 ICU admissions, or 6.2 per 100 ventilated admissions. This was equivalent to 27.2% of funded ICU bed-days in Lothian. PMV incidence showed a downward trend over the 5 years (chi^2 for trend=10.4, p=0.001) using ICU admissions as the denominator; this was confirmed using ventilated patients as the denominator (p=0.02). Mortality for PMV patients was higher at ICU discharge (28% vs 23%, p=0.046), and at hospital discharge (42.1% vs 33.9%, p=0.003). Mortality remained static in the PMV group over the 5 year study period. Adjusting mortality for confounders, however, showed a downward trend. Significant predictors of PMV on day 1 were: APACHE II score, previous cardiopulmonary resuscitation, admission diagnosis, operative status, PaO_2:FiO_2 (PF) ratio, ventilated on day 1 and vasoactive support on day 1. On day 7, only diagnosis on admission, PF ratio, ventilated on day 1, and requirement for renal or vasoactive support on days 5 or 6 were significant. The weaning unit models showed a potential saving of 1.6–2.0 ICU bed-days/year, equivalent to an annual cost saving of £300000 (€380000).

CONCLUSION. We have characterised the PMV population and established PMV incidence in Lothian ICUs. Mortality remains higher amongst PMV patients. Predictors have been identified which may aid early identification of PMV patients. Models for a weaning unit show substantial cost savings. This subgroup of ICU patients remains important due to its resource utilisation, using around one quarter of funded ICU bed-days.

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AGITATION IN THE ICU: DESCRIPTION OF ITS INCIDENCE AND ASSOCIATED RISK FACTORS

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INTRODUCTION. To describe agitation incidence and the factors associated with its development in ICU.

METHODS. All patients admitted to 9 Spanish ICUs (1 medical, 1 surgical, 1 trauma and 6 medical-surgical) during a 30 day period were followed until death or discharge. Age, gender, previous history of alcohol and illegal drug abuse were recorded at admission. Admission diagnosis, APACHEII, ICU length of stay (LOS) and mortality as well as ICU procedures (mechanical ventilation (MV) and sedation/analgesia (SA)) were also recorded. Presence of agitation was diagnosed according to the clinical judgment of the intensivist responsible for the patient. Statistical analysis was performed using SPSS 13.0. Significance level $p < 0.05$.

RESULTS. A total of 471 patients (66.9% males; mean age 58.9±17.6 y/o) were admitted due to medical (52.2%), post-surgical (38.4%) or traumatic (7.4%) cause with a mean APACHEII of 13.2±8.3 (range 0–44). Seventy-nine (16.7%) and 21 patients (4.4%) had previous history of alcohol and drug abuse respectively. Mean ICU LOS was 138.5±199.0 hours (range 1–1604). Two hundred and fortyfour patients (51.8%) were mechanically ventilated for a mean time of 114.7 ± 190.7 hours and 227 (48.2%) received continuous sedation and/or analgesia (mean time 88.5±128.6 and 132.1±187.0 hours respectively). Fifty-eight (12.3%) patients did not survive ICU. Agitation incidence was 26.7/1000 ICU days (n=70) and was diagnosed at a mean of 70.3±103.5 hours after ICU admission. Agitated patients had longer ICU LOS (260.2±291.6 versus 107.9±157.6; $p < 0.001$); duration of MV (190.6±227.2 versus 73.9±136.0; $p < 0.001$) and time under sedation (118.6±161.1 versus 59.5±98.5; $p < 0.012$) than non-agitated ones. Previous history of alcohol abuse (p=0.001), sedation time (p=0.083) and the use of midazolam (p=0.001), propofol (p=0.001), morphine chloride (p=0.004) or fentanyl (p=0.03) were associated with agitation in the univariate analysis. Using a backward regression multivariate model previous history of alcohol abuse (OR 3.45; 95%CI: 1.48 to 8.01) and sedo-analgesia with midazolam (OR 3.29 95%CI 1.42 to 7.64) profofol (OR 5.79; 95%CI: 2.42 to 13.89) or fentanyl (OR 2.87; 95%CI: 1.02 to 8.07) were identified as independent predictive factors of agitation. (Hosmer and Lemshow test p=0.36).

CONCLUSION. Agitation is a frequent complication in ICU patients. Its development can be related to patient characteristics but also to certain ICU interventions such as the sedation and analgesia practice.

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FACTORS ASSOCIATED WITH MORTALITY IN PATIENTS WITH ALI/ARDS UNDERGOING MECHANICAL VENTILATION: A MULTIVARIATE ANALYSIS

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INTRODUCTION. The outcome of ALI/ARDS patients can be related to different factors. Several severity scores and gas exchange parameters have been proposed as predictors of mortality in this kind of patients. The oxygenation index (OI) has been widely used in the pediatric field, but it is not always considered in adult intensive care units (ICU). Our objective was to evaluate the early predictive variables including OI as mortality predictor in ALI/ARDS patients who underwent mechanical ventilation (MV).

METHODS. All consecutive patients receiving MV whose PaO2/FiO2 ratio on admission was less than 300 mmHg between September 2006 and September 2007 were included. Age, APACHE II, SOFA, gas exchange, mean airway pressure, PEEP level were obtained. PaO2/FiO2 ratio and OI were calculated. These indicators were determined during the first 48 hours. ICU mortality was recorded. Numeric variables were compared with U Mann-Whitney test. In the univariate analysis the risk of mortality between different variables was determined. The significant variables ($p < 0.05$) were included in a backward stepwise multiple logistic-regression analysis. Results are expressed using odds ratio (OR) with 95% CI.

RESULTS. One hundred twenty one patients were studied. Age, APACHE II and SOFA were: 64±18; 20±7 and 8.5±3.4, respectively. ICU overall mortality was 11%. The main factors independently associated with increased mortality were: OI at the second day (OR: 3.4; 95% CI: 1.06–10.96; p=0.04); PaCO2 at the second day (OR: 1.4; 95% CI: 1.05–1.83; p=0.02); APACHE II on admission (OR: 1.23; 95% CI: 1.06–1.43; p=0.008) and PaO2/FiO2 ratio at the second day (OR: 1.02; 95% CI: 1.00–1.04; p=0.01).

CONCLUSION. The oxygenation index at the second day was a good mortality predictor when it was compared with other variables of interest. We consider that OI could be included in the respiratory monitoring of ALI/ARDS patients undergoing MV in adult ICU.

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CLINICAL CHARACTERISTICS OF SURGICALLY TRACHEOSTOMIZED PATIENTS IN A GENERAL ICU

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INTRODUCTION. Tracheostomy is commonly performed in critically ill patients. About 10% of critically ill patients who require mechanical ventilation have a tracheostomy. However, there are several questions unanswered concerning this procedure, including in whom and when it is indicated, or what is the outcome of tracheostomized patients. The aim of this study was to describe indications, time of tracheostomy and the outcome of tracheostomized patients in a general ICU.

METHODS. Prospective, observational cohort study. All consecutive patients submitted for tracheostomy in a general adult university ICU were included. For each patient the following informations were collected: demographic data, diagnosis at admission, APACHE II score, time and tracheostomy reason indication. According to the timing of tracheostomy, subjects were classified as early group (< or = 10 days) or late group (> 10 days). Variables were expressed in frequencies and means. Student's t test was used to compare means and $p < 0.05$ was considered significant.

RESULTS. A total of 139 patients (73 men) were included; mean age was 63±16 years and APACHE II score was 20.7±9.5. Patients were classified at admission in clinical (n=98; 70.5%), neurological (n=32; 23%), surgical (n=8; 5.7%) and trauma (n=1; 0.7%). Tracheostomy was mostly indicated due to respiratory (n=74, 53.2%, weaning failure, prolonged mechanical ventilation) and neurological (n=65, 46.7%, ischemic and hemorrhagic stroke) reasons. There were no differences between respiratory and neurological indications for age (63±14 yrs vs. 63±18 yrs), APACHE II score (21±12 vs. 20±6) and hospital mortality rates (41.8% vs. 41.5%). The Glasgow coma scale (GCS) was lower in neurological patients (7.7±3.0 vs. 11.5±3.5; $p < 0.001$). There were no significant differences between late (n=112, 81%) and early (n=27, 19%) groups for age (63±15 yrs vs. 65±19 yrs), APACHE II score (21±10 vs. 18±7; p=0.084), GCS (9.9±3.7 vs. 8.8±3.9; p=0.173) or discharge hospital rates (57.5% vs. 61.5%; p=0.878).

CONCLUSION. Independently of timing and/or indications, tracheostomy has similar morbi-mortality rates.

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0647

IS EVIDENCE BASED MEDICINE USED ON THE INTENSIVE CARE UNIT? A SURVEY

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INTRODUCTION. Intensive care clinicians rely on published evidence to choose interventions that are appropriate for their patients. This evidence has been incorporated into guidelines and bundles extending from local to international level. Examples being the Surviving Sepsis Campaign [1] and the Saving Lives Campaign [2]. The use of this evidence, with increased use of protocols should ensure that effective interventions are uniformly used for all appropriate patients between different intensive care units, and that clinicians should believe that the therapies they choose are beneficial. We wanted to investigate which interventions clinicians commonly used, and which of these were perceived by the same clinicians to be beneficial.

METHODS. We surveyed delegates at an international meeting. We asked all participants to complete a questionnaire with 24 commonly used, and much published interventions and we asked whether they believed an intervention was effective in reducing patient mortality and intensive care stay, and whether they used that particular intervention.

RESULTS. Of 214 attendees, we took the 80 responses from intensive care clinicians. There was a huge range in frequency of use of each intervention, from 87% to 12% across all 24 interventions. The most used intervention was low molecular weight heparin for thromboprophylaxis (87%). Another, stress ulcer prophylaxis, where appropriate, was only used by 70%. We also compared clinicians who believed an intervention to be beneficial and those who use it. Of the 24 interventions, 20 were perceived to be ineffective and yet were routinely used. 3 interventions were thought to be effective in reducing mortality, but were not commonly used.

CONCLUSION. These results suggest that not only do a significant number of clinicians use interventions that they perceive to be of little benefit, but also many interventions fall into this category. Conversely there are a small number of interventions that are believed to be helpful, but are infrequently used. It remains unclear why particular interventions are used in intensive care units. It is likely that the clinicians are significantly influenced by factors other than perceived patient benefit such as established local practice, national and international guidelines, care bundles and resource availability.

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CHARACTERISTICS AND OUTCOMES OF INTERHOSPITAL TRANSFER PATIENTS ADMITTED TO A TERTIARY CARE INTENSIVE CARE UNIT

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INTRODUCTION. Literature describes a large number of interhospital transferred patients (TP) admitted to the intensive care unit (ICU) of tertiary care referral centres. This specific cohort of ICU patients is known to be more severely ill as compared to ICU non-transferred patients (non-TP). However, in our university hospital, no data dealing on this topic were available. The current study aimed to assess the characteristics, organ failure and outcomes of TP vs. non-TP.

METHODS. A prospective observational cohort study was performed at the ICU of a 1062-bed tertiary care referral centre in Belgium. All consecutive adult patients admitted to the medical and surgical ICU from Sept 15th 2007 through Dec 15th 2007 were included. Demographics, APACHE II, diagnosis, ICU and hospital length of stay (LOS), and outcomes were gathered per patient. Severity of organ failure was assessed by the SOFA score. Data are represented as numbers (%) or as mean ± standard deviation. Statistical analysis was performed using Mann-Whitney U or Fishers' Exact tests. Significance was accepted when $P<0.05$.

RESULTS. During the study period, 500 non-TP and 85 TP were analysed. Main patient characteristics were similar between both non-TP vs. TP (age, 56±17 vs. 57±17 years, P=0.67; female sex 41% vs. 39%, P=0.72; APACHE II 16±8 vs. 17±9, P=0.42; medical/surgical admission, 48%/52% vs. 49%/51%, P=0.64). In 67% of transfers, the main reason for referral was the need for specific surgical procedures (neurosurgery and interventional radiology) or ICU expertise (24% of referrals). General condition of TP was better than non-TP as demonstrated by blank history, less cancer, and less end-stage renal failure ($P<0.001$; P=0.02 and P=0.006). During ICU-stay, TP more frequently needed respiratory support ($P<0.001$), vaso-active and sedative medication (P=0.01, and $P<0.001$), and had higher mean SOFA score (5±4 vs. 4±4, P=0.03); however, no difference was found in need for dialysis (P=0.47). The latter finding could be probably explained by a higher number of TP on DNR-code while in the ICU (15% vs. 6%, P=0.007). A trend towards higher admission rates during the weekend was observed for TP vs. non-TP (34% vs. 24%, P=0.06), respectively. Among the TP-group, higher ICU re-admissions rates (18% vs. 10%, P=0.03), longer ICU-LOS (9±11 vs. 5±7 days, $P<0.01$), and increased ICU-mortality (17% vs. 9%, P=0.03) was observed when compared to the non-TP-group.

CONCLUSION. In our ICU, TP were found to be more severely ill, to have worse prognosis and poorer outcomes than non-TP. Nevertheless, TP had similar age and severity of illness upon admission, and had less pre-existing co-morbidities.

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INVESTIGATION OF PROGNOSTIC FACTORS ASSOCIATED WITH ACUTE HOSPITAL MORTALITY FOR ADMISSIONS TO ADULT, GENERAL INTENSIVE CARE UNITS IN ENGLAND, WALES AND NORTHERN IRELAND WITH HAEMATOLOGICAL MALIGNANCY

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INTRODUCTION. Patients with haematological malignancy admitted to intensive care units (ICU) have a high mortality. Adverse prognostic factors include the number of organ failures, mechanical ventilation and previous bone marrow transplantation[1,2]. This study investigates casemix and outcome data and explores the association between admission characteristics and acute hospital mortality of such admissions in England, Wales and Northern Ireland.

METHODS. A secondary analysis of the ICNARC Case Mix Programme Database was conducted. Admissions to 178 adult, general ICUs in England, Wales and Northern Ireland between 1995 and 2007 were included. Admissions were selected for analysis if they had haematological malignancy as a primary or secondary reason for admission or as a reason for admission in their past medical history. An analysis of case mix and outcome was performed on these admissions. Multiple logistic regression analysis was used to analyse the effect of admission variables on acute hospital mortality. Admission variables were selected a priori.

RESULTS. There were 7689 eligible admissions. The mean (SD) APACHE II score on admission was 24.4 (7.9). ICU mortality was 43.1% (3312 deaths) and acute hospital mortality was 59.2% (4239 deaths). ICU and acute hospital mortality increased with the number of organ failures on admission. Admission characteristics associated with hospital mortality in patients admitted with a primary or secondary diagnosis of haematological malignancy (2980 patients) were age, previous bone marrow transplant, Hodgkin's lymphoma, length of hospital stay prior to admission, tachycardia, tachypnoea, GCS < 13, sedation, P/F ratio < 200 mmHg, acidaemia, oliguria, hyponatraemia, and uraemia. Factors associated with acute hospital mortality in patients with a haematological malignancy in their past medical history (4361 patients) were age, severe sepsis, length of hospital stay prior to admission, hypotension, tachycardia, tachypnoea, P/F ratio < 100 mmHg, low GCS, oliguria, sedation, mechanical ventilation, uraemia, serum creatinine below 0.6 μmol l–1, hypo- or hypernatraemia, acidaemia, alkalaemia and anaemia.

CONCLUSION. Acute hospital mortality of admissions to ICUs in England, Wales and Northern Ireland with haematological malignancy is nearly double that of other ICU admissions. Mortality increases with the number of failing organs on admission to ICU, and as the hospital length of stay before ICU admission increases.

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ETIOLOGIES, RISK FACTORS AND OUTCOME OF ACUTE RENAL FAILURE IN CRITICALLY ILL OBSTETRICS PATIENTS

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INTRODUCTION. Acute renal failure (ARF) is a serious complication of pregnancy. It is considered as an independent mortality risk factor in the intensive care unit (ICU) and associated with an increased mortality. The aim of this study was to determine the etiologies and to identify risk factors and outcome of peripartum ARF.

METHODS. An open prospective observational cohort study in a multidisciplinary ICU. Demographic and obstetric management (transfusion, cesarean section, hysterectomy, anesthetic complications, etc.) data were collected and analyzed.

