Poster Sessions
ICU management 0420-0432

0420

IDENTIFICATION AND ANALYSIS OF HANDOVER VARIANCE USING A NEW SCORING TOOL

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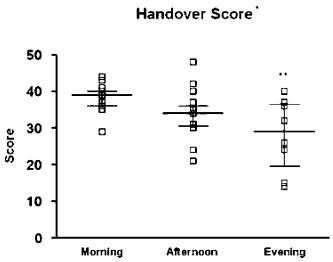
INTRODUCTION. Accurate information exchange between team members is of vital importance in an ICU setting. This component of quality in ICU is not widely reported. In particular, there are no handover scoring sytems for ICU. We present a new handover scoring tool that can identify handover variance in ICU.

METHODS. The scoring sytem was based on intensive care physician defined quality objectives for handover. The score measured the quality of handover of patient physiological status and team executive functions,(max.score=53). A handover score was prospectively collected from medical team members after morning, afternoon or evening rounds. Scores were analysed for variance and graphed as aligned dot plots with median and interquartile ranges(M,IQR).

RESULTS. 43 handover scores were collected. Handover round scores (M,IQR)were; Morning(39,36-40); Afternoon(34,30.5-36); Evening(29,19.5-36.5. One way ANOVA was significant*(p=0.0034). Bonferroni's post hoc analysis was significant between morning and evening rounds**(p<0.01). These scores reflected differences in the structure of each handover round.



CONCLUSION. Using a handover score, we can identify variance in ICU handover quality. Use of such a scoring tool should be considered prior to introducing changes in handover practice. Our scoring system may also allow an impact assessment to be made of proposed handover aids.

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0421

ROLES AND EFFORTS — IS LEADING AN ICU COMPARABLE TO LEADING A COMPANY?

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INTRODUCTION. Workload on intensive care units underwent a huge increase and condensation over the last years, focussing more on managerial tasks than on medical skills, and shifting people from physicians to managers. This study was designed to investigate the structure of daily work and responsibilities of leading intensivists in an University hospital and in a district hospital.

METHODS. This observational study was conducted in the setting of a 16-beded interdisciplinary ICU in a University hospital in Germany. The consultant on duty was observed from 6 a.m. till end of work over 2 weeks. The second part of our study was made on an interdisciplinary ICU in a district hospital. The consultant was followed for 8 days, the Chief physician for 1 week from 7 a.m. till end of work. Every task, its duration and any disturbances were recorded and categorized.

RESULTS. The working time was about 11h/day with all tasks and disturbances listed one after another (incl. overtime). 75% of all tasks were $\leq$ 2min and 58% $\leq$ 1min! Less than 10 % of working time was used for breaks. During the clinical working time at the University hospital, a mean of 191 different tasks had to be done with an average of 4min20sec (min 5sec;max 2h13min;median 1min). Unplanned disturbances e.g. by telephone calls or emergency situations occurred on average 85 times/day (0,8/task!). 56min were used for direct patient contact, 20% for documentation and German diagnosis elated groups (DRG), 17% for ward administration and 18% for research. The consultant of the ICU on the district hospital had much more tasks (357) with shorter duration (min 3sec;mean 1min49sec;max 1h24 sec;median 28sec). Disturbances happened 132 times/day (0,6/task). 1h19min was attributed to direct patient contact, 34% to documentation and DRG's. During the observation time the Chief physician carried out 252 tasks/day which lasted on average 2min46sec (min 3sec;max 1h20min;median 47sec). Disturbances occurred 90 times/day (0,6/task). 24% was used for chief administration and 17% for anaesthesiology and operation room scheduling.

CONCLUSION. A consultant in an University hospital has much more administrative and less clinical work to do than in a district hospital where the Chief physician is responsible for administrating the ICU and the department. A director of ICU has very condensed and chopped work load highlighted by a huge number of very short and unscheduled tasks and the need for quick and important decisions. Our results show the similarity of the job of a leading intensivist to jobs as a CEO as described by Mintzberg. The intensivist has to play different roles. He must represent his department and the unit, he is responsible for the performance of his subordinated colleagues and he is liaison officer.

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0422

TELEPHONE INFORMATION PROVIDED TO PATIENTS' FAMILIES IN ITALIAN ICUS: A NATIONAL SURVEY

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INTRODUCTION. Families of ICU patients want assurance, proximity to their loved ones and information [1, 2]. This leads relatives to telephone frequently for news [3]. To date, no published data are available on telephone information provided to families in Italy's approximately 600 ICUs. We investigated this issue in the course of a national survey on visiting policies in Italian ICUs.

METHODS. An email questionnaire on visiting policies was sent to all 303 ICUs (general and specialized) in the Italian collaborative group GiViTI (Italian Group for the Evaluation of Interventions in Intensive Care Medicine), including questions about their policy on providing telephone information to families.

RESULTS. The response rate was 85% (257/303). Daily meetings of doctors with relatives were held systematically in almost all ICUs (97%). Information was also given by phone (often or always, 34%; sometimes, 56%; never, 10%). Those authorized to give this information were mainly physicians (doctor on duty, 90%; charge nurse, 9%; nurses, 7%). Frequently (often or always, 48%) the family was given the ICU's extension number and 21% of ICUs had a specific time slot for taking relatives' phone calls. Not only reassurance (35%) and logistical information (43%) were given over the phone, but also generic clinical information (73%), e.g. regarding temperature or sleep. However, detailed clinical data, e.g. on diagnosis, prognosis and treatment, was given in only 9% of ICUs. To ensure confidentiality, 62% of ICUs arranged with the family for a single interlocutor to call at set times, 34% provided only generic information, and 2% gave the family an ID code.

CONCLUSION. The findings suggest that in Italian ICUs the telephone plays an important role in giving families information. 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 team [3], the phone can represent a complementary tool in providing information to relatives and, above all, in addressing their considerable need for reassurance [1, 2].

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0423

EVALUATION OF AN UNRESTRICTED VISITING POLICY IN A MEDICOSURGICAL ICU

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INTRODUCTION. We evaluated patients, families and staff's satisfaction concerning unrestriction of visiting policy in an intensive care unit.

METHODS. In a twelve-bed intensive care unit of a general hospital, visiting policy of relatives was opened from 4 hours a day to 24/24 hours. Satisfaction questionnaires were distributed six months after implementation of the new policy to families, competent patients (in the absence of their relatives) and staff on a two month period.

RESULTS. Families (n=93): families stated coming more often in the afternoon (35%) and in the evening (31%). 72% of working people came after work shift and some (7%) before work in the morning. Visitors stayed no more than 2 hours (80%) and several times a day (44%). Having the opportunity to come around the clock was reassuring (74%), reduced anxiety towards hospitalisation (88%), and rendered organization easier (81%). The flexibility and the availability of the ICU staff were appreciated by families.
Patients (n=15): Patients valued afternoon visits (58%), frequent but short visits (53%). The fact that families could come whenever they wanted reassured them (100%). The organization was considered ideal (53%). The possibility for children to come was appreciated.
ICU staff (n=28): 58% of staff members answered the questionnaire (clerks 33%, nursing assistants 47.5% – registered nurses 38% , medical staff 78%, secretaries 100%). The organization of care has been modified by the unrestricted visiting hours (48%). The staff felt that open visits affected care (48%). More than one half of the staff members considered it as an improvement in the relationship with the families, and considered it as positive for them (79%) but stated that more present families were more demanding (83%). 61% felt that this strategy has improved patient care, but expressed some concerns about patients' intimacy (86%). Therefore, most of caregivers asked the family members to leave the room during care (83%). However, very few considered this unrestricted visiting policy as stressful (18%).

CONCLUSION. An unrestricted visiting policy is considered as positive by families, by patients, demanding for the staff, however scarcely stressful. Since this strategy has been adopted in our unit, improvements have been made mostly to preserve patients' intimacy and facilitate care.

0424

SCREENING FOR CAPACITY AMONGST ICU SURVIVORS IN THE PATIENT EVALUATIONS RATING METHODS FOR INCLUSION IN TRIALS (PERMIT) PILOT STUDY

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INTRODUCTION. Consent for ICU research involving incapable patients is often obtained from substitute decision makers (SDM). Many study protocols and research ethics boards require that ICU survivors be screened until they regain capacity to reaffirm their willingness to participate in SDM-sanctioned research. However, the feasibility, yield and associated resources of this task are unknown.

METHODS. As part of a study examining consent framework preferences[1] (PERMIT), we systematically screened ICU survivors for capacity. All survivors discharged from 5 ICUs were screened every 72 hours for the first week; every week for the next 4 weeks; and every 2 weeks thereafter until deemed capable, death or discharge. Capacity was assessed by trained interviewers using a modified Aid to Capacity Evaluation Screening Instrument[2] (ACE). We did not contact patients to assess capacity after hospital discharge.

RESULTS. Of 1402 ICU survivors, 1375 were screened for capacity a median of 2 times (IQR 1 to 3) after ICU discharge until deemed capable, hospital discharge, or death. Time from ICU discharge until capacity was documented, or death or hospital discharge was 10.2 days (SD 12.3; median 6; IQR 4 to 12; range 1 to 153). Only 28% of patients were deemed capable, or were discharged or dead on the first visit (median 4 days, IQR 2 to 6). Two visits (median 5 days, IQR 4 to 9) were required for 20% of patients and 3 or more visits were required for the remainder (52%). The most frequent reasons for multiple screening visits were: deemed incapable on ACE (38%); sleeping (10.5%); isolated for infection control (8.0%); non-English speaking (7.5%); visit would interfere with patient's other activities (7.2%); declined assessment (7.3%), unable to communicate verbally (4.3%); other (not in room, etc.; 17%). Only 240 (17%) were deemed capable prior to death or hospital discharge.

CONCLUSION. Systematic scheduled follow-up of ICU survivors in this study identified 17% of patients who were deemed capable using the ACE instrument. Mandatory first person post-ICU consent for clinical studies should be revisited, given this evidence about the effort, yield, feasibility and cost. Submitted on behalf of the Canadian Critical Care Trials Group.

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GRANT ACKNOWLEDGEMENT. Supported by grants from Physician ServicesIncorporated and Canadian Intensive Care Foundation.

0425

BLOOD TRANSFUSION MANAGEMENT IN CRITICALLY ILL PATIENT – PRACTICAL CONSENSUS GUIDELINES

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INTRODUCTION. Blood transfusions are highly prevalent among ICU patients. Patient prognosis may be influenced by the transfusion practice, therefore transfusion risk as well it's benefit must be considered. This decision may be higly variable, so it must be based on the preciously estableshed guidelines. A consensus of transfusion practice was established in our Intensive Care Unit, in 1996 and update in 2001. The implementation of a hemovigilance programme and evaluation of the application of clinical guidelines applicance was also defined. Document current clinical practice of blood components uses in our ICU. Determine concordance with previously established guidelines and analyse the relationship of blood transfusion to clinical outcomes.

METHODS. Studied population includes all adult patients (1112) admitted to ICU, from 15th June 2002 to 31st to December 2006. The subjects were characterised in relation to : admission diagnosis, patient condition (SAPS II), length os stay in ICU and mortality. The concordance with previously established guidelines was analysed in each transfusion event. We also compared the concordance with guidelines in two different periods. For statistical analysis we used: median, percenties (25-75), Chi-square test, Mann-Whitney with ($p<0.05$).

RESULTS. Studied population includes 1112 patients with median age of 55years old and 66% of them were male. The prevalence of transfusions was 49,6%. Patients who were transfused had a longer stay (9 vs 4 days), a higher SAPS score (41 vs 39) with statistic significance ($p<0,001$). Mortality rate was higher in transfused patients (29%) compared with those not transfused (25%) but without statistic significance ($p<0,084$). When we analysed transfusion events, concordance with consensus guidelines in 2002-2005 relatively to 2006 in respect to red cells, platelets, plasma, albumin was 86,94,97,76% versus 91,100,100,70%, representing an increased concordance rate with hemovigilance guidelines in our hospital.

CONCLUSION. Patients who were transfused had a longer ICU stay and a higher SAPS score ($p<0,001$). Mortality was higher in transfused patients compared with those not transfused ($p<0,084$). This analysis reveals a high percentage of transfusion practice consensus and an improvement over time. In the patients in whom the consensus was not applied it was possible to establish a clinically valid justification for the transfusion. Albumin transfusion remains a controversial issue.

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0426

THE FEASIBILITY AND IMPACT OF A MULTI-DISCIPLINARY TEAM APPROACH TO WEANING PATIENTS FROM PROLONGED MECHANICAL VENTILATION

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INTRODUCTION. Liberation from prolonged mechanical ventilation presents a complex challenge to the critical care MDT. There is no commonly accepted way to wean from mechanical ventilation. This is often reflected in practice by the multiple approaches to weaning, even within the same unit. We aimed to establish whether we could adopt a common MDT-led approach to weaning, which would maintain continuity and consistency across the weaning process and across consultant weeks. Here we report an assessment of the feasibility of this approach and the impact of such plans on patients undergoing prolonged mechanical ventilation. Our long term care plans included; MDT adherence to an agreed weaning plan, full consultant buy-in to the MDT plan, communication and nutritional goals and functional rehabilitation.

METHODS. As a base line, we retrospectively reviewed patient characteristics (time ventilated and ICU mortality) of all patients ventilated >21 days over 12 months. Over the following 12 months, we determined the impact of the long term care plans on patients ventilated >21 days. Those who failed >3 weaning attempts from mechanical ventilation were assessed by the MDT for suitability for long term weaning plans. Not all were accepted by the MDT team due to resource limitations.

RESULTS. Both groups were similar with regard to age, gender and APACHE II. In the second group, 10 patients adhered MDT weaning plans; all survived to ICU discharge. The introduction of the MDT plan was associated with a significant reduction in mortality for all patients ventilated >21 days ($p<0.0046$), with the most significant difference seen in those patients ventilated >50 days ($p<0.001$). The duration of mechanical ventilation was greater following the introduction of the long term plans.

TABLE 1.

Days Ventilated	Pre MDT Plan No of pts	Pre MDT Plan Mortality	Post MDT Plan No of pts	Post MDT Plan Mortality	Significance
>**21**	33	61%	36	39%	0.0046
>**50**	8	75%	9	22%	0.001

TABLE 2.

Days Ventilated	Pre MDT Plan Median Days Ventilated of Survivors	Post MDT Plan Median Days Ventilated of Survivors
>**21**	29	38.5
>**50**	54	81

CONCLUSION. We demonstrated the feasibility of applying a long term MDT weaning approach to patients receiving prolonged mechanical ventilation across different consultant weeks. Our preliminary data suggests that this approach did not lead to harm and was in fact associated with a significant reduction in ICU mortality. The increase in median time to wean requires further investigation. Multidisciplinary team involvement with this difficult patient group was essential to enable a change in practice to occur and led to a culture shift within the unit.

0427

TIGHT GLYCAEMIC CONTROL IN CRITICAL ILLNESS — THE NEED FOR THOROUGH DEVICE EVALUATION?

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INTRODUCTION. Stress Induced Hyperglycaemia is common in critically illness[1]. Association between stress hyperglycaemia and outcome observed in numerous patient groups [2,3,4,5,6]. Strict glycaemic control[7,8,9]has shown a significant reduction in mortality and morbidity. Rapid, precise glucose determination requires consideration before Tight Glycaemic control can be implemented. Aim of evaluation was to determine whether POCT blood glucose devices demonstrate required accuracy and precision to implement a strict Glycaemic control protocol.

METHODS. Critical analysis of POCT Devices divided into two separate evaluations: 1.110 random,arterial blood samples were analysed for glucose concentration using Roche Advantage II, Abbott Medisense Optium and Roche Omni S reference blood gas methodology.
2.100 random,arterial blood samples were analysed for glucose concentration using Hemocue 201, Roche Inform,Abbott Medisense PCX and Roche Omni S.

RESULTS. 1.(a)Mean Glucose concentration 6.50 ±1.84 mmol/l Omni S, 7.00 ± 1.94 Optium and 6.59 ±1.84 Advantage II. (b)Optium/Omni S:r2=0.88,slope=0.99,intercept 0.57. Mean bias=0.50 mmol/l, SD=0.66, limits of agreement –0.79 – 1.79 mmol/l.(c)Advantage/Omni S:r2=0.96, slope=0.99,intercept 0.17. Mean bias 0.10 mmol/l, SD=0.35 with limits of agreement –0.59 – 0.79 mmol/l.
2.(a) Mean Glucose concentration 6.49 ± 1.97 mmol/l Omni S, 6.84 ±1.94 Hemocue 201, 6.10 ± 1.85 Inform and 7.15 ±2.18 Medisense PCX. (b) Hemocue/Omni S: r2=0.97, slope=0.95, intercept=0.49. Mean bias=0.19, SD=0.50 with limits of agreement=-0.81 – 1.19 mmol/l.(c)Inform/Omni S:r2=0.94, slope=0.87,intercept=0.36. Mean bias–0.69 mmol/l, SD=0.58 with limits of agreement –1.83 – 0.45 mmol/l. (d)PCX/Omni S:r2=0.95,slope=1.05,intercept 0.32. Mean bias=0.66, SD=0.69 with limits of agreement -0.71 – 2.03 mmol/l.

CONCLUSION. Implementation of Tight Glycaemic control reduces patient morbidity and mortality[7,8,9]. Krinsley et al [10] highlighted significant cost savings following implementation. Tight Glycaemic control now become adopted as a Standard of Care for the treatment of critical illness. Important that evaluation of the POCT device in situ is performed before implementation.
All POCT devices demonstrated statistically significant correlation with reference methodology. To be used within a Tight Glycaemic control protocol, interchange ability between devices across the working range must be evident. Bland Altman analysis demonstrated marked variability across the working range for a number of devices, which could preclude its use within a Tight Glycaemic control protocol.
It would therefore be recommended for clinical areas implementing a Tight glycaemic protocol, that a full evaluation of the POCT device in situ be performed,in conjunction with the local accredited reference laboratory.

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0428

NCEPOD 2005 AN ACUTE PROBLEM? OUR EXPERIENCE.

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INTRODUCTION. The National Confidential Enquiry into Patient Outcome and Death (NCEPOD) reviews practice in all medical specialties to improve quality and safety of patient care. Changes in healthcare provision, including the EWTD, initiated a report assessing the process of care of critically ill medical patients from hospital admission to ITU referral. The report issued several recommendations; its limitations were that the study was based on a small sample and only considered in detail the care of patients who had died. Our aim was to audit the care of our level 3 medical admissions against the key recommendations.

METHODS. 60 consecutive medical admissions were retrospectively audited. Data collection used a questionnaire identical to that used by NCEPOD covering all stages of the admission process. This information was combined with ICNARC data and analysed using Microsoft Excel.

RESULTS. 36 patients had complete data. Demographically 31% of admissions were from Accident and Emergency, 56%were from the wards, the mean Apache score 17.6 and mortality 31%. The medical notes rarely contained requests for the type and frequency of physiological observations required (4% respiratory rate, pulse 6%, urine output 14%). Instructions specifying parameters that should trigger patient review were not documented. Of all observations performed, respiratory rate was the least frequently recorded (table 1). Outreach were involved in 14% of admissions, but had potential to be utilised in 44%. Of the patients in hospital for greater than 24 hours prior to their ITU admission 45% exhibited physiological instability for more than 24 hrs. Resuscitation status was recorded in 36% of cases.

TABLE 1.

Frequency of Patent Observations in the first 24 hours of admission (%)

	<hourly	1-2 Hourly	2-4 Hourly	4-6 Hourly	>6 hourly	Nil
Respiratory Rate	19	6	8	14	17	36
Blood Pressure	19	6	17	14	28	16
Temperature	6	0	9	19	44	22
Heart Rate	19	5	14	14	31	17
Oxygen Saturation	17	8	14	11	31	19

CONCLUSION. Our data broadly reflect many of the key findings of the NCEPOD report. The general absence of physiologically based management plans and the inadequacy of the stipulation and recording of basic clinical observations in our patients' pre-ITU stays were striking. The partial use of a trigger system prompting a patient review was evident, but it would appear that our Critical Care Outreach service could be further utilised on our medical wards. If prompt access for seriously ill medical patients to critical care services is to be improved it would appear that physiologically based management plans need to be embedded in the diagostic pathways that currently dictate many of our patients' care pathways. This change of focus will require further medical and nursing education.

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0429

THE USE OF ECHOCARDIOGRAPHY IN INTENSIVE CARE UNITS IN ENGLAND

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INTRODUCTION. Echocardiography has become an important tool for haemodynamic management in critically ill patients (1), but is not always routinely available on all units. We aimed at identifying current practices in echocardiography in critical care and performed a telephone survey to assess the use of echocardiography in English Intensive Care Units.

METHODS. Throughout England a national telephone survey was implemented contacting a senior intensivist in National Health Service hospital trusts with a registered Intensive Care Unit. A questionnaire was employed to ascertain current practice, frequency of echocardiography requests, service availability, and involvement of intensivist in echocardiography examinations.

RESULTS. Of 121 units phoned, answers were obtained from 105 units (average number of beds: 12.2±4.5). Questions were answered by an ICU consultant in 94, by a senior specialist registrar in 8 and by the clinical fellow in 3 cases. 100 units were general intensive care units, while the others were surgical (2), medical (1), and neurological (2). 104 out of 105 ICUs used echocardiography. Most units (96) performed echocardiography less than five times per week. Only two units performed more than 10 echocardiograms per week. 24 units had an echocardiography service available 24 hours a day, while 74 units could obtain echocardiography examinations only during daytime. 6 units did not have echocardiography available on a regular base. The time interval between performance of echocardiography and availability of results was less than 2 hours in 38 units, and up to 6 hours in a further 35 units. 3 units had to wait routinely for more than 24 hours before results became available. In 20 units intensivists performed echocardiography, however, only 3 units had their echocardiograms exclusively done by intensivists. The majority of ICUs (101) depended on other specialists, mainly cardiologists, radiographers or both to obtain echocardiograms. 22 units had their own echocardiography device available.

CONCLUSION. Intensivists are infrequently involved in the performance of echocardiography in English intensive care units. However, a service is available in 98.1% of ICUs. Only 36.2% of English ICUs had results available in less than 2 hours. Since the importance of echocardiography as a diagnostic tool in haemodynamic instability and emergency situations is emphasised in the literature (1), its routine use by intensivists and quick availability of results is desirable in critically ill patients.

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0430

THE RESULTS OF A NATIONAL SURVEY ON THE PERCEPTION OF SEVERE SEPSIS AND WORKFLOW FOR DIAGNOSIS

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INTRODUCTION. The Surviving Sepsis Campaign(SSC)is a global program to reduce mortality rates producing guidelines for management of severe sepsis. The aim of this study is to investigate the perception,the diagnosis and monitoring of severe sepsis through the SSC Italian Centers, administering an ad hoc questionnaire.

METHODS. The questionnaire was distributed in 47 Italian centres. Seven questions were asked:1. Describe the methodology currently used in your institution for implementation of the SSC principles;2. If baseline data were collected,for how long was data gathered?;3. Are you using an educational initiative and tool kit?;4. When and how data is collected?;5. Who collects data?;6. Is there a partnership for SSC at your Institution?;7. Was the screening for sepsis performed in the ward?;8. How do you define the sepsis presentation time in the ED, ward and ICU?d hoc questionnaire.

RESULTS. Of the 47 participating centres,23 responded the survey:70% of the respondents adopted a continuous data collection methodology and 30% a before and after event design. No specific educational tool was used in 13% of cases and the other 87% adopted chart documentations and department conferences. Data collection for the diagnosis of sepsis occurred within 24 hours from the diagnosis only in 13 centers. In 17 Centers the responsibility of data collection is assigned to the attending physician,in the remaining cases, residents,nurses or students collect the data. Partnership between ICUs and other departments to approach sepsis is scarce: only 17% have a form of collaboration with other units. Only 26% of the hospitals corrently applied a screening for severe sepsis in the wards. Time of sepsis presentation in the emergency department(ED),in other wards and in the ICU were quite different. Only 50% of physicians in the ED identified the severe sepsis at the moment of triage and the other 50% elaborated this diagnosis only a posteriori. Surpisingly,in the ICU 30% of the cases is usually diagnosed through the medical reports.

CONCLUSION. Despite the important attempt made by the International Intensive Care Community to standardize severe sepsis diagnosis and therapy a large variability exists in time and logistics.

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0431

WORKING PATTERNS AND TRAINING OF JUNIOR DOCTORS IN THE ICUS OF THE NORTH WEST

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INTRODUCTION. Working patterns for junior doctors in the UK are changing due to the introduction of several new policies.as well as legal rulings such as the SiMAP proceedings altering the definition of working time. Problems highlighted by a review of critical care services and new training structures introduced by 'Modernising Medical Careers' will continue to influence working patterns. This audit was performed because there is is little information about working patterns both regionally and nationally. This knowledge could be valuable when designing working patterns, and organising teaching programs to support future doctors. The Intensive Care Society is also obtaining some similar information via the manpower survey.

METHODS. Between April and May 2006 we conducted a telephone audit to look at the working patterns of non-consultant grades doctors in all the ICUs of the Greater Manchester and the Lancashire and South Cumbria Critical Care Networks. The information was gained from speaking to one trainee from each level of the rotas on each individual ICU.

RESULTS. The 2 networks comprise 19 general and 3 cardiac ICUs (26 rotas). A feedback rate of 100% was obtained. Several units provide medical cover for both level 2 and level 3 patients. The overall bed numbers varied widely (5 to 24, mean 10.2 beds). There were 194 non-consultant grade doctors in total, with 18.5% non-anaesthetic doctors and 30.4% non-consultant career grade posts. The majority of rotas are now shift based with 44% partial shift and 44% full shift. Most rotas had a 1:6 frequency of nightshift, and the majority had a maximum of 4 consecutive nights. Almost all the ICUs had a formal morning handover, 53% of which had time recognized within the rota. 88% of the ICU rotas had resident medical staff. 55% of first on-call rotas had sole commitments to ICU (including referrals and transfers) but many rotas had other commitments outside of normal working hours (cardiac arrest/trauma team 27%, maternity 15%, general theatres 19%, pain 19%). There was formal consultant led teaching in 45% of ICUs, with 41% providing 'protected' teaching.

CONCLUSION. In conclusion, there are a huge number of non-consultant doctors working on ICUs with a considerable number of non-anaesthetic doctors. Hospitals were generally compliant with national guidelines, however a substantial proportion of rotas do not include handover times.

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0432

WORKLOAD CLASSIFICATION SYSTEMS ON THE INTENSIVE CARE AND QUANTIFICATION OF A PATIENT-NURSE RATIO

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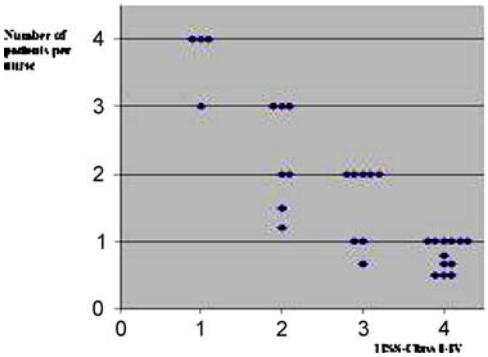
INTRODUCTION. A range of classification systems for measuring nursing workload is developed and used to classify care on an Intensive Care Unit (ICU) in different levels of complexity. The need for these classification systems has become an important issue for health-care management and policy in the ICU. Application of classification-systems can lead to a more effective use of nursing resources with different qualification-levels on the same number of ICU-beds, what is related to an increasing capacity on the ICU.

METHODS. We conducted a systematic review of the literature on available classification systems for measuring nursing workload and classification of the patients into different levels of care and different patient to nurse ratios.

RESULTS. The measurement of nursing workload with the available classification systems is dependent from the accuracy of the system in reflecting nursing efforts. TISS, a daily score, and NEMS, a simplified TISS, are the most common used systems but they are originally developed for measuring medical interventions. It is widely agreed to use both classification systems for defining a patient to nurse ratio.



CONCLUSION. We found a wide range of patients per nurse in the different levels of care according to TISS. Classification of care per shift, possible with NEMS, is necessary for adequate use of the systems for planning nursing resources. Defining different levels of care creates a possibility for differentiation of nursing qualification levels on the ICU.

Poster Sessions
Risk adjustment 0433-0441

0433

SEVERITY SCORE USEFULNESS IN ACUTE LUNG INJURY

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INTRODUCTION. The aim of our study has been to evaluate severity scores, focusing on acute lung injury (ALI) patient's evolution, and to find some prognostic factors.

METHODS. Prospective descriptive study from January 2004 to December 2005. Selected patients were diagnosed of ALI, admitted in 2 ICUs. We analyzed epidemiology factors and evolution of severity scores at the first five days ALI period, documenting PaO2/FIO2, LIS, oxygenation index (OI), APACHE II, APACHE III, SAPS II, SOFA, MODS and ventilation characteristics. Statistical tests: Chi-square, Fisher test, Student's t, U Mann-Whitney, Friedman test and logistic regression analysis. Data expressed as mean (SD) or median (range).

RESULTS. 66 patients, 47 men (71.2%), mean aged 55.8 (14.2) yr, APACHE II 20.9 (10.2). Patients with intrapulmonary ALI were 39 (59%) and sepsis 35 (53%). At the diagnostic time, 60 (91%) patients satisfied respiratory distress criteria, presenting PaO2/FIO2 129 (55.2), OI 28.9 (14.7), LIS 2.75 (2.5 – 3.25), APACHE II 18.4 (6.83), APACHE III 55.8 (18.6), SAPS II 52.7 (20.8), SOFA 9.9 (3.5), MODS 7.5 (3.3) and number of failed organs 3 (2 - 4). Initial respiratory parameters: plateau pressure 32 (8) cmH2O, peak pressure 35 (10) cmH2O and PEEP 10 (3) cmH2O. ICU length of stay (LOS) was 23(13-37.5) d, mechanical ventilation (MV) 16.5(10 - 33) d and MV length of pre-ALI 2 (1 - 5) d. Total mortality rate in ICU was 50% (33 patients). Patients with worst prognosis were older 61 (12) vs. 51 (15) yr ($p<0.005$), with a worst APACHE II 23.6 (10.7) vs. 18.4 (9) d ($p<0.005$) and shorter ICU LOS 21.4 (20) vs. 33.8 (20). From second day, we find out significant differences about mortality in PaO2/FIO2 137 (55) vs. 170 (66) ($p<0.05$), OI 29 (15) vs. 22 (12) ($p > 0.01$) and from third day in LIS 2.8 (0.6) vs. 2.5 (1.5) ($p < 0.01$). Independent factors associated a higher mortality were age (OR 1.05 (1.1.2); $p = 0.04$), ICU LOS (OR 0.7 (0.56-0.88); $p=0.002$) and MV LOS (OR 1.41 (1.12-1.77); $p=0.004$). We observe evolutive improvement in PaO2/FIO2 ($p<0.001$), IO ($p<0.001$), LIS ($p<0.001$), APACHE II ($p<0.005$), SOFA ($p<0.005$), MODS ($p<0.001$) and number of failed organs ($p<0.01$) in the alive group. Stepwise logistic regression was used to determine the factors predicting mortality within the first 28 days mortality, which was 36.4%. The predictive model included the following variables: age, APACHE III at admission and trend of the APACHE III and PaO2/FIO2 for 5 consecutive days. The diagnostic model yield presented an area under the receiver operating characteristic curve of 0.873.

CONCLUSION. The rise mortality in our study is due to a higher rate of patients with respiratory distress criteria. This model showed that in our population, trend of the APACHE III and PaO2/FIO2 at first five days of ALI period were correlated within the first 28 days mortality.

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NURSE WORKLOAD ADEQUACY EVALUATED BY TISS 28

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INTRODUCTION. Therapeutic Intervention Scoring System -28 (TISS-28) were based on therapeutic interventions related to severity of illness. However several nursing activities are not necessarily related to severity of illness. A typical nurse can deliver an amount of workload equivalent to 46 TISS-28 points per day. Nursing labour costs is the largest fraction of the operating budget for an ICU. Estimating the appropriate number of nurses required to ICU staff is crucial to minimize costs while maintaining excellent patient care. The efficiency in the use of nursing manpower can be based on the available number of nurses, on the amount of work a nurse can perform per shift and the amount of TISS-28 points executed. The Work Utilization Ratio (WUR) can be defined as the ratio between the produced workload and the available workload in the ICU. Objective: To evaluate planned versus operative level of care and nursing manpower efficiency in medical ICU.

METHODS. A prospective study during a 6-year period (January 1, 2001 to December 31, 2006) was performed. Data was collected for all patients admitted in the ICU. For each patient, a simple set of variables was collected including basic demographic characteristics, SAPS II score, APACHE II score and ICU outcome. TISS-28 was measured for each patient every day. The planned level of care (PLC), the operative level of care (OLC)and the Work Utilization Ratio (WUR) was defined according to the literature.

RESULTS. 1467 patients were analysed.

	2001	2002	2003	2004	2005	2006
Patients n	161	234	265	277	289	241
Age	63.4±18.4	64.1±17.6	66.4±16.1	63.7±5.6	65.9±17.4	67.3±14.9
Length of stay	14.3±31.6	11.5±30.7	8.7±9.8	8.9±12.4	7.2±55.4	9.0±13.6
SAPS II	47.9±21.4	47.9±21.4	54.2±20.7	52.6±21.3	51.2±19.6	51.0±17.7
TISS 28	30.1±5.7	30.1±7.2	30.0±7.5	31.7±6.8	31.4±5.8	31.3±6.3
PLC (N/P)	1:1.9	1:1.8	1:2.0	1:1.9	1:1.6	1:1.6
OLC (N/P)	1:1.5	1:1.5	1:1.5	1:1.5	1:1.5	1:1.5
WUR (%)	113	120	128	129	100	101

CONCLUSION. The scored nursing activities –TISS 28- was high during the studied years. The illness severity, evaluated by SAPS II and APACHE II scores, remain high during the study. The planned nurse-patient ratio for our ICU was 1:2 but many patients needed a ratio 1:1. In addiction the operative level of care was 1:1.5. During the years 2001-2004 the WUR was very high (>110%) but in the last two years it decreased to 100%. This fact was due to the increasing of the number of working days per nurse per year and a decrease in the occupation ratio. The mortality decreased in the last two years but its relationship with the decreased WUR was not addressed in this study.

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0435

DOES TISS-28 REFLECT THE SEVERITY OF DISEASE IN CRITICALLY ILL CHILDREN?

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INTRODUCTION. The Therapeutic Intervention Scoring System (TISS-28) is used to assess the severity of disease in critical care (1). Even though it has been developed for an adult ICU population, the system has been applied to critically ill children. Nevertheless, its ability to reflect the degree of disease in this group of patients has not been systematically investigated. Therefore, we evaluated the association between TISS-28 and morbidity and mortality in a paediatric ICU population.

METHODS. All paediatric patients (age < 15 years) admitted to a surgical ICU over a three year period were evaluated. TISS-28 was calculated daily until discharge or death. Mean TISS-28 values, TISS-28 values on the day of discharge and length of stay were compared for non-survivors, patients transferred to another ICU and patients discharged to a general ward using analysis of variance (ANOVA) with Tukey's post-hoc test. Values are expressed as mean ± standard deviation. A $p < 0.05$ was considered significant.

RESULTS. 450 patients with a median age of 2 years were evaluated. Mean TISS-28 values in non-survivors of 36.4 ± 8.6 points were markedly higher than in patients transferred to another ICU (30.8 ± 9.4 points, $p < 0.001$) and patients discharged to a general ward (22.9 ± 9.8 points, $p < 0.001$). Moreover, all 3 groups also differed significantly in their TISS-28 values on the day of discharge and in their respective lengths of stay (Table 1).

TABLE 1.

	Patients discharged to a general ward	Patients transferred to another ICU	Non-survivors
n	423	16	11
Mean TISS-28	22.9 ± 9.8*	30.8 ± 9.4*	36.4 ± 8.6*
TISS-28 on the day of discharge	17.0 ± 5.4*	23.0 ± 11.8*	36.1 ± 8.7*
Length of stay (days)	4.3 ± 7.1**	9.3 ± 12.0**	21.6 ± 17.0**

** p < 0.001, ** p < 0.05*

CONCLUSION. The TISS-28 system is able to reflect morbidity and mortality in critically ill children with clear differences between non-survivors, patients transferred to another ICU and patients discharged to a general ward. As the overall incidence of death is generally low in this patient population (2), further investigations into the association between TISS-28 and other measures of morbidity are warranted.

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0436

APACHE II SCORE AND A SIMPLIFIED VERSION PREDICT OUTCOME OF SEVERE TRAUMA PATIENTS

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INTRODUCTION. APACHE II score was not designed to evaluate trauma patients or in the emergency department. Others scores based on APACHE II, like REMS were validated to use in the emergency room. The aims of the study were to evaluate APACHE II score to predict outcome of trauma patients in the Emergency Room and to compare with a simplified version.

METHODS. Data for APACHE II score was collected in 163 trauma patients at admission to the Emergency Room and 24 hours after during a 5 months period. APACHE II score measured in the ER was compared with a simplified version (5 physiological parameters, age and chronic disease) by the Bland-Altman method and ROC curves areas.

RESULTS. Male were 80%, mean age was 38 yrs. Deaths were 17 (10.4%). Non-survivors had a higher APACHE II score than survivors (10.7±7.8 vs. 3.9±4.5, p=0.002) at admission and 24 hours later (12.2±8.8 vs. 3.4±4.6, p=0.001). Patients who had an APACHE II score greater or equal to 10 on admission, had a 36% probability of death and APACHE II score more than 10 in the 24 hours, had a 40.7% probability of death. APACHE II score and its simplified version showed a significant correlation (R2 = 0.92), mean difference between them was straight (1.0±1.6) and ROC curves area were equivalent (0.79±0.07 vs. 0.82±0.06, p=0.6).

CONCLUSION. APACHE II is useful to evaluate outcome in trauma patients at the ER but its simplified version is equivalent but easier to apply.

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0437

THE S.O.F.A. SCORE: A USEFUL PROGNOSTIC INSTRUMENT AFTER CARDIAC SURGERY

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INTRODUCTION. Organ dysfunction evaluation using Sequential Organ Failure Assessment score (SOFA score) has been shown to predict mortality and morbidity in adult cardiac surgical patients[1,2,3,4,5].

METHODS. Design: analysis of a prospectively collected database. Setting: medical Intensive Care Unit (ICU) in an University Hospital. Patients: A total of 76 patients (ASA II-IV) submitted to cardiac surgery. They were evaluated on 24,48 and 72 hours after ICU admission. All post-operative ASA IV-E (E= emergency) and all ICU patients with different diagnosis were excluded from data collection. Interventions: the collection of raw data necessary for the computation of a SOFA score on 24, 48 and 72 hours after admission and basic demographic and clinical statistics.

RESULTS. The Admission, TMS score and "SOFA presented a good correlation with mortality area under the curve 0,9 (SE 0,060) and 0,809 (SE 0,136), respectively]. All the patients that receive more than 2000 ml of intraoperative fluids had an Admission SOFA Score between 15 and 20 (p<0.001). All the patients with preoperative Left Ventricular Ejection Fraction > 45% had an Admission SOFA Score between 0 and 10 (p<0.001). All the patients mechanically ventilated for more than 5 days presented an Admission SOFA score between 15 and 20, while the same score was between 0 and 10 for those successfully extubated after 24 hours (p<0.001). The mean cardiovascular, coagulation, hepatic, neurological and renal SOFA score were associated with the highest relative contribution to outcome [area under the curve 0,985 (SE 0,030), 0,949 (SE 0,055), 0,923 (SE 0,066), 0,993 (SE 0,021) and 0,941 (SE 0,059), respectively].

CONCLUSION. SOFA score is a useful prognostic instrument even when used in the early postoperative period after cardiac surgery.

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0438

A PILOT STUDY OF ASSOCIATION OF APACHE II AND SOFA SCORES WITH ICU MORTALITY IN AN INDIAN MULTI-SPECIALITY ICU

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INTRODUCTION. Scoring systems to predict outcomes in Intensive Care Unit (ICU) have been developed in the western world. It needs validation in developing countries like India – with different patient profile and available ICU resources. Aim of this study was to assess association of observed mortality with APACHE II and SOFA scores as well as derived predicted mortality in an Indian tertiary level hospital ICU.1,2.

METHODS. Ninety-four adults (65M, mean +/- SD 47 +/- 19.0 years age) admitted from 1st February to 31st March 2007 with ICU stay > 24 hours were included. Data was obtained by review of charts. Besides demographic data, diagnosis and ICU outcomes, APACHE II and SOFA scores were recorded for the first, second, third and last 24hrs of ICU stay. APACHE II scores and SOFA scores were correlated with observed ICU death (OID). Predicted death rate adjusted for diagnostic category weight (PD) was calculated from APACHE II scores and this was associated with observed mortality.

RESULTS. APACHE II scores correlated significantly with ICU outcomes (death/live discharge). As the APACHE II scores increased in increments of 10, starting from 0-10, the mortality significantly increased. As the APACHE II scores increased to > or = 30, the risk of death increased by > or = 28 times. No patient with score >40 survived. The odds ratio could not be calculated for the APACHE II scores in last 24hrs. The trend of APACHE II scores with ICU observed outcomes were calculated and a linear trend was observed (chi-square trends for the first, second, third and last 24hrs respectively were 12.105 (p<0.001); 16.93 (p < 0.001); 19.264 (p <0.001) and 47.56 (p < 0.001)). The trend of SOFA scores with ICU observed outcomes were also calculated and a linear trend was observed (chi-square trends for the first, second, third and last 24hrs respectively were 9.979 (p = 0.003); 11.87 (p < 0.001); 7.742 (p = 0.005) and 40.35 (p < 0.001)). The PD calculated from APACHE II scores at first, second, third and the last 24hrs of ICU stay correlated significantly with the OID. The observed agreement were 88.3 (k = 0.456, 95% CI 0.154; 0.758), 91.5 (k = 0.59, 95% CI 0.318; 0.862), 90.4 (k = 0.481, 95% CI 0.159; 0.803) and 92.6 (k= 0.627, 95% CI 0.362; 0.893) percent respectively. The positive predictive value of calculated PD increased progressively from first to second to third to the last 24hrs of ICU stay (i.e. 60, 77.8, 83.3 and 87.5% respectively). There was thus a close association of PD and OID.

CONCLUSION. Although APACHE II and SOFA scores were developed in the Western world, in this study a significant association with actual ICU outcomes was observed in a Multi-specialty ICU of a tertiary level Indian hospital.

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0439

TISS 28 UTILISATION AS AN OUTCOME MARKER

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INTRODUCTION. Quantification of therapeutic activities using the Therapeutic Intervention Scoring System (TISS) is an alternative approach to evaluate outcome of patients in intensive care. The reason for using cumulative TISS points is to integrate various adverse events (except mortality) according to the amount of therapeutic effort that they require. The reduced version of TISS with 28 items (TISS-28) allows a reliable assessment of therapeutic activities with limited observer variation, provided that an exact description of all items is given. Measurements can be validated by correlations with established severity of -disease classification systems such as APACHE II and SAPS II. Objective: Analyse the TISS 28 score in a medical ICU comparing survivors to non-survivors.

METHODS. A prospective study during a 6-year period (January 1, 2001 to December 31, 2006) was performed. Data was collected for all patients admitted in the ICU. For each patient, a simple set of variables was collected including basic demographic characteristics, SAPS II score, APACHE II score and ICU outcome. TISS-28 was measured for each patient every day and the mean TISS-28 for each patient was calculated. The population was divided in two groups' survivors and non-survivors and the TISS-28 was compared. Statistical analyse by T student was made.

RESULTS. 1467 patients were analysed.

TABLE 1.

	Survivors	Non-survivors	p
Patients number	991	476	
Age	64.1±17.4	67.2±16.4	0.001
SAPS II	44.4±16.2	67.1±20.1	<0.001
APACHE II	21.4±7.9	31.3±8.5	<0.001
TISS 28	25.2±6.8	37.6±8.1	<0.001
Length of stay	9.7±34.0	9.1±25.2	0.342

CONCLUSION. The mean TISS-28 was significantly greater in the group non-survivers (p<0.001). The ICU length of stay was not statistical different between the two groups (p=0.34). The mean TISS-28 can report patients whose condition worsened during the ICU stay.

0440

OUTCOME OF MEDICAL INTENSIVE CARE UNIT PATIENTS: CHARACTERIZATION AND A STAGED PREDICTIVE MODEL

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INTRODUCTION. Predicting mortality and length of stay (a proxy for resources invested per patient) are key concerns in intensive care units. Here we report on several basic models for these outcomes derived from an analysis of the characteristics and outcomes of admissions to the Medical Intensive Care Unit (MICU) at the Hadassah Medical Center, Jerusalem, Israel. The unit population comprises mainly of complicated Medical patients with chronic diseases and little reserve. Our approach is novel in constructing not only a model of outcomes based on overall analysis of variables available post-hoc, but also separate models reflecting the information available at milestones in patient treatment.

METHODS. Data on 70 variables was collected on 891 admissions to the MICU during the period 1.3.03-30.6.06 (39 months). Multivariate logistic regression and recursive partition analysis were used to assess the contribution of these factors to the log likelihood of ICU mortality and length of stay. Factors relating to three groups of staged factors: (1) those preexisting hospitalization, such as chronic conditions; (2) factors present at ICU admission (source of admission, APACHE II scores, ventilation, etc.); and (3) events that occurred after admission (ventilation, procedures and complications) were identified.

RESULTS. Data on 891 patients was prospectively collected. 59% were male and 41% female, mean age 60.6 SE 0.66, mean APACHE II score was 22.6 SE 0.35. Our sample showed 21.5% mortality, with over 70% of this associated with a diagnosis of septic shock and multi-organ failure on admission. ICU Length of stay was described by a Weibull distribution, mean 10.5 days SE 0.45 (median 6), 10% of stays exceeding 24 days and an outlying maximum of 91 days. An overall stepwise regression showed than 43% of the variance in mortality could be accounted for by the following variables: a chronic state of immunosuppression prior to admission; at admission a diagnosis of septic shock or ARDS, the APACHE II score, and whether the admission was from a ward (compared to emergency room or another unit); during ICU stay, ventilation and non-respiratory complications. ICU length of stay was also shown to be significantly associated with several factors, depending on whether ICU stay is concluded by discharge or mortality. Pre-existing neurological diseases, pre-ICU length of stay, APACHE II score, interventions including ventilation and respiratory and non-respiratory complications were associated with a longer ICU stay in surviving patients.

CONCLUSION. We provide an analysis of factors associated with increased ICU mortality and length of stay at the various stages of pre-admission, admission, and events during ICU stay. These initial findings also point to several subgroups of patients for which separate outcome models should be constructed.

0441

THE PLASMATIC LEVEL OF TRANSTHYRETIN IMPROVES THE PREDICTIVE CAPABILITY OF THE SEVERITY SCALES

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INTRODUCTION. The transthyretin is a visceral protein which has been traditionally used as a marker of the nutricional state. It represent the magnitude of the inflammatory response and has a good correlation with the level of organ dysfunction. Recent studies have demonstrated that this protein is a predictor of the morbimortality outcome in critically ill patients. The Severity score systems and organ failure scores are imprecise and have lack of predictive ability. The use of new variables could improve the existing models. The aim of this study is to determine the inclusion of the transthyretin level in the severity scales and in indicators of organ failure to improve the predictive capability of these models.

METHODS. Prospective cohort study including all patients consecutively admitted at ICU during one year period. First step: designing models including transthyretin to the main severity scales (APACHE II y III, SAPS II) and organ failure scores(SOFA y MODS). Second step: validation, calibration study (Goodness of fit, observed / expected mortality correlations) and discrimination (area under ROC curves, diagnostic index and determination coefficient) of these models.

RESULTS. The models were obtained by multivariate logistic regression including transthyretin to the reference scales (called scale* tr). The validation cohort were 346 patients (62% men, 60.5 $\pm$ 17.8 years old). Causes of admission: severe sepsis / septic shock 27.3%, respiratory failure 23.6%, acute neurological events 18.6%, heart failure 10.2%, acute intoxication 5.6%. Mortality at ICU was 25.2% and at hospital was 33.9%. Discrimination study and calibration of the scales (Table 1 below): (S sensibility, E specificity, PPV predictive positive value, r correlation coefficient, r2 determination coefficient). Predictions was more accurate for the main subgroups of critical ill patients (respiratory, sepsis, cardiologic), except for neurological diseases.

TABLE 1.

Discrimination and calibration study

	ROC curves AUROC (CI 95%)	Diagnostic index S - E - PPV (%)	Goodness of fit Chi2 test (p)	Obs/exp mortality r (r2)	p value
APACHE II*th	0.937 (0.88-0.97)	77 - 92 - 83	5.56 (0.65)	0.993 (0.986)	.000
APACHE II	0.853 (0.79-0.91)	58 - 89 - 73	4.07 (0.77)	0.975 (0.950)	
APACHE III*th	0.913 (0.86-0.96)	73 - 91 - 81	5.33 (0.72)	0.992 (0.984)	.000
APACHE III	0.820 (0.75-0.89)	59 - 89 - 73	4.66 (0.76)	0.979 (0.958)	
SAPS II*th	0.927 (0.88-0.97)	77 - 90 - 80	2.43 (0.93)	0.995 (0.990)	.000
SAPS II	0.817 (0.75-0.88)	46 - 90 -69	7.50 (0.48)	0.939 (0.881)	
SOFA*th	0.917 (0.87-0.96)	77 - 90 - 80	8.26 (0.48)	0.990 (0.981)	.000
SOFA	0.826 (0.76-0.89)	56 - 87 -69	4.12 (0.76)	0.974 (0.948)	
MODS*th	0.908 (0.86-0.95)	77 - 89 - 78	5.56(0.69)	0.989 (0.978)	.000
MODS	0.805 (0.73-0.87)	52 - 84 - 71	8.23 (0.22)	0.967 (0.935)	

CONCLUSION. The inclusion of plasmatic levels of transthyretin as an a additional variable improves the predictive ability of the severity scales and indicators of organ failure.

Poster Sessions
Quality improvement 0442-0453

0442

INDICATORS OF QUALITY IN THE CRITICAL PATIENT IN OUR UNIT

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INTRODUCTION. As a result of the study iniciated by the GT planning, organization and management of the SEMICYUC, we contribute our results of the monitoring of the indicators of quality in the criticaly ill patient. Objective. Monitoring of the indicators in our unit and afterwards proposal of areas of improvement.

METHODS. Prospective, observational study of the patients admitted in our unit. Our intensive care unit consists of 7 polivalent beds in private setting, the average ingression rate is 700 per year. We registered the indicators as proposed in the multicenter study designed by the working party of the SEMICYUC: 1. Early administration of AAS in the acute coronary syndrome (3 months); 2. Semi-upright positioning of patients with invasive mechanical ventilation (15 days) 3. Prevention of tromboembolic events (15 days) 4. Pneumonia associated with mechanical ventilation (3 months) 5. Profylaxis of gastrointestinal hemorrhage in patients with invasive mechanical ventilation (15 days).

RESULTS. 1. Early administration of AAS in the acute coronary syndrome, during the 3 months of the study we diagnosed a total of 24 patients with ACS, all of them received AAS in the first 24 hours which results in a 100% compliance for this indicator. 2. Semi-upright positioning of patients with invasive mechanical ventilation (IMV), during the period of monitoring we attended 7 patients with IMV $>$ 24 hours, which made a total of 9 days of IMV, we complied to the indicator of semi-upright position 100% 3. Prevention of tromboembolic events, in the 15 days of monitoring we attended to a total of 35 patients with a stay over 24 hours and we achieved profylaxis of deep venous thrombosis in 31, which leads to a compliance of 88%. 4. Pneumonia associated with mechanical ventilation, during the 3 months of monitoring we recorded a total of 55 days of IMV in a total of 20 patients and 2 pneumonias associated with IMV, which comes down to a total of 36 per 1000 episodes. 5. Profylaxis of gastrointestinal hemorrhage in patients with invasive mechanical ventilation, during the 15 days of the study we attended a total of 4 patients with IMV $>$ 48 hours with a compliance to the indicator of 100%.

CONCLUSION. Discussion. In our unit the indicators have a high percentage of compliance, the only divergence being the pneumonia associated with mechanical ventilation which is due to the small number of patients with IMV. Due to the characteristics of our unit, with the private setting and the high number of admissions of post surgical patients (70%), IMV $>$ 24 hours constitudes a low percentage of our patients. We also have to stress the fact that there where non-labour days during the time of the study. Conclusions. In our unit the indicators of quality of the critical patient have a high compliance rate. The use of IMV $>$ 24 hours in our unit has a low occurance rate.

GRANT ACKNOWLEDGEMENT. Work group of quality indicators of the SEMICYUC.

0443

DRUG INTERACTIONS IN A SURGICAL ICU: AN INCIDENCE AND PATIENT SAFETY ANALYSIS

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INTRODUCTION. Drug-drug interactions can cause adverse drug events (ADEs) and affect ICU patient care. A pharmacist on rounds decreases the number of preventable order-writing ADEs and positively impacts patient safety, outcome and drug costs. The aim of this study is to describe the frequency of drug-drug interactions and its implications on patient outcome.

METHODS. From August 2006 to February 2007 our clinical pharmacist, present on daily rounds, conducted an active screening of all ICU physician orders searching for drug-drug interactions (Epocrates Rx® drug reference). These interactions were classified in seven different groups according to potential adverse effects: neurological, cardiovascular, gastrointestinal, renal / metabolic, pharmacokinetic, hematological and others. Once an interaction was identified the ICU team was warned to detect and report any possible ADE and the pharmacist could make interventions judged necessary like a recommendation of an alternative therapy or dose adjustments. Physicians· acceptance rate of these interventions and incidence of ADEs were recorded.

RESULTS. We analyzed 333 orders with 3118 prescribed items. There were 1661 drug-drug interactions identified (1 interaction per 2 prescribed items) and these interactions were present in 333 orders (100%). Neurological was the leading group with 29.4% (n=489) followed by cardiovascular 24.1% (n=400), gastrointestinal 13.6% (n=226), renal/metabolic 12.2% (n=203), pharmacokinetic 10.8% (n=179), hematological 5.4% (n=90) and others 4.5% (n=74). A great variety of therapies was involved in these interactions. The clinical pharmacist made 27 interventions in order to change the prescribed drug therapy and acceptance rate was 67%. The incidence of order-writing ADEs was 3.3 per 1000 patient days. There was not ADEs-associated mortality rate during the study period.

CONCLUSION. Drug-drug interactions are frequent and involve the majority of routinely prescribed items in ICU environment. Neurological and cardiovascular are the most common affected systems. These interactions can adversely affect patient outcome and a clinical pharmacist integrating the multiprofessional ICU team can help to identify and minimize its effects.

0444

MONITORING QUALITY INDICATORS IN CRITICAL PATIENTS

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INTRODUCTION. The Spanish Society of Intensive and Critical Care Medicine and Coronary Units(SEMICYUC)published a set of quality indicators in 2005. This study aimed to evaluate the degree of compliance with 5 quality indicators considered essential in critical care.

METHODS. Prospective, observational, cohort study carried out at 80 centers over a 3-month period. Compliance with 5 essential indicators in all patients meeting the criteria established in the quality indicators manual(1) was monitored.1. Early administration of acetylsalicylic acid (ASA)in acute coronary syndrome;2. Semirecumbent position in patients undergoing invasive mechanical ventilation (MV);3. Prevention of thromboembolism;4. Pneumonia associated to MV(PAV);5. Prophylaxis against gastrointestinal hemorrhage(GIH)in patients undergoing invasive MV. Indicators 1 and 4 were monitored throughout the 3-month study; indicators 2, 3, and 5 in 15-day periods. Statistical analyses (ANOVA) were performed using SPSS 12.0 and the significance level was set at 0.05. Data are expressed as means(standard deviation)or medians(interquartile range).

RESULTS. The image shows the % of compliance with the indicators evaluated and compares the results with the established standard.

	Mean	SD	10	25	50	75	90	95
ASA N=70	91.8	8.5	78.4	87.9	94.2	98.60	100	100
Semirecumbent position N=802	01.1	25.3	36.5	72.7	92.0	100	100	100
TE prevention N=2390	77.4	21.6	48.1	64.4	84.0	93.9	100	100
PAV; N=3173	19.8	24.2	0.0	6.25	16	25.6	38.3	52.8
GHIProphylaxis N= 717	96.5	9.7	85	100	100	100	100	100

Indicator	Established standard	% of hospitals complying with the standard
1	100 %	16.70 (22.85%)
2	97%	30.74 (40.5%)
3	90%	26.70 (33.3%)
4	18 episodes /1000 days MV	44.75 (58.7%)
5	95%	67.77 (87%)

CONCLUSION. The quality indicators have enabled specific, concrete aspects of critical care to be monitored with reliable, valid, objective, quantitative information. Although the degree of compliance is high in many hospitals, there is room for improvement in most of the indicators monitored.

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0445

IMPLEMENTATION OF AN OFF-LABEL RECOMBINANT ACTIVATED FACTOR VII PROTOCOL IN CRITICAL ILL PATIENTS

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INTRODUCTION. Patients with severe and persistent bleeding have high mortality rates despite standard therapy. Recombinant activated Factor VII (rFVIIa) must be considered as a pharmacological complementary treatment for critical ill patients suffering from acute bleeding (ACBL). The aim of this report is to evaluate the role of rFVIIa in the management of severe bleeding refractory to other treatments following a regular protocol for its administration in our ICU.

METHODS. During a one year period (February 06-February 07) a protocol of rFVIIa was applied to patients who were admitted with ACBL diagnosis in our ICU. The protocol was developed by a commission of experts according to the recommendations of use of rFVIIa indicated by Martinowitz et al (1). Indication: any salvageable patient suffering from massive uncontrolled bleeding that fails to respond to appropiate surgical measures and blood component therapy. Preconditions: fibrinogen >50 mg/dl, platelets >50000xmm3, pH >7,2, no hypothermia.

RESULTS. 6 patients with ACBL fulfilled the criteria of the protocol. Etiology of the bleeding: 4 surgical and 2 obstetric. The average of age was 52 [15-76]. Mean APACHEII was 23 [14-36]. In all cases only one dose of rFVIIa of 90 mcgr/Kg was given. Transfusion requirements: red blood concentrates (RBC), fresh frozen plasma (FFP), cryoprecipitate (CRY) and platelets (PLT) decreased significantly. In addition, prothrombin time (PT) and activated partial thromboplastin time (APTT) improved. 5 patients survived and were discharged from hospital, one patient died due to nosocomial pneumonia. There were no adverse events.

Before an After rFVIIa administration

Before-After	PT (s)	APTT (s)	Hct (%)	RBC (U)	PLTS (U)	FFP(U)	CRY(gr)
Case 1	11.9 - 11.5	28 - 23.7	20 - 23.6	12 - 0	4 - 0	6 - 0	0 - 0
Case 2	45 - 10.4	>180 - 41.8	15.7 - 31	10 - 0	5 - 0	8 - 0	0 - 0
Case 3	34.7 - 10.1	41.9 - 31.8	23 -30	5 - 0	0 - 0	8 - 0	0 - 0
Case 4	20.5 - 9.4	28 - 20.7	17.2 - 31	7 - 1	0 - 0	6 - 0	0 - 0
Case 5	39.2 - 12.6	>180 - 36.7	14.7 - 32	5 - 0	0 - 0	8 - 0	1 - 0
Case 6	20 - 7.7	37.8 - 29.9	26 - 27	5 - 2	0 - 0	3 - 0	1 - 0

Abbreviations: s=seconds, Hct= hematocrit, U= units, gr=grammes

CONCLUSION. Following an agreed protocol model, the use of rFVIIa may have an important role in achievement of an adequate hemostasis, reduces blood requirements and the adverse events in patients with ACBL.

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0446

MISSED MEDICATIONS IN ACUTELY ILL PATIENTS

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INTRODUCTION. Acutely ill patients are particularly sensitive to healthcare errors [1] and are of increasing interest to critical care clinicians. We previously identified a 26% rate of missed medications in patients admitted unexpectedly to ICU from medical and surgical wards [2]. The aim of this study was to examine medication administration practices across all patients in a sample of medical and surgical wards in four NHS Trusts.

METHODS. We conducted a prospective audit of medical and surgical patients across 4 sites in the South West of England. Data collected included: all instances of, and reasons for, non-therapeutic medication omission. We also recorded whether the patient was an 'outlier' and examined nursing documentation where no reason for medication omission was given on the drug chart.

RESULTS. We examined records for 162 patients. The number of patients who missed at least one medication was high across all sites (n= 129/79.6%, range 60-88%). Data revealed a small number of patients who were outliers (eg surgical patients on a medical ward); there was no relationship between outlier status and missed medications. The first dose of a drug was no more likely to be omitted than subsequent doses.

CONCLUSION. 1. Our data suggest a much higher rate of missed medications in medical and surgical ward patients who are not admitted to ICU. 2. The extent of missed medications in acutely ill patients is of concern. 3. The lower rate of missed medications on one site (60%) suggests that organisational factors should be explored.

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0447

POST PARTUM COMPLICATIONS IN AN INTENSIVE CARE UNIT: A RETROSPECTIVE STUDY

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INTRODUCTION. Obstetric patients are usually young and healthy. However, the potential for complications is real and they may be related to the pregnancy itself, aggravation of previous illness, or complications of the operative delivery. Hypertension related complications and massive obstetric hemorrhage due to uterine atony are the leading causes for admission of obstetric patients to the ICU.

METHODS. We retrospectively studied 42 patients admitted to the intensive care unit (ICU) between January and December 2006.

RESULTS. From 8248 obstetric hospital admissions at this period, 42 patients (0.5%) were admitted at the ICU (2%of all ICU admission). The overall median age was 33 years old with a median ICU length of stay of 2 days and also a mortality rate of 2.3%. The leading reason for admission was obstetric illness (64.3%), with hypertensive related complications corresponding to 38% and hemorrhagic complications to 26.3%. Aggravation of previous illness counted for 35.7% of all admissions. The group of patients with hypertensive related complications presented a mean age of 33.5± 1.0 years old, a mean length of ICU stay of 4. 4 ± 1.9 days with median APACHE II of 10. All patients were discharged from ICU. In the group of patients with hemorrhagic complications 63.6% had hemorrhagic shock. In this subgroup of patients, mean age was 30.6± 2.9 years old, mean length of ICU stay was 4.6±1.2 days and the median APACHE II was 8. Hysterectomy was performed in 71.4% of these patients and mortality rate was 14.2%.

CONCLUSION. Our data corroborate with previous studies showing that the leading causes of admission at ICU are hypertensive related complications and hemorrhagic complications. Moreover, our mortality rate was less than 5%, similar to the literature described rate.

0448

EPIDEMIOLOGY OF SURGICAL PATIENTS IN BRAZILIAN ICUS

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INTRODUCTION. We aimed to evaluate the epidemiology of surgical patients in Brazilian ICUS and to identify factors associated with increased risk of death.

METHODS. A multicenter cohort study in 21 Brazilian ICUs. Total 885 adult patients submitted to either elective or emergency surgeries and admitted in the ICU were evaluated, 587 were enrolled. Exclusion criteria were trauma, cardiac, neurological, gynecologic, obstetric and palliative surgeries. Numerous clinical and surgical factors, POSSUM score and a new score (adapted from ACC/AHA guidelines and Shoemaker criteria) were tested in a logistic regression model.

RESULTS. Median age was 65 years. Complications occurred in 38% of the patients. The commonest complications seen were sepsis (48%), ventilator weaning failure (26.5%), pneumonia (26.5%) and gastrointestinal dysfunction (21%). ICU and hospital mortality rates were 15% and 20.8%, respectively. A total of 94 % of the patients dying after surgery had significant medical co-morbidities (median 3). Main causes of death were MODS (53.4%) and cardiovascular failure (12.5%).

CONCLUSION. Patients with malnutrition, history of alcoholism and low functional capacity were more likely to die mainly after emergent or major surgeries.

TABLE 1.

Surgical and clinical predictors of death and complications

Predictor	Odds Ratio	CI 95% lower	CI 95% upper	p value
Death				
Emergent surgery	6.13	3.81	9.86	0.000
Major surgery	3.49	1.96	6.20	0.000
Malnutrition	3.06	1.67	5.58	0.000
Low funct capacity	2.50	1.51	4.15	0.000
Alcoholism	2.35	1.07	5.18	0.034
New Score	2.04	1.26	3.31	0.004
Complications				
Emergent surgery	4.75	3.15	7.16	0.000
Alcoholism	2.57	1.18	5.59	0.017
Malnutrition	2.09	1.16	3.75	0.014
Major surgery	2.07	1.36	3.15	0.001
Low Func Capacity	2.04	1.28	3.25	0.003
New Score	1.81	1.21	2.72	0.004
Age	1.48	1.00	2.20	0.049
POSSUM Score pre	1.36	1.05	2.54	0.029

0449

CENTRAL LINE UTILIZATION AND CATHETER-RELATED BLOODSTREAM INFECTIONS IN AN INTERMEDIATE RESPIRATORY CARE UNIT

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INTRODUCTION. Intermediate Respiratory Care Unit (IRCU) provides effective care for patients with acute and acute on chronic respiratory failure. Central lines are necessary for most admitted patients. Incidence of catheter-related bloodstream infections (CRBSIs) in these units has not been described but may cause significant morbidity, mortality and increases in health care costs. Recently a group of evidence-based interventions called bundle has been shown to reduce CRBSI. Our objective is to describe central line use profile, risk factors and incidence of CRBSIs besides the impact of central line bundle use in an IRCU.

METHODS. Twenty-six consecutive subjects who needed central lines were prospectively studied in a seven beds IRCU of a tertiary care hospital between June 2006 and April 2007. We describe information on demographics and initial severity of illness. Nurses previously trained applied a bedside checklist with key components of central line bundle. Catheter data was collected as total number of inserted catheter, number of catheter lumen, site of insertion, length of time to catheter placement, needleless closed blood sampling system use, catheter length of stay and compared to infection and non-infection suspicious groups. CRBSIs were defined as more than 15 CFUs per catheter segment and positive blood cultures with the same microorganism. The bundle utilization impact was compared with historical data eleven months before. The results are expressed as mean standard deviation (SD). For statistical analysis was used chi-square for evaluated difference of proportion, and considered statistical significance $p<0.05$.

RESULTS. Fourteen male and twelve female were studied. The mean age and APACHE II score were 74.13 ± 8.91 and 16.69 ± 4.38 respectively. One hundred catheters were inserted (65% were conventional double lumen catheter and 35% were tri-lumen hemodyalisis catheter). Adherence to aseptic technique during insertion was 100%. The site of insertion was: 48% in femural veins, 33% jugular veins and 19% sbclavian veins. The mean length of time to catheter placement was 24.19 ± 16.02 minutes. Needleless closed blood sampling system was used in 40% of catheters. The mean catheter length of stay was 9.29 ± 4.10 days. Fifty-one catheters were removed for suspected infection. The tri-lumen hemodyalisis catheter was statistically related to suspected infection ($p=0.01$). The mean incidence per 1000 catheter-days of CRBSI eleven months before and after the bundle implementation was 8.4 and 3.1 respectively.

CONCLUSION. The patients studied were old and critically ill. The tri-lumen hemodyalisis catheter was frequently related to suspected infection. The incidence of CRBSIs was reduced after introduction of central line bundle to the clinical practice.

0450

WHY DO PATIENTS DIE IN INTENSIVE CARE UNITS?

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INTRODUCTION. Intensive care units (ICUs) provide intensive observation and treatment for critically ill patients, but the total hospital mortality is high at 30.0%. This is according to statistics from the Intensive Care National Audit and Research Centre (ICNARC) Case Mix Programme database. Most of the deaths occur in ICU itself (19.5%), rather than after discharge from ICU (10.5%). The purpose of this study was to see if the deaths in the Lister Hospital ICU were related to the initial clinical insult or caused by a complication that developed during the ICU stay.

METHODS. This retrospective study included all patients admitted to the Lister Hospital ICU over a 1-year period from 1 April 2005 to 31 March 2006. For all patients who died in ICU, an ICU consultant classified the cause of death into the following three categories: (1) initial reason for admission; (2) co-morbidity – e.g. myocardial infarction that occurred after ICU admission on a background of ischaemic heart disease in a patient who was admitted after having had major surgery; or (3) complication that developed because the patient was in ICU – e.g. line sepsis or ventilator-associated pneumonia.

RESULTS. There were 320 admissions to Lister ICU over the 1-year period. Some were repeat admissions, leaving 299 individual patients to study. The total hospital mortality was 37.2%. 83 patients (27.8%) died in ICU, 28 patients (9.4%) died after discharge from ICU but prior to hospital discharge and 188 patients (62.9%) survived to hospital discharge.We were able to obtain medical notes for 65 of the patients who died in ICU. Of these 65 patients, 44 patients (67.7%) died due to initial reason for admission, 7 patients (10.8%) died due to co-morbidity, and 14 patients (21.5%) died due to a complication that developed because the patient was in ICU. Of the 18 patients for whom we could not obtain medical notes, 8 patients stayed in ICU for 1 day, 9 patients stayed for 2 days and 1 patient stayed for 3 days before dying in ICU. The short lengths of stay for these 18 patients suggest that they died due to initial reason for admission.

CONCLUSION. Our study reveals that most of the deaths in ICU were related to the initial clinical insult for which they were admitted. Less than a third of the deaths were related to a complication that developed during their ICU stay, whether the complication was related to co-morbidity or being in the ICU environment. This is surprising, as ICU admissions are for patients who suffer an acute deterioration that is potentially recoverable. Therefore, deaths that occur in ICU should be related to complications that subsequently develop rather than the initial clinical insult. Our finding that the converse is true could imply that we may be too unrealistic in our assessment of whether the acute clinical problem is potentially recoverable or not.

0451

COMPARISON OF COMPLICATIONS WHILE ON THE WARD IN PATIENTS DISCHARGED FROM INTENSIVE CARE UNIT VERSUS HIGH DEPENDENCY UNIT

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INTRODUCTION. Previous studies have looked at survival post HDU1 and mortality and morbidity post ITU2. The aim of this study was to determine differences in complication rates between patients discharged from Intensive care and High dependency care.

METHODS. We conducted a prospective observational study of all patients admitted to intensive care and high dependency care, and included all those discharged to the wards between September 2006 and March 2007. We looked at demographic data, severity of acute illness (Acute Physiology and Chronic Health Evaluation [APACHE] II), primary diagnosis, length of stay in ITU/HDU and organ systems supported while on critical care. We also looked at support patients received on the wards post discharge. We followed patients on the wards to determine complications occurring before discharge or death.

RESULTS. There were 159 patients discharged to the wards between September 2006 and March 2007. Of these, 69 required admission to the Intensive Care Unit, and the remaining 90 required only High Dependency care. A total of 16 patients died on the ward after receiving Critical Care. Mortality rate was higher after ITU discharge (13.2% vs 7.95%). Although the total complication rate was higher in post-HDU patients, the major difference was higher incidence of renal impairment (Table1). Of note, patients discharged after only HDU care received an average of one day less under the critical care outreach team compared to those discharged from ITU (3.2 days vs 4.2 days).

	Post ITU	Post HDU
Total	69	90
Renal Impairment	3.4%	12.3%
Myocardial Event	3.4%	3.7%
Drop in Haemoglobin	8.4%	8.6%
Sepsis	32.0%	32.1%

CONCLUSION. Higher rates of renal impairment in patients post HDU versus ITU may be explained by several factors. On discharge from ITU care, patients are routinely placed on step-down wards, corresponding with their major medical/surgical problem as compared to discharge after HDU where the patients are discharged directly to the general wards. The supportive management patients receive on step-down units is superior to general wards. Also the critical care outreach team is in place to identify patients at risk of critical deterioration while on the general wards and notify doctors with concerns. In our study, post-ITU patients had more input from the outreach team compared to post-HDU patients. Potential complications are avoided by detection of early warning signs. We recommend that post-HDU patients be discharged to a step-down facility before going to general wards and should receive more input from outreach team to decrease the rate of complications.

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0452

ANALGOSEDATION IN ICU: REMIFENTANIL-PROPOFOL VS MORPHINE-MIDAZOLAM

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INTRODUCTION. Analgo-sedation must be implemented, being am important tool in ICU patients management. It allows pain tollerance during nursing and invasive procedures, stress-control, heamodynamic stability and better intracranial pressure control, avoidance of accidental extubation, reduction of needs for neuromuscolar drugs and lenght of mechanical ventilation (thus reducing risks of pneumoniae), improvement of amnesia, tollerance and satisfaction of the patients. The aim of a randomized prospective study in aUniveritary Hospital is to compare a remifentanil-propofol protocol with a morphine-midazolam one, for a safety treatment and a better patient and staff satisfaction in a general ICU.

METHODS. Following the Ethical Commitee approval, 80 consecutive patients, potentially needing analgesia and sedation were enrolled and randomly assigned to two study protocols: Group 1 receiving remifentanil (0.006-0.007 mcg/kg/min) and propofol (0.5-4 mg/kg/h); Group 2 morphine (0.5 mcg/kg/min) and midazolam (start dose 0.03 mg/kg plus continuous infusion 0.03-0.12 mg/kg/h). Before starting infusion SOFA, SAPS, GCS were evaluated, while VAS, NRS, and BPS were repeated for pain control Sedation was controlled by Ramsay score and SAS. Ramsay results of 2-3, SAS 3-4, VAS <3, NSR <3, and BPS <6 were considered suitable during the analgo-sedation protocol appliance. ANOVA and Mann-Whitney U-test were used as appropriate. P values below 0.05 were considered statistically significant.

RESULTS. Group 1 seems to present a faster rescue time, a better extubation time and a shorter ICU recovery length ($p<0.001$). The better haemodynamic control in Group 1 allowed a faster reduction of cathecolamines infusion. Pain evaluation was statistically significant better controlled in Group 1 compared to Group 2 ($p<0.001$). Patient satisfaction was finally evaluated in long survivors and the results were discussed during auditing activities.

CONCLUSION. The main goal of the study was to evaluate the appliance of national recommendations for analgo-sedation. Remifentanil and propofol protocol seems more efficient and safer when compared to morphine-midazolam for the patients recovered in our general ICU. A shorter time of mechanical ventilation and ICU stay, could be considered in cost-benefit evaluation even when using more expensive drugs in ICU.

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0453

WITHDRAWAL OF TREATMENT IN CRITICAL CARE

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INTRODUCTION. The practise of withdrawal of treatment varies from unit to unit. If it is carried out properly it could decrease the amount of suffering the patients and the relatives undergo and it would also save valuable resources, which could be utilised more constructively. There was a relative's complaint on unnecessary prolongation of treatment and this lead to this prospective study. We proposed to study the frequency, reasons, documentation, delays and the process of withdrawal of treatment.

METHODS. The study was carried out at the New Cross Hospital, Wolverhampton UK over a period of 2 months May and June 2005. The critical care unit has 10 ITU and 6 HDU beds. A proforma was prepared after obtaining the suggestions from the consultants and the nursing staff working in this critical care unit. I was contacted when a decision to withdraw treatment was made. I went through the notes and the monitoring charts to fill in the details in my proforma. The patients were followed up from this point.

RESULTS. Treatment was withdrawn on 9 patients and there were 42 admissions during the audit period. The commonest reason was 'Unfavourable response in spite of aggressive treatment' followed by 'Poor neurological condition'. 7 out of 9 patients suffered from multi organ failure while 2 patients suffered irreversible neurological damage. The decision to withdraw was made by a single ITU consultant in majority of the cases. Withdrawal decision to death time ranged from 15 minutes to 12 hours. The commonest mode of withdrawal was by Extubation. DNAR forms were filled for 4 patients only. Quality of documentation varied from short and concise to long notes lacking relevant information. There was no documentation in one case. The documentation by the trainees was found to be sub standard.

TABLE 1.
Mode of withdrawal and decision to death time

	Mode of withdrawal	Decision to death time (minutes)
Patient 1	Extubation	25
Patient 2	Extubation start resedate	120
Patient 3	Extubation, stop IABP&Inotropes, resedate	15
Patient 4	Discontinue NIV	15
Patient 5	Extubation	Incomplete data
Patient 6	Organ retrieval	840
Patient 7	Ventilatory support reduced	245
Patient 8	Ventilatory support reduced	840
Patient 9	Discontinue NIV	90

CONCLUSION. Partial withdrawal was associated with delay in death. Complete withdrawal was associated with quicker death. Documentation was sub optimal. Inadequate information was provided when trainees did the documentation. Majority of the patients suffered from multi organ failure.

Poster Sessions
Metabolic response to sepsis 0454-0461

0454

HYPERGLYCEMIA ALTERS HUMAN PERIPHERAL BLOOD MONONUCLEAR CELLS OXYGEN CONSUMPTION IN CONTROL AND SEPTIC CONDITIONS

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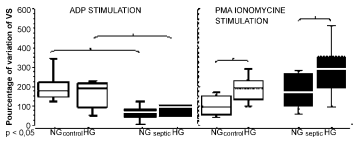
INTRODUCTION. Tight glucose control has been recommended in critically ill patients but for debated reasons. This study was designed to assess in vitro the effect of glucose (Glc) supplementation on oxygen consumption (VO2) of human peripheral blood mononuclear cells (PBMC), the main effectors of innate immunity during sepsis.

METHODS. Blood samples were harvested from healthy volunteers and PBMC were isolated from whole blood. Incubation at room temperature in control (donor) or septic plasma sampled at day 0 of septic shock with (hyperglycemia HG: +12.5 mmol/l Glc) or without (normoglycemia: NG; 6.4±1 mmol/l). Measured parameters: PBMC glucose uptake; VO2 (Clark oxygen electrode chamber, Fischer Bioblock Scientific, Switzerland): Vo (basal) and Vs: stimulation of oxygen consumption by PMA-Ionomycine (increases reactive oxygen species (ROS) production by NADPHoxidase stimulation and mitochondrial respiration) or ADP (stimulation of mitochondrial respiration only); these 2 metabolic pathways were respectively inhibited with DPI and antimycin A. Statistical analysis: median ± IQR, non-parametric tests.