ARF was defined as serum creatinine ≥ 100 μmol/l and/or oliguria <150 ml/8 hours or < 500 ml/day and/or doubling of baseline serum creatinine levels. Generalistic scoring systems (SAPS II, APACHE II, APACHE III) and organ dysfunction scoring systems were calculated at admission and on a daily basis. Data were computed on SPSS 11.5 XP-Windows compatible. Results were expressed as means ± standard deviation. Statistical analysis was based on the chi-squared test and Student t test corrected by the Fisher exact test.

RESULTS. Between January 1996 and December 2003, 541 obstetrics patients were admited to our ICU. The mean age was 31.2 ± 5.9 years; mean term was 34.7 ± 4.5 weeks. Pre-eclampsia, eclampsia and peripartum haemorrage were the leading causes associated with ARF. Univariate analysis found that uterine atonia, transfusion, multiple pregnancy and vaginal delivery were significantly associated with ARF, whereas cesarean section showed an odds ratio (OR) = 0.455. Multiple regression analysis retained only transfusion prior to ICU hospitalization as significantly associated with ARF. Oliguria and the level of renal failure are predicting factors of mortality.

Overall mortality was 10.4% (n = 57). ARF was noticed in 68 patients, with a mortality of 33.8% (n = 23). The relative risk (RR) of mortality when patients developed ARF was 4.7 with an OR of 6.6. Mean scores for patients with and without ARF were respectively: 41.1 ± 20.9 and 21.6 ± 13.7 for SAPS II; 16 ± 8 and 7.5 ± 6 for APACHE II and 63.3 ± 31.6 and 24.4 ± 23.8 for APACHE III ($P < 0.01$ for all scores). Renal failure was usually associated with at least another organ dysfunction as demonstrated by mean SOFA at day 1 (9.3 ± 4.5) whereas without ARF it was 3.7 ± 3 ($P < 0.001$).

CONCLUSION. ARF is associated with high mortality (> 30%). Aggressive treatment and prevention of renal failure is necessary to improve prognosis.

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OBSTETRIC ADMISSIONS TO AN INTENSIVE CARE UNIT

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INTRODUCTION. Complications of pregnancy may necessitate admission to an Intensive Care facility. Homerton University Hospital is situated in a deprived inner city area. We have previously recorded details of 144 women admitted to the Intensive Care Unit from 1989–1993 (0.75% of deliveries).

METHODS. We conducted a retrospective case-note study of obstetric patients admitted to the Intensive Care Unit from January 1994 to December 2005.

RESULTS. There were 47952 deliveries over the 12-year period of study. There were 175 obstetric admissions to the Intensive Care Unit. (0.36% of deliveries). Seventy percent of admissions were following operative delivery. Unlike our previous case-note study there was an increased proportion of admissions due to haemorrhage and a decreased rate of admissions associated with pre-eclampsia or hypertensive disease of pregnancy. There was one ICU admission as a consequence of pulmonary thromboembolism.

There was one maternal death in this 12-year period compared to 3 maternal deaths in our earlier report. This maternal death was associated with life-threatening coagulopathy.

CONCLUSION. The national triennial Confidential Enquiries into Maternal and Child Health (CEMACH) identify thrombosis and thromboembolism, pre-eclampsia and eclampsia, amniotic fluid embolism or haemorrhage as the commonest causes of direct maternal death in the United Kingdom. These do not represent the commonest causes for obstetric admission to our Intensive Care Unit.

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0652

FRESH FROZEN PLASMA TRANSFUSION IN CRITICALLY ILL PATIENTS

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INTRODUCTION. The use of fresh frozen plasma (FFP) is increasing. Over 4 million units in the UK and USA are transfused each year. Despite comprehensive guidelines as many as half of all transfusions in the critically ill may be inappropriate (1). FFP transfusion in critcal care is associated with significant morbidity, including an increased risk of infection (2) and Transfusion Related Acute Lung Injury (3). Conventional coagulation assays including International Normalized Ratio (INR) are often used to guide FFP transfusion, however a moderately deranged INR (<1.9) is not an accurate predictor of bleeding. Furthermore the use of FFP prophylaxis prior to invasive procedures in critically ill patients has been called into question (4).

METHODS. This was a retrospective audit of all FFP transfusions administered to patients in a UK District General Hospital ICU over a period of one year. Indications for transfusion and the volume of FFP administered in each transfusion were documented. In order to gauge thresholds for transfusion INR pre-transfusion was recorded.

RESULTS. Approximately 10% of all ICU admissions received a FFP transfusion. A total of 337 units were administered in 104 separate transfusions. Indications were varied, including correction of coagulopathy in actively bleeding patients, prophylaxis for invasive procedures (including epidurals and central venous catheters) and to correct coagulopathy in patients without any apparent bleeding. In 39% of transfusions the pre-transfusion INR was less than 1.9. At least 23% of transfusions were sub-therapeutic, using 2 units (approximately 400ml) or less.

CONCLUSION. A significant proportion of FFP administration is inappropriate. Administration to patients with mildly deranged coagulation assays is common. Transfusion is unlikely to be beneficial in these patients in the absence of active bleeding.
In addition a large number of FFP transfusions use sub-therapeutic doses - prominent guidelines suggest volumes of 12–15 ml/kg (4).
It is important to carefully assess the indications for FFP administration as transfusion is associated with significant adverse effects. Further education is needed.

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0653

PROGNOSTIC IMPLICATIONS OF LIVER DYSFUNCTION IN SEPSIS

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INTRODUCTION. Multiple organ failure is the main reason of mortality in sepsis. Liver dysfunction may be caused by sepsis and contributes for a worse outcome. Our objective was to evaluate the prognostic implications of liver dysfunction assessed by the Sequential Organ Failure Assessment (SOFA) score in patients with sepsis at ICU admission.

METHODS. Retrospective observational study in a 24-bed ICU of a private tertiary hospital from Jan 2007 to Jul 2007. We selected patients $\geq$ 18y with diagnosis of sepsis according to the ACCP/SCCM criteria (1992) at ICU admission. Data were recovered from the ICU data bank. Liver dysfunction was defined as the presence of hepatic SOFA score $\geq$ 1 in the first ICU-day. Univariate analysis was used to determine the differences of ICU-mortality rate, acute respiratory distress syndrome (ARDS) incidence, use of mechanical ventilation, hemodialysis, and hemotransfusion in patients with and without liver dysfunction. Multivariate regression analysis was used to determine the impact of each component of SOFA score in ICU-mortality. A p value.

RESULTS. During the period 775 patients were admitted in the ICU and 236 (30.5%) presented sepsis at admission. Liver dysfunction was present in 11.9% in the first ICU-day. Patients with liver dysfunction had greater total SOFA score at admission (8 vs 3, $p < 0.001$), developed more ARDS (46.4% vs 19.7%, p=0.002), required more hemodialysis (50% vs 20.2%, p=0.001) and hemotransfusion (42.9% vs 19.2%, p=0.005), and had higher ICU-mortality rate (39.3% vs 16.8%, p=0.005) than those without liver dysfunction. However, multivariate regression analysis revealed that hepatic (OR 1.8 [95% CI, 0.66–4.87]) and hematologic (OR 1.62 [95% CI, 0.68–3.83]) variables included in the first ICU-day SOFA score were not independently associated with ICU-mortality.

CONCLUSION. Liver dysfunction at ICU admission in septic patients was associated with a higher mortality rate and more organ failures according univariate analysis. Nonetheless, liver dysfunction evaluated by SOFA score was not independently associated with ICU mortality by multivariate regression analysis.

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0654

THE USE OF HYPOTHERMIA AFTER CARDIAC ARREST IN CROATIA

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INTRODUCTION. The use of mild therapeutic hypothermia (MTH) has been shown to improve survival and neurological outcome of comatose survivors who recovered spontaneous circulation after cardiac arrest. Although the evidence supporting the method is strong and it has entered the guidelines for resuscitation, implementation of this method is still low: according to recently published data, 87% of physicians and 76% of German ICUs did not use the method. In this survey we investigated current implementation of MTH in Croatia.

METHODS. A questionnaire was created and served as basis for a structured interview. A list of all Croatian hospitals was obtained from the Croatian health ministry. All hospitals were contacted by phone or personal visits and interviews were lead in December 2007.

RESULTS. There are 24 general hospitals and 8 university hospitals in an we conducted the interview in all but two. In those 30 hospitals, there are 33 ICUs admitting patients after cardiac arrest: 15 mixed surgical/medical, 11 coronary care units and 7 general medical ICUs. Only 9% ICUs used MTH as standard method, all in university hospitals. Ice cold infusions and ice packs in combination are methods of cooling in all three. Of those that do not use the method 10% are planning to start using it soon, 7% are not aware of the method, 20% claim it is technically too difficult, 7% claim it is too costly and 7% need more proof of efficiency. Most ICUs (48%) gave no reason for not using the method.

CONCLUSION. Even with the ICUs planning to start using MTH after cardiac arrest, it's implementation in is unacceptably low. The reasons given for not using it suggest lack of knowledge and a nationwide program promoting the method and its benefits could be the best way for improving the implementation in near future.

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Poster Sessions
ALI in the ICU: Diagnosis, treatment, outcome: 0655–0664

0655

A NATIONAL SURVEY STUDY ON THE PRACTICE OF DIAGNOSING ACUTE LUNG INJURY

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INTRODUCTION. ALI and ARDS are suggested to be often misdiagnosed, possibly because of disagreement with the presently used consensus criteria for ALI/ARDS. We determined which factors are considered important by physicians when diagnosing ALI/ARDS at Intensive Care Units (ICU) in the Netherlands.

METHODS. A survey was held among ICU-physicians using vignettes and a questionnaire. In the vignettes, 7 different factors considered important for diagnosing ALI were dichotomized: Pa02/FiO2 ratio (< 250 vs > 350 mmHg) – level of PEEP (15 cm H2O vs. 5 cm H2O) – pulmonary artery wedge pressure (< 18 vs. > 20 mmHg) – chest x-ray (CXR) (abnormalities consistent with ALI vs. no abnormalities) – lung compliance (30 vs. 60 ml/kg) – predisposing factor for ALI/ARDS (sepsis vs. vascular surgery) – history of heart failure (absent vs. present). Analysis of the vignettes was done by conjoint analysis (SPSS 15.0). Preferences of factor levels were analyzed by a logistic linear model. Data are presented as odds ratio (OR) with 95% confidence interval (CI). An OR > 1 means the factor is in favor of diagnosing ALI/ARDS. Questionnaires, including ten clinical factors physicians might use to diagnose ALI/ARDS, were measured with a Visual Analogue Scale (VAS). Data are presented as mean with SE, statistics Anova Analysis (P<0.05 statistical significant).

RESULTS. Hundred–one questionnaires from 30 hospitals were returned (response rate 42%). Odds ratios were as follows: Pa02/FiO2 ratio < 250 mmHg: OR 7.0 [95%CI 5.4 to 9.], high PEEP (15 cmH2O): OR 4.1 [95%CI 3.2 to 5.3], low wedge pressure (< 18 mmHg): OR 3.9 [95%CI 3.1 to 4.9], CXR abnormalities consistent with ALI: OR 1.3 [95%CI 1.1 to 1.3], low compliance of 30 ml/kg: OR 1.3 [95% CI 1.1 to 1.4], the presence of a risk factor for ALI (sepsis): OR 1.0 [95%CI 0.8 to 1.3], the absence of heart failure: OR 1.2 [95%CI 0.9 to 1.5]. The ten statements measured with the VAS showed that physicians form anesthesiology origin took hemodynamic variables more often into account when considering ALI diagnosis compared to physicians from medicine origin (valve dysfunction (52%±4.8 vs 33%±3.4 $p < 0.04$) and E/A ratio (38%±4.9 vs 26%±3.0 $p < 0.01$).

CONCLUSION. Dutch ICU physicians consider PEEP important when considering the diagnosis ALI. Implementation of PEEP in the definition is needed. Clinical risk or negative factors for ALI/ARDS, as presently required in the NAECC criteria, are modestly used for diagnosing ALI/ARDS.

0656

EARLY PREDICTION OF PROLONGED MECHANICAL VENTILATION IN CRITICALLY ILL PATIENTS. A PROSPECTIVE MULTICENTER COHORT STUDY. PRELIMINARY RESULTS

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INTRODUCTION. The purpose of this study was to identify early predictors of prolonged mechanical ventilation (≥7 days) in critically ill patients.

METHODS. Prospective, multicenter, cohort study. Thirteen participating medical/surgical ICU. Population: adult critically ill patients mechanically ventilated > 24 hours were enrolled. Exclusion criteria: patients < 18 years old and thermally injured patients. Within the first 24 hours of mechanical ventilation were obtained: 1. demographic variables, 2. variables related to the acute process and 3. variables related to the basal status (co-morbidity and functional activity).

RESULTS. Patients included: 592. Fifty one percent (n: 304) were ventilated ≥7 days. Men: 66,7%. Mean age: 63,1±16,1 years. Diagnosis: Medical: 63% (n: 364), Postoperative: 27% (n: 162), Trauma 8% (n: 47), Acute Coronary Syndrome: 2% (n:11). Mean APACHE II: 20,6±7,3. Mean SOFA: 8,2±3,8. Length of mechanical ventilation (median): 7 days (r: 0–85). Mortality in ICU was 27,9% (n: 165). Seventy five patients (12,7%) were undergone to non-invasive mechanical ventilation prior to endotracheal intubation. Univariate analysis: Total SOFA score was higher in patients ventilated ≥7 days (p=.001). Co-morbidity and functional activity index show no differences. A logistic regression analysis identified total SOFA score (OR: 1,1, IC 95%: 1,05–1,15 p= .001) and non-invasive mechanical ventilation failure (OR: 2,2 IC 95%: 1,3–3,7 p= .003) as independent predictive variables for long-term mechanical ventilation.

CONCLUSION. We cannot draw definite conclusions of this preliminary report. However, an interesting finding is the ability of prediction for those variables related to the acute process without predictive ability of other variables related to the basal status.

0657

TREATMENT OF ACUTE RESPIRATORY FAILURE IN FINNISH ICU'S (FINNALI), FOR FINNALI-STUDYGROUP

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INTRODUCTION. Recommendations of ventilation with low tidal volumes has been poorly adopted in clinical practice. We evaluated the compliance of lung protective ventilatory principles in Finnish ICU's.

METHODS. Prospective, cohort study of acute respiratory failure (ARF) in 25 Finnish ICU's during 8 weeks (April 16-June 10 2007). ARF was defined with the need of either invasive or non-invasive positive pressure airway for over 6 hours. The National database was used for data collection.

RESULTS. 2670 ICU admissions were screened. Ventilatory support was needed in 1319 admissions (49%). 958 patients fulfilled our criteria of ARF. 775 (81%) were ventilated invasively at admission and their hospital mortality was 22.6%.

TABLE 1 MAIN CHARACTERISTICS OF THE PATIENTS, MEDIAN (IQR), N (%)

	Survivors	Nonsurvivors	P-value
Number of patients	600	175	
SAPSII	39 (29,51)	60 (49,71)	<0.001
PaO2/FiO2-ratio at admission	38 (27,49)	30 (19,41)	<0.001
Spontaneous triggering	494 (82)	137 (78)	0.103
TV/predicted body weight	8.7 (7.6,9.9)	8.5 (7.6,9.9)	0.738
Plateau pressure	19 (16,22)	20 (16,24)	0.062
PEEP	6.0 (5.0,8.0)	6.0 (5.0,8.0)	0.612
Static compliance	48 (37,61)	38 (32,53)	<0.01
ICU LOS	3.2 (1.7,6.6)	3.1 (1.5,7.4)	0.589

CONCLUSION. Most patients were treated with invasive mechanical ventilation and with a ventilatory mode using spontaneous triggering. Tidal volumes were larger than recommended. However, tidal volume was not associated to hospital mortality. Plateau pressures were lower than recommended. Overall mortality was lower than in recent ARF/ALI-studies.