RESULTS. Addition of Glc induced: -in Control condition: 1/ higher Glc uptake (2.5±0.6 vs. 5.9±1.3 mmol/l/10E6 PBMC, $p<.05$); 2/ no effect on the stimulation by ADP; 3/ amplified stimulation by PMA-ionomycine (Fig1, $p<.05$). -in Septic plasma condition: 1/ smaller increase in Glc uptake (1.8±0.3 vs. 3.2±0.7 mmol/l/10E6 PBMC, $p<.05$) than in control condition ($p<.05$); 2/ inhibition of the stimulation by ADP without any effect of Glc addition; 3/ increased response to PMA-ionomycine with added Glc (Fig1, $p<.05$). DPI blunted the PMA-ionomycine Vs similarly in NG and HG conditions (about 70%). ADP stimulation was totally blocked by antimycin A. Figure 1: impact of glucose on the modification of VO2 in control and septic conditions.



CONCLUSION. In control conditions, addition of Glc increased ROS production in response to PMA-ionomycine. This effect was amplified in septic condition while mitochondrial VO2 was inhibited. Depending on extra-cellular Glc level, PBMC were able to exhibit an explosive ROS production, which might be useful for killing bacteria, but deleterious for tissue cells.

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0455

MRNA MODIFICATION OF THE MUSCLE VOLTAGE DEPENDANT SODIUM CHANNEL BY SEPSIS

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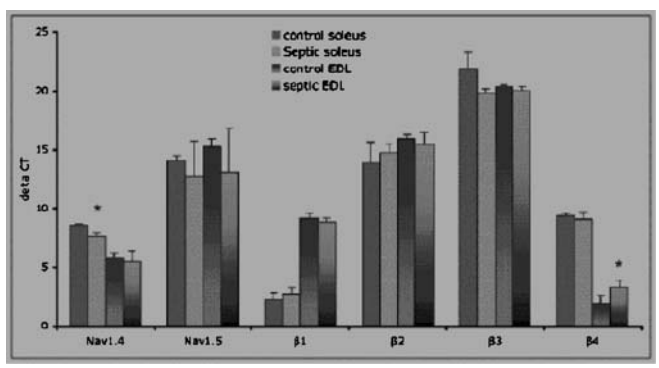
INTRODUCTION. Loss of excitability of skeletal muscle is a central feature of critical illness myopathy (CIM). Electrophysiology alterations of the voltage dependant sodium channels Nav were reported in animal models of CIM (1). Nav is a complex protein with α (Nav1.4 mature, Nav1.5 immature) and β subunit (β1 to β4). The β subunits modulate Nav. The aim of this study was to analyse if sepsis may induce modifications of mRNA of mature, immature and β subunits of Nav.

METHODS. Sepsis was induced by cecal ligation and puncture. At Day 8, a fast twitch (extensor digitorum longus EDL) and a slow twitch (Soleus) muscles were analysed. After Trizol extraction and DNase reaction, mRNA expression was studied with real time PCR (delta delta Ct).

RESULTS. Sepsis induces an increase of Nav1.4 mRNA in soleus (*2, $p<0.05$) and a decrease of β4 subunit mRNA (*0.4, $p<0.05$) in EDL without significant modification of the other Nav mRNA (fig 1). Figure 1: delta Ct for the different mRNA. * $p<0.05$.



CONCLUSION. Modifications of Nav mRNA are not the main event associated with Nav electrophysiology modifications induced by sepsis. Other factors like phosphorylation of Nav or variation of the resting potential remain to be analysed.

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0456

INFLAMMATORY MEDIATORS ENHANCE EXPRESSION OF VASCULAR ATP-SENSITIVE POTASSIUM CHANNELS

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INTRODUCTION. Activation of vascular ATP-sensitive potassium (K_{ATP}) channels is implicated in the pathogenesis of septic shock. Upregulation of channel function may relate to increased activity and/or channel number. We used a cell model to investigate the effect of an inflammatory insult on K_{ATP} gene expression and whether this involved overproduction of nitric oxide (NO).

METHODS. Quiescent primary cultures of rat aortic smooth muscle cells were treated with *S. typhi* lipopolysaccharide (LPS; 1 mug ml^{-1}) and interleukin (IL)-1"eta (10 ng ml^{-1}) for 48 h, with or without 1400W (10 muM), a selective inhibitor of inducible NO synthase. Levels of gene expression of the pore-forming Kir6.1 subunit and the regulatory SUR2B subunit (the two components of the K_{ATP} channel) were determined using RT-PCR. Densitometry quantified mRNA levels with respect to the housekeeping gene, "eta-actin. Rubidium efflux (a surrogate marker of K^+ efflux) and the membrane potential-sensitive fluorescent dye, $DiBAC_4(3)$ assessed functional responses to levcromakalim, a specific K_{ATP} channel opener.

RESULTS. In LPS/IL-1"eta treated cells, Kir6.1 subunit expression increased 1.84±0.25 fold ($p < 0.05$, $n = 4$), an effect reversed by 1400W. By contrast, SUR2B levels did not change. Rubidium efflux significantly increased, as did the response to 1 muM levcromakalim (from 12±0.1% to 16.7±0.1%, $p < 0.001$, $n = 12$-15). Levcromakalim caused membrane hyperpolarization in a dose-dependent manner, an effect potentiated in the presence of LPS/IL-1"eta and reversed by 1400W.

CONCLUSION. Increased expression and function of the K_{ATP} channel was seen in this *in vitro* model of sepsis. This increase in activity may be an important factor underlying the vascular hyporeactivity seen in septic shock.

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0457

CARBOXYHEMOGLOBIN LEVELS IN CRITICALLY ILL PATIENTS

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INTRODUCTION. Carboxyhemoglobin (COHb) and lactate levels are now routinely measured by blood gas analyzer in critically ill patients.
Tissue hypoxia is known to induce carbon monoxide production by heme oxygenase (heme degradation) and elevated lactate levels in ICU populations.
We decided to study if COHb and lactate levels could be correlated in these critical patients.

METHODS. 4425 simultaneous routine determinations by blood gas analyzer of COHb and lactate arterial levels in 642 ICU patients suspected of tissue hypoxia were compared. APACHE score of all these patients was superior to 10 on ICU admission.

RESULTS. Sixty eight percent of all patients had elevated lactate levels (>2.5 mmol/l) and 48 percent elevated COHb (>1.5%). There was no statistical correlation between lactate and CoHb levels (r= 0.69 with p <0.0001) in our surgical population. Lactate levels ranged between 0.10 and 28.9 mmol/l and COHB levels between 0.1 and 3.9%.

CONCLUSION. This observation suggests that levels of endogenous CO production are not related with lactate production. CO production could not be significant enough to influence COHb level measured during routine blood gas measurements. Further studies are necessary to confirm the observation that COHb doesn't reflect tissue hypoxia like lactate production does in routinely performed gas analyses in critically ill patients.

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0458

EFFECTS OF HYPEROXIA ON GLUCOSE METABOLISM DURING PORCINE FECAL PERITONITIS

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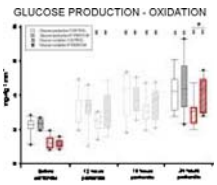
INTRODUCTION. Sepsis is associated with oxidative stress resulting from increased formation of reactive O2 species. Since mitochondrial dysfunction in sepsis is directly related to the degree of oxidative stress [1], hyperoxia is considered harmful under these conditions. However, hyperoxia was shown to redistribute blood flow in favour of the hepato-splanchnic system and to improve survival in hypodynamic shock models. Therefore we investigated the effects of pure O2 ventilation on the hepatic carbohydrate metabolism during fecal peritonitis-induced porcine septic shock.

METHODS. After induction of fecal peritonitis, pigs were ventilated for 24 h with 100% O2 (n=10) or a FiO2 adjusted in order to obtain a SaO2 > 92% (n=10). During continuous i.v. infusion of stable, non-radioactively labelled 1,2,3,4,5,6-13C6-glucose, blood isotope (gas chromatography-mass spectrometry) and expiratory gas 13CO2 (non-dispersive infrared spectrometry) enrichment were measured to derive the rates of gluconeogenesis and direct aerobic glucose oxidation [2]. Within group effects were analyzed using a Friedman ANOVA on ranks, intergroup differences with an unpaired rank sum test.

RESULTS. The rate of gluconeogenesis progressively increased but did not reveal any intergroup difference. In contrast, at the end of experiment aerobic glucose oxidation was significantly higher in the hyperoxic animals when compared to the control group (figure 1).



CONCLUSION. Since the O2 uptake was comparable in the two groups, the higher glucose oxidation rate suggests that pure O2 ventilation switched metabolism to a preferential use of glucose as an energy fuel. Hence, 100% O2 ventilation was affiliated with an improved yield of energy metabolism in early septic shock since glucose oxidation provides the best ratio between ATP-synthesis and O2-consumption.

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0459

PROTOCOL-GUIDED FLUID REMOVAL IN PATIENTS WITH FLUID OVERLOAD, SIRS AND CONTINUOUS RENAL REPLACEMENT THERAPY

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INTRODUCTION. Fluid retention typically occurs during the early resuscitation of unstable patients. Persistent positive fluid balance prolongs recovery and is associated with increased morbidity and mortality. Protocol-guided fluid removal with continuous renal replacement therapy (CRRT) may facilitate removal of excess fluid. The aim of the present study was to test the feasibility of protocol-driven fluid removal with CRRT in patients in whom standard CRRT was not successful.

METHODS. We studied 8 patients with SIRS [SAPS II 68 (25), mean (SD); all ventilated, 5 septic], CRRT, excess volume overload and invasive hemodynamic monitoring (PA catheter, PiCCO). The protocol was driven by mean arterial pressure (MAP), cardiac output (CO), mixed venous saturation (SvO2), filling pressures, capillary refill time and peripheral skin temperature. The fluid removal was adjusted hourly to maximize volume removal while maintaining stable circulation.

RESULTS. A total of 507 hours were included. Daily fluid balance after starting the protocol-guided fluid removal was [mean (95%CI)] -4117 ml (-2041 to -6192) on day 1, -4819 ml (-2856 to -6782) on day 2 and -3588 ml (-1179 to -5997) on day 3. This was markedly negative compared to daily fluid balance before study entry (p<0.0001): 308 ml (2196 to -1580), 1272 ml (3186 to -642.0) and 686 ml (2583 to -1209) on days -1 to -3, respectively. During the whole study period (maximum 72 hours) MAP, CO, SvO2 and extravascular lung water (EVLW) (mean of 8 hours) did not change significantly.

CONCLUSION. Fluid removal according to a fluid removal protocol with CRRT and hourly adaptation of the fluid removal rate to standard hemodynamic goals permits high volume fluid removal in patients with SIRS and fluid overload, without hemodynamic compromise and relevant impact on MAP, CO, SvO2 or EVLW.

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VAGUS NERVE STIMULATION AND NICOTINE EFFECTS IN PERITONITIS-INDUCED ALI IN RATS

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INTRODUCTION. The cholinergic pathway has been identified as playing a key role in the communication between the central nervous system and immune system. The potential beneficial role of vagus nerve stimulation (VNS) remains to be clarified in established sepsis. We hypothetized that VNS or nicotine administration would reduce ALI and mortality in a model of established sepsis.

METHODS. Four hours after induction of peritonitis by cecal ligation puncture (CLP) rats were randomized in 3 groups of 7 animals according to the intervention: Group I (GI) served as control, GII VNS, GIII Nicotine 400mg intraperitoneal (Nic). Survival and lung injury score (histology) were determined 8h after CLP. TNF-a, IL-6, IL-10, TATc were determined at baseline and 4h after intervention.

RESULTS. Survival at 8h was 71.4%, 100% and 23.8% in controls, VNS and Nic respectively ($p<0.05$ VNS vs Nic). All animals had lung damage but total score and PMN infiltration were more pronounced in Nicotine compared to VNS and controls. IL-6, IL-10, TNF-a and TATc were elevated in all groups but the difference was not significant.

CONCLUSION. In this model of established sepsis in rats, posttreatment by VNS was associated with increased survival while Nicotine administration was associated with increased lung damage and mortality. This suggests that VNS acts by other ways than nicotine receptor only and that high-dose Nicotine might reduce bacterial clearance to explain increased mortality.

0461

CLINICAL OUTCOME OF CRRT IN SEVERE SEPSIS

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INTRODUCTION. Renal failure is a complication of severe sepsis and septic shock. Patients may require continuous renal replacement therapy (CRRT). Anticoagulation with systemic unfractionated (UF) heparin and regional citrate are used to improve dialysis filter survival.

METHODS. A retrospective study was performed on subjects with renal failure from severe sepsis and septic shock requiring CRRT in our medical intensive care unit (ICU) from January 2005 to December 2005. Systemic UF heparin was used prior to June 2005 and regional citrate subsequently. The primary outcomes of our study were the twenty eight day mortality and time to renal recovery. The secondary outcomes include the length and cost of MICU stay, length of mechanical ventilatoin for intubated patients and dialysis filter survival.

RESULTS. Of 38 patients recruited, eighteen were on UF heparin. 9 patients in the heparin group and 14 in the citrate group died within 28 days (p=0.177). The median time to renal recovery was 32 hours in the heparin group and 44 hours with citrate (p=0.96). Patients on heparin during CRRT spend 3.00 ± 4.79 days in ICU while those on citrate spend 6.50 ± 9.11 days (p=0.23). Intubated patients on heparin spend 1.00 ± 3.22 days on the mechanical ventilator while those on citrate spend 3.50 ± 8.21 days (p=0.058). Fewer filters clotted on citrate CRRT (4 vs 13) (p=0.051). Heparin was found to be a significantly cheaper mode of anticoagulation (p=0.041).

TABLE 1.

Patients' demographics	Systemic UF Heparin (n=18)	Regional Citrate (n=20)	p value
Age (years)	67 ± 13.9	70 ± 10.4	0.81
Males (%)	10 (45.5%)	12 (54.5%)	0.52
APACHE II Scores	35 ± 5.12	35 ± 5.52	0.50
Patients Intubated (%)	5 (27.8%)	9 (45%)	0.40

APACHE = Acute Physiological and Chronic Health Score

TABLE 2.

Clinical Outcomes	Systemic UF Heparin (n=18)	Regional Citrate(n=20)	p value
28 Day Mortality (%)	9 (50%)	14 (70%)	0.177
Renal Recovery Time (h 95%CI)	32 (27.76, 38.24)	44 (25.85, 62.15)	0.96
Filters used in study	18	20	0.573
Filters Clotted (study population)	13	4	0.051
Median ICU Stay (days)	3.0 ± 4.8	6.5 ± 9.1	0.23
Median Cost of ICU Stay (Euros)	3218.06 ± 5744.08	7733.49 ± 8023.71	0.041
Mechanical Ventilation(days)	1.0 ± 3.2	3.5 ± 8.2	0.058

14 patients ventilated in the study

CONCLUSION. Better filter survival with citrate did not result in better clinical outcomes. Though patients on heparin CRRT show better outcomes, none were clinically significant.

Poster Sessions
Evaluation of prognosis and predisposition 0462-0474

0462

CELL-FREE PLASMA DNA AS A PREDICTOR OF OUTCOME IN SEVERE SEPSIS

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INTRODUCTION. Apoptosis is a key pathophysiological process in sepsis. Increased concentrations of cell-free plasma DNA have been found in various clinical conditions, including trauma and critical illness. It is likely that this cell-free DNA originates from accelerated apoptotic or necrotic cell death. We have recently shown that the maximum cell-free plasma DNA concentration is independently associated with the hospital mortality in critically ill patients and it is also associated with the degree of organ failure. The aim of our study was to assess the predictive value of cell-free plasma DNA regarding ICU and hospital mortality in patients with severe sepsis or septic shock.

METHODS. Finnsepsis study was a prospective study about incidence and prognosis of sepsis in Finland. All adult consecutive ICU admissions were screened daily for severe sepsis in a 4 month period (1.11.2004-28.2.2005) in 24 ICUs and included if the ACCP/SCCM (1992) criteria were met. Blood samples for cell-free plasma DNA analysis were drawn after the consent on day 0 and 72 hrs later. The cell-free plasma DNA was measured by real-time quantitative PCR assay for the eta-globin gene.

RESULTS. Blood samples were obtained from 255 patients. Mean age was 59 years (SD 15.5) and mean APACHEII and SAPSII scores were 24 (SD 9) and 44 (SD 17), respectively. 252 samples were obtained on baseline and 220 72 hrs later. ICU and hospital mortality rates were 13% (n=34) and 26% (n=67). The median cell-free plasma DNA concentration was 8070 GE/ml on baseline and 7457 GE/ml 72 hrs later. The plasma DNA concentrations were significantly higher in ICU non-survivors (median 15904 GE/ml, interquartile range 6815-44940 GE/ml) than in survivors (median 7522 GE/ml, IQR 3488-15554 GE/ml) on baseline ($p<.001$), and 72 hours later (median 15176 GE/ml, IQR 7018-37978 GE/ml and median 6758 GE/ml, IQR 3449-14868 GE/ml; $p=.004$). The plasma DNA concentrations correlated significantly with the first day and maximum SOFA scores ($p<.001$, $p=.001$). The ROC curve for day 0 and 72 hrs plasma DNA concentrations revealed a good area under the curve (AUC) of 0.72 (95%CI 0.60-0.85) and 0.70 (95%CI 0.58-0.80) regarding ICU mortality.

CONCLUSION. The cell-free plasma DNA concentration measured on baseline and 72 hours later showed good discriminate power regarding ICU mortality and is associated with the degree of the present and the developing organ failure.

GRANT ACKNOWLEDGEMENT. Helsinki University Central Hospital-TYH 6235

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AUTONOMIC DYSFUNCTION PREDICTS BOTH ONE- AND TWO-MONTH MORTALITY IN MIDDLE-AGED PATIENTS WITH MULTIPLE ORGAN DYSFUNCTION SYNDROME

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INTRODUCTION. Multiple organ dysfunction syndrome (MODS) is a disease entity that continue to be associated with a high mortality. It is characterized by a sequential failure of several organ systems after a trigger event, most commonly sepsis. There is increasing evidence that autonomic dysfunction may substantially contribute to the development of MODS. We recently characterized the spectrum of autonomic dysfunction by use of heart rate variability in critically ill MODS patients and were able to show that autonomic dysfunction predicts 28-day mortality in MODS (1). The aim of the present study was evaluate whether autonomic dysfunction is also a predictor of 180-day and 365-day mortalities.

METHODS. Design: Prospective cohort study. Setting: Twelve-bed medical intensive care unit in an university center. Patients: 90 consecutively admitted score-defined MODS patients. Interventions: Assessment of heart rate variability as a marker of autonomic dysfunction. The patients were followed up for 180- and 365-day mortalities.

RESULTS. We used the heart rate variability variable lnVLF which predicted 28-day mortality best in the entire cohort of patients now prospectively for analysis of 180- and 365-day mortalites. Total mortalities after 180 and 365 days were 65% (55/85) and 70 % (60/85), respectively (for comparison the 28-day-mortality was found to be 35%). Patients with blunted VLF had particular high mortalities: the Hazard ratio for 180-day mortality was 2.0 (95% CI 1.2-3.6, p=0.01) and for 365-day mortality 1.7 (95% CI 1.02-2.9, p=0.04).

CONCLUSION. Conclusions: Autonomic function of critically ill MODS patients is blunted and this attenuation has prognostic implications not merely concerning 28-day-mortality but also concerning longer-term (about two-month) mortality.

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GRANT ACKNOWLEDGEMENT. HS, UMW and DH are supported by grants of the "Deutsche Forschungsgemeinschaft" (SCHM 1398/3-1,-2; HOY 1634/8-1,2).

0464

EARLY PULMONARY NITROXIDATIVE STRESS PRODUCTION HAS PREDICTIVE VALUE FOR MORTALITY IN SEPTIC PATIENTS

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INTRODUCTION. During sepsis and mechanical ventilation Nitric Oxide (NO) is produced by lung cells. We study if pulmonary NO production is a prognostic factor in mechanically-ventilated septic patients.

METHODS. We studied 50 patients with sepsis within the first 48 hours of sepsis. Nitrite and nitrate (NOx-) and 3-Nitrotyrosine (3NT) in plasma and bronchoalveolar lavage fluid (BALF) were analyzed by the Griess/Vanadium chloride method and ELISA, respectively. Results were expressed as median and interquartile range. Receiver operator curves were constructed to compare the predictive value of NOx- values in BALF at admission with other variables. Kaplan Meier analysis was used to compare survival between high and low BALF NOx- levels at admission. A p value less than 0.05 was considered significant.

RESULTS. At study admission in the sepsis group nonsurvivors had higher levels of BALF NOx- than survivors 20(17-33) μM,27 versus 72(46-91) μM, 23, p = 0.0001. At day 7 BALF 3NT was higher in nonsurvivor septic patients than in survivors 1666(30-3173) pmol/mg protein versus 291(13-1908) pmol/mg protein. BALF NOx- had the highest area under the receiver operator curve for mortality (0.812, p = 0.001) in relation with other variables. Septic patients with BALF NOx- above 36 μM had a relative risk for mortality of 4.23. The difference between low bronchoalveolar NO (BALF [NOx-] < 36 μM at admission) group versus high bronchoalveolar NO group (BALF [NOx-] ≥ 36 μM at admission) in ICU mortality was significant , 19% versus 78%.(Log Rank 18.19, p= 0.00001.

CONCLUSION. Pulmonary NO production has predictive value for ICU mortality during sepsis.

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0465

DEFINING PREDISPOSITION IN PIRO: A SCORING SYSTEM FOR STAGING SEPSIS

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INTRODUCTION. In 1991 an expert panel developed consensus definitions of sepsis, severe sepsis and septic shock [1]. In 2001, another expert panel concluded that the prior classification scheme remained adequate but speculated that a new scheme that incorporated features of the Tumor Nodes, Metastasis (TNM) staging system used in clinical oncology may better prognostically define sepsis and related disease states [3]. The acronym PIRO was chosen for: predisposition P, insult/infection I, response R, and organ dysfunction O. The present inquiry evaluates variables associated with predisposition P as related to mortality due to sepsis.

METHODS. We analyzed variables associated with P from the placebo arm of an integrated clinical database of severe sepsis patients (1231 patients in INDEPTH, Eli Lilly and Company,) and validated the results in a registry of sepsis patients called PROGRESS (11.925 patients) using Classification and Regression Tree (CART) methodology and logistic regression.

RESULTS. The current Score for Predisposition is: P0) Patient age less than 46 years P1) Patient age from 46 to 64 years, with no chronic liver disease (CLD) or congestive cardiomyopathy (CC) P2) Patient age from 64 to 85 years, with no CLD and no CC P3) Patient age from 46 to 64 years, with CLD, or patient age from 64 to 85 years, with CC P4) Patient age from 64 to 85 years, with CLD, or patient age greater than 85 years We define CLD as follows: clinical manifestations of oesophageal varices, chronic jaundice, cirrhosis, or chronic ascites. We define CC- NYHA class IV - patients with cardiac disease resulting in the inability to carry on physical activity without discomfort. Results are based on the CART tree. Training indicates patients enrolled in INDEPTH and validation patients in PROGRESS. 1 represents death. Increasing thresholds of P (P0, P1,etc.)increase the odds of mortality (table1).

TABLE 1.

28-Day (INDEPTH) or In-Hospital (PROGRESS)

Data Set (n)	P0	P1	P2	P3	P4	Odds Ratio	95% CI Lower	95% CI Upper
INDEPTH	12.7	25.1	37.9	56.7	76.0	2.06	1.80	2.35
PROGRESS	37.6	46.7	53.3	59.0	64.2	1.32	1.28	1.37

CONCLUSION. Identification of variables correlated with predisposition P is an initial step. Subsequent studies would then be needed to test the clinical efficacy of PIRO scoring system in the diagnosis and management of sepsis.

GRANT ACKNOWLEDGEMENT. We acknowledge EliLilly for the access to the databases. We declare no financial support.

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ANGIOTENSIN CONVERTING ENZYME INSERTION/DELETION POLYMORPHISM IS NOT ASSOCIATED WITH SUSCEPTIBILITY AND OUTCOME IN SEPSIS AND ARDS

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INTRODUCTION. The insertion/deletion (I/D) of a 287 base pair Alu repeat sequence polymorphism in the angiotensin-converting enzyme (ACE) gene has been shown to predict susceptibility and outcome in the acute respiratory distress syndrome (ARDS). We hypothesised that the I/D polymorphism may also confer susceptibility to sepsis and be a predisposing factor for morbidity and mortality of patients with severe sepsis, with or without ARDS.

METHODS. A case-control study including 212 consecutive patients fulfilling criteria for severe sepsis who were admitted into a Spanish Network of post-surgical and critical care units, and 364 population-based controls. Susceptibility and mortality, as primary outcomes, development of ARDS and number of failing organs were examined using an additive model of inheritance, in which patients were classified into three genotype groups according to the distribution of I and D alleles: II, ID, DD.

RESULTS. Genotype and allele frequencies of I/D were similarly distributed in all septic, ARDS and non-ARDS patients, and in population-based controls. ACE genotypes were not associated with susceptibility to severe sepsis (p=0.340) or ARDS (p=0.895). Overall mortality was 44.8%; 120 patients had ARDS (mortality 62.5%). Mortality from severe sepsis (p=0.559) or from ARDS (p=0.950) was not associated with any ACE genotype. This association remained non-significant when using a multiple logistic regression analysis including other covariates.

CONCLUSION. Our data do not support an association of I/D polymorphism in the ACE gene with susceptibility and outcome of patients from Spanish ancestry with severe sepsis or with sepsis-induced ARDS.

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MOLECULAR STUDY OF HUMAN PROTEIN C (PROC) AND ITS RECEPTOR (PROC R) AS CANDIDATE GENES FOR THE SUSCEPTIBILITY TO DEVELOP SEVERE SEPSIS WITH MULTIPLE ORGAN FAILURE

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INTRODUCTION. To identify genetic markers of PROC and PROC C loci that may be associated with the susceptibility to develop sepsis, which may adversely affect the prognosis of patients.

METHODS. Between March 2003 and December 2004, a prospective, multicenter, national study was carried out in adult medical-surgical ICUs. A total of 106 samples from patients with severe sepsis and/or septic shock and 176 control samples from the general population were collected. Single nucleotide polymorphisms (SNPs) in the PROC (promoter region rs1799809 alleles [A and G] genotypes [GG, AA, GA] and rs1799808 alleles [C and T] and genotypes [CC, TT, CT] and PROC C (intron 4–5 rs2069945, alleles [C and G] and genotypes [CC, GC, and GG]) genes were identified and analyzed. The method of fluorescence resonance energy transfer (FRET) coupled to real-time PCR was applied and the following alleles and genotypes in the Spanish population were validated … Statistical tests included deviation from Hardy-Weinberg equilibrium for genotyping error and the Sasieni and Kruskall association tests for quantitative variables.

RESULTS. In the group of patients with severe sepsis and/or septic shock, there were statistically significant differences (P = 0.009) for the mean APACHE II score in genotype CC of SNPs of PROC C, without significant differences for the remaining variables (SOFA 24 h, prothrombin time, partial thromboplastin time).

SNP type	Groups or subgroups	OR 95%	CI_ P	
rs1799809	Cases vs controls	0.558	0.303–1.025*	0.058
rs2069945	Presence of shock	2.275	1.282–4.038	0.004
rs1799808	Presence of MOF	0.247	0.073–0.830	0.01†

OR: odds ratio, CI: confidence interval, MOF: multiple organ failure, *Sasieni test, †homozygous test

CONCLUSION. Genotype AA + GA vs GG of the PROC gene (SNPs809) was found to be involved in a higher susceptibility to develop sepsis, genotype CC (SNPs808) to present multiple organ failure, and genotype GC to develop shock. Genotype CC of PROC C was related to a higher APACHE II score. None of the SNPs studied seemed to affect the prognosis of patients.

0468

A CXCL2 POLYMORPHISM IS ASSOCIATED WITH BETTER OUTCOME IN PATIENTS WITH SEVERE SEPSIS

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INTRODUCTION. Several studies have implicated the CXCL2 chemokine as a mediator in the development of sepsis. We hypothesized that a tandem repeat polymorphism (AC)n in the CXCL2 gene, previously associated with severe sepsis, contributes to morbidity and mortality in severe sepsis.

METHODS. A prospective, observational and genetic study of 183 critically ill patients fulfilling the International Sepsis Criteria for severe sepsis admitted into a Network of Spanish post-surgical and critical care units. Patients were classified into three groups according to the presence of compound 24±1 (AC) repeat genotypes: homozygote 24±1 carriers (HC group), heterozygote 24±1 carriers (HTC), and non 24±1 carriers (NC group). Mortality, development of acute respiratory distress syndrome (ARDS) and number of failing organs were determined for each group.

RESULTS. Overall mortality was 46.4%. HC patients had a lower mortality (39.9%) than HTC (52.2%) and NC (72.7%) patients (Trend test, p=0.018). This difference remained significant when using a multiple logistic regression analysis (p=0.035). The presence of population stratification was ruled out, since 20 independent genomic control markers demonstrated homogeneity among groups. An exploratory analysis of the effect of ARDS on mortality showed a RR of 2.60 in the HC group (p=0.0004), while in the NHC group the RR was 3.34 (p=0.0001).

CONCLUSION. Our data suggest that a tandem repeat polymorphism (AC)n at position -665 in the CXCL2 gene may be an independent predictor of mortality for severe sepsis. Additional studies are needed to confirm these results.

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0469

INCIDENCE AND PROGNOSTIC IMPACT OF NEWLY DIAGNOSED ATRIAL FIBRILLATION IN SEPTIC SHOCK

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INTRODUCTION. Patients with sepsis, particularly those in septic shock often develop atrial fibrillation (AF) (1,2). Interestingly, incidence and prognostic impact of AF in septic shock have scarcely been examined so far. The aim of the present study was to answer the following questions: 1. What is the incidence of newly diagnosed AF on a surgical intensive care unit (ICU)? 2. Which percentage of patients suffering a septic shock eventually does develop AF? 3. What is the impact of newly diagnosed AF on mortality and length of ICU stay in patients with septic shock?

METHODS. We prospectively recorded data of all patients who were newly diagnosed with AF and all those with a septic shock on a surgical ICU (no cardiac surgery) during a one year period according to the requirements of the local ethical committee.

RESULTS. During the observation period 690 patients were admitted to the ICU. 49 patients (7,1 %) newly developed AF during their stay on the ICU. 62 patients (9,0 %) had a septic shock. 14 of the 62 patients with septic shock had chronic AF. Of the remaining 48 septic patients, 22 (46 %) were newly diagnosed with AF. Those patients with septic shock who developed AF, had a higher mortality as compared to septic patients without AF (46 % versus 23 %). Moreover the median length of stay in the ICU of surviving patients was significantly longer in patients with newly diagnosed AF as compared to those without AF (32 versus 18 days).

CONCLUSION. According to our data, more than 40 % of patients with septic shock develop AF. Those patients who do develop AF during septic shock seem to have a considerably poorer prognosis compared to those without AF. AF is a clinically important complication in septic patients and might be a useful criterion in assessing the prognosis of patients with septic shock. To our knowledge this is the first study to describe the incidence and prognostic relevance of newly diagnosed AF in septic shock.

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0470

PAPER OF SERIATED LACTATE MEASUREMENT BEING PART OF A COMPUTERIZED PROTOCOL FOR THE INTEGRAL MANAGEMENT OF SEPSIS (CPIMS) AS AN OUTCOME PREDICTOR IN PATIENTS WITH SEPSIS

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INTRODUCTION. Our objective was to evaluate the utility of seriated lactate measurement as a part of a CPIMS to predict outcome in patients with sepsis.

METHODS. Prospective study, conducted in a teaching hospital in patients with sepsis included in a CPIMS. It automatically produces an annotation on the medical chart and a serie of analytics forms when activated. Plasmatic lactate levels were determined at the moment of activation and after 6 and 12 h. Clinical and analitical variables, as well as severity scores were also collected. Patients have been included fron January 2006 to January 2007. Statistical tests: chi-square, Mann-Whitney, ANOVA, Kruskal-Wallis, Spearman, logistic regression. ROC curves were traced for all seriated lactate determinations and for lactate clearance at 6h [1].

RESULTS. 313 patients were included, 25 (8%) had sepsis, 155 (49,8%) severe sepsis and 131 (42,1%) septic shock. Eighty-five (27,2%) patients deceased, of whom 2 (8%) had sepsis, 30 (19,4%) severe sepsis and 53 (40,5%) septic shock at the moment of activation. Mean lactate levels were 2,66 (2,21) mmol/l, 2,30 (2,11) mmol/l and 2,01 (1,99) mmol/l at the activation moment, at 6 and a 12 hour respectively. Patients with septic shock had significantly higher lactate levels at every moment (p<0,0001). Moreover those levels correlated with the number of organ failure (NOF) for the first 3 d (table 1) and the SOFA score for the first 2 days (p<0,05). Using ROC curves we established a cutoff of 3mmol/l for lactate levels and of 12% for lactate clearance. Pacients with initial lactate >3 (p<0,0001), at 6 h (p 0,006) or at 12 h (p <0,0001) and those with a lactate clearance at 6 h <12% (p 0,032) had higher mortality.

TABLE 1.

ROC curves

	AUC	95% CI	p
Lactate 0	0,617	0,536-0,699	0,003
Lactate 6 h	0,602	0,504-0,700	0,032
Lactate 12 h	0,721	0,633-0,809	<0,0001
Lactate clearance 6 h	0,648	0,553-0,743	0,003

CONCLUSION. seriated measurement of plasmatic lactate as a part of a CPIMS is a useful tool to predict organ failure as well as mortality in patients with sepsis.

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0471

RED BLOOD CELL TRANSFUSION IN CRITICALLY ILL PATIENTS: DETERMINING FACTORS AND INFLUENCE ON OUTCOMES

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INTRODUCTION. Recently it was suggested that critically ill patients can tolerate hemoglobin levels as low as 7 g/dl and a more "liberal" red blood cell (RBC) transfusion strategy may in fact lead to worse clinical outcomes. Objective: To study the RBC transfusion practice in critically ill patients and to examine the relationship of RBC transfusion to clinical outcomes.

METHODS. Prospective observational study of patients admitted in the ICU between 08/01/06 and 02/28/07. We excluded patients with active haemorrhage. Data on demographics, comorbidities, length of ICU stay and ICU mortality were collected.

RESULTS. 479 patients were enrolled. 65 (13.6%) were transfused. Pre-transfusion hemoglobin was 7.49 ± 0.86 g/dl. Related factors to transfusion in multivariate analysis (OD (IC)): UCI LOS 1.03 (1.01-1.05). MV 2.4 (1.1-5.1). RR 5 (1.8-14). Chronic anemia 15 (4-55). Transfused patients had higher ICU mortality (22% vs 9%, p <0.01). However, in a multivariate analysis including SAPS 2, MV, RR and transfusion, only SAPS 2 was significantly related to outcome.

TABLE 1.

	Transfused (65p)	Non transfused (414p)	p
Sex (male %)	60	69	0.1
Age (years)	64 ± 15	60 ± 18	0.03
SAPS 2	46.4 ± 16.3	35.2 ± 17.2	<0.01
Diabetes (%)	27	13	<0.01
Hypertension (%)	50	37	<0.01
COPD (%)	17	7	<0.01
Chronic anemia (%)	14	2	<0.01
Chr renal failure (%)	17	8	0.1
Mech ventilation(%)	68	39	<0.01
Renal replac (RR)(%)	22	3	<0.01
UCI LOS	8 ± 8	3 ± 4	<0.01

CONCLUSION. Our transfusional trigger was approximately 7 gr/dl. RBC transfusion was related to chronic anemia (prior to ICU admittance), the use of invasive supports and the ICU LOS. In our group of patients, RBC transfusion was not related to ICU mortality.

0472

PROGNOSTIC FACTORS AND OUTCOME OF 98 PATIENTS WITH CONSERVATIVE THERAPY OF NECROTIZING PANCREATITIS (NP): WHAT IS THE IMPACT OF AN INFECTION OF THE NECROSIS?

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INTRODUCTION. NP still has a high mortality and the outcome is hard to predict in the individual patient. While in the last years non-surgical therapy of sterile necroses has become the standard of care, infected necroses are currently treated surgically in most centres. We here present the data of 98 consecutive patients with NP treated non-surgically regardless of the infection of the necroses. It was the aim of our study to find prognostic factors relevant for the outcome of patients with conservative therapy of NP focussing on the relevance of the infection of pancreatic necrosis.

METHODS. Data analysis of 98 consecutive patients with NP proven by contrast-enhanced CT-scan admitted to a medical ICU. Patients were treated with with imipenem as first line antibiosis and CT-guided puncture or drainage if appropriate. Surgery was restricted to complications of the puncture or fluid collections not accessible to radiological drainage (n=3). Hemodynamic monitoring using PiCCO or PAC and monitoring of intra-abdominal pressure if appropriate. Statistics: Multiple regression analysis (backward selection); chi-square-test (comparison of survival); SAS software.

RESULTS. Patients characteristics: n=98; 34 female; 64 male; age 53.5+/-15.1 years, maximum CRP 28.4+/-11.7mg/dl, max. APACHE-II-Score 26.4+/-13.4, max. lipase 7375+/-13193U/L; max. LDH 590+/-402U/L. 40/98 (41%) of the patients required mechanical ventilation and 29/98 (30%) dialysis/hemofiltration.
2.) Prognosis: The only independent risk factors at admission to the ICU for an unfavourable outcome were the level of serum creatinine (p=0.0007) and old age (p=0.035). The following parameters were not predictive: etiology of pancreatitis, blood/serum levels of lipase, calcium, glucose, leukocytes and hematocrit as well as the presence of a Cullen- and/or a Grey-Turner-sign.
3.) Mortality: The overall mortality was 12/98 (12%). In 50 patients puncture and drainage of the necroses was performed. The mortality of these patients (6/50; 12%) was not different compared to the patients without puncture/drainage (6/48; 13%). In 35/50 (70%) of the patients with puncture bacteria and/or fungi were cultured in the aspirates. The mortality of these patients (4/35; 11%) was not different compared to the patients with sterile necrosis (2/15; 13%).

CONCLUSION. 1.) The overall mortality of 12% was low with regard to the severity of NP. 2.) Infection of the necroses had no impact on the outcome. Therefore, the presence of infected necrosis is no contraindication to conservative management of NP. 3.) The most important predictors for the outcome were serum creatinine levels and old age.

0473

MONITORING OF BLOOD C-REACTIVE PROTEIN (CRP) CONCENTRATIONS TO EVALUATE THE RESPONSE TO SEPSIS THERAPY

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INTRODUCTION. Sepsis remains an increasingly common killer. Although there are a lot of studies about sepsis, it is a clinical syndrome and uncertainties will remain in its clinical course. The patient populations are very heterogeneous. Some patients will respond well to initial empirical antibiotic therapy while others do not improve and need an adaptation or even a procedure in order to contol the infection. Our study addresses for the first time the value of a dynamic evaluation of blood CRP concentrations in an ICU heterogeneous population of septic patients. Clinical an other biological variables were also studied.

METHODS. In 50 critically ill patients with sepsis, enrolled in a prospective observational multicenter study, CRP levels and standard clinical and biological variables were measured daily from the day of identification of sepsis until death, transfer to the regular floor, or the 7th day, whatever came first. Patients were divided into three groups according to their clinical course: group 1 - patients with a favourable response to the initial antibiotic therapy; group 2 - patients who required a change in antibiotic therapy (shift to or addition of another antibiotic class); group 3 - patients who needed surgery or drainage to control the infection.

RESULTS. The studied population, from two large institutions was similar to those found in most of the ICU's, with a median age of 63 years, a majority of male patients and the lungs as the most common infectious site, and about 76% of positive cultures. We found that an increase in CRP of at least 2.2 mg/dl in the first 48 hours was associated with an inadequate response to therapy with a sensitivity of 77% and a specificity of 67%. CRP concentrations decreased more rapidly and more significantly in group 1 than in group 2 (p=0.001). There is quite a significant variability in baseline CRP levels but we show that the time course during therapy is meaningful. In contrast, no correlation was found between CRP levels and any of the clinical or other biological studied variables. These variables may also vary in numerous other situations than sepsis.

CONCLUSION. Changes in CRP over the first 48 hours of therapy can help to evaluate the response to therapy in septic patients. The daily dosage of CRP is easily accessible, inexpensive to perform, and offers much information, aiding in the clinical course of sepsis and early adequate therapeutic attitudes. Is it not our rescuer?

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0474

HYPOALBUMINEMIA IS THE MOST SIGNIFICANT INDEPENDENT PREDICTOR OF THE 30-DAY MORTALITY IN SEPTIC PATIENTS IN MEDICAL ICU

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INTRODUCTION. Mortality of patients with severe sepsis is 30-50% in spite of contemporary treatments. Early risk stratification by sensitive markers would be helpful. In septic patients scoring systems such as acute physiology and chronic health evaluation II (APACHE II) as well as sequential organ failure assessment (SOFA) on admission and during treatment quantify the disease severity and therefore stratify the risk of adverse outcome. Predictive roles of certain in-hospital parameters such as hypoalbuminemia, increased serum creatinine, C-reactive protein (CRP), lactate and serum blood glucose were studied in some prospective clinical studies, however, their independent predictive roles of outcome in septic patients remain uncertain. Our aim was to evaluate the predictive role of admission APACHE II, admission and total maximum SOFA score, hypoalbuminemia, increased serum creatinine, C-reactive protein, lactate, and serum blood glucose for the 30-day mortality of septic patients admitted to medical ICU.

METHODS. Included were all consecutive patients admitted to our medical ICU in 2005 with criteria for sepsis according to SCCM/ESICM/ACCP/ATS/SIS International sepsis definitions conference. The data were collected retrospectively and the predictive roles of variables were tested by univariate and multivariate regressional statistical method.

RESULTS. In 89 patients (mean age 62.7 +/- 15.2 years, 62.9% men) mean admission APACHE II was 27.2 +/- 3.7, mean admission SOFA score 10.2 +/- 3.7 and total maximum SOFA score 12.5 +/- 4.9. 30-day mortality was present in 37%. We observed significant differences between nonsurvivors and survivors in mean APACHE II (31.97 +/- 8.7 versus 24.5 +/- 10.6 , $P = 0.001$), peak blood glucose (16 +/- 8.3 mmol/l vs 12.6 +/- 4.9 mmol/l, $P = 0.02$) peak serum lactate (6.9 +/- 5.7 mmol/l vs 3.3 +/- 2.2 mmol/l, $P < 0.001$), minimum serum albumin (24.4 +/- 5.1 g/l vs 30.2 +/- 5.9 g/l, $P < 0.001$), peak serum creatinine (451.6 +/- 303.1 micromol/l vs 235.4 +/- 209.3 micromol/l, $P < 0.001$), admission SOFA score (12.4 +/- 2.9 vs 8.9 +/- 3.4, $P < 0.001$) and total maximum SOFA score (15.9 +/- 4 vs 10.5 +/- 4.3, $P < 0.001$). According to regressional statistical analysis, minimal serum albumin level was the most significant independent predictor of the 30-day mortality of septic patients in medical ICU (OR 1.318, hi-square 7.182, $P = 0.007$, 95% CI 1.077 to 1.613).

CONCLUSION. Serum hypoalbuminemia was the most significant independent predictor of the 30-day mortality in septic patients.

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0475

MONITORING OF BLOOD MONOCYTE HLA-DR EXPRESSION DOES NOT RELATE TO OUTCOME BUT PREDICTS OCCURRENCE OF NOSOCOMIAL INFECTION

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INTRODUCTION. Constitutive blood monocyte HLA-DR expression (mHLA-DR) has been shown downregulated in sepsis and other acute inflammation conditions. The amplitude of downregulation was proposed for outcome prediction, and the duration of downregulation for nosocomial infection (NI) risk (1,2). But this has not been clearly demonstrated in ICU patients. Goals: 1) to study the relation between the early decrease in mHLA-DR and outcome in a large population of ICU patients; 2) to evaluate the interest of the mHLA-DR trend to predict the occurrence of NI.

METHODS. mHLA-DR expression was measured twice a week in 235 consecutive patients from ICU admission until discharge or death. This routine measurement was performed by flow cytometry (normal: 21955±12088 event per cells). A logistic regression model was used to study the link between outcome and the early level of mHLA-DR. The relation between the trend (log mHLA-DR individual linear regression against time) and NI ocurrence was evaluated by a regression for competing risks, considering death or discharge as competing events.

RESULTS. Etiologies for non septic patients: neurologic & medical disease (n=100) , severe hemorrage & trauma or severe post-op (53). Relation to outcome: The initial decrease in mHLA-DR for the total population was more pronounced in septic patients (p<0,0001), and significantly associated with mortality (p<0,001). This relation disappeared after adjustment on SAPS II (p=0,09). This observation was valid for the whole population and subgroups, especially septic patients. Relation with NI: A flat trend of mHLA-DR increase was associated with a higher risk of NI (p=0,015) in patients hospitalized at least one week in ICU, even after severity adjustment. Patients who rapidly increased mHLA-DR had less NI and were discharged earlier from ICU.

Population	Total n=235	Non Septic n=153	Septic n=82	Sepsis no shock n=32	Septic shock n=50
SAPS II	39 (28-53)	34 (26-48)	46 (33-59)*	31 (22-40)	58 (44-63) #
SOFA D0	5 (2-8)	4 (2-7)	5 (2-10)	2 (1-4)	8 (5-12) #
Early mHLA-DR	5048(2254-9190)	6915 (3850-10624)	2677*(1238-5313)	4141(1202-6856)	2076(1162-4500)
Death	27(11,5%)	13(10%)	11(13,4%)	1 (3,1%)	10(20%) #
NI	68 (28,9%)	37 (28,4%)	16 (19,5%)	4 (13,5%)	12 (24%)#

*median (Q1-Q3) significance (p<0,05) : *septic vs non septic; # sepsis vs septic shock*

CONCLUSION. The early decrease in mHLA-DR expression is related with mortality, but after the severity adjustment, it does not predict outcome globally or in septic subgroups. A flat trend curve of mHLA-DR expression is associated with a high risk of NI, which increases the ICU length of stay.

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0476

SKIN AUTOFLUORESCENCE AND CAPILLARY PERMEABILITY: RELEVANCE OF MEASURING ADVANCED GLYCATION ENDPRODUCTS IN CRITICALLY ILL PATIENTS

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INTRODUCTION. Advanced glycation endproducts (AGEs) are a diverse class of compounds resulting from a glycation process partly driven by oxidative stress. The accumulation of AGEs has been implicated as a contributing factor in the ageing of proteins and the progression of chronic, age-related diseases. The induction of AGEs was previously thought to occur slowly over weeks to months, but recent data indicates that AGEs can also develop during acute inflammatory conditions. Previous studies indicated that skin autofluorescence is a validated marker for the level of AGEs in skin in several conditions. Whether AGEs are induced during sepsis and whether this is related to outcome is unknown. Besides AGE formation it is also thought that capillairy permeability is a prognostic factor for outcome in patients with severe sepsis.

METHODS. In our pilot, patients were included during the first 24 hours after admission to the intensive care unit. All patients were suffering from respiratory failure and septic shock due to pneumonia. We used the non-invasive autofluorescence on-line technique (AFR) to assess AGE levels making use of their specific fluorescent properties. Additionally we injected a standardized volume of Fluoresceine-Na intravenously to assess the cappilary permeability, meassured by an increase in fluorescence. Data from these patients was compared to critically ill but non-infectious patients and healthy controls.

RESULTS. Skin autofluorescence in 15 patients with pneumonia-induced sepsis was significantly increased compared to 5 control ICU patients and 5 healthy subjects. Moreover, levels of autofluorescence were increased in non-surviving critically ill patients with pneumonia compared to surviving patients. These levels of skin autofluorescence were correlated to CRP, glucose levels, but not to SOFA score. In addition, a significant correlation was found with the capillary permeability.

CONCLUSION. Skin autofluorescence as parameter for levels of AGEs is significantly increased during pneumonia and sepsis and is related to survival, as is capillairy permeability. Before treatment, aimed at reducing AGE related inflammation can be initiated, increased understanding of the relationship between AGE formation and levels of oxidative stress during sepsis should be investigated.

0477

VARIATIONS IN THE REGULATION OF THE T HELPER CELL 17 RESPONSE PATHWAY MAY DETERMINE SEVERITY OF ILLNESS IN SEPSIS

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INTRODUCTION. We have previously demonstrated in humans that the development and progression of severe sepsis is related to a deficiency in pro-inflammatory cytokine production (1). This is characterised by lesser tumor necrosis factor-alpha and interferon gamma (IFNγ) gene expression, which is not explained by variations in the gene expression of the main putative regulator of the T helper cell type 1(Th1) response, IL-12. Consequently, we have investigated whether the development of severe sepsis and outcome following a septic insult are related to variations in gene expression of alternative regulators of T helper cell development, namely IL-18, and the newly defined Th17 regulators, IL-23 and IL-27.

METHODS. Sixty-two intensive care unit (ICU) patients, 13 bacteraemic patients with no acute critical illness and 10 healthy controls were assayed for IL-18, IL-23 and IL-27 mRNA levels over the course of their illness whilst clinical data was also collected.

RESULTS. IL-27 mRNA levels distinguished between the 3 groups (p=0.003), with levels highest in the ICU group, intermediate in the bacteraemic group and lowest in the control group. IL-23 also distinguished between the groups (p=0.03), with levels lowest in the ICU group. Greater IL-27:IL-23 ratios in late sepsis were associated with the development of septic shock (p=0.02) and also associated with higher organ failure scores (p=0.01). Greater IL-27:IL-23 ratios were associated with an increased risk of death in early (p=0.03) and late (p=0.02) sepsis. In late sepsis IL-23 and TNFα mRNA levels were directly related (p<0.0001).

CONCLUSION. A deficient proinflammatory response to an infectious insult is associated with increased disease severity. This is characterised by lesser IL-23 and greater IL-27 mRNA levels. This may reflect an inherent deficiency in either the Th1 or Th17 response pathways in these patients.

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0478

EFFECTS OF FLUID CHALLENGE ON MICROCIRCULATORY ALTERATIONS IN EARLY SEVERE SEPSIS AND SEPTIC SHOCK

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INTRODUCTION. Intravenous fluid therapy is a cornerstone in the management of severe sepsis and septic shock but the effects of rapid boluses of either crystalloids or colloids on septic-induced microcirculatory alterations are not well defined. We hypothesized that fluid administration may improve the microcirculation in the early phase of severe sepsis and septic shock.

METHODS. We used a Sidestream Dark-Field (SDF) imaging device (Microvision Medical, Amsterdam, the Netherlands) to evaluate the sublingual microcirculation in 17 patients with severe sepsis or septic shock during the first 12 hours of resuscitation, in whom fluid challenge was indicated to improve tissue perfusion. Hemodynamic and microcirculatory measurements were obtained before and after a fluid challenge with either 400 ml of a 4% albumin solution or 1000 ml of crystalloid over 30 min. At each assessment, 5 sequences of 20 seconds each were recorded and stored under a random number. An investigator blinded to the patient's clinical course and sequence order, analyzed the images semi-quantitatively. The vessels were separated into large and small using a cut-off value of 20 μm in diameter and two microcirculatory variables were evaluated: percentage of perfused vessels and percentage of perfused small vessels. A Student T-test was used and data are presented as mean ± SD. A p<0.05 was considered as significant.

RESULTS. While arterial pressure and vasopressor use remained unchanged, microcirculatory perfusion increased and lactate levels decreased during fluid challenge (Table 1).

TABLE 1.

	Before	After	p
Mean Art P, mmHg	73,5 ± 5,5	74,9 ± 7,6	0,35
Card outp, L/min (n)	6,6 ± 2,2 (11)	7,0 ± 1,9 (11)	0,45
ScvO2, %	71,2 ± 5,1	71,3 ± 4,4	0,90
Lactate, mmol/L	2,3 ± 1,4	2,1 ± 1,4	0,005
% total perfus vessel	80,9 ± 8,2	90,0 ± 7,0	< 0,001
% small perfus vessel	75,4 ± 8,4	88,0 ± 5,9	< 0,001

CONCLUSION. These results suggest that fluid resuscitation can improve the sublingual microcirculation in the early phase of severe sepsis. SDF monitoring may become a new tool to guide fluid therapy in critically ill patients.

0479

THE EXPRESSION OF INNATE IMMUNITY AND COAGULATIVE RESPONSE IN ACUTE LUNG INJURY. SEPTIC VERSUS NON SEPTIC PATIENTS.

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INTRODUCTION. It has been shown that the activation of Toll like receptors (TLRs), Cytokines and some markers of procoagulant and anticoagulant balance exert an important role in the trigging and in the amplification of the lung and systemic inflammatory responses. The goal of this study was to determine the relationships among the alterations of innate immunity and coagulative responses and Acute Lung Injury(ALI) in septic and in non septic patients.

METHODS. We selected two different groups of ALI patients: patients with a positive miniBAL cultures and CPIS >3(ALI-p) (n=22); patients without a positive miniBAL cultures and CPIS <3 (ALI-extrap) (n=20). We collected miniBAL and peripheral blood and then, we evaluated the expression of TLR4 and of TLR2 in miniBAL cells and in peripheral blood mononuclear cells by immunocytochemistry, and IL-8 and IP-10 concentrations in mini-BAL supernatants and in serum by ELISA. Thrombomodulin (TM), Tissue Factor/VIIa (TF/VIIa), Antithrombin III (AT) and protein C (PC) levels were monitored.

RESULTS. We have registered a significantly increased expression of TLR4 and significantly increased levels of IP-10 in the miniBAL of ALI-p when compared to the miniBAL of ALI-extrap. Increased expression of TM and TF-VIIa with a significant reduction of ATIII and specially PC levels were registered (p<.01). TLR2 expression and IL-8 concentrations were similar in the miniBAL of the two groups. Furthermore, we demonstrated an increased of IP-10 concentrations in the serum of ALI-p when compared to ALI-extrap. We did not observe significant differences in terms of TLR2 and TLR4 expression or in terms of IL-8 concentrations in peripheral blood of the two groups.

CONCLUSION. The assessment of TLR4 molecule and IP-10 concentrations in miniBAL samples may be putative diagnostic tools for identifying specific phenotypes of ALI patients and may be useful as new molecular targets for specific treatments. In our data this is also confirmed for coagulative markers and specially for the coagulation inhibitors.

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0480

LOW DOSE STEROIDS IN LATE SEPTIC SHOCK PATIENTS WITH MODS

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INTRODUCTION. According to the guidelines for the management of severe sepsis and septic shock, low doses of steroids are recommended in septic shock patients requiring vasopressors, despite adequate fluid replacement. The aim of this retrospective case control study was to assess the effectiveness of low doses of hydrocortisone in patients with late septic shock and MODS.

METHODS. The study was held in a 19 bed multidisciplinary ICU of a tertiary hospital. Twenty four Norepinephrine dependent (> 0.5 γ/kg/min) patients, fulfilling the criteria of septic shock, were enrolled in the study. Patients were divided in 2 Groups according to the continuous administration of 300 mg Hydrocortisone for > 7days (Group A:12 pts) or conventional treatment (Group B:12 pts). End points of the study were, the within 7 days vasopressors weaning, evolution of MODS and 7-day as well as 28-day survival. MODS was described by SOFA score. Statistics : Statistical analysis was computed by using paired t-test and linear regression analysis.

RESULTS. Groups were similar regarding demographics (57+17 vs 64+15 y), initial SOFA score (10 +3 vs 9,5+2), initial Norepinephrine dose (1.9 + 0.7 vs 1.13 + 0.6 γ/kg/min) and mean elapsed time from the onset of shock (3.7+3.1 vs 3.5+2.5 days). An early and significant decrease in Norepinephrine dose (p<0.005), was observed in all Group A pts, while no difference was detected in Group B pts. This decrease was associated with hemodynamic stability. On days 3 and 4 mean ABP was significantly higher in Group A pts (p<0.001, P<0.005). Weaning from vasopressors within 7 days was achieved in 5 pts in Group A (41.6%) and 1 pts in Group B (0.8%). Seven day mortality was 16.6% in Group A vs 50% in Group B while 28-day mortality was 50% and 91% respectively. In the treatment group a positive correlation between the within 7 days shock reversal and survival (cor coeff = 0.657, r2 = 0.432, p=0.02) was found. There was no relation between the time elapsed from the onset of shock to the steroid administration and survival (p=0.66). Oxygenation parameters (FiO2/PO2), SOFA score and creatinine did not differ between groups. WBC in Group A pts were significantly higher (p<0.005) only on day 3. No significant adverse effects were detected.

CONCLUSION. In late septic shock patients with MODS the administration of low doses of hydrocortisone is associated with decreased vasopressors requirements, hemodynamic improvement and beneficial effect on survival. The within 7 days shock reversal was a good predictor of survival.

0481

ASSESSMENT OF FUNCTIONAL STATUS OF WHITE CELL POPULATIONS DURING HUMAN SEPSIS

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INTRODUCTION. Prolonged sepsis is associated with the development of immunoparesis, a down-regulation of the immune system, the degree of which is associated with a poor outcome. Little is known about its evolution during the septic process (including the recovery phase), particularly in terms of functionality of the different leukocyte populations. Below are preliminary data from an ongoing study.

METHODS. After appropriate consent was obtained, 20ml blood samples were drawn from previously healthy patients with septic shock (n=5). Associated demographic and clinical data (eg SOFA score, steroid use etc) were also collected plus ICU and hospital outcomes. Samples from healthy volunteers acted as controls (n=3). Total and differential counts were performed by Coulter counter. Flow cytometry was used to assess viability (dual staining annexin V/ propidium iodide to determine apoptosis and necrosis), and characterization of populations (surface molecule expression of characterising lymphocytes, monocytes, and neutrophils). Functional assays were performed on the phagocyte cell population using Phagotest (phagocytic activity assessed as % ingestion of opsonized FITC-labeled bacteria) and Phagoburst (measure of oxidative burst activity in response to opsonized E coli, PMA and the chemotactic peptide fMLP expressed as % positive cells vs non-stimulated controls, and the increase in median fluorescence intensity [MFI]) (kits from Orpegen Pharma).

RESULTS. Compared to controls, septic shock samples taken on ICU day 1 showed a wide range of functional responses with some having a reduced number of functionally phagocytic phagocytes while others retained their phagocytic capacity. Changes in phagocytic capacity were not related to the respiratory burst. Respiratory burst was generally suppressed in septic patients. The viability of the phagocytic population ranged between 90-100% in all septic patients. The proportion of neutrophils of total leukocytes remained constant (85-93%) whereas the monocyte population was more variable (3-11%).

TABLE 1.

	Phagotest	Phagoburst E coli	Phagoburst PMA	Phagoburst fMLP
Control (n=3)	78-87%	79-86% (1.5-38)	79-94% (5-26)	8-28% (0.4-0.9)
Septic (n=5)	59-94%	0.3-84% (1.3-5)	70-95% (1-6)	0-37% (0.8-2)

Phagotest:%phagocytes ingesting EColi,Phagoburst:% positive burst (fold change in MFI)

CONCLUSION. Phagocytic populations of septic patients differ from healthy controls. Variable effects were seen in phagocytic activity and/or respiratory burst in different septic shock patients on Day 1 of admission. This may possibly relate to previous priming or to as yet unexplained immunoparetic mechanisms. Further work will assess the evolution of leukocyte number and functionality, and any relationship to outcome.

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0482

VERY HIGH PROCALCITONIN LEVELS MAY BE ASSOCIATED WITH POOR RESPONSE TO DROTRECOGIN ALFA (ACTIVATED).

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INTRODUCTION. It has been established that raised procalcitonin (PCT) levels >1ng/ml in critical care patients are associated with an elevation of infection-related mortality risk[1]. We have performed a study to assess the effect of drotrecogin alfa (activated)(DAA) on outcome in patients with severe sepsis and very high procalcitonin levels >10ng/ml.

METHODS. We examined the outcome data for 67 consecutive patients with severe sepsis and two or more organ failures who had procalcitonin levels greater than 10ng/ml at the time of critical care admission. PCT was measured using the BRAHMS PCT-Q immunochromatographic test. Patients were divided into 2 groups depending on whether or not they received drotrecogin alfa (activated). For all patients we recorded age, sex, APACHE II score, and outcome at 28 days. Risk of death and standardised mortality ratio (SMR) were then calculated.

RESULTS. Between July 2004 and November 2006 a total of 67 patients with severe sepsis and multiple organ failure had PCT >10ng/ml. Fourty-seven were not given DAA because of 1 or more contraindication or because their prognosis was so poor. The results are shown in the table. The SMR was lower in the group not given DAA.

	Number	Mean age	Male: Female	APACHE II score	Calculated deaths	Observed deaths	SMR
DAA	20	62.9	10:10	24.30	10.69	14	1.31
No DAA	47	63.1	29:18	32.74	24.59	29	1.17

Data for patients with PCT >10ng/ml, severe sepsis and MOF

CONCLUSION. In patients with very high PCT >10ng/ml there was no reduction in mortality associated with the administration of DAA. It is known that mortality increases with elevated PCT >1ng/ml and there may be a point at which the physiological derangement is so severe that DAA is less effective. Given that this drug is expensive and has significant side effects it would be prudent to avoid its use under such circumstances. PCT may be useful in selecting patients for this treatment if our results are repeated in a larger study.

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0483

THERAPEUTIC MILD HYPOTHERMIA IN SEVERE SEPSIS : A PHYSIOLOGICAL RANDOMIZED STUDY

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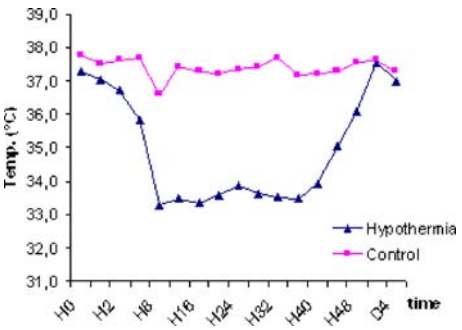
INTRODUCTION. Despite recent advances in treatment, prognosis of severe sepsis remains poor. Indication of mild therapeutic hypothermia are larger since few years, including cardiac arrest, stoke and acute brain injury. Experimental data suggest that mild hypothermia could induce several benefits during severe sepsis (1). The aim of this randomized, controlled, physiological study was to evaluate tolerance and to analyse the effect on physiological parameters of mild hypothermia during severe sepsis.

METHODS. All consecutive intubated and sedated septic patients were included. For patients assigned to the hypothermia group (H), core temperature goal was set between 32 and 34 °c for a 36-hours period. Hypothermia was induced using using an external watercooling blanket (Meditherm II, Gamida), and rewarming was passive. Medical treatment was standardized for all patients. Clinical and physiological data were collected during the first 4-days of management.

RESULTS. 19 patients were included (Hypothermia: n=8, control: n=11). Baseline characterics were similar between the 2 groups. Mild hypothermia was reached within the 4-hours following inclusion (figure 1). During the first 48-hours, respiratory, hemodynamic and biological parameters were similar between the 2 groups. No significant adverse effect was observed in the hypothermia group.



CONCLUSION. Mild hypothermia is easily reached during severe sepsis, without any adverse effect. A large randomized controlled trial should be conducted to evaluate potential clinical benefits.

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0484

BETA BLOCKER THERAPY IN PATIENTS WITH SEPTIC CARDIOMYOPATHY

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INTRODUCTION. Since adrenergic stress and catecholamine-induced myocardial stunning may contribute to the pathogenesis of septic cardiomyopathy we evaluated the effects of beta blockers in patients with septic cardiomyopathy and shock.

METHODS. Twenty patients with septic shock requiring milrinone therapy who were treated with enteral metoprolol after stabilization of cardiovascular function and within 48 hours after onset of shock were included into the retrospective study protocol. Hemodynamic, laboratory and clnical data documentation was performed immediately before, 6, 12, 24, 48, 72, and 96 hours after the first metoprolol dosage. The incidence of the following adverse events was evaluated during metoprolol therapy: symptomatic or asymptomatic bradycardia, decrease in mean arterial blood pressure, cardiac or stroke volume index, central venous oxygen saturation, and hypoglycemia. Descriptive methods and a linear mixed effects model was used for statistical analysis.

RESULTS. Metoprolol therapy was started after cardiovascular function had been stabilized (18.2±14.9 hrs after onset of shock) and was targeted to reduce heart rate to 95-65 bpm. Hemodynamic data and laboratory parameters were documented immediately before, 6, 12, 24, 48, 72, and 96 hours after the first metoprolol dosage. A linear mixed effects model was used for statistical analysis. Heart rate ($p<0.001$), central venous pressure ($p=0.018$), norepinephrine ($p<0.001$) and milrinone dosages ($p=0.04$) significantly decreased during beta blocker therapy. Cardiac, stroke volume and cardiac power index remained unchanged. Metoprolol was discontinued in two patients because of asymptomatic bradycardia. Norepinephrine and milrinone dosages had to be increased in seven and four patients, respectively. In none of the four patients with a decrease in cardiac index a decrease in central venous oxygen saturation occurred. Arterial lactate levels ($p<0.001$) and C-reactive protein serum concentrations ($p=0.024$) decreased during the observation period.

CONCLUSION. Enteral metoprolol therapy in combination with phosphodiesterase inhibitors seems to be safe and may be beneficial in patients with septic cardiomyopathy and shock. Further studies on the use of beta blockers for septic cardiomyopathy are warranted.

0485

INITIAL HEMODYNAMIC VARIATIONS WITH TWO DIFFERENT CONTINUOUS RENAL REPLACEMENT THERAPIES IN CRITICALLY ILL PATIENTS WITH SEPTIC SHOCK AND ACUTE RENAL FAILURE. HIGH-VOLUME HEMOFILTRATION AND COUPLED PLASMA FILTRATION ADSORPTION.

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INTRODUCTION. Septic shock represents the leading cause of mortality in critically ill patients worldwide. The cornerstone of therapy continues to be early recognition and prompt initiation of antibiotic plus hemodynamic support measures. Continuous renal replacement therapies (CRRT) seem to play an important role in the early management of septic patients with acute renal failure, based on classical depuration properties and mediator clearance capacity. Different CRRT include: -Convection techniques as high-volume hemofiltration (HVHF). -Adsorption techniques as coupled plasma filtration adsorption (CPFA); introduced in recent years,it's a technique that separates plasma from the blood by means of a plasma filter. The plasma is then passed through a synthetic resin cartridge and returned to the blood. A second blood filter is used to remove excess fluid and small molecular weight toxins.

METHODS. The aim of this prospective and not randomized study was to analyze and compare the hemodynamic effects of both techniques(HVHF and CPFA). We studied twelve patients (n=12) with septic shock and acute renal failure. We initiated either of the two CRRT when patients fullfilled renal depuration criteria. We analyzed the clinical effects by measuring main hemodynamic parameters and vasoactive drugs requirements during the first twelve hours. We started CPFA in four patients (mean age was 61 years, 50% were male, and mean APACHE II was 26), and HVHF in eight patients (mean age was 50 years, 37% were male, and mean APACHE II was 28).

RESULTS. In table 1 we represent the variation percentages in main hemodynamic parameters and norepinephrine requirements after the first twelve hours of CRRT. No adverse effects due to CRRT were registered.

TABLE 1.

	Heart Rate	Systolic Arterial Pressure	Dyastolic Arterial Pressure	Norepinephrine
HVHF (n=8)	- 12%	+ 14%	+ 14%	- 11%
CPFA (n=4)	- 9%	- 7%	+ 4%	- 27%

CONCLUSION. We observed hemodynamic improvement and significant reduction in norepinephrine requirements with both techniques.

0486

NECROTIZING FASCITIS AND ORGAN FAILURE: A CLINICAL EXPERIENCE IN ICU

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INTRODUCTION. Necrotising fascitis (NF) is a soft-tissue infection associated with rapid progression, extensive necrosis, systemic toxemia and high mortality (up to 70%). The aim of this study was to analyze the clinical presentation and to evaluate mortality associated factors (timing and accurancy of diagnosis, timing of surgery, severity score and organ failure, surgical and medical treatments).

METHODS. This study retrospectively investigated the medical records of 10 patients (pts) diagnosed and treated for NF who were admitted to a 8-bed general ICU from 2003 to 2007.

RESULTS. The pt characteristics are shown in table 1. The mean delay from onset of symptoms and hospital admission was 3.2±2 days. The provisional clinical diagnosis was incorrect in 30% pts. Eighty % of pts was admitted with clinical signs of septic shock (SS). The mean time from diagnosis until surgery was 12±10,1hrs. All pts underwent a mean of 6±7,1 surgical procedures related to necrotic tissue debridement. The wounds were sealed with a Vacuum-assisted closure device which was exchanged every 2 days until second intention healing. Only 1 pt required above-knee amputation. After surgery 40% of pts were submitted to hyperbaric oxygen therapy (n=5-6/pt). All pts received broad-spectrum antibiotics therapy which was changed according to the results of culture and sensitivity. Mechanical ventilation was performed in all pts for respiratory failure (mean time=11,8±9days). Two pts required surgical tracheostomy at admission for airways obstruction due to NF. All pts were in SS requiring vasopressor therapy for 13,9±11 days. Thirty % of pts showed renal dysfunction (RIFLE class Injury) and 50% were treated with High Volume Hemofiltration for anuric renal failure. Disseminated intravascular coagulation was diagnosed in 40% of pts. Low dose steroids were prescribed in 90% of pts and 2 pts were treated with APC. The average lenght of ICU and hospital stay were respectively of 23,1±23 and 112,5±62 days. Overall mortality in our series was 30%. Two pts died of severe SS and MOF. In one case hyperkaliemia of unknown origin (after SS resolution) was fatal.

PT n°	Age/Sex	SAPS II/SOFA	Site/ BSA%	Trigger	Microorganism
1	26/m	14/5	Neck/ 3	Odonthogenic	Coag-neg Staph
2	55/m	59/13	Lower limb/9	Unknown	Coag-neg Staph
3	40/m	21/6	Lower limb/9	Major trauma	E. Faecium
4	57/f	30/10	Pubic area/9	Bartholin abscess	Coag-neg Staph
5	36/m	10/10	Lower limb/14	Major trauma	E. faecium
6	77/f	41/6	Neck, thorax/6	Foreign body	Mixed flora
7	69/f	53/17	Abd wall/9	Unknown	S. agalacte
8	49/m	36/11	Lower limb/13	Minor trauma	S. pyogenes
9	41/m	45/15	Lower limb/9	Major trauma	Clostridium d.
10	56/f	47/14	Axillary area/6	Unknown	S. pyo, P. aeur

CONCLUSION. Although our sample size is too small to reach statistical significance, among the factors analysed our data suggest that SAPSII score,the number of organ dysfunction and the percent body surface area (BSA%) seem to be associated with outcome in NF requiring ICU.

0487

USING CLINICAL DECISION SUPPORT TO IMPROVE THE CARE OF PATIENTS WITH SEPSIS

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INTRODUCTION. Sepsis is a common source of morbidity and mortality among critically ill patients. Targeting measures to reduce the incidence and promote early recognition and treatment of sepsis is at the forefront of many critical care initiatives. Advances in the management of severe sepsis have evolved over recent years in an attempt to combat the spiraling mortality trends. The "Surviving Sepsis Campaign" (SSC) is a worldwide initiative promoting the evidence-based treatment of sepsis, with the explicit goal of reducing both the morbidity and mortality associated with sepsis. Protocol Watch (PW) was developed as a tool to assist clinicians at the bedside with the implementation and compliance of the SSC guidelines.

METHODS. Participants were critically ill patients in 28-bed intensive care unit in a large university-affiliated teaching hospital in the Northwestern United States. Prior to the installation of PW, implementation of the SSC was done using a paper-based system of standing orders. Base line data on compliance with the SSC guidelines were collected. Protocol Watch, which offers an electronic version of the guidelines and is resident on the bedside patient monitor, was then installed in all 28 critical care beds. The post PW installation data collection is currently being completed.

RESULTS. Preliminary results show a significant improvement in both the early identification of sepsis as well as compliance with the SSC guidelines. In addition, the feedback from the clinical users has been extremely positive.

CONCLUSION. If the final data analysis supports the preliminary findings, PW could emerge as an important method for assisting in the implementation of the SSC guidelines, thus making a valuable contribution in the care of critically ill patients with sepsis.

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Poster Sessions
Traumatic brain injury II 0488-0501

0488

STRESS ULCER PROPHYLAXIS IN NEUROSURGICAL INTENSIVE CARE UNIT. AN EXPANSION OF RISK FACTORS

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INTRODUCTION. The conventional stress ulcer prophylaxis in patients with CNS pathology is widely accepted and well proofed. Though, the frequency of gastrointestinal pathology as a complication of neurosurgical procedures and neurological insults does not lessen significantely throughout the last years. The commonly used protocol consists of three prearranged groups devided according to the probability of the development of the gastrointestinal pathology (groups of low, moderate and high risk). The separation is quite relative, based on the checklist of the CNS risk factors (brain injury GCS<9, brain tumors, intracerebral hemorrhage, SIADH, CNS infection, ischemic CVA, spinal cord injury) and coexistence of extra-CNS risk factors (long term use of steroids, burns > 25% of body surface area, hypotension, respiratory failure, coagulopathies, hepatic or renal failure, sepsis). Thus, the quality and amount of risk factors define the prophylaxis group and type of care. The following study was performed in attmpt to expand the indications for strengthening the prophylaxis.

METHODS. The retrospective analysis, 180 pts, 1999-2003 years. The prospective analysis, 104 pts, 2004-2006 years. Nosology: brain tumor, CVA, brain injury.

RESULTS. The additional risk factors that display the predisposition to the prophylaxis group were defined:
1. NEUROLOGICAL
a. consciosness (development of somnolence, development of sopor)
b. developing focal neurological deficit
c. signs of devolping or increasing damage of 7-12 cranial nerves (bulbar palcy) or pseudobulbar palcy.
2. THE APPEARANCE OR AGGRAVATION OF WATER ELECTROLYTE DISTURBANCES
3. THE APPEARANCE OR AGGRAVATION OF GASTROINTESTINAL IMPAIRED MOTILITY. GASTROPARESIS.

CONCLUSION. The expansion of risk factors leads to more thorough relocations between risk groups and reduction of the incidence of gastrointestinal pathology.

0489

CONTRIBUTION OF TRANSCRANIAL DOPPLER TO PREDICT NEUROLOGICAL OUTCOME AFTER MINOR AND MODERATE TRAUMATIC BRAIN INJURY

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INTRODUCTION. Patients with minor or moderate traumatic brain injury (TBI) are at high risk for neurological deterioration. Their outcome at 7 days could be predicted by CTscan and transcranial doppler (TCD). We investigated the contribution of TCD for detecting patients with secondary neurological deterioration after minor or moderate TBI associated with normal or moderate CT scan (Trauma Coma Data Bank, TCDB I or II, respectively).

METHODS. 98 patients with minor or moderate TBI were prospectively studied. CT scan and TCD were performed on admission within 12 hours post-injury. Time-averaged mean, systolic, and diastolic values of blood flow velocities (FVm,FVs, FVd, respectively, in cm/s) and the PI [(FVs-FVd)/FVm] were measured on the 2 middle cerebral arteries (Waki 1-TC, Atys Medical). Neurological outcome was assessed up to 7 days after trauma. Secondary neurological deterioration was defined as a decrease in GCS score of 2 points or more from the initial GSC score, or any treatment for neurological deterioration. Two groups of patients were defined : group 1 (absence of secondary neurological deterioration) and group 2 (presence of neurological deterioration). Data are expressed as median and range. Univariate analysis (nonparametric Mann-Whitney test, Chi2 test) was used to identify factors related to the neurological outcome. The accuracy of TCD (sensitivity Se ; Specificity Sp)was evaluated by the area under (AUC) the receiver operating characteristics (ROC) curve and likelihood ratios (LR+) (Stata, v8 software).

RESULTS. 21 patients had a secondary neurological deterioration 7 days after trauma (Group 2). Main factors associated with their deterioration were their Glasgow Coma Scale, the TCDB classification and their FVd and PI measurements. TCD cut-off limits were 1,2 for PI (Se 90% ; Sp 84% ; LR+ 5,8 ; AUC 0,95) and 25 cm/s for FVd (Se 92% ; Sp 76% ; LR+ 3,9 ; AUC 0,93).

TABLE 1.

	No aggravation (Grp 1) N=77	Aggravation (Grp 2) N=21
Age (years)	35 (15-84)	46 (20-80)*
Injury Severity Score	9 (2-43)	13 (5-41)**
MAP (mmHg)	90 (60-114)	93 (64-158)
Glasgow Score on admission	14 (9-15)	13 (10-15)**
TCDB I /II (n)	53/24	0/21**
FVd (cm/s)	34 (18-64)	18 (11-36) **
PI	1,02 (0,66-1,83)	1,47 (1,07-2,33) **

**p<0,05 **p<0,01*

CONCLUSION. Admission TCD can predict early neurological deterioration for patients with minor or moderate TBI. TCD contribution is major when minor damages are found on CTscan.
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0490

SAFETY OF INTENSIVE INSULIN THERAPY AFTER SEVERE TRAUMATIC BRAIN INJURY

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INTRODUCTION. Hyperglycemia during acute brain injury such as ischemic stroke, cerebral hemorrhage, or head trauma is frequent and is associated with increased morbidity and mortality [1]. There is also a profound increase in glucose utilization (hyperglycolysis) that can persist for up to one week after traumatic brain injury (TBI). However, little is known about the optimal glycolytic rate and about the influence of intensive insulin therapy on the TBI-induced changes in glucose metabolism [2]. This study was designed to estimate the safety of routine versus intensive insulin therapy on the basis of hypoglycemic episodes defined as blood glucose concentration < 4.44 mmol/L (<80 mg/dL), in patients admitted to intensive care unit (ICU) after severe TBI.

METHODS. In this prospective, single-blind, randomized clinical trial 97 patients admitted after severe TBI, were enrolled and randomly assigned to one of two groups on the basis of the targeted levels of glycemia. Insulin infusion was administered either at conventional rates, to maintain glycemia at 9.99 – 12.21 mmol/L (180-220 mg/dL), or intensive rates, to maintain glycemia at 4.44 – 6.66 mmol/L (80-120 mg/dL).