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0658

INCIDENCE, PREDISPOSING FACTORS, AND OUTCOME OF ACUTE RESPIRATORY FAILURE IN FINNISH ICUS (FINNALI)

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INTRODUCTION. Incidence, predisposing factors and their impact on outcome of acute respiratory failure (ARF) has varied in previous studies. Knowledge of these variables is essential in the process of developing new therapies and planning the future resources of ICM.

METHODS. Prospective, cohort study of acute respiratory failure (ARF) patients treated in ICUs. ARF was defined as a need of any form of positive airway pressure. The National ICU quality database was used for data collection.

RESULTS. During 8 weeks (April 16 - June 10 2007), 2670 admissions were screened in 25 Finnish ICUs for the presence of ARF. Ventilatory support for more than 6 hours was needed in 1033 (39%) of ICU admissions in 958 patients. Population-based incidence for ARF was 120/100 000/year. ICU mortality was 12.3% and hospital mortality 23.8%.

TABLE 1 PREDISPOSING FACTORS AND THEIR IMPACT ON HOSPITAL MORTALITY

Predisposing factors	Prevalence (%)	OR for hospital mortality (95% CI)
Pneumonia	114 (11.9)	NS
Heart failure*	192 (20)	2.73 (1.90–3.94)
Sepsis*	136 (14.2)	2.25 (1.48–3.42)
Trauma	64 (6.7)	NS
Obesity (BMI > 35)	76 (7.9)	NS
Alcohol related disease (acute)	117 (12.2)	NS
Alcohol related disease (chronic)	126 (13.1)	NS

** Independent predictor for hospital mortality*

CONCLUSION. Acute heart failure and sepsis related to ARF predict increased hospital mortality.

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0659

AUDIT OF VENTILATION PRACTICE ON INTENSIVE CARE

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INTRODUCTION. Large tidal volume ventilation can exacerbate Acute Lung Injury (ALI) and Acute Respiratory Distress Syndrome (ARDS) (1). The ARDSNet study (2) found that ventilation with tidal volumes of 6 ml/kg ideal body weight (IBW), compared to 12 ml/kg IBW, reduced mortality. Our aim was to establish current ventilation practice on the Intensive Care Unit (ICU) of a large UK district general hospital and compare it to evidence based standards(2) with particular reference to tidal volume (TV). We also assessed whether patient demographics or diagnosis affected practice.

METHODS. This prospective audit between Oct and Dec 2006, included all patients aged 15 years or older admitted for invasive ventilation, excluding those with significant brain injuries. Data were collected from clinical examination, and review of nursing observations, medical notes and X-rays. IBW was calculated based on height according to the formulae (Male: IBW=50.0+0.91*(Height (cm)-152.4), Female: IBW=45.5+0.91*(Height(cm)-152.4)) (2).

RESULTS. 52 patients were included, 33 (63%) were male. Mean age was 59yrs (range 15–88). Only 1 patient had their weight measured accurately, 25 had estimated weights. None had their height recorded. 2649 ventilator hours of data were collected, 1044 hours Pressure Control (PC), 1565 hours Pressure Support (PS) and 33 hours Volume Control (VC) modes. The mean(Range) TV delivered with each mode of ventilation was: VC 7.8(6.5–14.7)ml/kg IBW, PC 8.2(3.2–16.3)ml/kg IBW, PS 8.9(2.6–22.5)ml/kg IBW. The differences between all three groups were statistically significant ($p < 0.0001$, ANOVA Single Factor). There was a wide range of TV delivered in all modalities. Mean TV of Male and Female patients were significantly different (Male=8.01ml/kg IBW, Female=9.72ml/kg IBW, $p < 0.0001$, Student's T test).

CONCLUSION. Patients in ICU were ventilated with TV in excess of current recommendations. Patients ventilated with PS received highest tidal volumes and had the widest variability. Over-ventilation was significantly increased in female patients, suggesting that the lower IBW of female patients was not taken into account when setting ventilator parameters. Over-ventilation of at-risk patient groups may contribute to the development of ALI. Ventilator guidelines involving the accurate measurement of patient heights are being introduced as a result of this audit.

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0660

MORTALITY RISK FACTORS IN PATIENTS THAT REQUIRE MECHANICAL VENTILATION IN A CRITICAL CARE UNIT OF A GENERAL UNIVERSITY HOSPITAL IN SOUTHERN BRAZIL

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INTRODUCTION. Patients that need mechanical ventilation (MV) have high mortality rates. In Latin America, there is limited knowledge about mortality risk factors in patients on MV. Identifying such factors may contribute to improve the survival of these patients. The objective of this study was to determine mortality risk factors in patients that required MV in the Intensive Care Unit (ICU) of a general university hospital in southern Brazil.

METHODS. Prospective cohort study of 1115 adult patients conducted between March 2004 and April 2007. Patients were included if they needed MV for at least 24 hours. Data were collected on each patient at the inclusion in the study and daily during the MV for up to 28 days. Several variables were studied, including age, gender, APACHE II score, medical or surgical patients, causes for the requirement of MV, organ dysfunction/failure developed prior to MV or/and during MV, ventilatory parameters, modes of MV, and duration of MV. A multivariate analysis using conditional logistic regression model was performed.

RESULTS. The MV frequency was 46%; the overall and specific mortality rates were 23% and 51%, respectively. The mean age (±SD) was 57±18 years; 52% were male; 69% were clinical patients; the mean APACHE II (±SD) score was 22±8.3; 93% were on invasive ventilation and the mean (±SD) duration of MV was 10±7.9 days. The variables independently associated with increased mortality, classified in two groups, were (1) conditions present at the beginning of MV: age (p=0.04), APACHE II score ($p < 0.001$), ALI/ARDS as cause of MV (p=0.04), and gastrointestinal failure (p=0.01); (2) conditions occurred during the course of MV: ALI/ARDS ($p < 0.001$), sepsis (0.007), renal ($p < 0.001$), cardiovascular (p=0.002), and hepatic failure (p=0.009), use of opioids (p=0.04) and vasoactive drugs ($p < 0.001$), and duration of MV ($p < 0.001$). It should be noted that ventilatory monitored variables included in the multivariate model were not associated with mortality.

CONCLUSION. Risk factors for mortality in 28 days after the beginning of MV were conditions present at the beginning of MV (age, APACHE II, ALI/ARDS as cause of MV, and gastrointestinal failure) and also conditions that occurred over the course of MV, including aspects related to patient management (ALI/ARDS, sepsis, renal, cardiovascular and hepatic failure, use of opioids and vasoactive drugs, and duration of MV). The knowledge of mortality risk factors in patients requiring MV may improve interventions that might decrease the poor outcome of these patients.

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0661

OUTCOME OF MECHANICAL VENTILATION OF COPD PATIENTS ON A GENERAL INTENSIVE CARE UNIT

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INTRODUCTION. COPD patients requiring mechanical ventilation are often met with a nihilism regarding their outcome, which can limit their admission to intensive care. We present data of COPD patients who were mechanical ventilated and compare their mortality to a general ITU population. We also analysed the subgroup of patients who needed mechanical ventilation after failed trial of NIV.

METHODS. Retrospective analysis of data retrieved from a large teaching hospital ITU admission database and hospital records from Jan 2006 – Aug 2007.Statistical significance was determined by Fisher's exact test.

RESULTS. 822 patients were ventilated in this period.63/822 (13%) had a primary diagnosis of COPD exacerbation requiring mechanical ventilation. Mortality was similar regardless of whether the admission was due to COPD exacerbation 22.2% (14/63) or any other pathology 22.9% (169/759) (NS*).
20% (13) of the COPD patients received mechanical ventilation after failed trial of NIV. In the failed NIV group 70% (9) patients survived and 30% (4) died (NS)
The patients who survived tended to be younger (mean age 61.5 vs. 67.2 years NS), had less severe acidosis (pH 7.21 vs. 7.14; NS), lower APACHE score (18.4 vs. 23.4, NS) and a shorter stay (9.4 vs. 10.5 days, NS) than the failed NIV patients who died. Preadmission spirometric estimation of COPD severity was available in a minority 46% (29) of patients. Mean FEV1 was 1.4 L –60% of predicted (Range 0.56 – 2.5 L).

TABLE 1

	Admissions to ITU (except COPD)	Patients with COPD requiring mechanical ventilation
Number of patients	759	63
Mean age (years)	56.3	65.5
Patients requiring mechanical ventilation n(%)	606 (80)	53 (84)
Deaths n (%)	168 (22.9)	14 (22.1)

CONCLUSION. Our study shows that patients with COPD exacerbations selected for mechanical ventilation had no worse mortality than patients ventilated for any other pathology. Mortality is not worse after a failed trial of NIV. Spirometric results are usually not available at the time of admission and patients with variable disease severities are ventilated. Criteria to select individuals suitable for ventilation may be beneficial and could be addressed in larger studies.

*NS - Non-Significant.

0662

PROGNOSTIC VALUE OF SURFACTANT PROTEIN D FOR THE ASSESSMENT OF ACUTE LUNG INJURY IN ICU MECHANICAL VENTILATED PATIENTS

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INTRODUCTION. Surfactant proteins are known to be an important factor influencing lung function and the changes in its activity may have a diagnostic and prognostic value in acute lung injury (ALI/VILI). Surfactant protein D can be found and measured in plasma and its increased plasma level in experimental studies indicates the damage of alveolar epithelial barrier with increased permeability and impaired gas exchange. The goal of the study is to evaluate the changes of surfactant protein D serum levels in ICU mechanically ventilated patients looking for possible correlations with the clinical outcome.

METHODS. With the approval of the university ethics committee 20 mechanically ventilated patients (12 male and 8 female, mean age 58 [23–76], SD±14,36) were enrolled in the study. Acute respiratory insufficiency was caused in 4 patients by the community acquired pneumonia (CAP), in 6 by severe sepsis and 5 patients were ventilated in postoperative period after transhiatal esophagectomy while 5 needed mechanical ventilation during unconsciousness caused by subarachnoid hemorrhage (SAH). Serum samples were taken on admission, than at 1,3 and 5 day of treatment and PCT (Brahms, Kryptor), CRP, WBC count, were evaluated. Clinical course was monitored using APACHE II score, SOFA score, PaO2/FiO2 ratio, the length of mechanical ventilation and the final result of the treatment.

RESULTS. Seven patients, 2 with SAH (brain death), 2 after esophagectomy and 3 with severe sepsis died. There were no difference in baseline serum surfactant protein D levels between survivors and patients who died. In days 1, 3 and 5 serum SP-D concentrations was lower in survivors compared with those who died. We found correlation between decreased serum SP-D concentration and improved oxygenation (PaO2/FiO2) as well as in clinical outcome.

CONCLUSION. These results demonstrate that remained elevated serum SP-D levels may be associated with worse clinical outcome and risk of death in mechanically ventilated patients. These observations indicate that surfactant protein D may be a valuable marker in prognosis of ALI/VILI but further studies are needed.

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PAO2/FIO2 RATIO AND OXYGENATION INDEX DURING 24 HOURS AT ADMISSION AS PREDICTORS OF MORTALITY IN PATIENTS WITH ALI/ARDS

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INTRODUCTION. There is evidence that PaO2/FiO2 ratio is able to predict mortality in patients with Acute Lung Injury/Acute Respiratory Distress Syndrome (ALI/ARDS) undergoing mechanical ventilation (MV). However, this ratio could be changed by positive end expiratory pressure (PEEP) application. In this setting, oxygenation index (OI) could be better than PaO2/FiO2 ratio to predict mortality because it includes mean airway pressure in the formula. Our endpoint was to compare PaO2/FiO2 ratio and OI obtained during the first 24 hours as a mortality predictor.

METHODS. All consecutive patients receiving MV whose PaO2/FiO2 ratio on admission was less than 300 mmHg between September 2006 and September 2007 were included. The worst value of PaO2/FiO2 ratio and OI during the first 24 hours, were obtained. Demographic data and severity of illness were assessed using U Mann-Whitney test. The area under the ROC curves (AUROC) for PaO2/FiO2 ratio and oxygenation index were compared using Hanley-McNeil test. Results are shown as mean ± SD. We considered $p < 0.05$ as statistically significant.

RESULTS. One hundred twenty one patients were studied. Age, APACHE II and SAPS II were: 64±18; 20±7 and 45±14, respectively.The overall mortality was 11%. The PaO2/FiO2 ratio and oxygenation index during the first 24 hours were different between survivors (n=108) and non-survivors (n=13): 220±78 versus 149±77 and 6.5±3.7 versus 12.8±11.5 ($p < 0.05$). Moreover, OI was better than PaO2/FiO2 ratio to predict mortality: AUROC: 0.73 (95% CI: 0.58–0.87) and AUROC: 0.22 (95% CI: 0.081–0.36) ($p < 0.001$) respectively.

CONCLUSION. The oxygenation index at 24 hours is more accurate to predict mortality than PaO2/FiO2 ratio in ALI/ARDS patients who underwent MV. The OI could be an early and easy method to predict outcome in this kind of patients.

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EMERGENCY TRACHEAL INTUBATION IN CRITICALLY ILL PATIENTES; STUDY OF 288 PATIENTS

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INTRODUCTION. The complication rate of intubation under elective conditions is low. On the other hand airway management of the critically ill patient often requires emergent intubation (EI) in the setting of hemodynamic failure.

We study the incidence of hemodynamic, airway complications and mortality associated with EI.

METHODS. Prospective clinical trial over a period of 12 months. Patients in cardiopulmonary arrest were excluded. We assesed: indication, hemodynamic and gasometric changes, complications, difficulty and mortality. Definitions: difficult EI when a intensive care last year resident or a staff intensivist couldn't intubate at the first attempt. Intubation associated mortality: as death that ocurred during or within 30 minutes of the procedure. Chi-square was used for statistical analysis.

RESULTS. n= 288 patients. Gender (m = 190, f=98), mean age = 56 (15–87). Location of intubation: emergency room: 28%, Intensive Care Unit 60%, other units 12%. Indications for EI: work of breathing 45%, low level of conciousness 39%, bad management of secretions 12,2%, self-extubation 2,1%, airway obstrucion 1,7%. Medications administered: Benzodiazepines and Opioids 75%; propofol 8%; Muscle relaxants: 70%. Attempts: First attempt 81%; Second 8,4%; third or successive 9%; 3 patients (1%) underwent emergency cricothyrotomy. Difficult intubation = 31 (10,88%). 220 patients were normotensive before EI (TAS>=90 mmHg)and 68 patients hypotensive. In the first group 73 patients developed hypotension and two died (0,9%). In the hypotensive group one patient died (1,4%). No significant differences in mortality between both group (p00,5). Hypoxemia postEI: 10% (28); esophageal intubation: 1,7% (5); selective bronchial intubation: 1,3% (4); bronchoaspiration: 1,3% (4): global mortality 1% (3).

CONCLUSION. Securing the airway is a vital procedure in the critically ill patient that in many ocassions has to be applied in an emergency situation. Hemodynamic failure arised as the most important cause of death associated to an EI. The previous hemodynamic profile is not a predictor of mortality.

GRANT ACKNOWLEDGEMENT. EI; emergency intubation.

0666

IS IT WORTHWHILE TO OFFER FULL TREATMENT AND ICU ADMISSION TO OCTOGENERIANS WITH ACUTE ABDOMINAL AORTIC ANEURYSM?

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INTRODUCTION. At the regional level we have an integrated system for the rapid transport and subsequent immediate treatment of acute abdominal aortic aneurysm (AAAA). Our strategy is to treat all patients unless they have a very poor performance score. As such, 95% receives full treatment. With the ageing of the population, an increasing proportion of octogenarians reaches the ICU. In view of the demand for health care resources, advanced age may be a factor to refrain from further treatment and ICU admission. The purpose of this study was to investigate whether this holds true for octogenarians suffering AAAA.

METHODS. All 271 patients with manifest AAAA admitted and treated between January 2000 and February 2008 were included in the study. Six of them died during the operation, the remaining 265 patients form the basis of this report. Acute AAA was defined as either acute non-ruptured (N=82) or ruptured (CT or laparotomy-proven, N=183). There were 228 men and 37 women with a mean age of 71.9 $\pm$ s.d. 7.8 years (range 54–88). 16% of the patients was 80 years of older (N=42). Open treatment was performed in 191 patients (72%) and endovascular treatment in 74 (28%). When divided in a younger (<80 years) and an older ($\geq$80 years) group, no differences were observed, except for more women in the older group.