RESULTS. Hypoglycemic episodes, duration of ICU stay, infections rate, mortality and neurologic outcome measured using the Glasgow Outcome Scale (GOS) at 6 months follow-up, were recorded. In patients receiving intensive insulin therapy, hypoglycemic episodes were significantly higher (14.7% vs 3.4%, p<0.05), duration of ICU stay shorter (7.3 vs 10.0 days; p<0.05), and infections rate lower (25.0% vs. 38.8%, p<0.05) than in patients treated with conventional insulin therapy. Mean GOS and overall mortality at 6 months were similar in the two groups (12.3% vs. 10.4%).

CONCLUSION. Intensive insulin therapy significantly increased the risk of hypoglycemic episodes. Despite the shorter ICU stay and lower infection rates, no differences were observed at 6 months follow-up mortality and neurologic outcome. Therefore, in TBI patients receiving intensive insulin infusion, whether to avoid episodes of hypoglycemia either with a stricter blood glucose monitoring or with a wider target blood glucose level needs further investigation.

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0491

VENTILATION, RESUSCITATION AND OUTCOME IN HEAD INJURED PATIENTS

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INTRODUCTION. Severe head injuries are a frequently encountered problem in intensive care medicine, and a cause of significant mortality and long term morbidity. Various clinical features related to the initial trauma and secondary brain injuries are associated with adverse outcomes.[1] We developed a head injury database, and investigated the management and outcome of head injured patients in our department, with particular emphasis on ventilation and haemodynamics in the pre-hospital and resuscitation phases.

METHODS. In this observational cohort study we collected data on head injured patients admitted to the ICU at the Royal London Hospital (RLH) between March and November 2006. Demographic, clinical and outcome data was extracted from the patient notes and the ICNARC database and then entered in a data collection proforma and subsequently in a MS Excel spreadsheet for analysis. Outcome measures were primarily mortality, and for survivors, the length of stay both in intensive care and in hospital were recorded.

RESULTS. Data was collected on 61 head injured patients. The group of patients that died tended to be older, to have a lower GCS at the scene, a higher systolic blood pressure both at the scene and in the emergency department, and a lower PaO2 in the emergency department although these results were still in the physiological range for the majority of patients. Of the patients that had ABG results recorded, only 8% had an initial PaCO2 <4.0 in the emergency department. The lowest mortality (16.7%) was associated with an initial A&E PaCO2 in the range 4.0-4.5kPa. The mortality rate for patients brought directly to RLH was 21.6% compared with 37.5% for patients transported from other hospitals.

TABLE 1.

	Survived (mean+/-SD)	Died (mean+/-SD)
Scene systolic BP (mmHg)	129+/-24.7	153+/-33.4
A&E systolic BP (mmHg)	134+/-31.5	149+/-38.0
ICU systolic BP (mmHg)	133+/-27.2	124+/-18.5
A&E PaCO2 (kPa)	5.25+/-1.3	6.0+/-1.8
ICU PaCO2 (kPa)	5.04+/-0.85	5.0+/-0.60
A&E PaO2 (kPa)	40.6+/-24.1	29.0+/-25.1
ICU PaO2 (kPa)	28.7+/-13.4	21.0+/-18.7

CONCLUSION. The majority of patients appear to be being adequately ventilated and resuscitated in the pre-hospital and emergency department phases of their treatment. Relatively few patients are being inappropriately hyperventilated and the results are better than other published reports.[2] The results provide support for transporting head injured patients directly to a neurosurgical trauma centre.

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0492

BRAIN NATRIURETIC PEPTIDE (BNP) IN PATIENTS WITH SEVERE TRAUMATIC BRAIN INJURY

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INTRODUCTION. BNP seems to have an important role in the physiopathology of the hyponatremia, cerebral salt wasting syndrome (CSWS) and cerebral vasospasm (1,2) during subaracnoidal haemorrhage (SAH). In the literature there are few data about the role of BNP in patients with severe traumatic brain injury (TBI) (3,4). We evaluated the association between BNP and the presence of SAH, intracranial hypertension, hyponatremia, CSWS as well as water and salts balance in patients with severe traumatic brain injury (TBI).

METHODS. We examined patients with severe TBI coming from emergency ward. Serum BNP was measured five times: T1 (1°-2° day), T2 (3°-4° day), T3 (5°-6° day), T4 (7°-8° day), T5 (9°-10° day). Daily and cumulative balance of water, sodium and potassium were calculated for all the patients. The presence of hyponatremic events, CSWS, intracranial hypertension episodes, SAH (TC evidence) and the use of cathecolamines were notified, as well.

RESULTS. Seventeen male patients were included in the study (with a total of 187 days of monitoring in ICU and 83 samplings of BNP). No association between BNP and the other observed variables (hyponatremia, CSWS, SAH, the use of cathecolamines and intracranial hypertension) was observed. On the other hand, positive correlations between BNP levels and cumulative sodium balance (R=0,50; p<0,0001) as well as between BNP and water balance (R=0,43; p<0,0001) were observed. BNP level was higher in patients with positive cumulative sodium balance than in patients with negative balance: mean (SD) 73,3 (85) pg/mL vs 24 (33) pg/mL (p=0,02), respectively. BNP levels were also higher in patients with positive cumulative water balance: mean (SD) 69,7 (9,9) vs 14,8 (3,1) pg/mL (p=0,04), respectively.

CONCLUSION. Our study does not confirm the role of BNP in the genesis of hyponatremia and CSWS. Moreover, observing higher BNP levels in patients with positive sodium and water balance, we conclude that BNP in patients with severe TBI has a physiological role in the regulation of water and salts balance in order to avoid the excessive expansion of extracellular compartment.

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0493

BRAIN TISSUE OXYGENATION AND LONG TERM OUTCOME IN TRAUMATIC BRAIN INJURY

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INTRODUCTION. Brain tissue oxygen monitoring plays important role in prevention of secondary brain injury. Values of partial brain oxygen pressure (pbtO2) in first hours after severe brain trauma should predict final patient's outcome. Aim of this study is to analyze relationship between early values of brain oxygen in severe head trauma and the patient's outcome one year after this traumatic accident. Study follows up our previous observation.

METHODS. We analyzed data of 18 consecutive adult patients treated in our ICU during time period of 24 month for severe head trauma with Glasgow coma scale (GCS) 8 and less and with monitoring of intracranial pressure (ICP) and partial brain oxygen pressure (pbtO2). We placed sensor for pbtO2 monitoring at the same time as ICP sensor. All patients were treated according standard therapeutical protocol used in our department. Target of our treatment was to avoid ICP hypertension, to maintain cerebral perfussion pressure above 60 mmHg and to reach optimal pbtO2 levels. We compared data of first hours of the treatment in ICU with neurological status using Glasgow Outcome Scale (GOS) in time intervals 3, 6 and 12 months after trauma in all patients. All this studied patients were already not at these times treated in our hospital.

RESULTS. Group with GOS 1 at the time of leaving ICU had 4 patients and initial values of pbtO2 in first 24 hours of treatment 25,99 mmHg (mean). Group with GOS 2 had 5 patients and initial valus of pbtO2 19,91 mmHg (mean). From this group 4 patients died a one improved to GOS 3. Group with GOS 3 had 4 patients, initial values of pbtO2 19,91 mmHg. From this group 3 patients improved to GOS 4 and 1 patients to GOS 5, both in 6 months. There were no changes in neurological status between 6 and 12 month after injury. Group with GOS 4 had no patients. Group with GOS 5 had 5 patients and initial values of pbtO2 26,31 mmHg at a time of leaving ICU.

CONCLUSION. There were found in our study no clear relationship between initial values of brain tissue oxygen and long term outcome. Patients in vegetative state at a time of leaving of ICU had in our group bad prognosis. All patient with severe dissability improved. Values of brain tissue oxygen were in this group below 20 mmHg. Group with GOS 5 had values also relative low. We have no database of patients treated without brain tissue oxygen monitoring to make direct comparation and to evaluate real benefit of brain tissue oxygen monitoring.

0494

CAN PROTEIN S100 PREDICT NEUROLOGICAL DETERIORATION AFTER MODERATE OR MINOR TRAUMATIC BRAIN INJURY?

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INTRODUCTION. Serum protein S100"eta (PS100) is believed to reflect brain damage following traumatic brain injury (TBI). Since patients with moderate TBI (Glasgow Coma Scale, GCS, score 9-13) or minor TBI (GCS 14-15) may be at risk for subsequent neurological deterioration, we wondered whether the determination of serum PS100 on admission could be associated with the neurological outcome.

METHODS. 67 patients with moderate or minor TBI were prospectively studied. They had normal or moderate CT scan (Trauma Coma data Bank, TCDB, classification I or II, respectively) on admission. Serum PS100 dosages were performed on admission within 12 hours post-injury using a commercially available kit (ELECSYS S100 Roche, detection limit 0.01 *mathrm*μg/l). Neurological outcome was assessed up to 7 days after trauma. Secondary neurological deterioration was defined as a decrease in GCS score of 2 points or more from the initial GSC score, or any treatment for neurological deterioration. Two groups of patients were defined : group 1 (absence of secondary neurological deterioration) and group 2 (presence of neurological deterioration). Data are expressed as median and range. Univariate analysis (non parametric Mann-Whitney test, Chi2 test) was used to identify factors related to the neurological outcome.

RESULTS. 9 patients had a secondary neurological deterioration 7 days after trauma (Group 2). They had significant higher GCS score and more injuries on CT than Group 1. However, serum PS100 were not different between the 2 groups (Table).

	No aggravation (Gr.1) N = 58	**Aggravation (Gr.2) N = 9**
Age (years)	35 (15-73)	46 (20-80)
Injury severity score (ISS)	9 (1-43)	16 (9-48)
MAP (mmHg)	90 (58-139)	91 (67-158)
SpO2 (%)	100 (95-100)	100 (96-100)
Injury to PS100 sampling time (min)	142 (30-720)	180 (90-480)
Serum PS100 (µg/l)	0.39 (0.04-6.40)	0.93 (0.14-4.85)
TCDB classification I/II (n)	42/16	1/8**
GCS score on admission	14 (9-15)	12 (9-14)**

***p<0.01*

CONCLUSION. Serum PS100 cannot be viewed as a biological marker for detecting patients at risk for neurological deterioration after minor or moderate TBI. The contribution of this blood sampling is not as informative as a CT scan or the GCS.

0495

EFFECTS OF RESPIRATORY PHYSIOTHERAPY AND PASSIVE MOBILIZATION ON INTRACRANIAL PRESSURE

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INTRODUCTION. The effects of physiotherapy on intracranial pressure (ICP) are not totally clear. The aim of this study is to evaluate the effects of respiratory physiotherapy and passive mobilization on ICP.

METHODS. Seventy patients with traumatic brain injury (TBI) and stroke with Glasgow coma scale (GSC) < 8 were evaluated. Thirty-degree head-up position was used during the study. ICP was monitored during the following procedures: chest compression, vibration associated to chest compression, unilateral continuous chest compression, tracheal suction with open circuit and closed circuit, passive mobilization of arms and legs, hip rotation, scapular mobilization in lateral decubitus and lateral flexion of the lower trunk. Wilcoxon test was used to evaluate changes on ICP during the procedures.

RESULTS. Initial ICP was 14 + 6.4 mm Hg. Four procedures changed ICP expressively: lateral flexion of the lower trunk (19.1 + 6.52 mm Hg; $p < 0.0001$), unilateral continuous chest compression (19.09 + 6.43 mm Hg; $p < 0.0001$), tracheal suction with open circuit (19.06 + 6.46 mm Hg; $p < 0.0001$), and with closed circuit (18.2 + 7.61 mm Hg; $p < 0.0001$).

CONCLUSION. Unilateral continuous chest compression and lateral flexion of the lower trunk should be avoided in patients with intracranial hypertension. Tracheal suction is unavoidable, but should be done quick and carefully.

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0496

THE ROLE OF PRESSURE REACTIVITY MONITORING IN TREATMENT PATIENTS WITH TBI

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INTRODUCTION. Algorithm of intracranial hypertension (ICH) therapy in patients with TBI should be modified on the base of the level of cerebral autoregulation (CA) impairment. The aim of the study was the application of the Pressure reactivity Index (Prx) monitoring in the treatment of TBI patients.

METHODS. 12 TBI patients with GCS<9 underwent the monitoring of the arterial blood pressure (ABP), ICP, Prx. Analog outputs from the monitors ABP and ICP were connected to the analog-to-digital converter (DT 2814, Data Translation) installed into a laptop computer. Data were sampled, digitized, and stored on the hard disk with the software for the waveform recording. Digital signals were processed with software (ICM Plus, England). The therapeutic strategy modified on the base of results clinical evaluation and Prx, ABP and ICP.

RESULTS. All the patients were divided into two groups.
10 patients had preserved CA with Prx [-1; 0,2], GCS 6,5+/-0,5; ICP16,5+/-7;CPP 75,8+/-12mmHg. In 7 patients GOS was favorable (4-with good recovery; 3-moderate disability) and unfavorable in 3 patients (2-severe disability; 1-vegetative state). In this group we used IV infusion of colloids and vasopressors for CPP-protocol. In 8 patients were determined "optimal" levels of CPP: in 2 it was 85-95mmHg, in 3- 70-80mmHg, and in 3-55-65mmHg. In 2 patients developed CA failure on the 2 day after brain trauma and uncontrolled intracranial hypertension demanded decompressive craniotomy. Second group included 2 patients with impaired CA - Prx [0,2;+1], GCS 4, ICP26,5+/-9,5, CPP 65,7+/-12mmHg. GOS: both patient had unfavorable outcome (one- severe disability, other-vegetative state).

CONCLUSION. The monitoring of Prx added to routine measuring of the ABP and ICP in TBI patients is helpful in choice of the best therapeutic strategy.

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SEVERE TRAUMATIC BRAIN INJURY WITH MINIMUM INITIAL RADIOLOGIC EXPRESSION: RADIOLOGIC LESIONS PROGRESSION AND INTRACRANEAL HYPERTENSION DEVELOPMENT.

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INTRODUCTION. Severe Traumatic Brain Injury (TBI) defined with a Glasgow Coma Score (GCS) ≤8 with normal or near normal craneal CT at hospital admission (type I-II Traumatic Coma Data Bank classification) represents a common clinical dilemma about the real severity of cerebral lesions and neurological prognosis. The aim of the study was to relate some clinical factors with a higher probability of developing neurological complications (intracraneal hypertension) and bad neurological function on ICU discharge defined as the presence of a motor component of GCS≤5.

METHODS. Retrospective series of 72 patients consecutively admitted for Severe TBI in the general 26-bed ICU of a tertiary Trauma Center during one year. We study 24 patients with craneal CT admission classified as TCDB I-II, after excluding those with another non traumatic cause of the coma and encephalic death on admission. After the admission CT the radiologic study was repeated in the first 12 hours posterior to the trauma. ICP was monitorised in all patients with TCDB>1 in the second CT or type I and confirmed GCS ≤8 after transitory withdrawal of any sedative agent. The radiologic study was repeated after 24 hours, on the 5th day and if the clinical evolution or ICP required it. Epidemiological, clinical and radiologic associated variables were also analysed and the GCS at ICU discharge. A multivariant study was done adjusted by age, genre, initial GCS, radiologic lesion, associated trauma lesions and vital signs during the early phase of the traumatic injury (arterial oxygenation, blood pressure, etc).

RESULTS. Five patients (20%) had a poor GSC on discharge (M≤5). Those five patients showed an early damage of TCDB type at second CT and hyperICP during ICU admission. A sixth patient showed unfavorable outcome of the second CT with normal ICP and GCS=14 on discharge. Of the left over 18 patients with a favorable neurologic evolution, 16 showed hemodynamic and/or respiratory deterioration. The multivariant study displayed a relation between the early progression of lesions in the second craneal CT (OR 3.4, 95% CI: 1.5-4.3) with increase of ICP or a poor GCS on ICU discharge. Also, the presence of systemic factors associated to admission was related to a good GCS on discharge (OR 0.64, 95% CI: 0.5-0.88).

CONCLUSION. 1. The early progression of type TCDB is related to hyperICP and bad neurologic prognosis on ICU discharge.
2. Systemic factors in the initial phase of trauma (hypotension, hypoxia, etc) are related in these patients with a good final neurologic outcome, absence of both radiologic deterioration and intracraneal hypertension.

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0498

WHICH GLASGOW COMA SCORE?

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INTRODUCTION. The Glasgow Coma Score on hospital admission has been shown to be correlated with outcome in patients with traumatic brain injury(1). However many patients who arrive at a neurosurgical referral centre have been sedated and intubated some time prior to transfer and so their Glasgow Coma Score cannot be accurately recorded. An option in these cases is to use the last recorded score prior to sedation and intubation. This may be the Glasgow Coma Score recorded in the Accident and Emergency department of the referring hospital, or in some cases that recorded on the ward after deterioration. In some cases the only available score is that recorded at the scene of the injury. In our study we examined the degree of correlation between these various Glasgow Coma Scores and outcome at one year in order to assess the validity of using a surrogate for the admission Glasgow Coma Score when this is not available.

METHODS. Data were collected prospectively on all patients admitted to the Queens Medical Centre from 1993 to 2002 with a recorded Glasgow Coma Score of 12 or less within 48 hours of a traumatic brain injury. Three Glasgow Coma Score groups were identified. Patients in group 1 (certainty factor 1) had a Glasgow Coma Score recorded on admission to the Queens Medical Centre. Group 2 (certainty factor 2) was made up of patients in whom the last pre sedation and intubation Glasgow Coma Scores was recorded at the referring hospital. In group 3 (certainty factor 3) the Glasgow Coma Scores were recorded at the injury scene. For each group we looked at the strength of the association between the Glasgow Coma Score and Glasgow Outcome Score using linear regression analysis.

RESULTS. Data were available on 1101 patients. Mean age 39 years (range 16 – 84), 75% male and 53% victims of road traffic accidents. Linear regression between the Glasgow Coma Score and Glasgow Outcome Score was highly significant in all three groups (p = <0.0001 for all three groups). The strength of the association was similar for groups 1 and 2 and superior to group 3 (r2 = 0.104082 for group 1, r2 = 0.10149 for group 2, r2 = 0.055456 for group 3).

CONCLUSION. We found a good correlation between the Glasgow Coma Scores and outcome for all three groups. The best predictor of outcome is the Glasgow Coma Score actually recorded on admission to the referral centre, but the pre-intubation Glasgow Coma Score at the referring hospital provides an acceptable alternative.

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0499

OUTCOME OF PATIENTS WITH HEAD INJURY REFERRED TO A REGIONAL NEUROSCIENCES CENTRE

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INTRODUCTION. Head injury remains a common cause of hospital admission, morbidity and mortality. UK recommendations are that all head injuries are managed either in the Emergency Department or the regional neurosciences centre. Many patients are managed in local hospitals despite evidence that outcomes are improved by specialist care. We reviewed outcome data for all head-injured patients admitted to a regional centre over a 12-month period (Sept 05-Aug 06).

METHODS. Consecutive adult patients (>16 years) were studied prospectively. GCS following resuscitation, demographic data and surgical intervention were recorded. Glasgow Outcome Scores were determined at discharge from the regional centre, and at 6 and 12 months following injury. Whilst at the regional centre, patients were managed according to locally established protocols.

RESULTS. 111 patients were admitted (83M, 28F). GCS following resuscitation was 12-15 in 39 patients, 8-12 in 26, and <8 in 46. 76 patients were aged 16-45 years, 31 were 46-65 years and 4 >66 years. 16 patients had evacuation of an extradural haemorrhage, 16 had evacuation of a subdural haemorrhage, 2 had contusionectomies and 12 patients required decompressive craniectomy. GOS data were available for all patients at discharge, 104 at 6 months and 72 at 12 months (Table 1). For patients with initial GCS <8, GOS was available for 46 at discharge, 45 at 6 months and 29 at 12 months (Table 2). Mortality from head injury was 5% with only 1/46 patients with severe head injury dying. 12 patients were discharged in a vegetative state with only 1 remaining so at 6 months.

TABLE 1.

GOS for all patients

GOS	Discharge	6 months	12 months
Dead	4	6	6
Vegetative	12	1	1
Severe disability	60	18	7
Moderate disability	30	42	22
Good	5	37	36

TABLE 2.

GOS for pts presenting with GCS <8

GOS	Discharge	6 months	12 months
Dead	1	1	1
Vegetative	8	0	0
Severe disability	32	9	4
Moderate disability	5	25	12
Good	0	10	12

CONCLUSION. Management of head-injured patients in a specialist centre results in excellent functional outcomes. Concern that aggressive management of severe head injuries would result in an increase in the number of patients left in a vegetative state is unjustified.

0500

THE EFFECTS OF OSMOTHERAPY ON INTRACRANIAL PRESSURE WAVEFORM PARAMETERS

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INTRODUCTION. A bolus infusion of 7.2% saline in 6% hydroxyethyl starch 200/0.5 (HS) attenuates mean intracranial pressure (ICP) in patients suffering from spontaneous subarachnoid hemorrhage (SAH) (1). It has been suggested that intracranial pulse pressure is more useful for prediction of intracranial compliance than mean ICP alone (2). In this study, the effect of an infusion of HS on the parameter mean ICP wave amplitude (i.e. intracranial pulse pressure) is compared with the effect on mean ICP.

METHODS. Prospectively collected data was retrospectively analyzed. All patients included were sedated and mechanically ventilated patients suffering from spontaneous SAH. Nine patients received 15 infusions of HS, mean 1.6 (range 0.5 to 2.5) mL/kg. Mean values of a 15-minute period just prior to the infusion were compared with a 15-minute period after maximum effect was reached.

RESULTS. The mean ICP wave amplitude decreased 2.7 mmHg (95% confidence interval -3.9 to -1.5) from a baseline of 8.5 (SD 3.6) mmHg, p = .0002. Mean ICP decreased 9.3 mmHg (95% confidence interval -11.4 to -7.2) from 20.6 (SD 5.4) mmHg, p <.0001. Comparing mean ICP and mean ICP wave amplitude, there was no statistically significant correlation for baseline values or change (Table 1). There was a stronger correlation between baseline values and change for mean ICP wave amplitude than for mean ICP (Table 1).

TABLE 1.

	Pearson r	r^2	95% CI	*p*
Mean ICP versus mean ICP wave amplitude, baseline	.22	.05	-.33 to .66	.42
Mean ICP versus mean ICP wave amplitude, change	.28	.08	-.27 to .69	.31
Mean ICP baseline versus mean ICP change	-.56	.32	-.83 to -.07	.029
Mean ICP wave amplitude baseline versus mean ICP wave amplitude change	-.79	.63	-.93 to -.47	.0004

CI, confidence interval; ICP, intracranial pressure; ABP, mean arterial blood pressure

CONCLUSION. This study documents an effect of osmotherapy on intracranial pulsatility; mean ICP wave amplitude was attenuated after infusion of HS. This reduction was strongly correlated to baseline mean ICP wave amplitude. However, regarding the association between mean ICP wave amplitude and mean ICP, we found neither any correlation for baseline values nor for change after HS infusion. Hence, monitoring of one parameter can not substitute the other. The value of mean ICP wave amplitude in clinical practice should be further evaluated.

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0501

MANAGEMENT OF HYPONATRAEMIA IN NEUROINTENSIVE CARE: THE ROLE OF RENAL FUNCTION PARAMETERS

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INTRODUCTION. Hyponatraemia is an important electrolyte dysbalance in acute brain diseases. There are two known syndromes: the more frequent cerebral salt wasting (CSW) syndrome due to natriuresis, and the less common syndrome of inappropriate secretion of antidiuretic hormone (SIADH) caused by free water retention. Differentiation between them can be made using renal function parameters, and is essential because each syndrome requires different therapy.

METHODS. We retrospectively analysed all patients (pts) with acute brain diseases admitted to our neurologic-neurosurgical care unit (NNICU) over a period of five years who developed hyponatraemia (serum sodium < 135). First we divided them according to measured serum osmolality (normal values 275-295 mmol/kg) and then we evaluated the group with hypoosmolality (S_osm < 275 mmol/kg). The type of hyponatraemia was diagnosed using renal function parameters established in clinical practice in our NNICU.

RESULTS. There were 251 pts (mean age 62 +/- 16 yrs, M 160) with 736 days of hyponatraemia. The majority of pts had normal serum osmolality (155 pts, 297 days), some had hyperosmolality (38 pts, 41 days) and only 50 pts (169 days) had low plasma osmolality. Osmolality was not measured for the remainder. Pts in the hypoosmolal group (mean age 58 +/- 19 yrs, M 15) were with the following diagnoses: subarachnoid haemorrhage 9, intracerebral haemorrhage 3, ischemic stroke 5, tumour 9, trauma 13, infection 4 and others 7. The mean GCS at the start of hyponatraemia was 13.1 (range 7-15), the mean discharge GOS was 3.7 (range 1-5). Hyponatraemia lasted from 1 to 22 days (mean 3.4 days) and in 11 patients was already present on the day of admisson. The mean value of hyponatraemie was 129.6 mmol/l (range 107-134 mmol/l, p<0.001) and the mean value of serum osmolality was 267.3 mmol/kg (range 235-274 mmol/kg, p<0.001). The mean increase of natraemia over 24 hours was 4.3 mmol/l (range 0-20 mmol). No patients had central pontine myelinolysis. Renal function parameters were examined in 31 patients (62%), of whom 25 patients were diagnosed CSW syndrome (diuresis 3382 +/- 2055 ml/day; fU_Na+ 708.8 +/- 368.2 mmol/day, p<0.001; C_osm 0.092 +/- 0.042 ml/s, p<0.001; C_El 0.065 +/- 0.036 ml/s, p<0.001; C_Na+ 0.061 +/- 0.036 ml/s, p<0.001; EWC -0.015 +/- 0.032 ml/s, p<0.001; FE_Na+ 0.029 +/- 0.016, p<0.001), 6 patients had other causes of hyponatraemia and no one SIADH.

CONCLUSION. Renal function parameters are very useful to diagnose the type of hyponatraemia and available to put into clinical practice. Hyponatraemia with hypoosmolality is not so frequent, and CSW syndrome is more prevelant then SIADH.

Poster Sessions
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0502

A THREE-YEAR RETROSPECTIVE STUDY OF SYSTEMATIC COLONIZATION SURVEILLANCE IN THE ICU

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INTRODUCTION. Microbial colonization of the respiratory and gastrointestinal tract (RT and GT) of a critically ill patient is an early event in the chain leading to invasive infection. Systematic colonization surveillance permits monitoring of transmission dynamics, early detection of epidemics in the ICU and possibly guidance for adequate empiric antimicrobial treatment in infectious episodes. We retrospectively analyzed the ability of colonization surveillance to predict microbial etiology of subsequent infections and permit adequate empiric therpay in septic episodes.

METHODS. The study was performed in a 6-bed general ICU from November 2003 to December 2006. Infection control policy included weekly surveillance cultures of bronchial secretion and stool samples. All cases of ventilator-associated pneumonias (VAP) and bloodstream infections (BSI) during the study period were recorded and the relationship between infectious etiology and most recent colonization was analyzed, based on species, antimicrobial susceptibility patterns and molecular typing by REP-PCR of selected isolates. In cases of new septic episodes, empiric treatment was determined, among other risk factors, by the antimicrobial susceptibility of most recent colonizers in either the RT or GT.

RESULTS. During the three years of the study, we recorded 34 VAP and 101 BSI cases (44 catheter-related). Pathogens isolated from VAP cases correlated with bronchial or stool colonizers in 80%, with prior RT colonization being most important. In BSI cases, Gram-negative pathogens were recent colonizers in 67% associated with both the GT and RT. No relationship was observed between Gram-positive colonization and subsequent infection. REP-PCR techniques confirmed pathogen and colonizer concordance in all cases tested.
Systematic colonization surveillance use to determine empiric antimicrobial treatment in new VAP episodes permitted 88% adequacy, compared to only 72% if the Hellenic Society of Intensive Care VAP guidelines were used. Empiric treatment for BSI cases was adequate 80% of the time.

CONCLUSION. RT and GT colonization is strongly related to microbial etiology of subsequent infection. Systematic weekly colonization surveillance of RT and GT specimens could be helpful in implementing adequate antimicrobial therapy, especially for multidrug resistant Gram (-) pathogens, in the ICU.

0503

RISK FACTORS OF EXTENDED-SPECTRUM BETA-LACTAMASE-PRODUCING ENTEROBACTER INFECTIONS IN AN INTENSIVE CARE UNIT

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INTRODUCTION. Production of extended-spectrum beta-lactamases (ESBL) by enterobacteria is an important resistance mechanism against antimicrobial beta-lactamics. Klebsiella pneumoniae and Escherichia coli (ESBLs) strains had mostly been described but infection due to Enterobacter producing extended-spectrum beta-lactamases (ESBLs) is a relatively uncommon clinical entity. This study was performed to investigate the risk factors associated with the acquisition of Enterobacter-ESBLs strais infections in an intensive care unit (ICU).

METHODS. This case-control study took place at a tertiary spanish hospital with a polyvalent 30 ICU beds from January 2005 to December 2006. Demographic data, underlying diseases, risk factors, length of ICU stay and hospitalization and antimicrobial treatment were investigated by comparing infections due to Enterobacter ESBL-positive to cases due to ESBL-negative strains. Enterobacter were tested for ESBL production by Double Disc Diffusion Synergy Test (DDST) as well as by the MIC reduction test.

RESULTS. Thirty-six Enterobacter infections over a period of 2 years were collected. Ventilator associated pneumonia was the most frequent infection (69%). Nine cases (25%) of ESBL-producing Eneterobacter isolates were compared to those infections with Enterobacter non-ESBL. Days of mechanical ventilation, length of ICU stay, tracheotomy, peripherical venous catheter and administration of cephalospin were all associated with ESBL-Enterobacter infections in the univariate analysis. There was not differences for sex, age, prognostic scores and mortaliy between groups. The multivariate analysis revealed the administration of broad-spectrum cephalosporin as the unique risk factor for the presence of ESBL-producing strains [odds ratio (OR) 9.0; 95% confidence intervals (CI) 1.14-71.04; P=0.037].

CONCLUSION. Use of cephalosporines was associated with Enterobacter ESBL-positive isolates. Thus, rational antimicrobial administration and antibiotic protocol regimens appears to be critical for control emergence of ESBL production.

0504

NOSOCOMIAL INFECTIONS IN TWO INTENSIVE CARE UNITS IN A PORTUGUESE HOSPITAL

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INTRODUCTION. The surveillance of nosocomial infections (NI) is essential in achieving their control and prevention.

OBJECTIVES. To evaluate and characterize the NI in two intensive care units (ICU) of a Central Portuguese Hospital.

METHODS. A retrospective study of patients with NI, hospitalized in two ICU (one medical and other surgical)between 1/4/2005 and 21/12/2006 identified by a computer-based program Vigi@ct (Biomerieux) and confirmed after.

RESULTS. In the surgical ICU we found 172 episodes of NI. Of this 78 (45.4%) were respiratory infections; 29(16.9%) were surgical site infections and 29 (16.9%) bacteriemias. In the respiratory infections the most frequent agents were *Acinetobacter baumannii* (45-57.7%) and Pseudomonas *aeruginosa* (23-29.5%). *Enterococcus faecalis* (11-37.9%) was the most frequent in surgical site. *Staphylococcus epidermidis* (9-31%) and *Acinetobacter baumannii* (8-27.6%) the most frequent agents in bacteriemias. Among all microrganisms 42.1% of *Acinetobacter baumannii*; 15.1% of *Pseudomonas aeruginosa* and 8.2% of *Klebsiella pneumoniae* were multiresistent bacteria (MRB).
In the medical ICU we found 134 episodes of NI. Half of these were due to respiratory infections (67-50%), 43 (32.1%) were bacteriemia and 15 (11.2%) were urinary infections. *Pseudomonas aeruginosa* was the most frequent microrganism (27-40.3%) among respiratory infections. In the bacteriemias Coagulase Negative Staphylococcus (CNS) (*Staphylococcus epidermidis* and *Staphylococcus hominis*) were the agents most frequently found (23-53.5%). *Escherichia coli* was the bacteria most isolated in urinary infections (6-40%). In medical ICU we found 130 MRB, among these 36 were *Pseudomonas aeruginosa* (27.7%); 16 were *Staphylococcus epidermidis* (12.3%) and 14 (10.8%) were *Acinetobacter baumannii*.

CONCLUSION. NI is a significant problem in our ICU's. We found more NI episodes in the surgical ICU than in the medical.
Respiratory infection were the most common NI in both ICU. As expected Surgical site infection is also a serious occurence in the Surgical ICU as well bacteriemia. In the medical ICU bacteriemia was also a considerable issue.
Gram negative bacteria and CNS were predominat in this NI. *Acinetobacter baumannii* was the most frequent MRB.

0505

POSTOPERATIVE BACTEREMIA IN THE ELDERLY ICU PATIENTS

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INTRODUCTION. The purpose of this clinical trial is to study the clinical features of bacteremia in the elderly ICU patients (pts) who underwent surgical procedure.

METHODS. We study retrospectively 255 ICU pts, 209 men (82%), 46 women (18%) who developed bacteremia. All had been operated at least once under general anaestesia. Mean age: 51.4±23.2 years, length of stay (LOS): 20.4±9.1 days. All were mechanically ventilated and were divided in 2 groups according to their age: Group A 187 (73.3%) < 65 and group B 68 (26.7%) ≥ 65 years. In groups A and B we had respectively: Mean age: 43.1±17.4 and 74.2±3.9 years. LOS: 23.1±7.9 and 13.1±6.4 days. Underlying diseases: Multiple trauma 126 (67.4%) and 28 (41.2%), complicated surgery 53 (28.3%) and 38 (55.9%), other 8 (4.3%) and 2 (2.9%).

RESULTS. In groups A and B respectively: Site of infection: Pneumonia 128 (68.4%) and 29 (42.6%), intra-abdominal infection 28 (15%) and 12 (17.6%), central venous catheter-related infections (CVC-RI) 29 (15.5%) and 26 (38.2%), other 2 (1.1%) and 1 (1.5%). Invading microorganisms in single strain bacteremia: Ps. aeruginosa 83 (44.4%) and 36 (52.9%), Ac. baumannii 70 (37.4%) and 2 (2.9%), St. aureus 27 (14.4%) and 14 (20.6%), Kl. pneumoniae 5 (2.7%) and 4 (5.9%), St. epidermidis 2 (1.1%) and 4 (5.9%), other 0 and 8 (11.8%). MODS occurred in 21 (11.2%) and 30 (44.1%). Mortality rates (MR): 26/187 (13.9%) and 28/68 (41.2%). Global MR: 54/255 (21.2%).

CONCLUSION. 1) CVC-RI appeared more frequently in elderly ($p<0.01$), while all other sites of infection did not differ. 2) Invading organisms were similar in both groups except Ac. baumannii which was isolated much more frequently in younger pts and very rarely in the elderly ($p<0.001$). The resistance was similar in both groups. 3) LOS was smaller in elderly ($p<0.05$). 4) Elderly developed more frequently MODS ($p<0.001$) and had higher MR ($p<0.01$), while the outcome of the infection was independent of the type of invading organism and its resistance.

0506

CENTRAL VENOUS CATHETER-RELATED BLOODSTREAM INFECTIONS IN THE INTENSIVE CARE UNIT: INCIDENCE, MICROBIOLOGY AND OUTCOME

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INTRODUCTION. Nosocomial catheter-related bloodstream infections (CR-BSI) have been associated with increased morbidity and possibly increased mortality in critically ill patients. The aim of this study was to analyze the epidemiology of CR-BSIs in our intensive care unit.

METHODS. Prospective epidemiological study, in a mixed ICU of a tertiary care hospital, of the incidence of CR-BSIs, the responsible bacteria and the outcome of the episodes of bacteremia. The demographic and clinical characteristics of all patients admitted in the ICU were recorded. Each bacteremia recorded was classified as primary, catheter-related or secondary.

RESULTS. The study took place in a tertiary care hospital, mixed ICU, during a thirty-two months period. Three hundred and thirty patients were admitted. Their mean age was 66 years and 61% of them were male. Mean APACHE score was 18 and the mean duration of stay in the ICU was 18 days. The total number of bloodstream infections (recorded in 86 patients) was 175. Of these, 37% were catheter-related. Specifically, sixty-five CR-BSIs occurred in 5561 catheter days (11.6 per 1000 catheter days). Sixteen CR-BSIs were due to Gram-positive (1 methicillin-resistant Staphylococcus aureus, 6 coagulase-negative staphylococci and 9 Enterococcus spp.) and 49 to Gram–negative bacteria (10 Acinetobacter baumanii, 18 Pseudomonas aeruginosa, 18 Klebsiella pneumoniae and one each of Morganella morganii, Enterobacter cloacae and Serratia marcescens). Of the Gram-negative bacteria, 58% were multi-drug resistant, while 43% of the Enterococci were vancomycin resistant. A positive outcome was noted in 79% of the catheter-related and in 55% of the other bacteremias.

CONCLUSION. Although CR-BSIs have a better prognosis than the other bacteremias, they are still a serious cause of morbidity and mortality in the ICU. Since these infections are preventable, appropriate measures should be meticulously applied.

0507

INVASIVE ASPERGILLOSIS IN AN IMMUNOCOMPETENT HOST – TWO CASE REPORTS

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INTRODUCTION. Opportunistic invasive aspergillosis in an immune compromised patient is being increasingly reported. However, this condition is thought to be rather rare in an immune competent host and therefore often unrecognized.

METHODS. We report two cases of invasive aspergillosis in patients without previous medical history of conditions leading to immune compromised status admitted to our Intensive Care Unit.

RESULTS. First case concerns a 50-year old woman who underwent an exploratory laparotomy because of acute abdomen without any significant findings. In the postoperative period, the patient developed sepsis with multiorgan failure necessitating ventilation, vasopressive and inotropic support and hemofiltration. Early microbiologic analysis of the sputum showed an Aspergillus fumigatus and patient was treated with voriconazol. The further evolution was unfavorable with hemodynamic instability and the patient died after two months of treatment. The autopsy revealed a severe tracheobronchitis and aspergillus endocarditis.
The second patient, a 55-year old man admitted to our Intensive Care Unit due to recurring arterial embolism and fever was diagnosed culture-negative endocarditis of the native mitralis valve on the transoesophageal echocardiography. Subsequently, patient underwent a successful valve replacement. The culture of explanted valve revealed an Aspergillus fumigatus infection and appropriate antimycotic treatment was started. In the postoperative period, the course was complicated by a sudden neurological condition with altered consciousness and patient eventually died of cerebral aspergillosis.
In both patients, an exogenous infection possibly took place. The first patient was admitted to our hospital during the reconstruction work next to the intensive care unit. This may have led to her exposure to increased pathogen load during the early postoperative period. The second patient probably contracted the infection during the reconstruction work he was executing himself at his house before the admission to the hospital.

CONCLUSION. Invasive aspergillosis is a severe condition which is not only limited to patients with immune compromised status. Alertness of the physicians ensuing in early diagnosis may be crucial for determining the individual patient prognosis.

0508

FEASIBILITY OF OBSERVATION-INTERVENTION TO IMPLEMENT THE SURGICAL HAND DISINFECTION WITH ALCOHOL HAND-BASED RUB IN A INTENSIVE CARE UNIT

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INTRODUCTION. Surgical hand rubbing (SR) has been proved to be an efficient alternative to traditional hand scrubbing. We tested an educational program based on continuous direct observing practice in order to implement this technique in a medical ICU.