RESULTS. The mean follow-up was 33.8 $\pm$ 30.4 months (including early deaths). Mean hospital length of stay was 17 $\pm$ 20 days for patients younger than 80 and 15 $\pm$ 17 days for patients older than 80 years of age. Fifty-two patients (20%) died during postoperative ICU and hospital stay. Kaplan Meier survival analysis revealed a significantly better survival for the younger either with a cut off at 75 years (log rank test $p < 0.001$) or 80 years ($p < 0.05$). Stratification based on urgency or type of treatment did not change the difference. Two-year actuarial survival was 72.1% for patients younger than 80 and 59.5% for those older than 80. At 5 years follow-up, these figures were 66.7 and 47.6%, respectively. Mean survival in patients older than 80 was 43.6 $\pm$ 7.2 months versus 65.4 $\pm$ 3.0 months in those younger than 80.

CONCLUSION. Our liberal strategy of treating patients with AAAA was associated with satisfactory short and long-term outcome, also for octogenarians. Even with a devastating event such as AAAA, a mean survival of more than 3.5 years can be achieved in octogenarians, while hospital length of stay is not prolonged compared to the younger, and natural history of disease would give a survival of virtually zero %. Assuming an integrated system for managing AAA is in place, advanced age is not a reason to deny patients surgery or ICU-admission.

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CRITICALLY-ILL PATIENTS WITH HEAT STROKE: A RETROSPECTIVE REVIEW OF A NATIONAL HEAT STROKE TREATMENT CENTRE

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INTRODUCTION. With global warming and the worldwide increase in heat waves, the threat of heat-related illness is escalating. We describe our experience in the management of heat stroke in a national heat stroke treatment centre.

METHODS. Retrospective observational study over the past 10 years of patients with heat stroke requiring intensive care, at a 1,600 bed tertiary-care hospital.

RESULTS. Between 1998 and 2007, a total of 147 patients were admitted to our institution with heat-related illness. Of these 35 (24%) were transferred to the intensive care unit (ICU). The majority were young, healthy males who had been involved in military training or sporting activities. The mean presenting temperature was 40.5 degrees Celsius, and the mean time to cooling was 60 minutes. Half of these patients were cooled in the body cooling unit (BCU). Organ dysfunction included neurologic impairment (80%), coagulopathy (44%), hypotension (22%) and respiratory failure requiring mechanical ventilation (11%). Most of the patients improved rapidly with cooling and supportive care. The median length of ICU stay was 2 days (range 1 to 12 days) and there was 1 (3%) mortality.

CONCLUSION. Exertional heat stroke is associated with multi-organ dysfunction that is generally rapidly reversible with aggressive cooling and supportive care. In our experience, early recognition and treatment in the BCU is associated with a favourable outcome.

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0667

NEUROTOXICITY INDUCED BY CEFEPIME : A RETROSPECTIVE REVIEW OF 51 CASES

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INTRODUCTION. A meta-analysis of trials comparing anti-pseudomonal beta-lactam antibiotics to treatment of severe hospitalar infections concluded that cefepime was associated with increased mortality compared with other beta-lactams. It was speculated that neurotoxicity induced by cefepime could be associated to it. The aim of our study was to review all cefepime-induced neurotoxicity cases published in medical literature. It was focused on predisposing factors and clinical characteristics.

METHODS. We have searched in the PubMed, Scielo and Lilacs databases for cefepime publications from 1998 to april of 2008. We selected the pertinent publications dealing with cefepime induced neurotoxicity. The main search term used was "cefepime", combined with one of the following: "encephalopathy", "neurotoxicity", "cerebral toxicity", "seizure", "status epilepticus" and "neuropsychiatric". Data about these articles were retrospectively analyzed.

RESULTS. The search retrieved 19 articles reporting a total of 51 patients (26 men), aged from 15 to 94 years old (mean = 63.6 years). Febrile neutropenia was the most frequent indication of cefepime treatment (23.5%) followed by pneumonia (21.5%) and urinary tract infection (13.7%). The dosage of cefepime ranged from 1–9g/day (mean: 3.7). Renal failure of varying degree and time of onset was present in almost all cases. Fifty-two percent of them have had ClCr < 15ml/min and 60% of these patients were in renal replacement therapy. The common neurologic symptoms reported were myoclonus (n= 27), confusion (n= 24), coma (n= 12), agitation (n= 10) and seizure (n= 9). About 70% of the patients had an encephalopathy-compatible EEG. Nonconvulsive status epilepticus developed in 3 men and 5 women, with a mean age of 62.6 (17.8) years, all of them had renal failure. The mean latency to develop symptoms was 6.5 days. The most common treatment reported was cefepime withdrawn, followed by starting antiepileptic therapy. The overall mortality was 30.2%.

CONCLUSION. Physicians should be aware of the potential neurotoxicity of cefepime. It can be related with increased mortality. When prescribing this drug, any neurologic change, such as myoclonus, confusion, coma, agitation and seizure, should be promptly considered the diagnosis of drug neurotoxicity. Population of concern are renal failure and elderly patients.

0668

HEMODYNAMIC AND RESPIRATORY CHARACTERISTICS AFTER BRAIN TUMOR SURGERY COMPARING EARLY AWAKENING TO SHORT TERM POSTOPERATIVE SEDATION

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INTRODUCTION. Intracerebral hematoma and major cerebral edema are the most feared complications after brain tumor surgery. Arterial hypertension is a wellknown risk factor for postoperative intracerebral hemorrhaghe, while hypoxia and arterial hypotension might exacerbate neuronal injury. Therefore, emergence from anesthesia for brain tumor surgery should guarantee stable systemic (cardiovascular as well as respiratory) parameters. This prospective study was performed to compare early postoperative systemic complications after emergence of anesthesia in pts awakened in the operating room at the end of surgery or on the ICU (within a max of 4 hours of ICU admission).

METHODS. Over a 2-years period, 142 pts scheduled for elective brain tumor surgery were randomised into early awakening (71pts) or postoperative short-term sedation with propofol (71pts). We analysed and compared the incidence of respiratory events (hypoxia defined as PaO2<90mmHg, hypercapnea defined as PaCO2 >46mmHg) and cardiovascular events (arterial pressure increase above 30% of baseline, systolic arterial pressure.

RESULTS. Patients who were awakened in the operating room revealed a 5.3% incidence of arterial hypoxia, while in 27.3% of them hypercapnea was observed. None of these pts developed respiratory depression necessitating reintubation. In late awakening pts, incidence of arterial hypoxia was 18%, while incidence of hypercapnea was 8.3%.

Analysis of cardiovascular complications revealed that no pt in the early awakening group developed postoperative arterial hypotension necessitating administration of vasopressors. In the late awakening group, 4.3% of pt revealed hypotensive values (2.9% necessitating the use of vasopressors). In the early awakening group, incidence of arterial hypertension (necessitating antihypertensive medication) was 14.3%, while for the postoperative short-term sedated pts, incidence of arterial hypertension (with antihypertensive medication) was 21.5%. We observed no difference in duration of postoperative ICU stay between both groups and no difference in incidence of major neurological complications (postoperative hemorrhaghe or cerebral edema).

CONCLUSION. Pts allowed to early awakening after brain tumor surgery revealed an increased incidence of hypercapnea, while pts submitted to postoperative short-term sedation with propofol appeared to be more vulnerable to arterial hypoxemia and especially to arterial hypertension. Therefore, both choices of anesthetic regimen require close hemodynamic and respiratory monitoring (and eventual treatment) in the early hours of ICU admission.

0669

ELEVATED SERUM LEVELS OF S100B PROTEIN CORRELATE WITH INTERLEUKIN-6 IN PATIENTS WITH HEMORRHAGIC SHOCK

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INTRODUCTION. Experimental hemorrhagic shock induces increased production of S100B protein, a marker of brain injury, associated with the severity of shock (1). Whether this increase is exclusively due to cerebral hypoperfusion or other factors also contribute to this increase, remains unclear. Inflammatory response also follows acute hemorrhage (2), and might have a role in the release of S100B. Thus, we investigated the relationship between serum S100B protein and IL-6, and their possible prognostic value in patients with hemorrhagic shock.

METHODS. Eighteen (12 men) patients with a mean age of 62±22 yr, undergoing emergency surgery to control hemorrhagic shock of various etiologies were included. None suffered previously from cerebral damage or neurological disease. Blood samples were taken for blood gas, lactate, IL-6, and S100B measurements on admission and over the next three days. Vital signs were recorded and severity of illness was assessed by the APACHE II score.

RESULTS. Initial values of serum S100B protein were increased (median 0.46 μg/l; interquartile range 0.16 ± 3.5) and were positively correlated with IL-6 ($r=0.8$, $p < 0.01$), lactate ($r=0.63$, $p < 0.01$), and hospital outcome ($r=0.5$, $p < 0.05$). For all data, there was a significant correlation between S100B levels and IL-6 ($r=0.46$, $p < 0.01$), lactate ($r=0.49$, $p < 0.01$) APACHE II score ($r=0.38$, $p < 0.01$) and outcome ($r=0.54$, $p < 0.01$). Mortality was 44%. Serum S100B and IL-6 concentrations on admission were significantly higher in nonsurvivors compared to survivors (3.7 ± 3.6 vs. 0.7±1.05 μg/l, $p < 0.01$ and 505 ± 409 vs. 138 ± 197 pg/ml, $p < 0.01$, respectively). By linear regression analysis APACHE II score was an independent predictor of outcome ($F=13.9$, $p < 0.01$).

CONCLUSION. Serum S100B protein is increased in patients with hemorrhagic shock and this increase correlates with IL-6, lactate, illness severity and outcome. These findings indicate that, except of a possible cerebral hypoperfusion, the release of S100B may be stimulated by other factors involving the inflammatory response and/or impaired tissue perfusion.

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0670

SURVEY ON USE OF EXTERNAL VENTRICULAR DRAINS (EVD) AND CEREBROSPINAL FLUID DRAINAGE (CSF) IN TRAUMATIC BRAIN INJURY (TBI)

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INTRODUCTION. The primary aim of this survey was to assess current practice on the use of EVD for monitoring intracranial pressure (ICP) and CSF drainage to treat raised ICP in TBI amongst all neurosciences centres in the United Kingdom.

METHODS. Electronic questionnaires were sent to the lead clinicians in 35 adult and paediatric neuro-intensive care and neurosurgical units. A copy of the questionairre was sent by post to all non-responders. The aim was to collect data regarding the type of ICP monitor used, frequency of use of EVD and CSF drainage including indications, contraindications and complications associated with their use.

RESULTS. Forty-eight completed questionaires were returned representing 31 neurosurgical and intensive care units. The response rates from the neurosurgeons and neuro-intensivists were 63% and 74% respectively. The number of severe head injuries managed per annum varied between units ranging from 50–150 cases. Sixteen percent of the units used EVD's routinely to monitor ICP, 17% reported never using this technique and the remaining 67% used it occasionally. Of the 16% who used EVD's to monitor ICP routinely only 60% used CSF drainage to treat raised ICP.

Eighty percent of the units agreed that CSF drainage had an important role in the management of raised ICP compared to 20% who thought that CSF drainage was of no value. Of those that considered CSF drainage beneficial 47% would consider it to treat raised ICP in the presence of hydrocephalus, accessible or patent ventricles compared to 53% who considered when maximal medical therapy failed to control ICP or if EVD was already in situ. Seventy four percent of the units drained CSF continuously compared to 17% who drained CSF intermittently. There was considerable variability in the use of CSF drainage in relation to second tier therapies such as barbiturate coma, craniectomy and therapeutic hypothermia. Forty-eight percent of the units used it before craniectomy, 41% before barbiturate coma and 11% before therapeutic hypothermia. The reported contraindications to the placement of ventricular drains in patients with head injury inlude:slit ventricles,coagulopathy,infection, midline shift, compound or penetrating injuries and mass lesions. The complications of CSF drainage that were reported include: blockage, infection, misplacement, displacement, bleeding and administration of drugs into EVD.

CONCLUSION. Though majority of the units agree that CSF drainage has got an important role in the management of ICP, there was lack of consensus on timing, indication and frequency of CSF drainage in relation to other second tier therapies.

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0671

AN 8-YEAR EXPERIENCE IN EXTERNAL VENTRICULAR DRAINAGE (EVD) IN A NEUROTRAUMA ICU

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INTRODUCTION. External ventricular drainage placement is a common practice in our ICU as a diagnostic and therapeutical technique. Our aim is to know the profile of patients admitted in the ICU requiring EVD, the incidence of observed complications and related risk factors.

METHODS. Observational study which includes all the patients admitted in a Neurotrauma ICU that required EVD placement due to any cause in a 8-year period (1999–2007). Collected data included demographic characteristics, prognosis scores (APACHE II and APACHE III), cause of admission, EVD placement indication, Glasgow Coma Scale pre and post EVD, complications, length of drainage, cause of withdrawal, incidence of infection and need for ventricular-perithoneal derivation. Cualitative variables are expressed as percentage an cuantitative variables as media ± SD or median and percentiles. Student's t and chi2 were used to compare medias depending on the kind of variable.A $p < 0.05$ was considered statistically significant.

RESULTS. The studied group includes 168 patients, 56% men, of 57 ± 17 year old in average. The most frequent cause of admission was subarachnoid hemorrhage (48.2%), with an APACHE II 20.69 ± 8.77 and APACHE III 66.48 ± 29.87. The main indication for EVD was hydrocephalia (92%). EVD were placed for 7 [4,12] days in average. Reasons for withdrawal were cessation of the cause of indication (41%) and exitus (38%). Infection was observed in 11%, being the most frequent complication, followed by hemorrhage. Despite of being infection more frequent in EVD placed in ICU than those placed in the operating room, no significative difference was observed. On the other hand, we could find that there were significative difference in the length of EVD placement between patients without infection and patients with infection (8.13 ± 6.56 vs 17.68 ± 16.88 days, $p < 0.05$). Over 50% of patients died during treatment. GCS 12 hours after EVD was 6±4, while survivors showed a GCS 12 hours after EVD of 11±3 (statistically significant). Around 19% required ventricular-perithoneal derivation placement, being more frequent in patients with higher cerebrospinal liquid debit (250.56 ± 109.35 vs 153.09 ± 130.92, $p < 0.05$).

CONCLUSION. In our experience, patients that required EVD showed high severity scores and mortality. The main indication for EVD placement was hydrocephalia. We observed very few complications related with EVD placement.

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CATATONIA IN THE INTENSIVE CARE UNIT

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INTRODUCTION. Catatonia is a syndrome characterized by mutism, posturing, negativism, staring, rigidity, and echophenomena. Catatonia has for long been considered to be associated with psychiatric disorders, but the syndrome is also known to be common in neurologic and general medical conditions. Several studies have estimated the incidence of catatonic syndromes in psychiatric and different medical settings, reporting varying results. Our aim was to estimate the frequency and presentation of the catatonic syndrome in the Intensive Care Unit (ICU) patients.

METHODS. A prospective observational study was carried out. All patients admitted in the ICU over a six-month period (from August 2007 to January 2008) were examined for signs of catatonia. Diagnosis of catatonia was made according to the criteria proposed by Taylor and Fink. Diagnoses, APACHE scores and previous medical and psychiatric history were recorded.

RESULTS. During the study period a total of 92 patients were admitted in the ICU. The mean age of the patients was 52.2±16.7 years. The mean APACHE score was 20.4±7.1 Four patients (4.3%) met Taylor and Fink's criteria for catatonic disorder. Diagnoses of these patients were multitrauma, respiratory infection (2 patients) and acute respiratory failure (Table 1). In all four patients lorazepam was administrated, which resulted in the resolution of the symptomatology in two cases.

TABLE 1

Patients	Age	APACHE score	Diagnosis	Psychiatric history
Patient 1	40	21	multitrauma	No
Patient 2	65	18	respiratory infection	No
Patient 3	72	24	respiratory infection	No
Patient 4	82	28	acute respiratory failure	Yes

CONCLUSION. The results of the study are only preliminary and should be seen with caution. The incidence of catatonia in the ICU may not differ from other medical settings and is lower than the reported incidence in psychiatric settings. Conclusions regarding the association of the catatonic syndrome with age, APACHE score and psychiatric history cannot be drawn due to the limited data.

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HYPOACTIVE DELIRIUM IN CRITICALLY ILL PATIENTS

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INTRODUCTION. Delirium is a complex neuropsychiatric syndrome which is common in all medical settings. It is characterized by cognitive impairment, disorientation and several psychotic symptoms, such as perceptual disturbances and paranoid ideation. Two motoric subtypes of delirium have been described, the hyperactive and hypoactive type. Our aim was to estimate the frequency and presentation of the hypoactive delirium in Intensive Care Unit (ICU) patients.

METHODS. All patients admitted in the ICU over a one year period (from January 2007 to January 2008) were examined for signs of delirium. Diagnosis was made according to ICD-10 criteria. The discrimination of clinical subtypes was made with the application of the criteria proposed by Liptzin and Levkoff.

RESULTS. Delirium was diagnosed in 74 patients. Hypoactive type was detected in 39 cases (52.7%), hyperactive type in 24 patients (32.4%), whereas the remaining 11 patients (14.9%) were considered to present mixed type of delirium. Differences between the three patient groups regarding age, sex and the underlying medical condition had not been recorded. Length of hospitalization and mortality were not statistically different in patient groups.

CONCLUSION. Hypoactive delirium may be the most common type in ICU patients. This may be clinically relevant because this subtype of delirium may go unrecognized and the treatment options are limited. Firm conclusions regarding the length of hospitalization and mortality of hypoactive delirium cannot be drawn at present due to the small study sample and further, larger studies are required.

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SAPS 3 VS TRISS ASSESSMENT IN A TRAUMATIC INTENSIVE CARE UNITY

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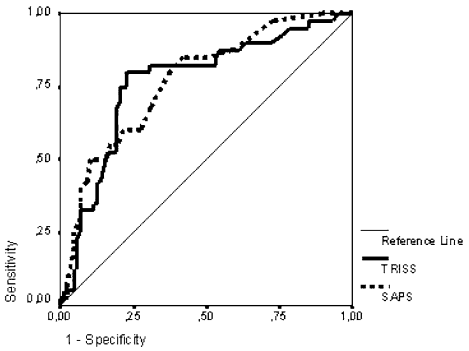
INTRODUCTION. General scores are validated using larges databases composed by heterogeneous patients groups, and it could lose accuracy when applied on some specific patient subgroups. SAPS 3 is a general score and our main purpose is evaluate whether it could be acceptable accurate in traumatic patients in comparison with TRISS.

METHODS. Prospective study, where were included all patients admitted consecutively in the ICU for eight months, in a total of 128 patients. We evaluated TRISS and SAPS 3 scores in all patients. Then, the database was analyzed using Pearson's correlation and ROC Curves to assess the scores performance.

RESULTS. The average ICU length of stay (LOS) on this cohort was 7.35 days (IC95% 6.29–8.41) and the mortality was 31.25%. Both scores had an acceptable performance on the ROC curve (Fig. 1), without difference between TRISS (AUC = 0.774) and SAPS 3 (AUC = 0.771). It was observed a level of Pearson's correlation of 0.452 between the scores, what was significant (p = 0.01).



CONCLUSION. Both scores showed a similar discriminating power to ICU mortality, besides a good correlation between then.

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A LINEAR MODEL PREDICTING LENGTH OF STAY OF TRAUMA PATIENTS IN THE INTENSIVE CARE UNIT

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INTRODUCTION. The aim of our study was to identify baseline clinical parameters which independently determine length of stay (LOS) of trauma patients in the intensive care unit (ICU).

METHODS. All trauma patients admitted to our general ICU during a 48-month period were prospectively enrolled in the study. Burn patients were excluded. Patients' data included: demographics, APACHE II score, Injury Severity Score (ISS), ICU LOS and outcome. ICU LOS was fitted as the dependent variable in linear regression models with various combinations of explanatory variables. Model fitting was tested with examination of residuals. Statistical significance level was set at $p < 0.05$.

RESULTS. One hundred fifty-two consecutive trauma patients (130 males and 22 females) were included in the study. Age (mean±SD) was 38.4±17.3 years, APACHE II score16.7±6.3, ISS 24.9±11.9, LOS 21.7±18.9 days. In univariable linear regression, LOS was significantly associated with age (beta coefficient=0.380, $p < 0.001$) and ISS (beta coefficient=0.414, p=0.001). Gender, APACHE II score at admission and the presence of head injury didn't show any significant association. In multiple linear regression, it was shown that a 10-year increase of age prolongs ICU LOS by 3.6 days ($p < 0.001$) and a 10-unit increase of ISS prolongs ICU LOS by 4.4 days ($p < 0.001$). Multivariable models adjusted for gender, APACHE II score at admission and the presence of head injury did not produce significantly different estimates.

CONCLUSION. Age and ISS are significant baseline predictors of ICU LOS in critically ill trauma patients. In our patient sample, a 10-year increase of age and a 10-unit increase of ISS prolonged ICU LOS by 3.6 and 4.4 days, respectively. APACHE II score at admission had no significant association with ICU LOS.

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FUNCTIONAL OUTCOME AFTER EMBOLIZATION IN PATIENTS WITH ISOLATED PELVIC FRACTURES

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INTRODUCTION. Angiographic embolization of bleeding pelvic vessels is increasingly used in patients with pelvic injuries. The application of angiography and embolisation isn't possible in every hospital because requires a specific local infrastructure. The aim of the study is to compare the functional outcome of patients with mayor traumatic pelvic fractures (MTPF) treated with embolization in comparison to not embolizated patients.

METHODS. Between January 2005 and September 2007 we collected 35 patients with mayor trauma with pelvic fractures not requiring embolization (Group 1) and 35 patients in which embolization was performed (Group 2). Exclusion criteria were age < 18 years, brain injury, patients with proximal femoral or sacro-lombar fractures. The mean age was 45.5 years (range 20–70 years).

We collected the Injury Severity Score (ISS) and SAPS II at admission in ICU. The fractures were assisted according to Burgess's score. In this score fracture patterns have been differentiated in two groups: 1) stable pelvic fractures (SPF):antero-posterior compression (APC) fractures type I and lateral compression (LC) fractures type I;2) unstable pelvic fractures (UPF):APC fractures type II and III, LC fractures type II and III and all vertical shear (VS) fractures. The follow-up was performed at 2(time 1), 4(time 2) and 6 months (time 3) from trauma. Functional outcome was evaluated with clinical assessment and questionnaire SF-36 of quality of life.

RESULTS. Mean ISS was 30 (range 28–32) in Group 1 and 40 (range 35–45) in Group 2. Mean SAPS II at admission was 34 (range 30–38) in Group 1 and 45 (range 43–48) in Group 2. Mean necessity of blood transfusion to obtain haemoglobin range of more or equal to 8 mg/dl was 10 unit (range 8–12) in Group 1 and 4 (range 3–5) in Group 2. Mean discharge time from hospital was 30 (range 20–40) in Group 1 with ICU LOS of 20 (range 15–25), 35 (range 25–45) in Group 2 with ICU LOS of 14(range 11–17). The functional outcome at time 3 doesn't show any differences between the group 1 and group 2 and the work activities restarted in 20 of group 1 (57.1%) and 24 of group 2 (68.5%).

TABLE 1

	Group 1	Group 2
ISS	30	40
SAPS II	34	45
Blood Trasfusion units	10	4
Discharge from hospital	30	35
LOS ICU	20	14
Return to work activies	20	24

Results for two Groups expressed in mean

CONCLUSION. The treatment of embolisation of MTPF determinate less blood transfusion in the first 24 h and decrease the hospitalisation even if in our analysis the outcome of the two Groups doesn't show any differences.

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0677

LOW HAEMOGLOBIN PREDICTS POOR OUTCOME IN TRAUMATIC BRAIN INJURY

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INTRODUCTION. Cerebral damage arising from traumatic brain injury (TBI) can occur primarily at the time of injury or can occur secondarily at a temporally distant time point post insult1. Low haemoglobin concentration (Hb) occurs in 17–58% of head injured patients and may exacerbate secondary brain injury2,3. Anaemia may occur as a result of blood loss from extra-cranial trauma, pre-existing disease or dilution from fluid replacement during resuscitation. Low Hb will lead to reduced oxygen delivery to cerebral tissue and may contribute to ischeamic brain injury4. However, high Hb levels or blood transfusion may increase blood viscosity, reducing cerebral blood flow or result in transfusion related side effects5. We have studied the admission Hb in moderate to severe TBI patients, examining its role as a prognostic indicator in these patients.

METHODS. All patients admitted to the Queens Medical Centre from 1993 to 2002 with a recorded Glasgow Coma Score of 13 or less within 48 hours of a TBI were included in the Nottingham Head Injury Register. The admission Hb and Glasgow Outcome Score at one year was recorded on the register. We looked at the strength of the association between the admission Hb and the outcome.

RESULTS. Data were available on 487 patients. The mean age was 36 years (range 16–91). 76% of the patients were male. Of the 487 patients 165 died at one year. The Hb was abnormal in 37.57% of patients (decreased in 37.16%, increased in 0.41%). Linear regression and logistic regression after group division into Dead versus Alive and Favourable versus Unfavourable outcome were significant for the whole range of decreased Hb but particularly striking and clinically relevant outcome difference was found where the Hb was less than 8g/l (Chi squared p value <0.001).

CONCLUSION. Decreased Hb was observed in patients presenting with moderate or severe TBI and was associated with unfavourable outcome. An admission Hb less than 8g/l is a statistically significant indicator of poor prognosis in moderate to severe TBI patients and may be useful prognostic markers in these patients. This may be a valuable addition to prognostic scoring systems.

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0678

PREVALENCE OF ADMISSION ARTERIAL PACO2 IMPAIRMENT IN SEVERE BRAIN INJURY PATIENTS

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INTRODUCTION. Hypocapnia at hospital admission is correlated with a worse outcome in traumatic brain injury (TBI) patients submitted to prehospital artificial ventilation (1–4). Moreover in a recent report (5) a correlation between abnormal PaCO2 level on admission could be demonstrated in the intubated patients, but not in the non intubated.

METHODS. In order to assess the prevalence of hypocapnia and hypercapnia in patients with TBI ventilated in the prehospital setting, we analized the data of the Italian Trauma Registry (RIT). Among the 753 patients with ISS > 15, admitted to 3 Italian Level 1 TC over a period of 12 months, we identified a subgroup of TBI patients with a GCS< 9 at the scene and an arterial blood gas analysis collected just on admission, 144 patients met these criteria. Data of the 115 patients who were intubated on scene and artificially ventilated on admission (IOT group) were compared with the 29 non intubated patients (non IOT).

RESULTS. Patients were non significantly different as for demographics, average GCS (5 vs. 5.5), GCS distribution and average ISS (34 vs. 33). Admission PaCO2 is shown in Table 1, 41% of the IOT pts had PaCO2< 35 vs. 17% in the non IOT group; 8% vs. 3% were severely hypocapnic (< 25). Hypercapnia was less frequent in the IOT group (23% vs. 34%). Only 36% of the IOT patients, compared with 48% of the non IOT, had admission PaCO2 levels within the normal range. However mortality rate was higher in the non IOT group (45%) than in the IOT group (30%), with the highest mortality among non IOT patients who were hypocapnic on admission (80%). Both hypocapnia (40%) and hypercapnia (40%) were associated with a higher mortality than normocapnia (22%).

TABLE 1 MORTALITY RATE IN THE INTUBATED AND NON INTUBATED PATIENTS AND PACO2 VARIATIONS

	Nr patients	PaCO2<25	PaCO2 26–34	PaCO2 35–45	PaCO2 > 45
IOT group	115	9	38	41	27
Hospital death	35	4	13	8	10
non IOT	29	1	4	14	10
Hospital death	13	1	3	4	5

CONCLUSION. Our data confirm the association between prehospital intubation and PaCO2 impairment. Although in our series non IOT patients had a lesser incidence of hypocapnia, they were more often hypercapnic and mortality rate was higher in the non IOT group.

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Perioperative hormones: 0679–0690

0679

HYPOTHYROIDISM AFTER LIVING DONOR LIVER TRANSPLANTATION

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INTRODUCTION. Hypothyroidism is well known to be associated with end-stage liver disease. Changes in pituitary–thyroid function occur in patients undergoing major surgical procedures. Such changes are referred to as the euthyroid sick syndrome, which decreases in serum Triiodothyronin (T3) and Thyroxine (T4) concentrations. This hypothyroidism has different causes in different patients, and has different effects on different tissues. The literature on hypothyroidism after liver transplantation is limited. The influence of hypothyroidism in liver regeneration is controversial. We have prospectively studied thyroid function and its association with liver function during postoperative course after living donor liver transplantation (LDLT).

METHODS. Seventy-two patients who have received LDLT at our institution between November 2004 and September 2007 were registered. The thyroid-stimulating hormone (TSH), free T3 and free T4 levels were investigated at consecutive time points (preoperatively, Postoperative day 1, 7). We have also investigated the influencing factors on the thyroid function at POD1, including preoperative factors. We collected postoperative liver function tests, such as aspartate aminotransferase (AST), alanine aminotransferase (ALT), International normalized ratio (INR) of Prothrombin time (PT) and Total bilirubin (T-Bil) taken at postoperative day 1, 2, 4 and 7. Finally, we have investigated the relationship between postoperative thyroid function and liver function. Data were expressed as means with standard deviations. Analyses were conducted using Student's t test and logistic linear regression as appropriate. A $p < 0.05$ was considered statistically significant.

RESULTS. Eleven patients (15%) had preoperatively hypothyroidism who had received thyroxine. TSH, free T3, and free T4 showed a significant decrease compared with pre-operative level at POD1. (pre-TSH: 2.76±3.47, POD1-TSH: 0.53±0.54; $p < 0.0001$, pre-free T3: 2.24±0.60, POD1-free T3: 1.44±0.50; $p < 0.0001$, pre-T4: 1.20±0.20, POD1-free T4: 1.03±0.2; p=0.0005). POD7-TSH increased compared with POD1 (p=0.005), while POD7-free T3, T4 did not change compared with POD1 (p=0.37, 0.13). Any patients except for pre-hypothyroidism did not have thyroxine during postoperative course. By linear regression analysis, we could find that age and MELD score were associated with the decrease of free-T3 at POD1. (R2: 0.07, p=0.03; R2: 0.07, p=0.04).
We also could find the positive correlation between the decrease of free-T3 at POD1 and serum T-Bil at POD 4, 7 (p=0.04, 0.04), although we could not find any significant relationship between free-T3 at POD1 and postoperative liver function, complication, and outcomes.

CONCLUSION. Patients undergoing LDLT exhibit marked decrease in serum thyroid hormones, especially in older and higher MELD score patients. Stress response, anesthesia, and perioperative fasting may be decisive factors eliciting this response. These metabolic derangements do not deteriorate the clinical outcome and subsequently may be an adaptive response for energy preservation in various organs.

0680

CONTINUOUS POSTOPERATIVE BLOOD GLUCOSE MONITORING AND CONTROL BY ARTIFICIAL PANCREAS IN PATIENTS UNDERGOING PANCREATIC RESECTION: A PROSPECTIVE RANDOMIZED CLINICAL TRIAL

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INTRODUCTION. Hyperglycemia associated with pancreatogenic diabetes after pancreatic resection often causes dysregulation of liver metabolism and immune function resulting in impaired postoperative recovery. This study evaluated a closed-loop system providing continuous monitoring and strict control of perioperative blood glucose following pancreatic resection.

METHODS. Thirty patients who underwent pancreatic resection for pancreatic neoplasm were prospectively randomized. Perioperative blood glucose levels were continuously monitored using an artificial endocrine pancreas (STG-22). Glucose levels were controlled using either the sliding scale method (sliding scale group, n = 13) or the artificial pancreas (artificial pancreas group, n = 17).