METHODS. Residents and medical students benefit from an educational program included a ten minutes video demonstration of the SR presented by the infection control practionner. Results of each observation was immediatly feed back to residents. Medical students were encouraged to complete a form for each SR occuring 24h activity. Data collection were due to SR (in emergency or not), duration of SR procedure, quantity of alcohol hand based (AHR) rub used.

RESULTS. Two successive groups of 6 residents and 3 groups of 12 students participated to the study. Two hundred and twenty-five observations were performed during a 5 month period. The mean of the procedure time was 184s (SD51.6). Time expected according to the institutionnal protocol was 180s. 20.4% of SR was inferior to 2mn30, 14.7% between 2mn30 and 2mn50, 64.9% superior to 2mn50. Time of SR did not differ between emergency or planned procedure (186s vs 183s, p=0.73). Cumulative volume of AHR was significantly correlated with duration of the procedure (r=0.48,p<10-4).

CONCLUSION. Our study suggest that implement of a new procedure of surgical hand disinfection in a ICU is feasible on result on good adhesion of educated residents. The original method based on a audit performed by medical students may allow both hand hygiene education and adherence to an infection control program of future practionnners.

0509

SURVEILLANCE AND INFECTION CONTROL IN AN INTENSIVE CARE UNIT

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INTRODUCTION. To describe the surveillance system and the infection control measures developed at an intensive care unit, with 20 polyvalent beds, from November 2005 to March 2007, and also inform about the results, epidemic outbreaks appeared and the changes on handwashing compliance.

METHODS. Infection surveillance: It is based in the unit not in the patient, using the ENVIN-HELICS tool. This information from the patients was gathered: age, diagnosis on admission, APACHE II, exposure and use to invasive devices (mechanical ventilation, central venous and urinary catheter). A multidisciplinary team from microbiology, preventive and intensive care units composed the team. The criteria for infection diagnosis were those from the CDC. Incidence rates were calculated. Handwashing surveillance: It was recorded in two periods: January-March 2006 (P1) and October-December 2006 (P2); each observation period lasted 40 minutes. We observed the opportunity, defined as every time in which an indication for handwashing exists.

RESULTS. 751 patients were enrolled, 67,2% male, mean age 55±16; more frequence of patients with medical pathology (47,9%) with a media ± standard deviation of 11,4±7,5. APACHE II 11.4± 7,5. Overall mortality rate was 17,4%. A greater incidence of infections were found in the traumatic group. There is a large number of central venous catheter (use rate 92,9%, 71,8%:coronary patients). 204 infections were detected as acquired in our unit (27,1% and 24,6‰ patient-day). The respiratory tract infections and bactraemias were the most frequent localizations, with ventilator-associated pneumonia (VAP) as the predominant nosocomial infection (51.5% over total infections; 23,9% in intubated patients, an incidence rate of 18,2 ‰). There were two outbreaks of methicillin resistant Staphylococcus aureus (MRSA). Thus, the most frequent were Pseudomona aeruginosa (17,1%), Escherichia coli (11,1%) and Staphylococcus aureus (8,8%); Acinetobacter baumanii and methicillin resistant Staphylococcus aureus were quite very infrequent (3,3% and 2,8% repectively). 346 opportunities of handwashing were detected (P1:198, P2:148). The compliance increased from 13,1% in P1 to 37,8% in P2.

CONCLUSION. 1)Nosocomial infections affected to one out of five of the admitted patients. The VAP was the most frequent infection. 2)We had a large rate of VAP but similar to Spanish standard (18,2/1000 days of use of mechanical ventilation). 3)The microbiology was similar to other critical care units, with a predominance of Pseudomona aeruginosa. There were two outbreaks by MRSA. 4) Despite an increase in handwashing compliance, the rate of VAP did not was lowered.

0510

SIGNIFICANCE OF MULTIDRUG RESISTANT GRAM (-) ISOLATION IN BROCHEAL ASPIRATES IN I.C.U. PATIENTS' OUTCOME

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INTRODUCTION. ICU physicians are nowadays faced with the formidable task of dealing with bacteria that can hardly treat. Multidrug resistant Gram(-) bacteria are usually isolated from brocheal aspirates and associated with the development of VAP , while their presence increases the risk of death. Sometimes the only option for treating them is colistin , which was until recently an obsolete antibiotic of questionable efficacy.

METHODS. 31 patients with at least a 4-day stay in our ICU had the following characteristics : 20 men (64.52%) , median age 75 years (interquartile range 11 years) , median ICU stay 32 days (interquartile range 44 days) , a mean APACHE II score of 18.8 (95% confidence interval 16.4-21.2) These patients where retrospectively divided in two groups. The first one included 12 patients with at least one brocheal culture positive for panresistant Gram (-) bacteria and the second one consisted of 19 patients carrying bacteria sensitive to colistin only. A comparison was made according to days of stay in the ICU , survival in 6 months , age and APACHE II score. Statistical analysis was made using Mann-Witney analysis and a Kaplan-Maier analysis for survival.

RESULTS. The patients in the group with the panresistant bacteria spend more days in the ICU (p<0.05) , while tended to live longer (Mantel-Cox pairwise , p<0.05).

CONCLUSION. Multidrug resistant bacteria are poorly responsive to colistin which failed to make an impact in survival.

0511

AIDS IN PATIENTS ADMITTED TO A GENERAL ICU: EPIDEMIOLOGY AND IMPACT IN MORBIMORTALITY

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INTRODUCTION. AIDS is a increasing chronic disease , with a great impact in medical costs. OBJECTIVE: To analyze incidence and epidemiological factors and outcome in AIDS patients (with previous or actual diagnosis) admitted to a general adult ICU, comparing them with non-AIDS patients.

METHODS. Retrospective cohort comparative study made in a general adult 9-bed ICU of a University Hospital, in a 23-month period. It were analyzed all patients admitted during this period. It was made descriptive statistics, analysis of variance and t-test.

RESULTS. During studied period, there were 14 patients admitted with a previous or actual diagnosis of AIDS. Most common admission cause in these patients was sepsis by community pneumonia (07 patients) and neurological diseases (05 cases). There were 02 patients with association with pulmonary tuberculosis, and 01 patient with coexistent pulmonary paracoccidioidomycosis. Among most frequent complications, 05 (35.7%) had acute renal failure (ARF), 08 (57.1%) plaquetopenia (of these, 06 had associated leucopenia), and 04 (28.6%) ARDS (all secondary to pneumonia).

TABLE 1.

	AIDS	Non-AIDS	p
n	14	784	—
Male gender (%)	85,7%	60,3%	0.098
Age	41.8	52.2	0,054
APACHE II	25.5	18.1	0,003
ICU Mortality (%)	64.3	40.5	0,128
Hospital Mortality (%)	78.6	45.0	0,026
ICU length (days)	6.7	6.7	1.000

CONCLUSION. In this study, AIDS patients admitted to ICU were younger, mainly male, more severe and with a higher ICU and hospital mortality. Systemic complications were frequent, and commonest admission cause was community pneumonia with sepsis. It is emphasized the association with tuberculosis and paracoccidioidomycosis.

GRANT ACKNOWLEDGEMENT. This study was not supported by any companies.

0512

RISK FACTORS AND MORTALITY RATE FOR ACINETOBACTER BAUMANII INFECTIONS IN ICU PATIENTS

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INTRODUCTION. Acinetobacter baumanii is a Gram-negative coccobacillus that is normally a commensal pathogen but can be a nosocomial pathogen which is responsible for severe ICU-acquired infection, mainly pneumonia and bacteraemia. The aim of this study was to determine the risk factors and mortality rate of acinetobacter baumanii infections in ICU patients.

METHODS. In this retrospective study, we analyzed acinetobacter baumanii infections developing in all patients who were admitted into our ICU between January 1, 2005 and December 31, 2006. A comparison of data was collected from the patients' record cards. Age, gender, mortality ratio, APACHE II and SOFA values, length of mechanic ventilation (LOMV) and length of ICU stay (LOICUS) up to determination of infection, total length of mechanical ventilation (TLOMV) and ICU stay (TLOICUS), region of culture from which the infectious agent was obtained, existence of another microorganism together with acinetobacter baumanii (EAMO), tracheotomy, intubation tube, central catheter, urinary catheter and nasogastric tube days up to the determination of infection and the feeding route were evaluated. These characteristics were compared between living and dead patients.

RESULTS. During that time period, 68 cases of acinetobacter infection were found in our clinic. The mortality ratio was 60%. The comparison of living and deceased cases is shown in the following table. We observed that this nosocomial infection was seen in the 45-54 year-old age group and in the first week of mechanical ventilation. Mortality was greater in patients with high SOFA scores and the infection prolonged the length of total ICU stay. If the infection was located in the lungs, the mortality rate could be higher. There were 28 cases of A baumanii nosocomial pneumonia and 23 of them died. In addition, the rate of female patients dying was greater (21 of 27 female patients died).

TABLE 1.

	Living	Dead	p
Age (year)	45	54	< 0.05
Gender	6 F 21 M	21 F 20 M	0.03
APACHE II	19.7	21.9	<0.05
SOFA	5.52	8	0.007
LOMV (day)	7	8	< 0.05
LOICUS (day)	13	10	< 0.05
TLOMV (day)	11	16	< 0.05
TLOICUS (day)	26	17	0.02
EAMO	11	4	0.003
Feeding route	8 PEN 19 EN	14 PEN 26 EN	< 0.05

CONCLUSION. If A baumanii infiltrates the lungs of ICU patients who already have multi organ failure, it could significantly increase the mortality rate.

GRANT ACKNOWLEDGEMENT. The authors are grateful to their staff of ICU.

0513

IMPLICATION OF FIBRINOGEN, OXIDIZED FIBRINOGEN AND SCD14 AS NEW MARKER IN DIAGNOSIS PULMONARY DISEASES COMPARED TO OLD MARKERS

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INTRODUCTION. Community-acquired pneumonia, that requires hospitalization, is a severe illness with high mortality rates, especially, in the cases of delay of appropriate treatment. At times, the correct diagnosis of the disease is difficult due to equivocal clinical picture or chest film, accompanying diseases that could mask or simulate the pneumonia. The aims of our study were: 1.follow-up levels of sCD14 and Oxidized Fibrinogen (OF) throughout hospitalization in the group of patients admitted to the hospital due to pneumonia and pulmonary edema of non-infectious origin; 2.an estimation opportunity using them as possible new markers for diagnosis of pneumonia and for following response to treatment.

METHODS. Three groups of patients were studied: a group of 15 patients admitted due to pneumonia, a group of 15 patients admitted due to pulmonary edema, and a control group – 15 healthy subjects. The blood samples for white blood cells count, erythrocyte sedimentation rates, levels of fibrinogen, C-reactive protein, albumin, sCD14, oxidized fibrinogen were taken for each patient on admission, 48 and 72 hours following admission and on discharge day. The received dates were compared using Student T-test.

RESULTS. The levels of sCD14 were higher, but still in the normal ranges, on admission in the patients with pneumonia and pulmonary edema in comparison with control group ($P<0.02$ for both groups), with gradual declining throughout hospitalization period ($P>0.1$ for both groups in discharge day). The comparison of sCD14 levels between groups of patients with pneumonia and pulmonary edema did not reveal statistically significant results ($P>0.6$). The rates of oxidized fibrinogen were in the normal ranges (<1.0 nmol/mg) throughout hospitalization period in both groups of patients, but surprisingly higher in the control group ($P<0.013$).

CONCLUSION. Oxidized fibrinogen and sCD14 can't be used as reliable markers neither for primary diagnosing of pneumonia or differential diagnosis from pulmonary edema, nor for patient follow-up throughout hospitalization period.
The finding of elevated levels of OF in the group of healthy persons demands additional studies for discovering other factors that cause changes in fibrinogen oxidation rates.

GRANT ACKNOWLEDGEMENT. NO CONFLICT OF INTEREST EXIST

0514

ASSOCIATION BETWEEN INFECTION AND APPEARANCE OF MYOCARDIAL INFARCTION AND STROKE DURING THE SAME HOSPITALIZATION

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INTRODUCTION. Appearance of myocardial infarction and stroke during the same hospitalization is rare and has great mortality ratio. It was expected these events to take place more often during winter and in connection with infection.

METHODS. We have retrospectively analyzed data of 21 patients with diagnose of acute myocardial infarction and stroke during the same hospitalization, treated in our internal Intensive Care Unit from January 1995 to December 2006. None of these patients were subjugated to thrombolytic therapy, percutaneus coronary intervention or coronary artery bypass graft.

RESULTS. All included were Caucasians (who were maked 0.22% of total number of hospitalised patients during that period), 8 (38%) males,and 13 (62%) females. Age of patiens was between 49 and 85 years, mean 71±5.6 (CI 67- 76). Six patients have survived (29%), and 15 died (71%) (5 males and 10 females). The average age of deceased males was 66±10.1 years (CI 54-79), and females was 76±10.1 (CI 69-83). Mean APACHE II score was 23±12 (CI 18-29), and mean GCS was 7±4 (CI 5-8). Most of the patients (9 patients or 43%) were admitted during the winter, six in autumn (29%), five in spring (24%) and in summer only one patient (4%). In 11 patients (52%) (6 males and 5 females) we found connection between current state with recent infection (within last month) or signs of infection on admission in ICU. Respiratory infection was found in 6 patients, urinary infection in 2, and in 2 cases we have found some other source of infection. Also we found significant connection between current state (myocardial infarction and stroke during same hospitalization) and infection during winter ($p=0.0369$) and positive correlation between infection and mortality of these patients ($r=1.0000$, $p<0.0001$).

CONCLUSION. Acute infection like chronic inflammation can increase risk of vascular events although exact mechanisms are still unknown. We can expect these events more often during winter period when are respiratory infection are more frequent.

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0515

ORAL DECONTAMINATION WITH HEXETIDINE FAILS TO REDUCE MOUTH BACTERIA COLONIZATION AND RISK FOR VENTILATOR ASSOCIATED PNEUMONIA (VAP) IN ICU PATIENTS

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INTRODUCTION. VAP is the most frequently occurring nosocomial infection among patients requiring mechanical ventilation in the ICU and is associated with increased morbidity and mortality. The major route of acquiring VAP is oropharyngeal colonization by the endogenous flora or by pathogens acquired from the ICU environment. Oral decontamination with hexetidine 0,1% reduces the risk for VAP according the results of many reported studies and is the most common oral antiseptic in greek ICUs. Our aim was to determinate the effect of oral decontamination with hexexidine 0,1% on development of oropharyngeal colonization and VAP.

METHODS. 30 patients admitted to the ICU and received mechanical ventilation for more than 7 days.13 were males (43,3%) and 17 (56,7%) females. Mean Apache II score on admission was 19,5 ± 3,5. We excluded patients with multiple ICU admissions. Only the first admission was considered for analysis. We excluded also all patients with a diagnosis of pneumonia on or before the first day of mechanical ventilation, so that the sample would include only patients who had hospital-acquired pneumonia develop while receiving mechanical ventilation. All patients were randomized to hexetidine 0.1% applied every 8 hrs into the mouth, beginning 8 hrs after admission. Oropharyngeal sample cultures were obtained on admission on the 2nd and on the 7th day of hospitalisation and analyzed for gram positive, gram negative microorganisms and fungi. All patients were examined daily for the presence of VAP with clinical criteria and chest x-rays.

RESULTS. The most common isolates were: Pseudomonas aeruginosa 16,7%,Klebsiella pneumoniae 16,7%,S.aureus 10%,Enterococcus faecium 10% ,Acinetobacter 10%,E.coli 6,66%,Proteas mirabilis 6,66% and Candida species 20,2%.

TABLE 1.

No of patients %	Oral bacteria No at admission	Oral bacteria No 2nd day in ICU	Oral bacteria No 7th day in ICU	VAP incidence No of patients %
7 (23,3%)	0	7	6	2 (28,5%)
4 (13.3%)	0	0	4	1 (25%)
13 (42%)	23	20	18	3 (23%)
6 (20%)	6	4	0	1 (16,6%)

CONCLUSION. 1)23,33% of patients acquired buccal microorganisms during 2nd day of ICU hospitalization and 13,3% of patients between 2nd and 7th day of ICU stay 2)Hexetidine 0,1% succeeded to erase mouth bacteria only in 6 patients (20%) 3)VAP incidence was significally decreased (16,6%) in patients without oropharyngeal colonization.

GRANT ACKNOWLEDGEMENT. OK

Poster Sessions
Technology assessment III 0516-0529

0516

COUPLED PLASMA FILTRATION ADSORPTION IS BENEFICIAL IN SEPTIC SHOCK

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INTRODUCTION. Coupled plasma filtration adsorption (CPFA), using a sorbent once the separation between plasma and blood has been obtained with a plasma filter, has been designed to non-selectively remove inflammatory mediators released in sepsis and septic shock. The aim of this study was to test whether CPFA is beneficial in septic shock.

METHODS. Fourteen 24 h-fasted, anesthetized, invasively monitored, mechanically ventilated female sheep (28.9 ± 3.8 kg) received 1.5 g/kg body weight of feces s lactate (RL)+ hydroxyethyl into the abdominal cavity to induce sepsis. Ringer starch (Voluven) (volume ratio=1:1) was titrated to maintain cardiac filling pressures at baseline levels throughout the experimental period. Four hours after feces injection, animals were randomized to two groups: CPFA treatment (n=8) or control (n=6). A four-pump hemofiltration machine (Lynda, Bellco, Mirandola, Italy) was used for the study.

RESULTS. Although mean arterial pressure and cardiac index were significantly lower in the CPFA group compared to the control group (p=0.04 and p=0.02, respectively) and blood lactate concentrations tended to be higher in the CPFA treated group (p=0.05), survival time tended to be longer in the CPFA than in the control group (21.8 ± 1.6 vs 16.0 ± 2.3 hours, Log rank p=0.05).

CONCLUSION. In this clinically relevant septic shock model, CPFA treatment tended to prolong survival time.

0517

MOLECULAR ADSORBENT RECIRCULATING SYSTEM (MARS®) IN ACUTE SEVERE LIVER FAILURE PATIENTS

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INTRODUCTION. Acute severe liver failure (ALF) is a clinical syndrome that results from rapid loss of the major liver functions. Despite improvements in the treatment of these patients, including liver transplantation, mortality rates remains high. A liver support system capable of removing endogenous toxins may be useful in ALF patient's management. The aim of this study was to assess the efficacy of the extracorporeal liver assist device MARS® (Molecular adsorbent recirculating system) in patients with ALF unresponsive to intensive medical therapy.

METHODS. The study was performed in a medical–surgical intensive care unit of a tertiary referral hospital with multi-organ transplant program. A prospective clinical case-control study was designed. Patients with severe ALF of any etiology admitted to ICU were included if MODS was present and an indication for liver transplantation was done. Standard treatment measures were applied in all cases according to patient's clinical condition. Patients received MARS® treatment after this therapy was introduced in our ICU. Patients without MARS treatment were the control group. Outcome parameters were the main variables for comparison between groups. Complications related with MARS treatment were also analyzed.

RESULTS. A total of 45 patients were included (control group: 26, MARS group: 19). Illness severity scores were greater for the MARS group: APACHE II: 17,38 ± 7,98 vs 7,73 ± 5,13 (p<0.0001). SOFA: 11,04 ± 3,25 vs 8,03 ±1,93 (p<0.001). Laboratory parameters showed only statistical differences for plasma bilirrubin levels in the first 24 hours. ICU mortality was 57,8% in the treatment group and 42,3% in the control group (p=0,49). Liver transplant was performed in 17 patients (65,4%) in the control group and in 11 (57,8%) in the MARS group. ICU mortality was significantly lower for transplanted patients in the MARS group (27,3% vs 87,5%) (p=0.019). MARS® therapy was well tolerated in all cases.

CONCLUSION. MARS® therapy can be applied in an ICU setting to patients with severe ALF without significant adverse effects. Combination therapy with MARS and liver transplantation seems to be the more effective therapeutic option for patients with severe ALF.

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0518

THE EFFECT OF HUMIDIFIER TEMPERATURE ON HUMIDIFICATION WITH HIGH FREQUENCY OSCILLATORY VENTILATION

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INTRODUCTION. At our institution there was an increase in blockage of tracheal tubes in patients on high frequency ventilation (HFO). We hypothesised that this was caused by changing our adjustable-thermostat humidifiers to a type with fixed temperature (37.0 ˚C).

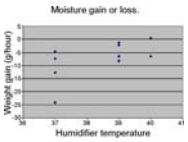
METHODS. In a previously-described test set-up, a 20L jar serving as a dummy lung was ventilated through a heated water-filled reservoir placed on a weighing scales so that gain or loss of water from it could be detected. The ventilator was a VIASYS SensorMedics 3100B using a Fisher/Paykel MR730 Humidifier The ventilator was set to maximum power at a frequency of 5 Hz. Three investigations were performed with humidifier temperatures of 37.0 ˚C, 39.0 ˚C and 40.0 ˚C. Weight gain or loss over 1 - 2 hours was recorded and calculated in g/h.

RESULTS. Four measurements were made at 37.0 ˚C, four at 39.0 ˚C and two at 40.0 ˚C.

TABLE 1. Change in water content per hour (g)

Humidifier temperature	Weight gain (weight loss if -ve)
37	-4.59
37	-7.35
37	-24.06
37	-12.65
39	-6.48
39	-2.21
39	-1.18
39	-8.11
40	-6.47
40	0.43

p = 0.033 (one-tailed t-test 37 ˚ group vs (39 or 40)



CONCLUSION. Compared with higher temperatures, a humidifier setting of 37.0 ˚C a produced a considerable drying effect on the dummy lung.

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0519

LONG TERM SPIROMETRY FINDINGS AFTER PERCUTANEOUS TRACHEOSTOMY USING THE BLUE RHINO SINGLE DILATOR TECHNIQUE

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INTRODUCTION. Previous spirometry studies suggested 0-20% tracheal stenosis following percutaneous tracheostomy(PT) based on techniques that involved either the original Ciaglia serial dilatation or Griggs modified forceps blunt dilatation of the trachea. Subjective voice changes and hoarseness has been reported at an incidence of 19% following PT by the Blue Rhino single dilator technique. Aim of this study was to assess upper airway narrowing effects based on spirometry and symptoms following PT by Blue Rhino technique.

METHODS. Invitations were sent to patients(identified from the Liver Database) who underwent PT during their intensive care stay and were attending liver clinic beyond 6 months after the procedure. All participants underwent formal pulmonary function tests and filled in a standardized questionnaire on symptoms (pain, dysphonia, dyspnoea, cough, throat tightness, dysphagia) and scar appearance. Flow volume loops were recorded using a Jaegar Masterlab4.65 pneumotachograph, and best values for forced vital capacity(FVC),forced expiratory volumes at 0.5 and 1second(FEV0.5,FEV1),peak expiratory flow rate(PEFR),forced inspiratory flow at 50%vital capacity(FIF50),forced expiratory flow at 50%vital capacity(FEF50)and peak inspiratory flow(PIF) recorded. Values for FEV1/PEFR,FEF50/FIF50 and FEV1/FEV0.5 ratios were then calculated.

RESULTS. During August2000 to January2006, 439 patients underwent PT, of whom 198 survived. 30 of the 59 outpatient attendants participated in the study. Median age was 43.7years (20-72y) and M:F ratio was 1:2. 6 of the 21 current or past smokers had obstructive airway disease based on FEV1/FVC ratio. Median interval between PT and review was 24months (6-12mth,n=8; 13-24mth,n=7; 25-48mth,n=8, beyond 5y,n=2). Median APACHE II score on day of PT procedure day was 16. Nine patients had failed extubation, and one patient underwent 3 PT procedures during the same hospital stay. Median duration of translaryngeal intubation prior to PT and from PT placement to decannulation were 9days (3-30d) and 16days (5-152d) respectively. Moderate/severe dyspnoea was reported by 3 patients (mild,n=12) and cough by 4 patients (mild,n=7). 7 patients reported voice changes and 1 patient with hoarseness. Assessment of scars at the time of review showed 1 patient with keloid scar and 1 patient with an ugly indurated scar (at 11 and 14 months respectively); all others were good to barely visible. Satisfactory flow-volume loops were obtained for 29 patients. 6 patients had evidence of extrathoracic tracheomalacia based on the FEF50/FIF50 ratio >1 (3 with symptoms), however FEV1/PEFR ratio did not suggest obstruction in any of them.

CONCLUSION. Dyspnoea and cough were the most common symptoms, notably in smokers. Late complications were uncommon, other than one patient with indurated scar, hoarseness and possible tracheomalacia.

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0520

HUMIDIFICATION DURING INTRAPULMONARY PERCUSSIVE VENTILATION (IPV) ADDED TO A CONVENTIONAL VENTILATOR

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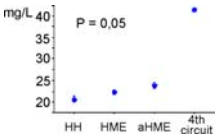
INTRODUCTION. High frequency percussive ventilation (HFPV) is a technique that delivers small bursts of gas with frequency higher than 1 Hz (usually 4-10 Hz). Intrapulmonary percussive ventilation using HFPV has been used during spontaneous breathing, but is also proposed superimposed to conventional ventilation (CV). Airway humidification during HFPV has not been studied, however, and is generally provided with an aerosol. A poor airway humidification could lead to secretion thickening and atelectasis. We therefore performed a bench study to assess hygrometry provided by different devices when HFPV is added to CV.

METHODS. 4 circuits have been tested:
1. A heater humidifier (HH) (Fisher & Paykel MR 850) placed on the inspiratory line of the CV.
2.&3. Heat and moisture exchanger (HME) and active HME (aHME) were tested placed at the Y piece.
For these circuits, HFPV was connected to a 3 branches Y piece with inspiratory and expiratory lines of the CV.
4. HH was connected between HFPV and Y piece.
All circuits were tested with the aerosol provided by the manufacturer. Hygrometry (relative and absolute humidity RH and AH) was measured using psychometric method at Y piece.
Hygrometry provided was compared with non parametric test. P<0,05 was considered significant.

RESULTS. Table summarize AH and RH results:

TABLE 1.

	HH	HME	aHME	4th circuit
RH (%)	85,3 ±1,1	93 ±0,0	93,4 ±1,1	93,7 ±0,6
AH (mg/L)	20,5 ±0,3	22,4 ±0,1	23,9 ±0,3	41,5 ±0,3



CONCLUSION. The minimal level of humidity recommended during prolonged mechanical ventilation is 30 mgH2O /L, and the fourth circuit was the only one to provide sufficient AH. Temperature drop due to gas acceleration and large admission of gas during HFPV may explain the lack of efficacy of the other devices.

0521

THE ADMISSION THROMBELASTOGRAPH (TEG®) PROFILE IS ASSOCIATED WITH MORTALITY IN UN-SELECTED CRITICALLY ILL PATIENTS

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INTRODUCTION. Coagulation abnormalities are very frequent in critical illness. These, often secondary to sepsis and DIC, significantly contribute to mortality in the Intensive Care Unit (ICU). Thrombelastography (TEG®), a cell-based whole blood analysis, enables global evaluation of the haemostatic system and the purpose of the present study was to evaluate whether the haemostatic competence on admission to the ICU, evaluated by TEG® was associated with mortality in critical ill patients.

METHODS. Blood samples were prospectively obtained upon arrival from 161 consecutive patients admitted to a multidisciplinary tertiary ICU. TEG® analysis was performed (TEG® Haemostasis analyzer, Haemoscope Corporation, Niles IL, USA), measuring clot formation, -stability and degradation in whole blood. The TEG® parameters R time, Angle, and the maximal amplitude MA were evaluated. The R time represents the initiation of the coagulation process (normal reference 3-8 min), the MA represents maximal clot strength mainly dependent on the platelet function (normal reference 51-69 mm), and Angle represents the clot build up, involving fibrinogen function (normal reference 55-78 ˚). The primary endpoint of the study was defined as death within 30 days. Data are presented as mean (SD). Mann-Whitney's U-test and Fischer's exact test were applied with a p value <0.05 considered statistically significant.

RESULTS. The age was 56.0 (20) years in a cohort of 37.3 % medical (n=61) and surgical (n=100) patients of whom 96 were male (60.2%). Length of stay in the ICU was 8.9 (9.8) days and the APACHE II score was 22.6 (7.6). Thirty-one patients died (19.3 %). R time (8.8 (4.0) min vs. 6.5 (3.9), respectively; p=0.0008), MA (50.8 (14.4) mm vs. 56.3 (17.9), respectively; p=0.04) and Angle was significantly lower in non-survivors than in survivors (52.3 (15.7) ˚ vs. 61.1 (12.7), respectively; p=0.004). Patients with a normal TEG did receive less CVVHDF (6.3 % vs. 32.9 % (p<0.0001)and had a lower mortality rate (10.5 % vs. 29.3 (p<0.002) than patients with not-normal TEG.

CONCLUSION. A compromised haemostatic competence on admission to the ICU as evaluated by the TEG® R time, Angle, and MA are associated with increased 30-day mortality in un-selected critically ill patients. This finding is consistent with the hypothesis that a dysfunctional haemostatic system could be a central part of developing organ failure and, hence, mortality. This prognostic tool may be useful as a rapid, point-of-care assessment. The possibility of goal-directed haemostatic intervention should be investigated in a randomized controlled trial.

0522

CORRELATION OF BRAIN NATRIURETIC PEPTIDE LEVELS WITH SEVERITY OF SEPSIS IN ELDERLY PATIENTS

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INTRODUCTION. Brain natriuretic peptide (BNP) is a 32-amino-acid polypeptide mainly secreted by the ventricles of the heart in response to excessive stretching of myocytes. Cardiac dysfunction, characterized by reduced ejection fraction, biventricular dilatation and decreased response to resuscitation with fluids, is often present in patients with sepsis. The myocardial depression is probably due to tumour necrosis factor-α and interleukin-1β acting in synergy. The aim of the study was to determine whether BNP levels in elderly septic patients are related to the severity of the disease.

METHODS. In 27 patients (14 males) with sepsis of various origin, aged 72±18 years, hospitalized in the Internal Medicine Department, BNP serum levels (direct immunochemiluminescence, CENTAUR, BAYER) and APACHE II score were measured within 6 hours after hospital admission. Sepsis was determined according to the criteria of the consensus of the American College of Chest Physicians and the Society of Critical Care Medicine (1992). Patients with acute myocardial infarction were excluded from the study.

RESULTS. The mean BNP value (pg/ml) in our subjects was 353 (12-4048). The BNP levels in the subgroup of individuals with chronic heart failure (n: 10) were higher than those of the rest of the patients [628 (85-4048) vs 191(12-1558), p=0.020, Mann-Whitney test]. A statistical significant difference was also found in BNP levels of the patients with APACHE II score ≥15 as compared to those of lower score [620 (44-4048) vs 105 (12-321), p=0.008, Mann-Whitney test]. Patients who succumbed (n: 3, 9%) had extremely high BNP levels [mean: 1963 (284-4048)]. A positive correlation was observed between BNP values and APACHE II score (Linear Regression analysis , r=0.75, p<0.001).

CONCLUSION. In conclusion, brain natriuretic peptide was found to be correlated with the severity of sepsis in elderly patients and thus it might be used as a useful prognostic marker in septic process.

0523

FRACTIONED PLASMA SEPARATION AND ADSORPTION (FPSA) WITH HIGH-FLUX HEMODIALYSIS (PROMETHEUS ®): EXPERIENCE IN 39 APPLICATIONS

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INTRODUCTION. Prometheus® is a newly developed extracorporeal liver support that combines fractionated plasma separation and adsorption (FPSA) with high-flux hemodialysis. Clearance of albumin-bind and water-soluble toxins are achieved in several steps. Here we present our results in 39 applications.

METHODS. Thirteen patients (8 patients with viral hepatitis acute on chronic liver failure, three mushroom intoxication, one liver failure after metastatectomy and one cittrullinemi) have undergone 39(3.0 ±1.4 [1-5]) times FPSA with high flux hemodialysis between June 2005 till March 2007 in our ICU. Inclusion criteria were hyperbilirubinemia (total bilirubin > 5mg/dL), or hepatic encephalopathy (grade 4), or INR >4. During a six-hours period of application, a variety of clinical and biochemical parameters were assessed; and data before and after the procedure were recorded.

RESULTS. Seven of the 13 patients survived. One patient has undergone liver transplantation; six survived without liver transplantation. There was a decrease of 18 ± 25 % in total bilirubin per application (From 11.6±8,6 mg/dL to 8.9±6.7 mg/dL; p< 0.05), blood urea nitrogen (BUN) was decreased from 13 ±15gr /dL, to 10,1±10,3 gr/dL (p<0.05), white blood cell (WBC) increased from 11,6±6,1 mm3 to 13±8,1 mm3 (p<0.05), albumin decreased from 2,8 ±0,5 gr/dL to 2,6 ±0,4 gr/dL (p<0.05). Consequent applications have led to additional decreases in bilirubin. Regarding the hemodynamic parameters, there were no significant changes during the procedure.

CONCLUSION. FPSA obtained decreases in bilirubin and BUN (but also in albumin levels). There can be an increase in white blood cell count. This procedure can be considered a bridge therapy for liver transplantation: It can increase the tolerance time until the liver transplantation or can improve the clinical status achieving a treatment without an organ donation.

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0524

BENCH TESTING OF INTRAPULMONARY PERCUSSIVE VENTILATION (IPV) ADDED TO A CONVENTIONAL VENTILATOR: PRESSURES AND VOLUMES GENERATED

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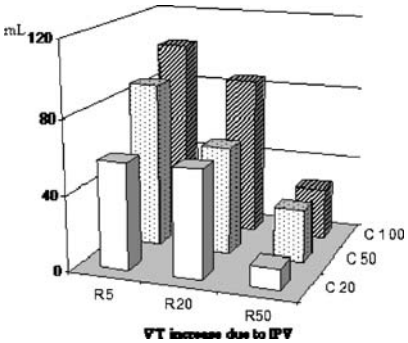
INTRODUCTION. High frequency percussive ventilation (HFPV) is a technique that delivers small bursts of gas with frequency higher than 1 Hz. IPV using HFPV has been used during spontaneous breathing, but is also proposed superimposed to conventional ventilation (CV). We designed a bench study with 3 resistances (R) and compliances (C) to assess the effect of IPV on tidal volume (VT) generated by CV, positive end-expiratory pressure (PEEP) and maximal alveolar pressure (Palv) during volume controlled ventilation.

METHODS. IPV (Percussionnair corporation) was connected on the inspiratory line of a ventilator using a heater humidifier. Palv and PEEP were recorded inside the test lung, VT was inferred using flow integration at Y piece. R=5, 20 & 50 cmH2O/L/s and C=20 50 & 100mL/cmH2O were tested on a Michigan test lung. Three pauses (0 0,2 & 0,4s) were used with 2 IPV driving pressure of 12 & 18 cmH2O. No PEEP was set on CV.

RESULTS. Results are difference between with and without IPV. Shown for pause=0 s and IPV driving pressure =12 cmH2O. PEEP, VT and Palv increased all with IPV. This increase is higher with lower C and can reach 8 cmH2O for Palv. Volumes and pressures are increased more with a higher driving pressure (18 cmH2O) or a longer pause.



CONCLUSION. IPV added to a CV increases pressures and volumes delivered but cannot be monitored on the ventilator. Pressures (Palv & PEEP) and volumes increase due to IPV are strongly dependent of R and C. This might be well known when using this technique.

0525

COMPLICATIONS ASSOCIATED WITH CENTRAL VENOUS CATHETER INSERTION AND MANAGEMENT

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INTRODUCTION. Central Venous Catheterisation is a frequently performed in Theatre and Intensive Care and is associated with serious complications. The aim of this project was to ascertain the prevalence of complications associated with the insertion and management of Central Venous Catheters in our department and highlight areas where changes in practice are necessary.

METHODS. Data was collected over a four month period, for all CVCs inserted in Theatre and Intensive Care. For each CVC inserted the following data was collected at insertion: operator, site, type of line, aseptic measures, difficulty of insertion, use of ultrasound and immediate complications. Each CVC placed underwent daily surveillance looking for Catheter insertion site infection and signs of Catheter Related Bloodstream Infection (CR-BSI). Upon removal all CVC tips were cultured and blood culture data from patients suspected of having CR-BSI was correlated.

RESULTS. A total of 174 CVC's were inserted, 83 in theatre and 91 in ICU. 113 (65%) of CVC's were inserted solely a trainee, 52 (30%) were inserted solely by a consultant and 9 (5%) were the result of a combined effort by consultant and trainee. 115 (66%) of CVC's were inserted via the subclavian route, 47 (27%) by the internal jugular and 12 (7%) by the femoral route. Ultrasound guidance was used in only 13 cases (7%) and most commonly by consultant staff (77%) for internal jugular and femoral CVC insertion. Full barrier precautions were used in only 76 (44%) of the total cases, with a lower rate in ICU (11%).
The most commonly occurring complication of CVC insertion was the need for repeated attempts (defined as more than 2 attempts). This occurred in 15 (9%) of cases. Carotid artery puncture occurred 3 times (6% of IJ insertions) and subclavian artery puncture occurred twice (2% of SC insertions). Aberrant line position requiring line re-insertion occurred in 4 (2%) cases, all associated with the subclavian route. Pneumothorax occurred in 4 cases (2%, which were all by the subclavian route. Three of these followed CVC insertion by trainee's and one by a consultant.
In total there were found to be 13 infections related to CVC, of which 4 were local infections and 9 were confirmed as cases of CR-BSI, with 68% positive bacterial culture. Overall rates of CR-BSI were higher for CVC's inserted in theatre (9.9 per 1000 line days) than in ICU (2.6 per 1000 line days).

CONCLUSION. 1. Increased use of US guidance and necessary training in this technique is required.
2. Strict adherence to infection reducing measures such as use of full barrier precaution and use of 2% Chlorhexidine is being enforced.
3. Ongoing surveillance of CVC's inserted and education for staff involved in handling these lines is required.

0526

MARS DIALYSIS; HARD WORK – NO BENEFIT OR A LIFESAVING TREATMENT?

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INTRODUCTION. In Sweden the experience of MARS dialysis is limited. The treatment is only available at four hospitals. The MARS treatment is infrequent, expensive and requires extra personnel resources as well as special training programs to maintain skills.

METHODS. A retrospective, descriptive study was completed in the intensive care unit at the University Hospital, Akademiska sjukhuset, Uppsala Sweden. The aim was to determine the outcome for patients treated with MARS, Molecular Adsorbing Recycling System, during the period January 2002 until December 2006.

RESULTS. The study included nine patients with Child-Turcotte- Pugh score between 12-15. Five of the patients had an Acute on Chronic liver failure (AcOCh) and four of the patients suffered from acute liver failure (ALF). Seven females and two men with an average age of 43,2 years (18-62 years) received between one and eight treatments with MARS dialyses. Four of the patients received a new liver and the liver regenerated spontaneously for two patients. An obvious effect was seen in the laboratory results for ammonium, ALAT and bilirubin.