RESULTS. In the sliding scale group, postoperative blood glucose levels rose initially before reaching a plateau of approximately 200 mg/dl between 4 and 6 hours after pancreatectomy. The levels remained high for 18 hours postoperatively. In the artificial pancreas group, blood glucose levels reduced steadily, reaching the target zone (80 – 110 mg/dl) by 6 hours postsurgery. Total insulin administered per patient during the first postoperative 18 hours was significantly higher in the artificial pancreas group (107 ± 109 IU) compared to the sliding scale group (8 ± 6 IU; $P < 0.01$). Neither group showed hypoglycemia.

CONCLUSION. Perioperative use of an artificial endocrine pancreas to control pancreatogenic diabetes after pancreatic resection is an easy and effective way to maintain near-normal blood glucose levels. The artificial pancreas promises to revolutionize insulin treatment for patients with pancreatogenic diabetes after pancreatic resection.

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0681

EFFECTS OF GLUTAMINE DIPEPTIDE ON NITROGEN BALANCE AND IMMUNE FUNCTION AFTER OPERATION OF ABDOMEN

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INTRODUCTION. Objective: To assess the efficacy of glutamine (Gln) dipeptide-enriched total parenteral nutrition (TPN)on selected metabolic, immunologic, and clinical variables in surgical patients.

METHODS. Fifty-two patients undergoing operation of abdomen were allocated, after randomization, to two groups to receive isonitrogenous and isoenergetic TPN over 5 days. Controls received 1.5 g of amino acids kg-1day-1, and the test group received 1.2 g of amino acids and 0.3 g of L-alanyl-L-glutamine (Ala-Gln) kg-1day-1. Venous heparinized blood samples were obtained on days 1, 3, and 6 after surgery for routine clinical chemistry and for the measurement of plasma free amino acids. IgG, IgM, IgA, CD3, CD4 and CD4/CD8 were counted and the generation of cysteinyl-leukotrienes from polymorphonuclear neutrophil granulocytes was analyzed on days 1, 3 and 6 after surgery. Nitrogen balances were calculated postoperatively on days 2, 3, 4,and 5.

RESULTS. No side effects were noted. Patients receiving Gln dipeptide revealed improved nitrogen balances, improved IgG, IgA, CD3, CD4 and CD4/CD8 on day 6 and improved generation of cysteinyl-leukotrienes from polymorphonuclear neutrophil granulocytes ($p < 0.05$). Postoperative hospital stay was shorter in the dipeptide-supplemented group.

TABLE 1 CHANGES OF PLASMA AMINO ACIDS IN TWO GROUPS

Group	1st D post-operative	3rd D post-operative	6th D post-operative
glutamine Control	356.78±16.6	446.87±21.7	426.92±27.0
Glutamine	365.32±26.3	531.24±38.0*	542.62±28.5**
Alanine Control	247.89±17.6	325.46±24.1	282.20±26.4
Glutamine	200.03±23.3	313.41±41.8	356.76±26.5
Glutamic acid Control	26.44±2.4	36.85±4.6	37.24±3.0
Glutamine	27.64±4.1	35.38±12.5	42.45±3.8

campared with control,$p < 0.05$,**$p < 0.01$*

CONCLUSION. We confirm the beneficial effects of Gln dipeptide-supplemented TPN on nitrogen economy, maintenance of plasma Gln concentration, immune function, cysteinyl-leukotriene generation, and shortened hospital stay in surgical patients.

0682

EFFECTS OF INTRA-OPERATIVE BLOOD SUGAR CONTROL ON HYPERLACTATEMIA DURING CARDIAC OPERATIONS

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INTRODUCTION. Evidence shows that perioperative tight glycaemic control (TGC) improves patients' outcome 1. However there are suggestions that insulin infusions can enhance glucose conversion to lactate via stimulation of glycolytic enzyme activities 2. At our institution 50% dextrose 50ml + 50u insulin (DI) and 50ml N. saline+50 u insulin sliding scale (ISS) are used to maintain intra-operative TGC during cardiac operations, depending on anaesthetist preference. Higher blood lactate levels were observed among patients who needed treatment for TGC than in patients who did not need treatment (No treatment). Aim of this audit is to identify the effects of our current management of blood sugar control on hyperlactatemia.

METHODS. We audited demographic data, co-morbid conditions, type of operation, type of treatment were recorded in 246 unselected consecutive patients who underwent on pump and off pump cardiac operations (intra-op procedure) during 3 months period. Arterial blood gas (ABG) samples were retrieved from the ABG machine database to analyse the lactate levels and blood sugar control.

RESULTS. 246 patients (male 80.9% & female 19.1%, mean age 67.47yrs, SD ±9.785yrs) underwent cardiac operations out of which 12 patients were excluded due to no regular ABG results. Intra-operative procedures, blood sugar & lactate levels are presented in Table 1. Average blood sugar and lactate levels of each patient during 1st 3 hours considered as the outcome variable for assessing the statistical significance. Intra operative procedure has no significant effect on the intra operative blood sugar levels. Significant blood sugar differences were seen between no treatment vs DI (P=0.003), ISS vs DI (P=0.001). Both intra-operative procedure and treatment is significantly associated with intra-operative lactate levels (P=0.001, P=0.002). There were no significant differences in the mean lactate levels of ISS and DI groups. However the "No treatment group" has shown the least average intra-operative lactate levels and it was significantly different form the other 2 methods of treatment.

TABLE 1

Intra-operative procedure	Intra-operative treatment	Mean blood sugar levels	Mean lactate levels	Number of patients
Off Pump	No treatment	6.5747	1.2263	16
	ISS	7.115	1.7209	16
	DI	6.645	1.5567	5
On Pump	No treatment	7.3358	1.9638	73
	ISS	7.5448	2.2823	105
	DI	6.0162	2.8065	19

CONCLUSION. DI regime is an effective method of maintaining tight glycemic control in patients who are undergoing cardiac operations. ISS as well as DI insulin treatment significantly increases the intra operative lactate levels.

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0683

LEVOSIMENDAN FOR LOW CARDIAC OUTPUT STATES AFTER CORONARY SURGERY : A CASE SERIES

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INTRODUCTION. Levosimendan is a new inodilator drug, which improves the myocardial contractility without increasing oxygen requirements and it seems to be interesting in order to improve the cardiac function following open heart surgery. In our study we measured the short-term hemodynamic effects of levosimendan, in postoperative low cardiac output surgical coronary patients.

METHODS. At the end of cardiopulmonary bypass, twenty patients with a preoperative ejection fraction less than 50%, underwent coronary artery by-pass grafting operation (alone or combined with mitral valve repair/replacement, aortic valve repalcement, ventricular septal defect repair), with low cardiac output states despite receiving dobutamine (mean dose of 15 microg/kg/min) and adrenaline (mean dose of 0,15 microg/kg/min) under or not aortic counterpulsation, were treated with an infusion of levosimendan for 24 hours (0.2 microg/kg/min), without loading dose. We measured the cardiac index, the pulmonary capillary wedge pressure and the mixed venous saturation before levosimendan, 6 hours and 24 hours after the start of infusion.

RESULTS. Fourteen patients survived, six died and the final results shown in the Table 1 were tested with Wilcoxon Signed Ranks Test. Results show that there is a statistically significant increase of CI from pre-infusion to 6 hours (p= 0.04), a statistically significant increase for SvO2 from pre-infusion to 6 hours (p= 0.002) and 24 hours ($p < 0.001$) and a decrease of PCWP from pre- period to 6 (p= 0.002) and 24 hours (p= 0.001). The differences between 6 and 24 hours are not statistically significant.

TABLE 1

Parameter	Mean	Standard deviation
CI pre –infusion (L/min/m2)	3.085	0.969
CI 6 hours (L/min/m2)	3.465	1.148
CI 24 hours (L/min/m2)	3.345	0.859
PCWP pre-infusion (mm.Hg.)	20.4	5.21
PCWP 6 hours (mm.Hg.)	16.05	3.42
PCWP 24 hours (mm.Hg.)	15.75	2.48
SvO2 pre-infusion (%)	58.15	7.25
SvO2 6 hours (%)	64.19	8.75
SVO2 24 hours (%)	64.85	8.03

CONCLUSION. In this group, levosimendan was able to improve in a significant manner both the hemodynamic status and balance between the global oxygen delivery and oxygen consumption.

Levosimendan could be useful in order to treat low cardiac output states after coronary surgery in cases in which the maximal conventional doses of classic inotropes (and in some cases even associated with the aortic counterpulsation) failed to do it, but more data are needed.

0684

PLASMA N-TERMINAL BRAIN NATRIURETIC PEPTIDE AS SHORT-TERM PROGNOSTIC MARKER AFTER MAJOR SURGERY

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INTRODUCTION. Plasma N-terminal brain natriuretic propeptide (NT-proBNP) is synthesised in the ventricular myocardium and released in response to ventricular wall stress (1). Is a useful prognostic marker in patients with cardiac failure (2) and in ICU NT-proBNP increases with severity of disease and predicts mortality. (3)

METHODS. This was a prospective observational study. All elective surgical patients admitted to the ICU over a period of 3 months were included. Blood serum NT-proBNP concentrations were determined at admission to the ICU.
Death during hospitalization (mortality), the Acute Physiologic Score Age Chronic Health Evaluation (APACHE) II, Simplified Acute Physiologic Scale (SAPS) II, laboratory data, medical history, and demographics were assessed.

RESULTS. Our study included 27 patients, 21 men (78%) and 6 women (22%). Patients were a mean of 73,7 (65 to 80) years old.
All patients were underwent electiv surgery: 12 major abdominal surgery, 11 open abdominal aortic aneurysm repair, 4 thoracic surgery.
Mean length of stay in the intensive care unit was 2,1 days (1 - 5 days).
The ICU mortality rate was 3,7% (1 death), the APACHE II score was 16,2 (from 9 to 26) and SAPS II was 30,8 (12 - 56).
In the study population NT-proBNP serum concentration was 1001,3 pg/ml (169 - 2143). Four patients had complications during ICU stay, their NT-proBNP serum concentration was 1631 pg/ml (mean).

CONCLUSION. NT-proBNP concentrations are elevated after major surgery and postoperative NT-proBNP level can be a predictor of short-term adverse events after major surgery. More work is needed to explore the diagnostic role and the prognostic significance of NT-BNP in postoperative patient.

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0685

BILATERAL GLUTEAL COMPARTMENT SYNDROME AFTER TRAUMATIC INJURY

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INTRODUCTION. The gluteal region is divided into three separate, non-expandable compartments; the gluteus maximums, the gluteus medius/minimus and the tensor fascia lata. Bilateral gluteal compartment syndrome (BGCS) is rare disease, until now only five cases reported in the literature. This syndrome occurs after drug overdose, surgical positioning and vascular surgery. It is essential for acute and intensive care physicians to have knowledge about BGCS as it has been associated with devastating effects on muscle, neurovascular bundle and can cause multiple organ dysfunction syndrome (MODS) and death.

METHODS. Case report - A 40-year-old construction worker was trapped under a collapsed building for seven hours. On admission, he was fully awake, but dehydrated and complaining of severe pain in both lower limbs and buttocks.

RESULTS. He was tachycardic but with stable BP. The CT scan of the whole spine, pelvis and abdomen was normal. The laboratory parameters indicated acidosis, hyperkalemia, hypocalcaemia and prolonged coagulation profile. He was diagnosed with crush injury syndrome and admitted to trauma ICU for correction of metabolic abnormalities and intensive monitoring. Twenty four hours later bilateral swelling of the upper legs was observed and the patient gradually started complaining of weakness in both lower limbs with impaired sensation below the right knee. Nerve conduction studies and electromyography confirmed bilateral sciatic nerve injury. Three weeks after admission, he developed sepsis treated with IV ciprofloxacin. Cultures from the gluteal discharge confirmed the presence of Pseudomonas and Bacteroides fragilis, requiring adjustment of the antibiotic therapy to meropenem. Despite this he remained febrile; both buttocks were very tense and edematous up to the lateral aspect of both thighs and associated with severe pain. An MRI of the gluteal region/lower limbs showed bilateral multiple gluteal compartment syndrome, intramuscular hematoma and swelling of both thighs with edema of both sciatic nerves. Urgent fasciotomy of the gluteal and right thigh was performed with drainage of the collection followed by three more sessions of debridement of necrotic tissue and muscle. The patient improved gradually and the fasciotomy was closed on day 62. Strength in the left lower limb recovered, but he had a right foot drop as sequel.

CONCLUSION. High index of suspicion and knowledge about gluteal compartment are essential to diagnose and manage these patients as prompt and optimal as possible.

0686

A RANDOMIZED DOUBLE-BLINDED STUDY COMPARING PROTON PUMP INHIBITORS (PANTOPRAZOLE) VS H2 BLOCKERS (FAMOTIDINE) IN PERIOPERATIVE GI PROPHYLAXIS

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INTRODUCTION. Aspiration pneumonitis remains a feared complication with potential for mortality and significant morbidity. Aspiration of acidic gastric contents causes a chemical pneumonitis that is initially manifested by bronchospasm, hypoxemia, and atelectasis. Morbidity has been correlated with low gastric pH (<2.5) and high gastric volume (>0.4 mL/kg.) In severe cases epithelial degeneration, interstitial and alveolar edema, and hemorrhage into the air spaces progresses to ARDS.

METHODS. Inclusion criteria: Ages 18 and older,capable of informed consent,NPO for at least 8 hours.
Exclusion criteria:
Allergy to Famotidine (Pepcid) or Pantoprazole (Protonix).
Significant liver,renal,or coronary disease.
History of PUD, GERD or any other conditions requiring H-2 blockers or PPI for a period of time prior to surgery.
Patients undergoing esophageal or gastric surgery or any other surgical procedure that may alter gastric acidity and pH.
Any medical condition or surgical procedure that my preclude passage of an orogastric or nasogastric tube.

RESULTS. Seventy-eight participants were enrolled with a total of 50 who completed the study. Men encompassed 49.4% (38), women denoted 50.6% (39) and 1 had missing data. African Americans represented 31.2% (24), Caucasians comprised 68.8% (53), and 1 had missing data. The average age was found to be 46.5 +/- 1.7 and ranged from 19 to 79. Twenty-six participants received pepcid and 24 participants received protonix. The mean difference for the group who received pepcid was 1.33 +/- .26; whereas, the mean difference for the protonix group was 1.24 +/- .29. The independent t-test yielded a p-value of .829. Therefore the difference in gastric pH between pepcid and protonix was not found to be statistically significant for this subset of patients.

CONCLUSION. Pantoprazole at the dose of 40 mg intravenously and famotidine at the dose of 20 mg intravenously given preoperatively had similar efficacy in reducing gastric pH in our patient population. We suggest further studies with larger sample size and prolonged sampling up to 20 hours.

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0687

ANAPHYLACTOID REACTION TO GELAFUNDIN IN A PATIENT WITH A HISTORY OF DRUG ALLERGY

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INTRODUCTION. Colloids are widely used as vascular volume replacement solutions during the peri-operative period. They are responsible for 27 54% of anaphylactic reactions in anaesthesia (1,2). Gelatins have the highest frequency (93%), and they are associated with some risk factors (2). We report a case of allergy due to gellatin in a patient with a previous history of multiple drug allergies.

METHODS. We present the case of a woman 56-yr-old ASA II, with a history of allergy to metabisulphites, beta-lactamins, metals, thiomersal and nickel sulphate.
She had received the diagnosis of ovarian torsion and she was scheduled for surgery. Surgery was uneventful and she was relocated into our ICU.
In the ICU we infused 300 ml of gellafundin, and the patient referred pruritus, rash, and displayed facial, upper-body and tongue oedema immediately, with an important dysarthria. We decided to stop gelafundin infusion, and treat those clinical signs and symptoms with hydrocorthisone 100 mg, ranitidine 50 mg, and dexchlorpheniramine 5 mg, and all the symptomatology partially disappeared.
After 24 h. the patient was discharged from ICU without any complications. Prick test was performed after 4 weeks with positive result.

RESULTS. The incidence of anaphylactic reactions with colloids varies between 0033% - 0219% (2). In most cases (90%) clinical reactions are at least grade II and mortality is 3 6%. There are some risk factors associated with allergic reactions to colloids: male sex, previous drug allergy, and gelatine or dextrane infusion. It has even been recommended that gelatins be avoided in patients with a known history of drug allergy (2). In those cases the safest alternative would be hydroxyethyl starch with a slower frequency of allergic reactions (0058% - 00085%).
This patient had drug allergy as a unique risk factor to colloids allergy. Clinical signs and symptoms following so closely after gelatine infusion, strongly indicates an anaphylactic reaction. Cause-effect relation was confirmed after 4 weeks with a positive result for skin tests.

CONCLUSION. Although the incidence of severe reaction to colloids is low, it must not be ignored, because colloids infusions are an extremely frequent practice in medicine. Gelatin and dextrane infusion must be avoided in patients with a previous history of drug allergy.

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0688

THE USE OF HORMONE RESUSCITATION THERAPY IN PATIENTS DIAGNOSED WITH BRAINDEATH

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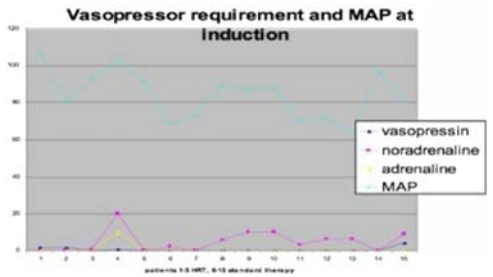
INTRODUCTION. Advances in transplant surgical techniques and immunosupressive therapies have led to treatment of organ failure with transplantation. Demand for organs continues to outpace supply leading to increasing donors with marginal organs and older donors. Efforts aim to improve medical care and improve conversion rates and graft survival. Studies demonstrate benefits of hormone resuscitation (HRT) increasing organ utilization and graft survival with minimal risk [1].

METHODS. Tertiary referral centre. We reviewed all patients diagnosed with brain death in 2007 who donated organs. HRT comprises T4 bolus followed by infusion, vasopressin bolus followed by infusion and methylprednisolone 15mg/kg 24hourly.

RESULTS. 16 patients donated organs, 11 males, 4 females. 1 chart lost. Average age 41years. 5 patients received HRT, 10 standard therapy. Figure demonstrates vasopressor requirement and mean arterial pressure(MAP). On average 2.4 organs per patient were successfully transplanted from HRT group, compared to 2 per patient in standard group.



CONCLUSION. HRT conveys haemodynamic stability to organ donors following diagnosis of braindeath as manifested by lower vasopressor requirement and higher MAP. There was a higher successful organ donation from patients treated with HRT. HRT should be considered to stabilise potential organ donors.

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0689

PERIOPERATIVE PAIN TREATMENT IN NEUROSURGICAL PATIENTS WITH VERTEBRAL DEGENERATIVE-DISTROPHIC DISEASES

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INTRODUCTION. The preemptive analgesia is the main pain treatment principle according to conception of it's transmission,transduction and modulation.

METHODS. 140 adult patients operated by the single neurosurgical team because cervical,thoracic and lumbar instability and hernia spine had moderate or severe pain before operation (with a pain score>5 using a 0–10 Numeric Rating Scale) in spite of non steroidal anti-inflammatory drugs (NSAIDs)administration including COX-2 selective NSAIDs. In all cases premedication before 30 min of the operation starting included midazolam 0,08 mg/kg and chlorphenamine 10 mg intramuscularly. The anaesthesia induction was performed with Before the incision all patients without allergic NSAIDs history received ketoprophen 100 mg i.m.General anaesthesia was carried out with propofol 2,0 mg/kg/h, fentanyl 2,5 mcg/kg/h and clonidine 0,45 mcg/kg/h intravenously with artificial lung ventilation and total myorelaxation with rocuronium. Before 30 min of the operation ending paracetamol infusion 1000 mg intravenously was administrated. Evaluation of postoperative pain (POP)was carried out several times with Visual Analogue Scale (VAS:from 0 to 100 mm,0=no pain at all,100=the worst possible pain), Nunerical Rating Scale (NRS:from 0 to 10,0=no pain,10=the worst possible pain),Verbal Rating Scale (VRS:4-point scale,0=no pain,1=mild pain,2=moderate pain,3=severe pain).

RESULTS. After exubation in the operating room nobody had POP.The choice of the pain scale during 1st and 2nd postoperative day depended on the patient's age and ability to communicate.Also adverse events considered to be related to analgesics and requiring symptomatic treatment (nausea,vomiting).During 2 postoperative days all patients received paracetamol 3000 mg/day intravenously.10% of patients felt POP at rest (pain was assessed <2 using a 4-point VRS).7% of patients felt POP on movement on the 2nd postoperative day (pain was assessed < 2 using a 4-point VRS). Nothing cases of nausea and vomiting connected with NSAIDs and paracetamol were observed.There were no cases with hematologic disorders and clinical importance of increased levels of transaminases.

CONCLUSION. Multimodal analgesia based on the combined opioids,alpha2-adrenoagonists use during induction of anaesthesia,NSAIDs before incision and paracetamol intraoperatively use and prolonged paracetamol intravenously treatment during 2 postoperative days gives possibility for comfortable patient's condition after spinal neurosurgery and early patient's activity.

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0690

A CARBOHYDRATE RESTRICTIVE STRATEGY IS SAFER AND AS EFFICIENT AS INTENSIVE INSULIN THERAPY IN CRITICALLY ILL PATIENTS

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INTRODUCTION. In 2001 Van den Berghe et al(1) published a study that radically modified the conventional approach of tolerating high blood glucose levels in the critically ill patient. New trials (2,3) were interrupted prematurely. The reasons were that no difference were seen in mortality and there was a significantly higher incidence of hypoglycemia in the group that received intensive insulin therapy.

The objective of this study was to evaluate the safety and efficacy of a carbohydrate restrictive strategy as compared to intensive insulin therapy for glycemic control in critically ill patients, assessing primarily the occurrence of hypoglycemia, and secondarily the mortality, incidence of infectious complications and organ dysfunctions.

METHODS. A total of 337 adult patients that presented two blood glucose levels higher than 150 mg/dl in the first 12 hours after admission to a 20-bed multidisciplinary ICU of a general hospital and an 11-bed trauma center ICU. were randomly assigned to a carbohydrate restrictive strategy (group 1) or to strict normalization of blood glucose levels with the use of continuous insulin infusion (group 2).

RESULTS. Patients in group 1 (n = 169) received 2 (0 – 6.5) units of insulin/day, while patients in group 2 (n = 168) received 52 (35 – 74.5) units/day ($p < 0.001$). The median blood glucose level was 144 (123 – 174.2) mg/dl in group 1 and 133.6 (119.7 – 153.3) mg/dl in group 2 ($p = 0.003$). ICU mortality was 25.0% in group 1 and 22.6% in group 2 ($p = 0.6$). Hypoglycemia occurred in 6 (3.5%) patients in group 1 and 27 (16%) in group 2 ($p < 0.001$), and was identified as an independent risk factor for neurological dysfunction and mortality.

CONCLUSION. Our study analyzes an alternative approach for glycemic control in patients admitted to the ICU, with a strategy of restricting carbohydrate intake and has shown that it is possible to maintain the blood glucose levels within acceptable limits, with lower incidence of hypoglycemia, identified as a risk factor for mortality and neurological dysfunction. Results regarding mortality, infectious complications and organ dysfunctions were comparable between the two groups. This much simpler strategy for glycemic control may even be extended to the hospital ward.

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Poster Sessions
Advances in critical care II: 0691–0704

0691

IMPROVEMENT OF OUTCOME AFTER CARDIAC ARREST IS MAINLY DUE TO INCREASED SURVIVAL OF IN-HOSPITAL CARDIAC ARREST PATIENTS- A RETROSPECTIVE MULTICENTER OBSERVATIONAL STUDY IN THE NETHERLANDS

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INTRODUCTION. Survival after cardiac arrest has increased dramatically over the past years: 67% of good outcome of in-hospital cardiac arrest (IHCA) [1] and 56% of good outcome in out-of-hospital cardiac arrest (OHCA) patients [2] after ICU treatment have been reported. This improvement is at least in part due to the introduction of mild hypothermia (MH). In the present analyses we determined outcome after OHCA and IHCA in 3 Dutch ICU's.

METHODS. Retrospective multicenter observational study of consecutive patients with all presenting rhythms (VF, PEA, asystole) admitted after cardiac arrest to 3 intensive care units (ICU's) in the Netherlands. We compared outcome after IHCA and OHCA between two separate periods of 12 months, the first before the introduction of MH in 2002 and the second in 2006/7. Hospital survival and final neurological outcome were scored using the Glasgow Outcome Score, 4/5 being good, 2/3 being unfavourable and 1 being dead. Patients with unfavourable outcome (7 in period 1 and 12 in period 2) were presently left out of this analysis. Data were analysed using Pearson's Chi-square test.

RESULTS. 252 patients were admitted after cardiac arrest, of whom 203 could at this time be evaluated. Hospital survival with concomitant good outcome after cardiac arrest had improved in period 2 (p=0.04). This was caused by a strong significant increase in survival with good neurological outcome after IHCA (p=0.01). We found however no improvement of good outcome after OHCA. There were no important baseline differences between the two year-groups, except for an (expected) increase in frequency of acute coronary interventions.

TABLE 1 OUTCOME AFTER CARDIAC ARREST

	Outcome	OHCA	IHCA	Total
Period 1	Dead n(%)	13 (56%)	36 (78%)	49 (71%)
	Good outcome n %)	10 (44%)	10 (22%)	20 (29%)
Period 2	Dead n(%)	42 (56%)	32 (54%)	74 (55%)
	Good outcome n(%)	33 (44%)	27 (46%)	60 (45%)
Total (n)		98	105	203

CONCLUSION. Outcome after cardiac arrest improved after the introduction of MH in the Netherlands. In our cohort this improvement was mainly due to an increase in good neurological outcome for IHCA. Outcome of OHCA was already better than expected and in our cohort did not improve after introduction of MH.

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0692

HIGH VOLUME HEMOFILTRATION (HVHF) VS. "CONVENTIONAL HEMOFILTRATION" (CVVH) IN SEPTIC SHOCK PATIENTS WITH ACUTE RENAL FAILURE (ARF)

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INTRODUCTION. Septic shock is the main cause of mortality in our ICU units. In these type of patiens multiorgan dysfunction and ARF are common and worsens prognosis. Continuous renal replacement therapies (CRRT) have become an important cornerstone in septic support measures. Renal dose above 35 ml/kg/h has been stablished as the goal standard in critically ill patients with ARF. Sepsis dose has not been still defined as many studies propose higher doses in septic shock patients. Our objective was to compare the efficacy of two different strategies of CRRT (HVHF vs HVVC) in septic shock patients with ARF.

METHODS. Our study was a randomized and prospective trial.
Patients who achieved CRRT inclusion criteria (ARF and septic shock) were randomized, and either HVHF or CVVH was started.
We studied 62 patients, 29 treated with CVVH and 33 with HVHF.

Group A (CVVH). n=29, 68% males; mean age 59±11 years; APACHEII 26±9; 41% were surgery patients. At the beginning of CRRT 97% of our patients needed mechanical ventilation(MV), 46% had disseminated intravascular coagulation(DIC), and 41% had liver failure. Mean ultrafiltrate dose was 25 ± 6 ml/Kg/h.

Group B (HVHF). n=33, 51% males; mean age 59±14 years; APACHEII 27±9; 56% were surgery patients. At the beginning of CRRT 97% of the patients needed MV, 52% presented DIC, and 36% had liver failure.
Mean ultrafiltrate dose was 43 ± 6 ml/Kg/h.

RESULTS. There were no important adverse effects related with both techniques.

The extrarrenal depuration parameters were measured at 24,48,72 hours and were similar in both groups.
28 day survival rate was 23% in CVVH group and 48% in HVHF ($p < 0,022$).

CONCLUSION. Both tecniques were safe.
HVHF showed and stadistically significant improvement in survival rate.
Our median ultrafiltrate dose in HVHF group was 43 ml/kg/h.
Future trials with larger series are neccesary to confirm our results.

0693

TWO YEAR ANALYSIS OF WARD CARDIAC ARRESTS BY TYPE AND OUTCOME AT A LARGE DISTRICT GENERAL HOSPITAL IN THE UNITED KINGDOM

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INTRODUCTION. The Resuscitation Council UK recommends all cardiac arrests are audited using the principles of the 'Utstein Template'[1]. Presentation of this data allows evaluation of the incidences and outcomes from cardiac arrest. In an age of early warning systems, Outreach and Medical Emergency teams there is ever increasing interest around in-hospital cardiac arrests. It is well recognised that many cardiac arrests, particularly those presenting with pulseless electrical activity (PEA) or asystole are predictable and potentially preventable consequences of suboptimal medical care. Southend hospital is a large district hospital serving an aged population of approximately 300,000. The aim of this audit was to establish the incidence, type and outcome from cardiac arrest occurring amongst in patients on the acute wards at our hospital. The secondary aims were to highlight some of the strengths and weaknesses of our acute care services, and to guide future developments.

METHODS. Data collected daily by the Resuscitation Officer was retrospectively analysed for all ward cardiac arrests occurring between 1 June 2005 and 31 May 2007. The hospital PAS system was used to determine long term outcome for patients surviving to and beyond hospital discharge. Cardiac arrest was defined as loss of spontaneous circulation. Data from the Accident Centre, Critical Care Unit, Theatres and out patient areas was excluded.

RESULTS. Table summarises the results for the 2 year study period. Our presentation will show the data in 'Utstein format' for the study period as a whole and as separate 1 year periods. The mean patient age was 77.6 years, for survivors to discharge was 71.3 years. Overall survival to discharge was 5.8%, survival to discharge for asystole/PEA was 1.6% and for VF/PVT 27.7%. Survival to 1 year was 0.5% and 27.7% respectively. The figures in brackets in the table demonstrate the number of patients on the Coronary Care Unit (on CCU) for each type of cardiac arrest and outcome. There is a preponderance of asystolic/PEA cardiac arrests on the general wards and the outcome is very poor.

TABLE 1

	Cardiac Arrests	No ROSC	ROSC	Survived to discharge	Alive at 1 year
VF/PVT (on CCU)	36 (14)	15 (2)	21 (12)	10 (8)	10 (8)
Asystole/PEA (on CCU)	189 (28)	150 (21)	39 (7)	3 (0)	1 (0)
Unclassified	1	1	0	0	0
Totals	226	166	60	13	11

ROSC: Return of spontaneous circulation, PVT: Pulseless VT, VF: Ventricular Fib

CONCLUSION. The outcomes from confirmed cardiac arrests are as expected for the different types of cardiac arrest. The preponderance of PEA and asystolic cardiac arrests on the acute wards suggests that there remains considerable room for improvement in compliance with cardiac arrest prevention measures and end of life decision making processes.

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0694

DEATH IN THE HOSPITAL AND MEDICAL EMERGENCY TEAMS –DO THEY CALL US?

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INTRODUCTION. The outcome from in-hospital cardiac arrest is universally poor. The introduction of Medical Emergency Teams (METs) in our hospital has led to a significant reduction in the mortality of risk patients. Data from several studies indicate that in a large number of cases, although patients met criteria for MET activation, that action was not performed. Several important barriers to staff calling for higher assistance have been identified. In the present study we tried to evaluate the occurrence of MET calls in patients who died during their hospitalization and their association with the presence of MET calling criteria in the 24 hours before death and the existence of a do not resuscitate (DNR) order.

METHODS. An integrated emergency program is implemented in our hospital since 2003, which includes continuous training of all staff, METs, widened calling criteria, and periodical audits. In order to evaluate the impact of this program in hospital mortality we conducted a retrospective analysis of the medical records of the patients that died between October 2007 and January 2008. Studied variables included demographic variables, MET calls, the presence of MET calling criteria within the 24 hour period before death and the existence of a DNR order. Patients from the emergency and intensive care department were excluded, as METs are not activated for these places.

RESULTS. 6507 patients were admitted in the hospital. Of these, 159 died. Mean age was 76 years old and 57% were male. 102 patients presented at least one alarm sign in the 24 hours previous to their death. 91 patients presented at least one alarm sign in the 8 h previous to their death. 113 patients had a DNR order written in the clinical record. From the remaining 46 patients, we gathered complete data in 37. MET was called for 9 of these 37 patients. From the remaining 28 patients, there were alarm signs registered in 12 patients, who had a presumed DNR order. There were no registered alarm signs in the other 16 patients. Further analysis of these patients revealed that the majority had a presumed DNR order (12 patients) and that MET calling criteria weren't properly recognized in 4 patients (3%).