TABLE 1.
Child–Turcotte-Pugh Score for patients before treatment with MARS

Patient	1	2	3	4	5	6	7
Encephalopathy grade	3	4	3	1-2	4	3	4
Ascites	moderate	refractory	none	none	mild	mild	refractory
PK INR	2,4	2,0	5,4	2,5	4,3	2,2	3,2
Albumin g/L	29	30	26	26	25	17	19
Bilirubin µmol/L	553	179	321	766	222	420	560
Child-Pugh Scoring	14	13	13	12	14	14	15

CONCLUSION. Despite the fact that MARS is expensive , requires extra work and specially skilled nurses it has shown to be a life saving treatment with benefit for certain patients.

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0527

EXTRAFORPOREAL LIVER SUPPORT SYSTEMS — CLINICAL EXPERIENCE

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INTRODUCTION. At present orthotopic liver transplantation is the only treatment modality that provides significant improvement in outcome of hepatic liver failure; but the availability of transplantation is hindered by organ shortage resulting in extended wainting list. Extracorporeal liver support devices are effective therapies to overcome periods of descompensation or to bridge until transplantation. Although its main therapeutic indication is hepatic failure, the possibility of removing metabolits opens new therapeutics options for other entities.

METHODS. We reports 3 clinical cases where patients were treated with PROMETHEUS as a bridge to transplant or to treat refractory pruritus. Several analytics results like bilirubin, Platelets, Creatinine, urea were measured before and after each treatment.

RESULTS. Clinical case n. 1: Women, 27 years old, Auto-imune hepatitis 10 years ago, under imunossupression. Cirrhosis - Child C. She was admitted to ICU in Fev. 2007 with MOF related with klebesiela bacteraemia. An urgent call to transplant was made, but no compatible liver was available. Due to deterioration of clinical status treatment with PROMETHEUS was started, which made transplant possible 10days after.
Clinical case n. 2: Male, 64 years old; history of Hepatitis C Virus (HCV) cirrhosis submitted to liver transplantation. He was admitted to ICU in the 3rd month post-transplant with acute hepatic insufficiency (MELD score 37) and MOF. An urgent call to re-transplant was made. Due to deterioration of the clinical status, treatment with PROMETHEUS® was started, which made re-transplantation possible 2 days later.
Clinical case n. 3: Male, 67 years old, liver transplant due to hepatocarcinoma in the setting of HCV cirrhosis. Due to community acquired pneumonia, the patient was admitted to ward in March 2006. As immunosupressive doses were reduced, the patient began to refer complaints of pruritus. An intense and disabling pruritus developed associated with sleep deprivation, anorexia, weight loss and psycho-motor lentification. Due to the refractoriness of pruritus to medical therapy, PROMETHEUS® therapy was initiated leading to complete disappearance of pruritus complaints after the 1st session.
In all 3 cases PROMETHEUS treatment significantly improved blood levels of protein bound (conjugate bilirubin) and water soluble (creatinine, urea) substances and the clinical status of the patients.

CONCLUSION. Extracorporeal liver support devices have recently attracted increasing interest. Although its role in liver failure and other conditions with toxin accumulation is yet to be better characterized, we believe that its use may be advantageous and life saving in selected patients.

0528

BACKWARDS COMPATIBILITY IN THE DEVELOPMENT OF A SAFE CONNECTOR SYSTEM

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INTRODUCTION. A typical intensive care unit patient has multiple lines including peripheral, central, arterial, epidural or intrathecal and air lines each with associated connectors. The consequences of inadvertent misconnection of any of these lines range from minor e.g. venous necrosis from peripheral administration of concentrated KCl to severe e.g. death from air embolism but are all disastrous from a medico-legal point of view.
Systems have been proposed to address these safety concerns but have limitations.

METHODS. The most obvious fail-safe system is one in which the different connectors are simply different sizes or shapes completely preventing misconnection. A major drawback of this system is the need for connector-specific syringes, hampering the ability of the physician to over-ride the system in urgent circumstances. Another important consideration is the need for the purchasing authority to completely change all lines, connectors and syringes in one fell-swoop at considerable financial cost.
Another proposed system uses colour coded connectors but has the disadvantage of continued reliance on operator vigilance i.e. the system is not fail-safe.

RESULTS. A more suitable option is a system with backwards compatibility, that is to say one that is fail safe for line connection but will still permit the tip of a standard syringe. We have developed this system in prototype form. It utilises a standard luer-sized tip with "lock and Key" modifications to the flange. An advantage of this system is that modifications of the "key code" allows for patterns of permitted or not-permitted combinations e.g. the system permits connection of any peripheral line to a central line but not vice versa.

CONCLUSION. A limited version of the system has been introduced on our intensive care unit. This prevents the connection of cuff inflator air-lines to anything other than the pilot port of an endotracheal tube. The fact that the majority of staff have not noticed a change in the equipment highlights the importance of backwards compatibility whilst ensuring safety.

0529

ROTATIONAL THROMBOELASTOMETRY (ROTEM) UTILIZATION IN A PATIENT WITH HEPARIN-INDUCED THROMBOCYTOPENIA (HIT) TO FOLLOW TREATMENT: A POSSIBLE ALTERNATIVE?

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INTRODUCTION. Thrombocytopenia is a common problem in the ICU and cardiovascular patients. It has been considered to play a role in worsening the prognosis of ICU patients. Especially patients submitted to cardiac surgery may be exposed to high dose of unfractionated heparin (UFH) infusions, mainly during extra-corporeal circulation. After open-heart surgery, as opposed to other surgical procedures, the platelet count falls, primarily due to platelet damage and destruction in the bypass circuit and hemodilution. Heparin is the most common drug to be implicated in thrombocytopenia in ICU patients. Determining the etiology for the low platelet count is important for the implementation of appropriate management. The use of a direct thrombin inhibitor in treatment should be considered early (< 48 hours) if a diagnosis of heparin-induced thrombocytopenia is possible(1).

OBJECTIVE. The aim of the study is to present one case of heparin-induced thrombocytopenia after a mitral valve replacement surgery and to compare the rotational thromboelastometry (roTEM) and coagulation tests before and after argatroban administration.

METHODS. CASE: An 83-year-old female patient was hospitalized because of acute mitral regurgitation secondary to chordal rupture and submitted to a mitral valve replacement. Past medical history included hypertension, diabetes, chronic atrial fibrillation and mild renal failure. Before the surgery, a coronary angiography was performed and revealed normal coronary arteries and a normal left function. After four days using UFH, the platelet count dropped 30% and the anticoagulation was changed from UFH to low molecular weight heparin. Postoperatively, the patient presented in shock, acute renal failure and signs of peripheral hypo perfusion and increased abdominal pressure. Seven days after the surgery, the suspicion of HIT was confirmed by ELISA test for PF4–heparin antibodies. Heparin was stopped and argatroban was initiated. The patient died from multiple organ failure 1 week later.

RESULTS. We evaluate the roTEM and coagulation tests (platelets; PTT; TAT; PAI; PTN-C; fibrinogen; D-Dimer and Antithrombin-III) before and after the argatroban use.

CONCLUSION. COMMENTS: In this case the roTEG was as good as a wide coagulation profile test to evaluate the effects of anticoagulation using argatroban in a HIT patient.

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Poster Sessions
Airway management ventilator circuit 0530-0543

0530

ROLE OF FIBEROPTIC BRONCHOSCOPY AND ITS SAFETY IN VENTILATED PATIENTS IN ICU

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INTRODUCTION. Fiberoptic Bronchoscopy (FBO) has been increasingly performed in ICU care for a range of therapeutic and diagnostic indications. ICU should have the facility to perform it urgent and timely.
The objective of this study is to evaluate the efficacy and safety of this technique in a multidisciplinary ICU environment following a procedures' protocol.

METHODS. It was created a fiberoptic bronchoscopy protocol to implement in a routine basis, and we are testing it in this study. We applied it, in a prospective manner, in every patient undergoing fiberoptic bronchoscopy from January to March 07, to evaluate the indications, risk factors, the use of drugs (sedatives, analgesics and muscle relaxants) and monitoring (ECG, BP, SpO2, ETCO2, plateau pressure and blood gas analysis), complications and results of this technique. Our sample included 21 patients (medical, surgical and trauma patients), with a median SAPS II of 46 (14-67). Ten patients had criteria of severe respiratory failure (PaO2/FiO2 < 200).
Twenty four FBO were done in the study period; 18 for diagnostic reasons (16 pulmonary infiltrates, 1 hemoptysis and 1 stridor), 2 for therapeutic reasons (bronchial toilet) and 4 to assist percutaneus tracheostomy.
Seventeen of our patients had risk factors for this procedure (bronchodilator therapy in 11 patients, PaO2/FiO2<100 in 3 patients, PEEP > 10cmH2O in 1 patient, platelet count < 50000/mm3 in 1 patient and altered coagulation screen in another).

RESULTS. All exams were successfully concluded. The median procedure time was 6 minutes (2-42 minutes). Beyond sedation, 5 exams were done with topical anaesthesia and 14 with muscle relaxants.
Concerning safety, the exam was interrupted due to hypoxemia in one patient and due to episodic tachycardia in another patient, both concluded without major problems.
Two patients showed new pulmonary infiltrates in X-ray evaluation 24 hours after the technique.
No significant variation of the PaO2 and PaCO2 were noticed during the first hour after the procedure.
Concerning efficacy, from 16 broncho-alveolar lavage samples, 10 were microbiology positive. One small-cell lung carcinoma was diagnosed by a bronchial biopsy. All these findings have therapeutic relevance. Full pulmonary reexpansion was achieved after FBO in 2 cases of lobar atelectasis.

CONCLUSION. Implementation of a protocol and an individual risk assessment policy may improve safety of BFO in ventilated patients in ICU. FBO contributes to valuable diagnostic information and is useful for therapeutic purposes.

0531

ARRANGEMENT OF T-PIECE PARTS AND OXYGENATION IN CRITICALLY ILL PATIENTS WITH AN ARTIFICIAL AIRWAY

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INTRODUCTION. There is a scarcity of data on the effects on oxygenation of the position of the mixing tube relative to the T-Piece and the Venturi mask. Some data show that while a mixing chamber positioned between the Venturi mask and the T-piece is associated with improved oxygenation, positioning of the T-Piece between the mixing chamber and the Venturi mask has no effect on patients' PaO2 (1). Yet there are no data on an alternative arrangement, with two mixing chambers, one at each end of the T-Piece. We relate our experience with this arrangement.

METHODS. We studied critically ill patients who were either intubated or on tracheostomy and who although clinically stable and spontaneously breathing on a T-Piece for at least 2 hours could not be extubated. The patients initially (t-0) had one mixing chamber that was positioned between the T-piece and the Venturi mask. After sampling of arterial blood gases, a second mixing chamber was inserted at the other limb of the T-Piece and arterial blood gases measured again after a further 20 minutes (t-1). Patients in whom interruption of these arrangements (for administration of nebulized drugs or for endotracheal suction) was needed at the time period starting at 20 minutes before t-0 and up to t-1, were excluded from the study. During this time period FiO2 for all patients was 0,5. In all 27 patients (12 intubated and 15 on tracheostomy) were studied. Results are expressed as median and interquartile range. Statistical analysis was performed with Wilcoxon signed-rank test.

RESULTS. There was a significant increase in PaO2 from t-0 (median 88 mmHg, 25%-75% range 73-105 mmHg) to t-1(median 91 mmHg, 25%-75% range 78-125 mmHg) (p = 0,0009), with no significant change in PaCO2, breathing frequency, arterial blood pressure or heart rate.

CONCLUSION. A second mixing chamber adjusted to the limb of the T-Piece opposite to the Venturi mask is associated with significant improvements in oxygenation. Presumably the second mixing chamber acts as a reservoir with high- content oxygen mixture, and this might be beneficial, especially in patients with higher peak inspiratory flows.

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0532

COMPARISON OF TWO HUMIDIFICATOR SYSTEMS ON ENDOTRACHEAL TUBE RESISTENCE

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INTRODUCTION. The objective of this study was compare the endotracheal tube resistance after mechanical ventilation using two different humidification systems.

METHODS. Consecutive patients ventilated for more than 48h and in whom inspired gas conditioning was performed either with a heated humidifier (HH) or a heat and moisture exchanger (HME) were studied. Patients were matched for endotracheal tube diameter, age, SAPS II and days of mechanical ventilation. Endotracheal tube resistance was measured immediately after extubation. In vitro resistance was calculated with non-used and identical, sterile and clean endotracheal tubes.

RESULTS. Twenty three patients in each group were compared with a mean age of 62.8±12 years, a SAPSII of 41.4±12.3, an endotachreal tube diameter of 7.9±0.35 mm and 10.8±6.6 days of mechanical ventilation. In vitro, native, resistance of endotracheal tubes was. 6.2±1.5 in the group ventilated with HH and 6.0±1.4 in the group ventilated with HME (p= 0.64). No difference was found in the endotracheal tube's resistance after mechanical ventilation: 12.4±9.6 for the HH group and 10.2±3.8 cm H2O/L/s for the HME group, p=0.32. No differences were found for the days of treatment with salbutamol: 3.7±4.7 in the HH group vs. 1.8±3.7 days for HME group, p= 0.127, neither for the total hydric balance -2963±6433 for the HH group vs.-2490±5315 ml for the HME group, p= 0.787.

CONCLUSION. The type of humidification system did not influence the endotracheal tube resistance in patients ventilated for about ten days.

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0533

AIRWAY MANAGEMENT IN ICU. LARYNGEAL MASK ANAESTHESIA DURING PERCUTANEOUS DILATATIONAL TRACHEOTOMY

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INTRODUCTION. Percutaneous dilatational tracheotomy (PDT) is one of the procedures more frequently performed at the patient bedside in ICU. Airway control is usually maintained through an endotracheal tube (ETT) but a laryngeal mask airway (LMA) can be successfully used as well (1,2). LMA ensures a high quality fiberoptic view of laryngotracheal structures; furthermore mechanical ventilation is easier and more uniform with LMA than with an ETT withheld at vocal folds level. Potential disadvantages of LMA are the risk of inhalation and a failed ventilation in case of oedematous airway.

METHODS. 73 ICU patients were scheduled for PDT in the last three years.
All pts were admitted to PDT after a 4-6 hours fast time from enteral nutrition. Predictive anatomic and anthropometric parameters or history of difficult airway were considered. In case of suspected difficulties in airway management, an evaluation laryngoscopy was made. If tube removal was considered possible, a LMA, proportional to body weight, was positioned. The following parameters were registered:
- Classification of fiberoptic laryngeal view through LMA
- Uniformity of inspired/expired tidal volumes during mechanical ventilation
- Trends of PCO2 and PO2 during whole procedure by seriated blood gas analysis
- Need of LMA repositioning or its substitution with an ETT during the procedure
- Suspect or clinical evidence of airway inhalation
- Chest X-ray after PDT

RESULTS. In 3 patients LMA positioning was unsuccessful; in 4 patients LMA did not allow an adequate ventilation due to a increasing laryngeal oedema evident at FOB endoscopy. In these cases the ETT was soon repositioned. In 3 other patients ventilation was maintained thorough LMA but an increase in PCO2 higher than 10% was registered during procedure. In all the other 63 patients we had no problem neither in LMA positioning nor in mechanical ventilation. In all our population we did not have any difficulty in airway management. No cases of airway inhalation were registered.

CONCLUSION. In our experience LMA is an effective and successful ventilatory device during PDT. It improves the quality of endoscopic view, makes easier tracheal puncture and allows a more uniform ventilation. It is important to remember that, before removing ETT, we must always evaluate the risks related to full stomach and to the presence of a difficult airway.

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0534

PERCUTANEOUS TRACHEOSTOMY IS MUCH EASIER WITH PERCUTAN TRACHEOSTOMY SET

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INTRODUCTION. Single dilator technique is increasingly used for percutaneous tracheostomy (1). Although complications have shown a decreasing trend, there remains a concern that the posterior tracheal wall damage can occur during tracheostomy tube placement over a loading dilator. The lip between the loading dilator and the tracheostomy tube tip often causes an obstruction requiring greater force which may be responsible for posterior tracheal wall damage. The Percutan Tracheostomy set (Tracoe Medical, GmbH, Frankfurt) claims to overcome this problem by having a tracheostomy tube-loading dilator assembly with a collapsible silicone sleeve covering the tip of the tracheostomy tube. We were interested to evaluate this in practice.

METHODS. A total of 51 patients scheduled for elective PDT were enrolled in this open prospective observational clinical trial. Assent was obtained from the immediate relatives. Patients were excluded if they had unidentifiable anatomy, severe coagulopathy, a history of difficult tracheal intubation or required significant levels of ventilatory support (FiO2 > 0.6 or PEEP > 10 cmH2O). Experienced operators conversant with PDT techniques performed the procedures whilst the airway and bronchoscopy were maintained by an anaesthertist. The trachea was punctured in all cases between the 2nd and 3rd tracheal rings and dilated using the percutan single Rhino dilator. The tracheostomy tube-loading dilator assembly was then inserted. The ease of tracheostomy tube insertion was graded by the operator on a scale of 0-10, 0 being extremely difficult and 10 extremely easy. All complications were recorded during the procedure.

RESULTS. A total 37 male and 14 female patients aged 53±21 years (mean±SD) were enrolled. Patients were ventilated for 5.1±2.3 days (range 3-9 days) before tracheostomy. The operating time was 5.27±2.3 minutes (range 2-10 minutes). Stoma dilatation and placement of a size 8 tracheostomy tube was successful 49 patients. Other two cases required a second dilatation before tracheostomy tube placement. Average grade of tracheostomy tube placement was 9 median (range 7-10). The operators stated that the force required to place the tracheostomy tube was less than that required with other single dilator manufacturers kit. There were no serious perioperative complications and blood loss was estimated for all cases between 3-5 ml except in one patient surgical ligation of a venous bleed was required. No significant difference was seen in pre and post tracheostomy arterial blood gases.

CONCLUSION. This study suggests that the Percutan Tracheostomy Set allows a single step dilation of tracheal stoma and relatively easier placement of tracheostomy tube. Further randomised controlled trials are warranted to assess its advantages over the other singe dilator techniques.

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0535

PERFORMANCE CHARACTERISTICS OF A NEW NEBULIZER FOR HELIOX

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INTRODUCTION. Nebulizers designed for use with oxygen or air require high flows of heliox to create aerosol in the respirable range. This aerosol is not well characterized for standard nebulizers and the high flow of heliox is costly. The objective of this study was to characterize the performance of a new breath enhanced nebulizer designed for use with Heliox (80/20) gas and compare it to an industry standard breath enhanced nebulizer.

METHODS. Using a Malvern Spraytec laser difractor we measured the aerosol particle size (VMD), total output rate (TOR), respiratory fraction (RF) and calculated the respiratory drug delivery rate (RDDR = TOR x RF). Heliox flows of 7 and 9 lpm were used and normal saline was nebulized. We performed 3 trials with each flow. A Pari LC Plus reusable breath enhanced nebulizer was used for comparison at 15 lpm source gas flow.

RESULTS. See Table 1.

TABLE 1.
Performance Characteristics

	Source Flow (lpm)	VMD (um)	Resp Fraction % (0.1 - 5.0)	TOR (ml/min)	RDDR (ml/min)
Pronto Heliox	7	5.8	46.9	0.257	0.120
Pronto Heliox	9	2.4	71.4	0.342	0.244
LC Plus	15	3.64	61.9	0.478	0.295

CONCLUSION. The Pronto Heliox disposable nebulizer provides excellent nebulization performance using a flow of 9 lpm of heliox source gas (80/20) similar to an industry standard breath enhanced reusable nebulizers at flow rates of 15 lpm. The Pronto Heliox has the potential to save heliox gas and provide the clinician with an alternative to other nebulizers not designed for heliox and which have not been characterized with alternative gas sources.

GRANT ACKNOWLEDGEMENT. The study was funded by Pari Respiratory Equipment

0536

PERFORMANCE OF A NOVEL HUMIDIFICATION DEVICE IN MECHANICAL VENTILATION

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INTRODUCTION. A novel active humidification system has been developed which can heat and humidify dry therapeutic gases during mechanical ventilation. This study measures the ability of this in-line humidification device (PARI Hydrate , Pari Respiratory Equipment, Midlothian, VA, USA) to heat and humidify gas during mechanical ventilation. The new technology (C-Force ; Pari Respiratory Equipment) produces water vapor from an in-line, small device placed proximal to the circuit 'wye' in the inspiratory line. A controller allows precise water vaporization and heating directed into the gas flow. This study was performed to determine the performance of this humidification device for mechanical ventilation.

METHODS. We used a Puritan Bennett 7200 mechanical ventilator under various settings to produce minute ventilation volumes of 25, 20, 15, 11.25, 6 and 4.8 litres. Our test lung (Quick Lung, Ingmar Medical, Pittsburg, PA, USA) was set to normal lung settings to simulate Cp=0.2 L/cm H2O and Ra=5 cm H2O/L/s. The disposable C-Force was inserted into the ventilator circuit 6 inches proximal to the patient wye. Gas temp and relative humidity (RH) were recorded at the patient wye using an electronic thermometer and hygrometer. The source gas was dry medical air; measured at 3% RH and 20oC. Ambient temperature was 25.3oC and relative humidity was 23.5%. Although the amount of water and the temperature are adjustable with this device we used a constant temperature setting of 37oC and the calculated water setting that would saturate the volume of gas using minute ventilation. No attempt was made to optimize the temperature and humidification of the gas beyond these settings.

RESULTS. See Table 1. The inspiratory line of the ventilator circuit remained dry.
TABLE 1.

RH and Temperature of Gas Proximal to Patient 'Wye"

Minute Volume (L/min)	**Relative Humidity (%)**	**Temperature (C)**
4.8	90.7	37.0
6.0	90.2	37.0
11.3	94.6	34.5
15.0	94.5	33.5
20	94.5	35.0
25	95.7	36.0

CONCLUSION. The Pari Hydrate is capable of humidifying and heating dry medical gases during mechanical ventilation throughout a range of minute ventilations to values that meet or exceed standards of 30 mg/L humidity and 33oC. The Hydrate allows clinicians to optimize temperature and humidification by independent adjustment. Because this protocol was to determine basic settings this optimization was not performed. Further studies are warranted to determine optimal gas conditioning with the Pari Hydrate. Because the device is placed immediately proximal to the endotracheal tube the inspiratory line of the ventilator circuit remains dry and no cooling or condensation can occur.

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0537

INTUBATION PROTOCOL IN ICU DECREASE THE INCIDENCE OF LIFE-THREATNING COMLICATIONS

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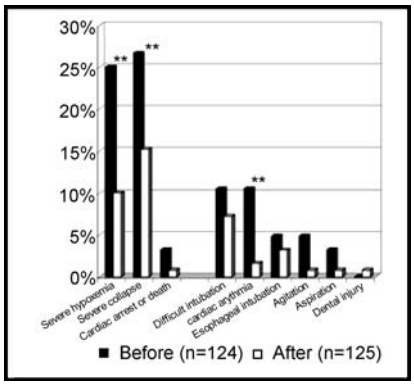
INTRODUCTION. Endotracheal intubation (ETI) in ICU patients is associated with a high rate of immediate life-threatening complications[1]. The aim of this before-after multicenter study was to evaluate an ETI protocol on life-threatening complications related to ETI.

METHODS. 229 ETI procedures were evaluated in 3 ICU (124 before and 125 after implementation protocol). The main end point was the incidence of severe life-threatening complications [1] occurring within 30mn after ETI.
INTUBATION PROTOCOL: PRE-INTUBATION: 1) Fluid loading 2) Vasopressive drugs if DAP< 35mmHg 3) Preoxygenation with Noninvasive positive pressure ventilation (NIV) 4) Prepare sedation 5) Presence of 2 operators. PER-INTUBATION: 6) Rapid Sequence Induction 7) Sellick maneuver POST-INTUBATION: 8) Use capnograph 9) Early use of vasopressors 10) Initial TV=5-6 ml/kg.

RESULTS. Patients were similar in terms of demographics,type of admission and reason for intubation. The overall incidence of severe life-threatening complications was significantly lower in the after group than in the before group (20% vs. 35, p<0.01) (fig1).



CONCLUSION. The implementation of ETI management protocol permitted to decrease the incidence of severe life-threatening complications in ICU patients.

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0538

REVIEW OF TRACHEOSTOMY PRACTICE IN CRITICALLY ILL PATIENTS AT AN INNER CITY GENERAL HOSPITAL

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INTRODUCTION. Critically ill patients frequently require a tracheostomy to facilitate ventilator wean. Both surgical tracheostomy (ST) and percutaneous tracheostomy (PT) are accepted techniques. Each method has its recognised advantages and risks [(1,2)]. The aim of this study was to review the tracheostomy practice and to determine if either technique was associated with better outcomes in the setting of an inner city general hospital.

METHODS. We identified patients who had had tracheostomies over a 2½ year period (May 2004-Dec 2006) by using our institution's ICNARC (Intensive Care National Audit and Research Centre) database. The case notes of these patients were examined in detail. We divided the patients into two groups (ST and PT) depending on method of tracheostomy insertion. Patient age, sex, weight and APACHE score were recorded. We collected figures on ICU length of stay (LOS) and ICU & hospital mortality. We also compared the following data: duration from intubation to tracheostomy, time from clinical decision to actual procedure, size of tracheostomy tube inserted and number of tracheostomy days.

RESULTS. A total of 82 tracheostomies were performed, of which 45 (54.8%) were PTs and 37 (45.2%) were STs. The median age was similar (59 vs 62yrs), as was male sex (68.8% vs 59.4%, p=0.49), mean weight (74.7 vs 86.4kg, p=0.18), mean APACHE score (20.6 vs 23.1, p=0.19) and mean ICU LOS (32.8 vs 40.1 days, p=0.053) between the PT and ST groups. ICU mortality was lower in the PT group (17.8% vs 40.5%, p=0.02). There was no difference in hospital mortality between groups (31.2% vs 40.5%, p=0.052).
Mean duration from decision making to procedure was 0.95 days in the PT group and 1.42 days in the ST group (p=0.16). The duration from initial intubation and ventilation to tracheostomy, however, was significantly lower in the PT group when compared to the ST group (7.5 vs 11.6 days, p=0.03). The mean number of tracheostomy days was 30.4 days for the PT group and 33.6 days for the ST group (p=0.85). 4/45 (9%) patients in the PT group and 8/37 (21.6%) in the ST group had large (size 9.0) tracheostomy tubes inserted (p=0.06).

CONCLUSION. ICU mortality was significantly lower in the PT group, although hospital mortality was not. Time from initial intubation to tracheostomy was lower in the PT cohort; however the number of tracheostomy days was not. A higher percentage of patients in the ST group had large tracheostomy tubes inserted; this group also had a higher mean weight. Both PTs and STs have important roles in our institution.

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0539

EMERGENCY PERCUTANEOUS DILATATIONAL TRACHEOSTOMY FOR DIFFICULT AIRWAY MANAGEMENT

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INTRODUCTION. Percutaneous tracheostomy is a common procedure within intensive care units (ICU). Considered an elective procedure unresolved questions about the technique include his indications. Emergency setting has been considered as absolute contraindication. We describe four cases admitted to our institution over a six year period, in which an emergency percutaneous dilatational tracheostomy was performed for airway management because IOT by conventional methods was unsuccessful.

METHODS. In our center we use the Ciaglia technique from 1998 modified to the Blue Rhino method from 2002.
Case 1: a 38 years old man admitted to ICU after severe burns with respiratory tract affection by smoke and fire injury and acute respiratory failure. IOT was impossible because orofacial damage. 75% oximetry was achieve by manual ventilation using a facial-reservoir bag mask with pure oxygen during the procedure.
Case 2: a 28 year old woman admitted to our unit with urinary infection developing septic shock and ARDS. Prolonged ICU care included prolonged mechanical ventilation, renal and circulatory support. She remained intubated for 32 days. Finally a successful weaning was achieved and the tracheal tube removed. The patient presented an acute respiratory failure with severe stridor needing reintubation. Several unsuccessful attempts at IOT were done and cardiac arrest occurred.
Case 3: a 61 years old woman suffering from haematological malignancy was admitted to ICU for controlling secondary effects of chemotherapy but anaphylactic shock was developed. Hemodynamical instability was recovered with intravenous epinephrine. After IOT attempts by different physicians a percutaneous tracheostomy was performed for definitive airway.
Case 4: a 24 years old man was attended at the emergency room after traffic accident with severe head and facial trauma. The prehospital emergency medical team performed an aggressive resuscitation but were unable to achieve a definitive airway because of the major maxillofacial injury of the patient. Severe progressive desaturation despite high concentration oxygen therapy occurred.

RESULTS. All tracheostomies were performed after failure to accomplish IOT, by two experienced in airway management and percutaneous tracheostomy ICU physicians. The mean time for the procedure was less than 5 minutes. There were neither procedure related nor late complications. All patients survived and three of them underwent for early inhospital cannula removal without problems. Transferred to another hospital, the tracheostomy tube was kept in place for several months in case 1.

CONCLUSION. Percutaneous dilatational tracheostomy in experienced hands is feasible and safe and may play a role in the management of the emergency difficult airway access.

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0540

A RETROSPECTIVE STUDY COMPARING PERCUTANEOUS TRACHEOSTOMY VERSUS SURGICAL TRACHEOSTOMY IN CRITICALLY ILL PATIENTS

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INTRODUCTION. Many critically ill patients require long-term mechanical ventilation (MV), and therefore, are in need of a tracheostomy. Our aim is to compare the safety and effectiveness of percutaneous dilatational tracheostomy (PDT) with surgical tracheostomy (ST) in our Intensive Care Unit (ICU).

METHODS. An observational, retrospective study was carried out in critically ill patients with percutaneous or surgical tracheostomy between January 2004 and October 2006. PDT was performed in the ICU by two intensivists using a Portex PDT set with single dilator system. ST was performed in the operating theatre by the Otorhinolaryngology department. Statistical analysis was carried out by using SPSS 13.0 software, and parameters such as age, sex, source of the patient, disease that caused mechanical ventilation, APACHE II score, mortality, mean ICU stay and length of hospital stay, duration of mechanical ventilation, type of tracheostomy, time from intubation until tracheostomy and complications due to tracheostomy were analyzed.

RESULTS. 112 tracheostomies were performed. No statistically significant differences in age, sex, source, disease, APACHE II or mortality were found. There were no significant differences in mean ICU stay, Hospital stay, days of MV, time to tracheostomy and complications in the performance of the tracheostomy. We found significant differences in the incidence of complications after tracheostomy, the most common was bleeding. Only two PDT needed to be converted into SST, both of them because of the bleeding.

TABLE 1.

	PDT	ST	p
Number of tracheostomies	62	50	
Intraprocedural Complication	4	3	n.s.
Postprocedural Complications	10	24	0.00
Minor bleeding	4	10	0.08
Major bleeding	3	5	n.s.
Others	4	9	0.015

CONCLUSION. 1-.PDT is a safety procedure and has a lower incidence of complications, if patients are correctly selected and if it is performed by trained staff.
2-.We found no significant differences in duration of mechanical ventilation or days spent under mechanical ventilation until tracheostomy was performed.

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0541

CURRENT HIGH FLOW GAS HUMIDIFICATION SYSTEMS COMPARED TO A NOVEL HUMIDIFIER (PARI HYDRATE™)

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INTRODUCTION. High flow gas therapy is a new therapy which has been shown to reduce intubations, ventilator days and non-invasive ventilation. The purpose of this study is to determine the efficacy of a novel humidification device (Pari Hydrate™ G) for high flow gas therapy and compare it to current high flow oxygen humidification devices.

METHODS. We compared Aquinox (Smiths Medical), MR 850 (Fisher & Paykel), 2000i (Vapotherm) and Pari Hydrate (Pari Respiratory Equipment). Each device was setup as per manufacturer's instructions to heat and humidify medical air at flow of 30 LPM. Temperature settings were adjusted to 37 C. We recorded warm-up time from "on" to highest stable temperature when set at 37 C, exiting gas temperature, maximum device surface temperature, and water condensate. Water condensate was obtained from a condensation tube connected to outlet side of the devices and measured after 30 minutes. Temperature of the condensate tube water was set at 10 C.

RESULTS. See Table One

TABLE 1.

Comparison of Four High Flow Gas Humidification Devices

	Aquinox	Fisher & Paykel	Vapotherm	Hydrate
Total Condensate	12.0	23.0	24.0	25.0
Gas Temp (C)	27.4	38.4	38.4	37.6
Max Device T (C)	53.0	36.2	33.4	32.8
Warmup Time (Min)	27	35	39	1

CONCLUSION. The Pari Hydrate G humidification system for high flow oxygen therapy performs comparably to other high flow gas systems. Hydrate delivers equal humidification as measured by condensate, stabilizes gas temperature closer to set temperature and has the lowest device surface temperature. Warm-up time is significantly shorter than other devices.

GRANT ACKNOWLEDGEMENT. This study was supported by Pari Respiratory Equipment.

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TRACHEOSTOMY DECANNULATION BEFORE ICU-DISCHARGE: AN INDEPENDENT PREDICTOR OF HOSPITAL SURVIVAL

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INTRODUCTION. Retrospective data (1) suggest that, in patients liberated from mechanical ventilation (MV), the persistence of the tracheostomy tube at discharge from ICU to the ward may increase the post-ICU mortality rate. Our objective was the confirmation of this hypothesis with close attention to selection biases as confounding by indication, patients characteristics and the prognosis at ICU-discharge (2).

METHODS. Prospective observational study in the general 26-bed ICU of a tertiary hospital without a step-down unit. Inclusion criteria: patients tracheostomized in our ICU during a 18-month period without neurological damage. Exclusion criteria: patients tracheostomized before ICU-admission, tracheostomies for difficult to control airway, and patients with "Do-Not-Resucitate" orders. Data collection: age, gender, comorbidities, severity of illness at ICU admission, admission category, indication for tracheostomy, length of ICU and hospital stays, length of MV, need for aspiration and characteristics of respiratory secretions, and Glasgow Coma Scale (GCS) at ICU-discharge. Patients with tracheostomy tube were discharged only to wards with specific "tracheostomy care protocols" with a nurse-to-patient ratio of 1:10-15.
Statistical analysis: multivariate logistic regression analysis adjusted for age, gender, body-mass index (BMI), severity of illness and diagnosis at ICU-admission, indication for tracheostomy, duration of MV, Glasgow Coma Scale, need for aspiration and characteristics of respiratory secretions at ICU-discharge.

RESULTS. Patients description: admitted: 1645; under MV: 951; tracheostomized: 114 (12%); tracheostomized without neurological damage: 80. Of them, 7 patients died in the ICU and 73 were discharged to ward, 35 without tracheal tube and 38 still cannulated. Ward mortality rate was 17.8% (8.5% in decannulated vs. 26.3% non-decannulated patients, p=0,04). Cardio-respiratory arrest was the cause of death in 33% of decannulated patients vs. 90% of non-decannulated patients. Multivariate analysis found 3 factors associated with ward mortality: decannulation before ICU-discharge (OR=0.14, 95% CI: 0.026-0.829; p=0.03), BMI>30 (OR=5.81, 95% CI: 1.24-27.24; p=0.026) and tenacious sputum (vs. thick, frothy or watery) (OR=7.27, 95% CI: 0.99-55.46; p=0.05).

CONCLUSION. In our Critical Care Organization setting, withdrawal of the tracheal cannula before ICU discharge is associated with lower ward mortality rate.

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0543

HEMODYNAMIC RESPONSE TO A SEQUENTIAL LUNG RECRUITMENT MANEUVER IN ARDS PATIENTS

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INTRODUCTION. Lung recruitment (RM) can be considered as an adyuvant for lung protection in the ventilatory support of ARDS patients. The recruitment pressures needed to achieve full lung recruitment in these patients are generally above 40 cmH2O. However little is known about the hemodynamic effects of the brief application of pressures beyond this level in ARDS patients when using a sequential cycling recruitment maneuver.

METHODS. We 0,44) that were± 90 mmHg; LIS 2,81 ±present six ARDS patients (PaO2/FiO2 140 managed with a global lung protective ventilation (LPV) strategy. We used trans-esophageal echocardiography (TEE) to assess the effects of a RM using increasing levels of pressure. After confirming hemodynamic stability with predefined criteria, patients were submitted to a cycling sequential RM in pressure controlled ventilation that included three consecutive PIP/PEEP levels of 45/25, 50/30 and 55/35 cmH2O each one of them maintained for 2 min and followed by a 2 min period of pressure reduction to 40/20 cmH2O before the next pressure level was explored (1). Data were collected during the second minute of each recrutiment step. After RM, LPV was reinstituted: Vt 6 - 7 mL/kg and a PEEP level adjusted to a level immediately above maximum dynamic compliance obtained during a decremental PEEP trial after recruitment(2).

RESULTS. All patients could be 68 mmHg). No significant decreases in mean±fully recruited (PaO2 + PaCO2 421 systemic arterial pressure (less than 10% during maximal intrathoracic pressure) and in heart rate were observed. TEE measured left (LV) and right (RV) cardiac output (CO) and systolic volume (SV) decreased significantly only at RM pressures of 50 and 55 cmH2O (around 20 and 40% respectively). Recovery to baseline levels occurred within minutes after reducing the airway pressures (Table). Central venous pressure increased progressively to a maximum of 30% of the baseline value at maximal RM pressures.

TABLE 1.

TEE variables

	Baseline	Pre RM 40/20	RM 1 45/25	RM 2 50/30	RM 3 55/35	PostRM3 40/20	After 15 min
LVSV (ml)	70+/-15.4	72.1+/-23.5	61.4+/-16.4	53.9+/-16.2*	46.4+/-22.8*	71.6+/-25.9	69+/-12.6
RVSV (ml)	67.8+/-17.1	65+/-15.5	57.7+/-18.01	58+/-12.8*	40.6+/-14.3*	58.4+/-13.4	66.6+/-19.6
LV CO(L/min)	5.9+/-2.4	5.3+/-1.6	5.2+/-1.7	3.9+/-1.2*	3.3+/-1.5*	5.5+/-2.9	5.9+/-2.4
RV CO(L/min)	6.1+/-1.1	5.6+/-0.7	4.9+/-0.6	4.3+/-0.6*	3.3+/-0.8*	4.9+/-0.7	5.5+/-1.2

p<0.05 compared to baseline values. Data represents mean and SD values.*

CONCLUSION. RM in ARDS patients at pressures above 45 cmH2O transiently decrease cardiac output and stroke volume without compromising systemic perfusion pressures. Recovery to pre RM values occurs within minutes after RM.

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Poster Sessions
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0544

ACID-BASE BALANCE IN PATIENTS WITH ACUTE ON CHRONIC RESPIRATORY FAILURE AND ARDS

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INTRODUCTION. We hypothesized that patients in acute (ARF) on chronic respiratory failure (CRF) have complex acid-base disorders and that Stewart's quantitative approach may be useful to make the situation clearer. In this approach, plasma pH is dependent on 3 independent variables: Strong Ion Dissociation (SID), total weak acid negative charge (Atot) and PaCO2.