CONCLUSION. More than half of the patients had registered alarm signs, although they might have a DNR order. On those patients without a DNR order, MET was called in all that had an alarm sign. Alarm signs were not properly recognized in only 3% of the patients who died. This low percentage might be explained by the integrated emergency program, which includes training and education of all the staff.

0695

PROCALCITONIN - A PREDICTOR OF OUTCOME AFTER CARDIO-PULMONARY RESUSCITATION?

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INTRODUCTION. Procalcitonin (PCT) is considered a parameter capable of distinguishing systemic inflammatory reactions caused by infections from those resulting from non- infectious states. However, the trigger for its secretion is still unclear and some investigators reported increased PCT also in non- infectious conditions like major abdominal surgery, heatstroke or treatment with T-cell antibodies. It was the aim of this study to test whether PCT is increased in the absence of infection after cardio-pulmonary resuscitation (CPR) and if so, whether it does correlate with survival and neurological outcome.

METHODS. 31 consecutive patients admitted to the ICU after CPR from March to November 2006 were included in the study. PCT, CRP, NSE and lactate were determined daily within the first 72 hours. ICU survival as well GOS (Glasgow outcome scale) at hospital discharge were obtained. All patients were intubated and received standard medical treatment.

RESULTS. 17 patients did not survive whereas 14 patients survived to hospital discharge. Of the surviving patients four were classified GOS 2, one GOS 3, two GOS 4 and seven GOS 5. PCT obtained within 24 hours of admission was significantly different between survivors and non-survivors. A statistically significant difference between those two groups could not be established for NSE, CRP or lactate. In addition we found a highly significant correlation between GOS at hospital discharge and PCT-levels during the first 24 hours after ICU-admission (Pearson $r=-0.56$, $p=0.0018$).

TABLE 1

Lab values on day 1 (ICU-admission)	Survivors (n= 14)	Non-survivers (n=17)	p-value
PCT (ng/ml, median)	0,41 (IQR: 0,11–2,73)	5,20 (IQR: 0,98–10,10)	p=0.031
CRP (mg/dl, median)	1,19 (IQR: 0,18–2,56)	3,50 (IQR: 0,36–8,13)	n.s.
Lactate (mg/dl, median)	25,0 (IQR: 12,50–49,30)	51,45 (IQR: 23,30–89,40)	n.s.
NSE (µg/l, median)	21,90 (IQR: 15,05–28,10)	30,20 (IQR: 21,60–69,20)	n.s.

CONCLUSION. PCT can be significantly elevated in non-infectious acute states like CPR. Moreover PCT obtained within 24h after ICU admission appears to predict not only survival but also neurological outcome after CPR.

0696

RAPID INDUCTION OF THERAPEUTIC HYPOTHERMIA AFTER CARDIAC ARREST WITH INTRANASAL COOLING-A PRELIMINARY REPORT

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INTRODUCTION. Induced therapeutic hypothermia improves neurological outcome after cardiac arrest, but there is strong evidence in animal models that delays in introduction of cooling negates its beneficial effects. The effectiveness of a new device in rapid induction of cooling using nasopharyngeal approach was shown in this preliminary investigation of post resuscitation cardiac arrest patients.

METHODS. Seven patients after succesful resuscitation from cardiac arrest were included into the study. Following standard diagnostic and therapeutic procedures, therapeutic hypothermia (TH) was induced by evaporisation of aerosolized perfluorchemical (PFC) into the nasopharyngeal cavity using a nasal tubing set (RhinoChill device, BeneChill Inc. San Diego, USA) to achieve cerebral and systemic hypothermia. Temperature measurements were continously taken throughout induction and maintanance of hypothermia via tympanic (Ttymp) and arterial catheter (Tcore). After achieving a target temperature (Ttarget) of 33°C in one of the measurement sites, the cooling method was switched to standard sytemic cooling and maintained for 24 hrs. The therapeutic range was defined as 32–34°C with a Ttarget of 33°C.

RESULTS. The mean age of the patients was 78 years, the mean time from cardiac arrest to succesful ROSC was 22 min. Core temperature on admission was 35,8°C (mean). Application time of the RhinoChill device was 80,3 min (mean) from start of the nasal cooling; the therapeutic range (34°C) could be reached in 42 min (mean-Ttymp) and in 84 min (mean-Tcore). Ttarget was achieved within 67 min (mean-Ttymp) and 115 min (mean-Tcore) representing a cooling rate of 2,52°C/hr (Ttymp) and 1,6°C/hr (Tcore). Good recovery was achieved in 2 patients, 1 was neurologically impaired, 4 patients died.

CONCLUSION. Evaporative nasopharyngeal cooling using a PFC rapidly decreases Ttymp and Tcore and provides rapid establishment of therapeutic hypothermia immediately after admission in the ICU. The added benefit of rapid early cooling on outcome remains to be demonstrated.

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0697

THE INTRODUCTION OF A MEDICAL EMERGENCY TEAM LEADS TO A DECREASE IN THE NUMBER OF RESUSCITATIONS

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INTRODUCTION. In-hospital medical emergencies still occur and are often preceded by clinical deterioration.

Both recognition of this situation and subsequently immediate response are essential. This so-called Rapid Response System has gained growing interest. Nevertheless supporting data are still weak. In Arnhem we introduced a Medical Emergency Team (SIT; spoed interventie team) in 1997.

METHODS. We analyzed the number of resuscitation calls and SIT/MET calls in the hospital from 1995 until 2006. A nurse could call the SIT/MET when a patient fulfilled simple calling criteria, i.e.

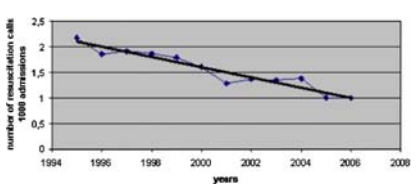
1. A breathing frequency of less than 5 or more than 36/minute.

2. A heart frequency of less than 40 or more than 140 bpm or a systolic blood pressure of less than 90 mmHg.

3. A decrease in the Glasgow Coma Scale of more than 2 points.

RESULTS. Since 1995 the number of times that the resuscitation team has been called, has decreased from 45 times a year to 29 times (Table 1). This number reflects the actual calls for the resuscitation team in which CPR was performed. These calls were coming from all departments in the hospital, except the emergency department, the CCU, the Operating Theatre and the ICU.

We corrected the number of calls for the number of admissions through the years.



CONCLUSION. The Introduction of a Medical Emergency Team leads to decrease in the number of in-hospital resuscitations.

0698

SUCCESSFUL TREATMENT IN MONKSHOOD (ACONITINE) INTOXICATION WITH MAGNESIUM SULFATE

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INTRODUCTION. Exposure to toxic plants account for about 5% of all intoxications. We describe a case of severe deliberate aconite intoxication. This is the first report of a patient successfully treated with MgSO4 in this instance.

METHODS. A 77-year-old man was admitted to ICU for severe muscarinic syndrome associating hypotension, bradycardia, wheezing, sweating, nausea and vomiting, only 20 minutes after the intentional ingestion of 5 grams of crushed roots from Aconitum napellus. The patient complained numbness, dizziness and ascending paresthesia. Important features of ECG consisted of ventricular bigeminism, then severe bradycardia (20 bpm), long QTc (524 msec) and polymorphic ventricular extrasystoles. Activated charcoal was administered but no gastric lavage was performed seeing severe arrhythmias and hemodynamic compromise. Saline infusion, atropine (3 mg loading dose, and 0.5 mg/6 hours during 48 hours) and magnesium sulfate (6 g loading dose, and 3 g/24 hours for 48 hours) were administered to treat hypotension, muscarinic signs and arrhythmias, respectively. Plasma magnesium levels remained below 4 mmol/L. Symptoms rapidly disappeared and return to regular sinus rhythm (86 bpm) was observed. Further evolution was uneventful.

RESULTS. Aconitine is the main toxic alkaloid in monkshood. LD50 is about 5 mg which represents 2 to 4 grams of crushed roots. Cardiac and neurological toxicities, as well as increased vagal tone, are due to activation of voltage-dependent sodium channels. Cardiotoxicity consists in early and delayed afterdepolarisation. Indeed, during late repolarisation (phase 4 of the action potential) of the Purkinje cells, aconitine-attached Na channels open, allowing sodium influx and depolarization (“delayed afterdepolarization”). This results in increased automaticity (premature ventricular beats). During late phase 2 or early phase 3 (repolarisation), aconitine-induced Na accumulation induces depolarization (“early afterdepolarisation”). This results in long QT interval with a risk of torsades de pointes. Antiarrhythmic agents have inconstant results in aconite intoxication. Especially amiodarone could promote torsades de pointes. The effects of magnesium sulfate on aconitine-induced ventricular arrhythmias have been studied in animal models (1). In contrast to other antiarrhythmic agents, it abolishes early afterdepolarisation and shortens the prolonged duration of the Purkinje cell action potential.

CONCLUSION. To our knowledge, this is the first clinical report of aconitine-induced polymorphic ventricular arrhythmias successfully treated with magnesium sulfate.

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0699

STRESS REACTIONS OF MEDICAL STUDENTS RESPONDERS TO A SIMULATED CARDIAC ARREST

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INTRODUCTION. Advanced cardiac life support (ACLS) course represents a challenge experience for medical students. During training they have to demonstrate their ability to managed a simulated cardiac arrest scenario which requests the knowledge of ACLS algorithms, effective communication, promptness and firmness in deciding. This represents a mental stressful situation that has been few documented.

METHODS. After a 4 weeks earlier training in ACLS, 105 medical students were enrolled in the study. 35 teams, each consisting of 3 health-care students were studied in a patient simulator (SimMan Laerdal). A scenario of witnessed cardiac arrest due to ventricular fibrillation or asystole was used. Each scenario lasted not more than 20 minutes. Heart rate, systolic and diastolic blood pression, SpO2 were recorded just before and just after the end of scenario. Then an individual self report of identifying sources of mental stress and perceived difficulties (visual analogic scale, VAS : 0–10) was proposed. Assessment of teams’ performance was made using standard European Resuscitation Council testing sheets which includes a list of treatments/and interventions appropriated for the scenario, combined in this study into 20 items.

RESULTS. Heart rate increased moderately (98 ± 18 vs 102 ± 19, $p < 0.005$) after the scenario whereas systolic (140 ± 16 mmHg vs 135 ± 15 mmHg, $p < 0.03$) and diastolic blood pressure (78 ± 8 mmHg vs 76 ± 7 mmHg, $p < 0.04$), decreased modestly. Team’s performance assessment was 13 out of 20 (10–16). Perceveid difficulties reporting focused on familiarity with the ACLS algorithm (major 41%, moderate 34%) management of airway (minor 20%, moderate 36%), and promptness of medication’s choice (major 41%, moderate 37%) whereas difficulties was rarely reported about diagnosis (87%),deliverance of shock (77%) and individual role in the team (68%). VAS was 6 (1–10). Most of the students thought about simulation some days before (major 50%, moderate 26%), had worries about it just before and a large majority thought to be affected by the test. Most of them thought that it was a positive (75%) and a helpful experience (96%) to do again.

CONCLUSION. During the testing scenario, hemodynamic constraints were minor. Perceveid difficulties would be decreased by training and consequently mental stress.

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0700

COMPARISON OF TRAINING BETWEEN ANAESTHESIA AND EMERGENCY MEDICINE FOR DUAL CERTIFICATION IN ICM

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INTRODUCTION. Modernising medical careers in United Kingdom has created basic training module in anaesthesia and emergency medicine known as Acute common care stem(ACCS).
It enables a good cohort of emergency medicine trainees to be eligible for dual certification in ICM.
The aim of this study is to compare the training between anaesthesia and emergency medicine for dual certification in ICM.

METHODS. Comparison of Acute common care stem curriculum between Anaesthesia and Emergency medicine.
The curriculums were downloaded from websites of Royal College of anaesthesia and College of Emergency medicine.

RESULTS. Similarities

6 months each in Intensive care,Emergency medicine,Acute medicine and anaesthetics.
It also completes the basic competencies required for ICM.

Skills: Rapid sequence Induction, Central and arterial line insertion.

Differences

Extra 1 yr training in anaesthesia for anaesthetic trainees.
Extra training in paediatrics and surgical specialities for emergency medicine trainees.

CONCLUSION. Emergency medicine trainees have wide exposure in managing acute medical and surgical emergencies. Furthermore, as shown in the curricula the basic training for both anaesthetic and emergency medicicne are the same. This give emergency medicine trainees a good platform for further training in ICM.
Emergency medicine trainees lack the experience of managing patients on ventilators in comparison to anaesthetic trainees. However, the increase use of non-invasive ventilators in emergency medicine department helps them in understanding the principles of ventilators and respiratory physiology.
Emergency medicine is a rapidly changing speciality in United Kingdom with more onus on emergency physicians to diagnose and stabilise patients in emergency department prior to transfer. Therefore emergency medicine trainees should be encouraged and treated equally with their anaesthetic colleagues in the pursuit of a career in ICM.

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0701

FOUR-YEAR EXPERIENCE WITH SIMULATION-BASED TRAINING ON EMERGENCIES IN CARDIOLOGY

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INTRODUCTION. Emergencies in cardiology are among the key demands of 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 procedures 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 emergencies in cardiology; to evaluate the students satisfaction with the course.

METHODS. The study was performed at Berkeley Training Center – Brazil, between March 2002 and December 2006, with a total number of 497 trainees. Trainees received a baseline evaluation (n=283) followed by an 8 hour-training sessions that involved an introdutory lecture, skills management with mannequin simulator, clinical scenarios for training ACLS algorithm, and instructor-facilitated debriefings. After finishing the course, the trainees were retested and completed a numerical scale survey (n=497) of their perceptions about the course (1= poor, 2= fair, 3= good, and 4 =excellent).

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CONCLUSION. The extremely positive response to simulation–based training on emergencies in cardiology found in this 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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0702

TRAINEES' EXPERIENCE OF ANAESTHESIA IN NON-THEATRE ENVIRONMENTS

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INTRODUCTION. UK Trainee anaesthetists provide anaesthesia for patients in A&E, radiology & for transfers. Quality anaesthesia in non-theatre environments depends on adequate training, qualified assistance & orientation to environment & equipment(1). Skilled assistance must be available to assist the anaesthetist as Gwinnutt suggests an increased incidence of failed intubations in A&E(2). The AAGBI state that standards of anaesthesia must be the same as those in theatre(3). Transfer of critically ill patients poses a significant risk. Transporting within hospital is often poorly managed & Andrews et al(5) state that patients deteriorate significantly during such transfers. Our objective was to identify & aim to minimise risks when undertaking anaesthesia in the non-theatre environment.

METHODS. The audit was undertaken in 2006 and reaudited in 2008. Trainees in a department covering 2 large district general hospitals, each with separate A&E, radiology and critical care facilities, received a questionnaire. The questions concentrated on training & orientation of A&E, radiology and equipment. Anaesthesia standards for intra-hospital patient transfer & anaesthesia in A&E were audited according to the RCoA (6).

RESULTS. The results demonstrated deficits in training & knowledge of the equipment & assistance. 71.4% of trainees responded & only 5% had received training in anaesthesia in non-theatre environments within the last year; 13% had received a orientation session. During transfers 65% patients had minimal monitoring, 28% patients had no physiological parameters recorded despite transfer up to 135 min. 67% trainees believed their assistant was suitably trained for induction of anaesthesia & 14.7% described poor assistance with RSI; 21% found minimal monitoring unavailable.

CONCLUSION. Changes implemented included the creation of transfer training for trainees. A 24 hr outreach service has now been created in one hospital & a vital part of the role is to support anaesthetists; this data was a major part of the business case to justify its establishment. Reaudit of trainees demonstrated a substantial improvement, but training in emergency situations has now been set up. We recommend that all ICU review their training for the non-theatre environment. New staff should undergo an orientation that is regularly up-dated. We believe that trainees should undergo specific training & demonstrate proficiency in anaesthesia in the non-theatre environment.

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