METHODS. In a prospective observational study, arterial plasma from 44 consecutive patients with CRF, 24 obstructive and 20 restrictive, admitted to our medical ICU in ARF between November 1, 2006 and April 1, 2007 were studied. They were compared with those from 14 patients with ARDS admitted to our ICU in the same period. In addition, values in patients were compared with those in 9 normal subjects from the literature(1). The plasma values were taken from the samples obtained at ICU admission (D1), D2 and D3. Arterial blood gas, electrolytes, lactate and albumin were measured and the following variables computed: SID = $HCO3^-$ + albuminate (Alb-) + phosphate (Pi-)) from reference (1), strong ion gap (SIG) computed from reference (2), Atot= (Alb-)+(Pi-). The values (mean±SD) were compared using ANOVA (table 1).

RESULTS. There was no effect of time on the variables and, therefore, the values in table 1 correspond to ICU admission. For statistical similar pH between CRF and ARDS, PaCO2 was higher in obstructive CRF than ARDS. SID was not different between CRF and normal subjects but greater in CRF than in ARDS, as was SIG. Atot was lower in ARDS than in obstructive CRF. In CRF patients, low pH mostly resulted from hypercapnia without metabolic alkalosis on average. In ARDS patients, acidemia is mostly metabolic. The positive SIG expresses accumulation of unmeasured anions.

TABLE 1.
Values on ICU admission

	Obstructive CRF	Restrictive CRF	ARDS	Normals
pH	7.31±0.09 †	7.38±0.11 †	7.32±0.09 †	7.42±0.01
PaCO2 (mmHg)	62±23 †	50±25 †	44±12 * †	38±1.5
SID (mEq/l)	41±9	39±8	30±8 *,**, †	39±1
SIG (mEq/l)	10.2±6.7 †	8.6±7.3 †	1.1±8.3 *,**, †	0±0
Atot (mEq/l)	16±3 †	15±4 †	13±3 * †	23.3±5 (3)
lactate (mEq/l)	1.7±0.8	1.6±1	2.8±1.7 *,**	2.0±0.1

*P<0.05 vs obstructive *, vs restrictive **, vs normal †*

CONCLUSION. The mechanisms for acidemia are different between CRF and ARDS patients. In both groups acidemia is offset by a reduction in Atot.

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0545

DIFFERENCE OF STATIC COMPLIANCE CURVE BETWEEN PATIENTS WITH ARDS AND WITHOUT ARDS

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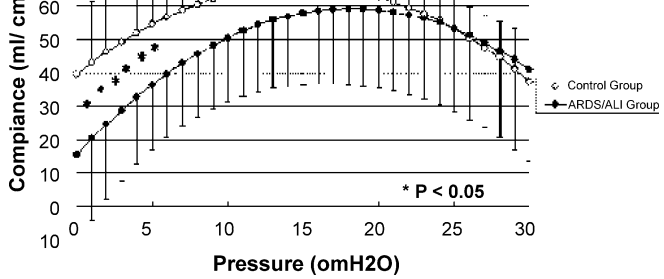
INTRODUCTION. Open lung approach has been based on a lower inflection point (LIP) and an upper inflection point (UIP) of the pressure-volume (P-V) curve. But we cannot always find out them, so we examined the method to get maximal compliance point in stead of UIP and LIP from static compliance curve.

METHODS. In ten patients with ARDS(ARDS group) and twelve non-ARDS patients (control group), we found a maximal compliance point by the static compliance curve induced by differentiation of the pressure volume curve led by polynomial approximation of scattergram of plateau pressure and tidal volume.

RESULTS. In the ARDS group the compliance at the range from 0 to 5 cmH2O were smaller than that of the control group ($p<0.05$). But there was no difference between the maximal compliance point of the ARDS group and that of the control group (61.0 ml/cmH2O at 17.8 cmH2O vs. 67.5 ml/cmH2O at 16.6cmH2O).



CONCLUSION. We conclude that maximal compliance points were detected in all patients by this method and there was difference of the compliance between the ARDS group and the control group in low pressure range.

0546

PRONE POSITIONING IN HYPOXEMIC RESPIRATORY FAILURE: META-ANALYSIS OF RANDOMIZED CONTROLLED TRIALS

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INTRODUCTION. Prone positioning is increasingly used to improve oxygenation in patients with hypoxemic respiratory failure, especially those with acute respiratory distress syndrome-acute lung injury. However, its benefits in regard to clinical outcomes are uncertain. We performed a systematic review and meta-analysis of the pertinent randomized controlled clinical trials to assess at what extent prone positioning has an effect on mortality and various clinical outcomes in patients with HRF.

METHODS. We conducted a systematic literature search of MEDLINE, Current Contents, and Cochrane Central Register of Controlled Trials (from inception to January 2007). We included only RCTs(in which prone positioning was the applied intervention and supine positioning the control treatment) that reported clinical outcomes in patients with HRF. There were no language restrictions. Four trials met our inclusion criteria, including 662 patients randomized to prone and 609 patients to supine ventilation. Data were extracted independently to assess intention to treat intensive care unit (ICU) and hospital mortality, days of mechanical ventilation, length of stay, incidence of ventilator-associated pneumonia and pneumothorax, and associated complications of the implemented intervention. Data were also collected to assess the quality of the included studies.

RESULTS. The pooled odds ratio (OR) for the ICU mortality in the intention-to-treat analysis was 0.97 (Confidence interval 0.77-1.22), for the comparison between prone and supine ventilated patients. Interestingly, the pooled OR for the ICU mortality in the selected group of the more severely ill patients favored prone positioning (OR 0.34; CI 0.16-0.66). The duration of mechanical ventilation and the incidence of pneumothorax were not different between the two groups. The incidence of ventilator-associated pneumonia was lower, but not statistically significant, in patients treated prone compared with patients treated supine (OR 0.81; CI, 0.61-1.10). However, prone positioning was associated with a higher risk for development of pressure sores (OR 1.49; CI, 1.17-1.89) and a trend for more complications related to the endotracheal tube (OR 1.30; CI, 0.94-1.80).

CONCLUSION. Despite the limitations of the meta-analysis (ie the included studies were heterogeneous in terms of design, case mix, report of outcomes etc), the available evidence suggests that prone positioning has no discernible effect on mortality in the general population of patients with hypoxemic respiratory failure. It may decrease the incidence of ventilator-associated pneumonia at the expense of more pressure sores and complications related to the endotracheal tube. However, some data imply that the more severely ill patients may benefit most from the intervention and await confirmation from adequately powered and designed clinical trials.

0547

HIGH FREQUENCY OSCILLATION AND TRACHEAL GAS INSUFFLATION FOR SEVERE ACUTE RESPIRATORY DISTRESS SYNDROME

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INTRODUCTION. In severe acute respiratory distress syndrome (ARDS), short-term high frequency oscillation (HFO) and tracheal gas insufflation (TGI) improves oxygenation relative to both standard HFO and ARDS network conventional mechanical ventilation (CMV)(1). We hypothesized that HFO-TGI may improve pulmonary function indices relative to CMV, if repeatedly employed on a daily basis.

METHODS. Thirty adult patients with severe ARDS {PaO2/inspired O2 fraction (FiO2) < 150 mm Hg at PEEP > 8 cm H2O}were randomized to receive either low tidal volume CMV (6-7 mL/Kg predicted body weight) alone or in combination with daily, 4-24-h-lasting HFO-TGI until resolution of severe ARDS or death. Primary end-points were the time courses of gas exchange, respiratory mechanics, and hemodynamics. Survival to 28 days following randomization was also evaluated.

RESULTS. Data from all patients were analyzed. Patient clinical profiles were similar. Median HFO-TGI use was 6 h/day for 4 days. Within the first eight days following randomization, study (HFO-TGI) group patients vs. controls had higher PaO2/FiO2 (145.6-212.6 ± 47.4-65.1 mm Hg vs. 100.2-126.8 ± 24.5-68.4 mm Hg; P < 0.01-0.05) and quasistatic respiratory system compliance, and lower oxygenation index (8.6-18.2 ± 7.0-10.0 vs. 19.9-23.6 ± 10.0-10.1; P < 0.01-0.05), shunt fraction, and plateau and mean airway pressures. Hemodynamics were not significantly affected by HFO-TGI. There was a trend toward improved 28-day survival in the study group vs. control (13/15 vs. 8/15, P = 0.109 by Fisher's exact test).

CONCLUSION. In severe ARDS, the systematic daily use of HFO-TGI substantially improves gas exchange and respiratory mechanics.

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GRANT ACKNOWLEDGEMENT. Supported by the Thorax Foundation

0548

THE HYSTERESIS OF THE PRESSURE-VOLUME CURVE MAY PREDICT THE RECRUTABILITY OF THE LUNGS IN ARDS PATIENTS

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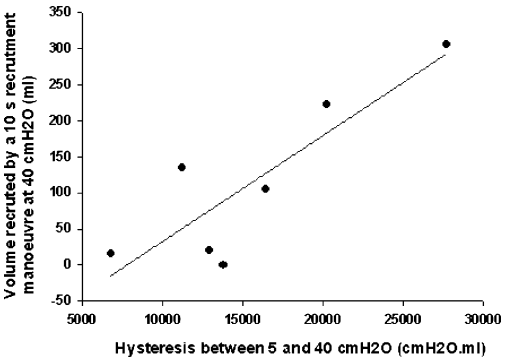
INTRODUCTION. It has been suggested that the Hysteresis (HYS) of the a quasi-static Pressure-volume (PV) curve could help knowing which patient can benefit from a recruitment manoeuvre (RM). This study has been design to compare the HYS of the quasi-static PV curve and the volume recruited by a RM.

METHODS. After ethical approval and relatives informed consent, 7 early onset (< 24h) ARDS patients were investigated (IGS II = 59 [40-71], LIS = 2,5 [2,1-3,2]). Patients were sedated and paralyzed throughout the study. A 0 to 40 cmH2O PV curve (PV tool, Hamilton Medical) was realized to measure HYS i.e. the surface between the inflation and deflation curve measured between 5 and 40 cmH2O. After 30 min of ventilation, a RM consisting of a 10 seconds pause at 40 cmH2O was realized using the PV tool. The volume recruited during the 10 seconds/40 cmH2O RM was obtained by integration of the flow signal necessary to maintain the pressure of 40 cmH2O.

RESULTS. No correlation was found between the lower/upper inflection points and the point of de-recruitment on the deflation limb of the PV curve. The volume recruited during a pause at the end of the inflation curve was well correlated with HYS (r2 = 0,74 ; p = 0,01) (figure).



CONCLUSION. In the early course of ARDS, the HYS of the PV curve may be an indicator of how much the lung can be recruited by a 10 seconds/40 cmH2O RM.

0549

CHANGES IN PEEP AND PULMONARY GAS EXCHANGE – BEDSIDE EVALUATION

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INTRODUCTION. Treating acute respiratory failure (ALI/ARDS) in the ICU often requires mechanical ventilation, which carries a risk of VILI. It is now commonly accepted that these patients should be ventilated "gently", i.e. reducing transpulmonary pressure fluctuations during ventilation. It is however still much debated as to how PEEP should be applied. Methods to identify "best PEEP" are based upon descriptions of respiratory mechanics. However, only little is known as to how changes in PEEP modify pulmonary gas exchange. Pulmonary gas exchange is usually described by arterial blood gas analysis or over-simplifying models such as the PaO2/FiO2 ratio, the alveolar-arterial oxygen difference or the effective shunt. We describe the use of a more complex two-parameter model (1) describing the effects of a PEEP-change using routine ICU equipment. This method has potential for non-invasive use and may be incorporated in standard respiratory monitoring.

METHODS. Eleven adult patients with acute respiratory failure on mechanical ventilation were included in the study. The patients were studied at two different levels of PEEP, i.e. either increasing or decreasing PEEP with 5 cmH_2O. On each occasion the FiO_2 was varied in 4-6 steps to achieve values of SaO_2 ranging from 88-100%. At each FiO_2 level measurements were taken of ventilation and arterial acid base and oxygenation status. These data were then used to estimate pulmonary shunt (shunt) and a measure of ventilation/perfusion mismatch, i.e. $DeltaPO_2$.

RESULTS. Upon increasing PEEP shunt decreased significantly by 11% (median) in 6 patients, whereas $DeltaPO_2$ improved in 5 patients by 5 kPa (median). As assessed by the P/F ratio oxygenation improved in 7 patients by 3 kPa (median). The increase in P/F ratio was, however, in 2 cases explained by decreased $DeltaPO_2$ not shunt. In 2 patients where P/F-ratio was unchanged the value of shunt decreased significantly.

CONCLUSION. The results suggest that by describing gas exchange by shunt and $DeltaPO_2$ additional information can be obtained. These information may enable improved assessment of potential for recruitment and/or PEEP optimization. Further studies are warranted.

REFERENCE(S). Rees SE et al. The Automatic Lung Parameter Estimator (ALPE) system: Non-invasive estimation of pulmonary gas exchange parameters in 10-15 minutes. Journal of Clinical Monitoring and Computing, 2002, 17(1), 43-52.

0550

TAU-CO_2: A NOVEL VARIABLE TO HELP OPTIMIZING PEEP

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INTRODUCTION. Optimal PEEP avoids ventilator induced lung injury. This study determined the value of the elimination time-constant for CO_2 (Tau-CO_2) to assess optimal PEEP.

METHODS. 7 pigs received lung lavage and 4 hrs of injurious mechanical ventilation. A recruitment maneuver (RM) was performed for 2' at 30/60 cmH_2O of PEEP/plateau pressure. The open lung PEEP (OL-PEEP) was defined as the level of PEEP after RM that kept the lung free from collapse. OL-PEEP was determined by respiratory dynamic compliance (CDyn), during a PEEP titration trial using the Open Lung Tool® (Maquet, Sweden), which was performed in VCV at a Vt of 4 ml/kg while decreasing PEEP from 22 to 8 cmH_2O in steps of 2 cmH_2O every 2' (1). Thereafter, we randomly assigned six 10' periods at diff. PEEPs: OL-PEEP and PEEP either 4 cmH_2O above or below it both, in recruited and non-recruited conditions. Baseline ventilation was applied between study periods. We recorded dynamic lung mechanics and volumetric capnography data on a breath-by-breath basis (NICO, Respironics, USA). ABG data were collected at the end of each period. $PaCO_2$ was added to volumetric capnography to perform a complete dead space analysis using the standard Bohr-Enghoff formula. Tau-CO_2 was calculated multiplying the respiratory time constant (CDyn x Raw) by the amount of CO_2 eliminated per breath ($VTCO_2$,br).

RESULTS. Lung mechanics and gas exchange were best at OL-PEEP after RM. Tau-CO_2 was longest at this moment due to an increase in both, CDyn and $VTCO_2$,br. The increase in CDyn and the decrement in Raw slowed down peak expiratory flow during OL-PEEP ventilation. A reduction in VDalv/VTalv after RM and OL-PEEP indicated an increased ventilatory efficiency (2). VDalv/VTalv was more sensitive for determining ventilatory efficiency than the classical VD/VT.

	PEEP cmH_2O	CDyn ml/cmH_2O	Raw $ml/cmH_2O/s$	VT_2 br ml	Tau-CO_2 ml/s	VDalv/ VTalv	VD/ VT
baseline	10	8	19	4,2	0,64	0,41	0,61
4 –	15	11	13	4,8	0,72	0,38	0,59
OL-PEEP	19	12	12	4,7	0,71	0,29	0,61
4 +	23	12	13	4,8	0,70	0,24	0,58
4 RM	15	15	12	5,0	0,84	0,29	0,56
PL-PEEP RM	19	17	11	5,1	0,94	0,19	0,59
4 RM	23	14	12	4,8	0,78	0,20	0,58

CONCLUSION. In this ALI model, lung recruitment and OL-PEEP improved the efficiency of CO2 elimination. Tau-CO2 is a variable that can be determined non-invasively and might become useful for optimizing PEEP at the bedside.

REFERENCE(S). (1) Suarez Sipmann F. Crit Care Med 35:214–221,2007. (2) Tusman G. Intensive Care Med 32:1863-1871,2006.

GRANT ACKNOWLEDGEMENT. Departmental sources only

0551

A COMPARISON OF TWO ALVEOLAR RECRUITMENT MANEUVER APPROACHES IN PATIENTS WITH ACUTE RESPIRATORY DISTRESS SYNDROME AND HEMORRHAGIC STROKE WITH GLASGOW COMA SCALE < 8

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INTRODUCTION. Alveolar recruitment maneuvers (ARM) are generally not used in used in acute respiratory distress syndrome (ARDS) patients in acute phase of brain injury, aiming avoiding increasing intracranial pressure (ICP).

METHODS. Sixteen patients with ARDS and hemorrhagic stroke were evaluated. Criteria to admission were: acute onset, bilateral chest radiographic infiltrates, pulmonary-capillary wedge pressure < 18 mm Hg, PaO2 / FiO2 ratio < 200 and Glasgow coma scale < 8 with ICP monitorization. Patients were randomized in two similar groups. One received ARM with CPAP of 35 cm H2O for 40 seconds, and the other received pressure control ventilation (PCV) with positive end expiratory pressure (PEEP) of 15 cm H2O and pressure control above PEEP of 35 cm H2O for two minutes (tidal recruitment). ICP, cerebral perfusion pressure (CPP) and oxygen pulse saturation (SpO2) were similar in both groups before the randomization. Fraction of inspired oxygen (FiO2) was kept in 1.0 during the study. ICP, CPP and SpO2 were measured before and after ARM and compared by Student's t Test. Mortality was compared by Fisher's Test.

RESULTS. Initials values of ICP, CPP and SpO2 were respectively: 13.38 + 4.53 mm Hg (CPAP group) x 13.25 + 3.45 (tidal recruitment group), p = 0.95; 82.75 + 10.37 (CPAP group) x 84.25 + 10.37 mm Hg (tidal recruitment group), p = 0.73; 95.75 + 1.04 (CPAP group) x 95.0 + 1.51 % (tidal recruitment group), p = 0.26. After ARM, ICP was higher in the CPAP group (20.50 + 4.75 mm Hg x 13.13 + 3.56 mm Hg; p = 0.003), CPP was lower in the CPAP group (62.38 + 9.81 x 79.60 + 6.80 mm Hg; p = 0.001) and SpO2 was lower in the CPAP group (96.58 + 1.50 x 98.25 + 1.83 %; p = 0.045). Mortality was lower in the tidal recruitment group, but not statistically different (37.5 % x 50 %; p = 0.50).

CONCLUSION. Tidal recruitment with PEEP of 15 cm H2O and pressure control above PEEP of 35 cm H2O didn't affect ICP, decreased CPP, but in safe levels, besides improving oxygenation, it can be done safely in patients in patients with ARDS and brain injury. In the other hand, ARM with CPAP of 35 cm H2O for 40 seconds can worsening ICP and CPP, should be avoiding in these patients.

REFERENCE(S). Brabas CSV et al. Mechanical ventilation in acute respiratory failure: recruitment and high positive end-expiratory pressure are necessary

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0552

MIGET ANALYSIS OF LUNG RECRUITMENT IN AN ALI MODEL

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INTRODUCTION. Positive pressure ventilation in patients suffering from acute lung injury (ALI) affects both, the distribution of ventilation (V) and perfusion (Q) within the lungs. The aim of this work was to study the effect of lung recruitment and PEEP on V/Q as assessed by multiple inert gas elimination technique (MIGET).

METHODS. 7 pigs received lung lavage and 4 hrs of injurious mechanical ventilation. A recruitment maneuver (RM) was performed for 2' at 30/60 cmH2O of PEEP/plateau pressure. The open lung PEEP (OL-PEEP) was defined as the level of PEEP after RM that kept the lung free from collapse. OL-PEEP was determined by respiratory dynamic compliance (CDyn), during a PEEP titration trial using the Open Lung Tool® (Maquet, Sweden), which was performed in volume control at a Vt of 4 ml/kg while decreasing PEEP from 22 to 8 cmH2O in steps of 2 cmH2O every 2' (1). Thereafter, we randomly assigned six 10'periods at diff. PEEP levels: OL-PEEP and PEEP either 4 cmH2O above or below it both, in recruited and non-recruited conditions. Baseline ventilation was applied between study periods to standardize lung volume history. We recorded dynamic lung mechanics on a breath-by-breath basis. Hemodynamic data were recorded continuously and discont. by the PICCO monitor (Pulsion, Munich, Germany). MIGET and ABG data were collected at the end of each study period.

RESULTS. Ventilation at OL-PEEP after a RM resulted in better oxygenation and lung mechanics, lower shunt and lower amounts of areas with a high V/Q as compared to the other periods studied (Table).

TABLE 1.

Main Results

	PEEP cmH2O	CDyn ml/cmH2O	PaO2 mmHg	Shunt %	High V/Q %	CI L/min
baseline	10	8	64	63	3,0	6,4
4 -	15	11	188	35	5,7	6,1
OL-PEEP	19	12	388	17	7,2	4,9
4 +	23	12	477	12	12,9	5
4 - RM	15	15	329	24	7,7	5,2
OL-PEEP RM	19	17	535	8	4,6	4,1
4 + RM	23	14	544	11	11,1	4,2

CONCLUSION. Recruited lungs ventilated at OL-PEEP showed better gas exchange and ventilatory condition than any other condition studied. These findings show that RM in conjunction with OL-PEEP make ventilation and perfusion more homogeneously distributed within the lungs and lead to an adequate matching of both.

REFERENCE(S). (1) Suarez Sipmann F. CritCareMed 35:214–221,2007.

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COMPARISON OF DIRECT AND INDIRECT LUNG INJURIES TO ALI/ARDS PATIENTS WHO WERE TREATED WITH SIBELESTAT SODIUM HYDARATE

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INTRODUCTION. The onset mechanism of ALI/ARDS and subsequent tissue injury are considered to be associated with neutrophil elastase, and the main two causes(Direct lung injury: Group D. and Indirect lung injury: Group I) of ALI/ARDS are considered to be pneumonia (bacterial, fungal, viral et al), aspiration pneumonia and sepsis. In Japan, sivelestat sodium hydrate, a selective elastase inhibitor, was approved in 2002 for ALI/ARDS accompanied by SIRS, and this medicine has been evaluated in clinical situation.

METHODS. In this study, we performed a retrospective comparison of the sivelestat sodium hydrate administration between two groups of patients: Group D, consisting of 162 patients (105 males and 57 females, aged 67±16 years old) , and Group I, consisting of 119 patients (73 males and 46 females, aged 63±15 years old) with ALI/ARDS accompanied by SIRS who were treated with sivelestat sodium hydrate at a dose of 0.2 mg/kg/hour for 72 hours or more in the ICU. IL-6, IL-8, ELAM-1(endothelial leukocyte adhesion melucule-1), PAI-1(plasminogen activator inhibitor-1) and PCT (procalcitonin) were measured every 24 hours. ELISA and EIA methods were used for the measurement of IL-6, PAI-1 and ELAM-1, respectively, and ICL method was used for PCT.

RESULTS. The APACHE ?scores of Group D and Group I were 22±8 and 24±10, and the lung injury score(LIS) were 2.2±0.7 and 2.0±0.6, respectively, with no significant differences between the groups. SOFA scores of Group D and Group I were 8±3 and 10±4, which was significantly higher than that of Group D (P<0.005). The PaO2/FIO2 ratios under mechanical ventilation management 24, 48 and 72 hours after the beginning of drug administration were 144±59, 206±86, and 228±89 mmHg in Group D, and 161±62, 222±89, and 225±86 mmHg in Group I. Furthermore, the survival rate after 28 days was significantly higher in Group D than in Group I (Group D: 81.9%, Group I: 73.7%, p<0.05).

CONCLUSION. These results suggest that sivelestat sodium hydrate is a good option as a treatment strategy for neutrophil elastase-associated direct lung injuries accompanied by SIRS.

GRANT ACKNOWLEDGEMENT. no disclosure

0554

EFFECTS OF AEROSOLIZED ILOPROST AND INHALED NITRIC OXIDE ON PULMONARY CIRCULATION AND LUNG EDEMA IN OVINE ACUTE LUNG INJURY

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INTRODUCTION. Pulmonary edema significantly contributes to ventilation-perfusion mismatching and hypoxemia in ARDS. While inhaled nitric oxide (iNO) has been shown to lower pulmonary pressures and edema accumulation in experimental acute lung injury (ALI)(1), its clinical use has been questioned because of a lack of improvement in outcome, rebound phenomena and potential toxicity. We investigated the effects of aerosolized iloprost, a stable prostacyclin analogue, compared to iNO on pulmonary pressures and lung edema in oleic acid lung injury.

METHODS. The most effective dose of Iloprost in this setting was determined in healthy animals prior to the experiment. The anesthetized and ventilated sheep received a central venous oleic acid infusion (0.1 mL/kg) and were continuously infused with Ringer's lactate to achieve a positive fluid balance (5 ml/kg/h). In the iNO group (n=6), inhaled nitric oxide (20 ppm) was then administered continuously for 8 hours, while animals in the Iloprost group (n=6) received aerosolized Iloprost (40µg every 2 hours). Animals in the Control group (n=6) had no further intervention. Pulmonary edema was measured by transpulmonary thermodilution (extravascular lung water).

RESULTS. Oleic acid infusion was associated with impaired oxygenation, pulmonary hypertension, and lung edema in all groups. While iNO significantly decreased pulmonary vascular resistance index (PVRI), effective pulmonary capillary pressure (Pceff), and extravascular lung water index (EVLWI), both parameters were unaffected by Iloprost. Oxygenation index (PaO2/FiO2) increased significantly both during NO and Iloprost inhalation but also tended to improve in the Control group over time.

CONCLUSION. This is the first study directly comparing the effects of inhaled nitric oxide and aerosolized Iloprost on pulmonary hemodynamics and lung edema in experimental lung injury. In contrast to iNO, 40 μg Iloprost inhaled every 2 hours was ineffective to reduce pulmonary pressures and extravascular lung water. These findings partly contradict previous investigations, and may be best explained by dissolution of the highly water soluble Iloprost in alveolar edema, which is a common finding in oleic acid lung injury. Much higher doses of Iloprost may thus be required to achieve a reduction of pulmonary pressures and fluid filtration when alveolar edema is present.

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0555

IS INHALED NITRIC OXIDE A COST-EFFECTIVE THERAPY IN ARDS?

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INTRODUCTION. While inhaled nitric oxide (iNO) may be used in the management of ARDS, data would suggest that its benefits pertain to a short-term improvement in oxygenation with no significant beneficial effect on mortality1. We performed a retrospective audit on the use of iNO in our mixed medical and surgical intensive care unit. The following data were collected; age, APACHE II score, length of ICU stay, duration and cost of iNO therapy, percentage change in PaO2/FiO2 ratio, ICU mortality.

METHODS. Between April 2005 and April 2006, 30 patients with ARDS received iNO. Patients were sub-divided into responders/non-responders and survivors/non-survivors. A response to iNO was defined as >20% increase in PaO2/FiO2 ratio2. Results are displayed in the table below.

RESULTS. Five responders survived to ICU discharge (55.6%), while 6 non-responders survived (28.6%). This difference did not reach statistical significance (p = 0.2, Chi-Square). The total group costs of iNO for responders, non-responders, survivors and non-survivors were £20,130, £43,981, £21,137 and £42,974 respectively. Responders only accounted for 31% of the total iNO expenditure in our ICU.

TABLE 1.

	Responder n=9	Non-responder n=21	Survivor n=11	Non-survivor n=19
Age Years	57+/-18	55+/-14	51+/-14	58+/-22
Apache II	19+/-7	24+/-8	20+/-5	24+/-9
ICU stay Days	19(5,28)	14(8,22)	20(17,24)	17(5,24)
iNO duration hours	99(27,117)	81(47,141)	76(22,96)	87(65,153)
%change in PaO2/FiO2 ratio	62*(47,69)	3(-7,11)	19(11,67)	3(-6,17)
cost per patient GBP	3168(891,3168)	2673(1551,3168)	2508(1551,3168)	2822(1551,3168)

*Data presented as mean+/-standard deviation or median (interquartile range).*p<0.001*

CONCLUSION. iNO is an expensive therapy. In this small retrospective audit we were unable to show any significant benefit of iNO on outcome. The use of iNO within our ICU needs to be reappraised, especially in those ARDS patients classified as non-responders.

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0556

PEEP SETTING BASED ON A PRESSURE-VOLUME MANOEUVRE IMPROVES THE OXYGENATION OF PATIENTS WITH ALI/ARDS

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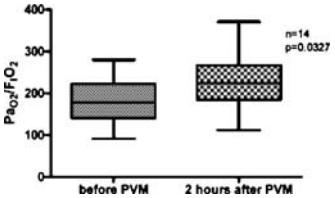
INTRODUCTION. The setting of positive endexpiratory pressure (PEEP) can be optimized by the determination of the lower inflection point (LIP) derived from a pressure-volume manoeuvre (PVM) [1]. Nowadays, some respirators enable to perform an automatic PVM. The present investigation was designed to find out whether a routinely performed PVM led to a change of PEEP and to an improvement of oxygenation in patients with acute lung injury (ALI/ARDS).

METHODS. 14 patients with ALI/ARDS were included after Institutional Review Board approval. The PVM was performed using an Evita XL respirator (Dräger Medical, Lübeck, Germany) with the following settings: starting airway pressure 0 cm H_2O, gas flow 6 l/min, upper airway pressure limit 35 cm H_2O, volume limit 2 l. Arterial blood gas analyses were drawn before and 2 hours after the PVM and the setting of PEEP to 2 cm H_2O above LIP. Values are given as median ± standard deviation. Statistical analysis was performed using the Mann-Whitney test.

RESULTS. The PVM tool of the respirator was easy to use. We observed no clinically evident haemodynamic complication. As a consequence of the PVM PEEP was increased in 7 patients from 10 ± 2 to 14 ± 2 cm H_2O and decreased in 5 patients from 15 ± 2 to 12 ± 2 cm H_2O. PEEP was not changed in two patients. There was a significant increase in Pa_{O2}/F_IO_2 ratio from 178 ± 54 to 225 ± 65 (p=0.0327) (Figure) while the change in Pa_{CO2} was not significant (52 ± 8 versus 51 ± 15; p=0.6631). Changes in PEEP did not correlate with changes in Pa_{CO2} (R^2=0.0851; p=0.3177).



CONCLUSION. After the implementation of the PVM into commercially available respirators, this manoeuvre can be performed safely and quickly. The setting of PEEP according to the results of the PVM lead to an improved oxygenation of the patients. We conclude that patients with ALI/ARDS may profit from a routinely performed PVM.

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COMBINATION THERAPY WITH ORAL SILDENAFIL AND INHALED PROSTACYCLINS IN PATIENTS WITH ARDS AND SEPTIC SHOCK

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INTRODUCTION. ARDS is a common syndrome with a high mortality rate in intensive care units. Several pharmacological therapies have been proposed but none of them improved survival up to now. Pulmonary hypertension occurs already in early stages of the disease and its magnitude has been shown to be associated with poor outcome. The phosphodiesterase type 5 inhibitor sildenafil selectively dilates pulmonary vessels and has been approved for treatment of pulmonary arterial hypertension.. We investigated the effects of oral sildenafil in combination with inhaled prostacyclins in five patients with ARDS and septic shock.

METHODS. Five patients with severe ARDS were investigated. Underlying diseases were: COPD (n=2), small airway disease (n=1), idiopathic fibrosing alveolitis (n=1), as well as cardiac insufficiency (n=1). Four patients showed severe obesity, mean BMI was 40,1 (± 10,4). All patients fulfilled criteria of septic shock, three of them developed acute renal failure requiring continuous venovenous hemofiltration. All patients were monitored by a pulmonary artery catheter. Mechanical ventilation was carried out according to recommendations of the ARDS-Network. Prone positioning (at intervals of 12 hours) was instituted if possible. Inhaled prostacylins (iloprost) were given 6 times daily (max. concentration 240 µg/d). If no persistent improvement of oxygenation could be achieved, sildenafil was added per os (3x 25 mg/d).

RESULTS. The combination of oral sildenafil (3x 25 mg/d) and inhaled prostacylins resulted in a significant decrease of the mean pulmonary arterial pressure (PAP-M). On the third day of therapy pulmonary arterial pressure was reduced by about 20 % of the initial value (table 1). Within a week a 50% improvement of the Horowitz Indices could be achieved.
Administration of sildenafil was continued in four patients until they could successfully be weaned from mechanical ventilation. These four patients left hospital alive.
One patient died because of cardiogenic shock.

TABLE 1.

Oxygenation and hemodynamics before and during sildenafil therapy

Sildenafil-Therapy	**Horowitz-Index**	**PAP-M (mmHg)**	**Cardiac Index (l/min/m²)**
Day 0	107.94 ± 23,93	45,40 ± 14,64	3,18 ± 0,46
Day 1	112,39 ± 33,27 *	42,60 ± 11,22	3,43 ± 0,39
Day 3	121,92 ± 30,31	36,60 ± 8,79 *	3,41 ± 1,28
Day 7	156,9 ± 43,64 *		

** significant difference from day 0 (p < 0,05)*

CONCLUSION. Sildenafil in combination with inhaled prostacyclins causes significant reduction of pulmonary arterial hypertension as well as significant improvement of oxygenation in patients with ARDS and septic shock.

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PRESSURE CONTROLLED VENTILATION OF 6 MICE SIMULTANEOUSLY: A SUCCESFUL VENTILATOR STRATEGY FOR DECREASING EXPERIMENTAL DAYS WHEN LARGE EXPERIMENTAL SERIES ARE REQUIRED

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INTRODUCTION. Increasingly the mouse has become the experimental animal of choice in immunological research because of the large set of immunological tools that is available. This is of particular interest in the area of inflammatory and immunological response to mechanical ventilation. Most available rodent ventilators only ventilate one mouse at a time. In order to expedite the results of interventions, larger series of mice must be ventilated in a short period of time. Therefore, we developed a method to ventilate 6 mice simultaneously using a conventional ventilator.

METHODS. Twelve mice were anesthetised, tracheotomised and subsequently connected to a Servo Ventilator 900 C with a distribution system allowing simultaneous ventilation of six mice. A canula was inserted into the carotid artery for bloodsampling. For 5 consecutive hours the mice were ventilated in a pressure-controlled, time-cycled mode, PIP 6 cm H2O, PEEP 2 cm H2O, I/E ratio of 1:2, FiO2 1.0 and a frequency of 85/min. During the 5 hours of ventilation, arterial bloodgasses were collected after various periods of ventilation, with a maximum of 2 bloodsamples per individual mouse.

RESULTS. Repeated arterial bloodgas analyses (n=23) at several time intervals and in different mice (n=12) not only demonstrated normocapnia (PaCO2 33.7 ± 8.46) but also a normal pH (pH 7.39 ± 0.08) and adequate oxygenation (PaO2 436.5 ± 84.03).

CONCLUSION. Six mice can be ventilated simultaneously using a Servo Ventilator 900C with a distribution system, thereby decreasing the number of days spent to the experimental procedure and expediting experimental time.

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PHOSPHOINOSITIDE 3-KINASE GAMMA MODULATES VENTILATION — INDUCED ALVEOLAR EDEMA IN MOUSE LUNG

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INTRODUCTION. Pulmonary vascular permeability increases in response to lung overstretching. Phosphoinositide 3-kinase gamma (PI3K gamma) is activated by mechanical stretch. Akt, a major downstream signal molecule of PI3K gamma, induces nitric oxide (NO) production. We investigated the contribution of PI3K gamma to acute alveolar edema formation by mechanical stretch.

METHODS. In wild type (WT) and knock-out (KO) PI3K gamma mice, lungs were ventilated and perfused with two settings: EIP -25 cmH2O and EEP 0 cmH2O (STRESS) or EIP -10 cmH2O and EEP -3 cmH2O (NO STRESS). At the end of each experiment histological alveolar edema, lung elastance, pulmonary expression of ERK, Akt, eNOS, nitrate/nitrite (NOx) on pulmonary perfusate were measured.

RESULTS. See table 1. Data are mean ± SD.

TABLE 1.

	STRESS +/+	**STRESS -/-**	**NO STRESS +/+**	**NO STRESS -/-**
Alveolar edema score	5.14±0.89 * °	3.37±1.5	3.5±1.19	2.5±0.7
Lung elastance (cmH2O/ml)	160.45±38.26 * °	100.65±30.41	111.19±20.81	83.27±17.5
pERK	1.67±0.25 * °	0.94±0.01	1.16±0.12	0.91±0.02
pAkt	1.4±0.19 * °	1.14±0.09	1.12±0.12	1.13±0.01
peNOS	1.24±0.15 * °	0.86±0.15	1.01±0.12	1±0.3
NOx (nmol/ml)	12.59±6.9 * °	2.28±1.01	1.61±0.27	2.03±0.5

** p < .05 STRESS +/+ vs STRESS -/- ; ° p < .05 STRESS +/+ vs NO STRESS +/+.*

CONCLUSION. During high stress ventilation vascular permeability changes were PI3Kgamma, Akt, eNOS mediated. The lack of PI3K gamma activity protected from alveolar edema increases.

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EFFECTS OF AGE ON VENTILATOR-INDUCED LUNG INJURY

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INTRODUCTION. Different susceptibility to ventilator-induced lung injury (VILI) has been shown in juvenile (neonatal, respectively) vs. adult animals. However, in old animals VILI is poorly investigated.

METHODS. Old (> 13 months; body weight: 595±15 g) and young adult (10-12 weeks; body weight: 380±4 g) male Wistar rats were anesthetized and mechanically ventilated (FiO2 0.4) for 4 h with low (8 ml/kg), high (16 ml/kg) or very high (24 ml/kg) tidal volume (Vt) and PEEP. Respiratory and hemodynamic variables were recorded throughout and lung inflammation markers assessed at the end of the ventilation period.

RESULTS. In old and young adult animals ventilated with low Vt, hemodynamics, airway pressure, oxygenation and inflammatory cell counts in lung lavage were comparable, but IL-6 in lung lavage was significantly higher in old animals (252±29 vs. 126±22 pg/ml). Ventilation with high and very high Vt caused significant hemodynamic depression, impaired oxygenation and increased mortality (Vt 24 ml/kg: 70% vs. 20%) in old compared to young adult rats. At high and very high Vt airway pressures were higher in old than in young adult animals. Ventilation with increasing Vt increased inflammatory cell counts in lung lavage in both young adult and in old animals. Il-6 levels in lung lavage were higher in old than in young adult animals (Vt 16 ml/kg: 499±80 vs. 149±22 pg/ml).

CONCLUSION. Our study suggests that old male rats are more susceptible to VILI than young adult rats.

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RELATIONSHIPS BETWEEN AGE AND INFLAMMATORY RESPONSES TO MULTIPLE TRAUMA

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INTRODUCTION. Recent experimental data suggest that intrapulmonary CXC chemokine release, neutrophil infiltration and myeloperoxidase activity is considerably increased in aged individuals [1]. 43 years represented the best age threshold value that discriminated survival in mechanically ventilated patients [2] and, we speculated that inflammatory responses may differ considering this age threshold.

METHODS. In 24 patients bronchoalveolar lavage (BAL) was performed with 3 aliquots of 60ml 0.9% saline on initial hospital presentation within 6 hours after multiple trauma. Cytokines were quantified using a sandwich immunoassay and neutrophil secretion products were determined with immunoluminometric assays. BAL-phospholipids were determined with electrospray ionization mass spectrometric analysis. We compared older (>43 years, n=8) with younger patients (<200pg/ml) (n=16) using the Mann-Whitnes-U-test or Fisher's exact test and used the Spearman Rank correlation to assess relations between inflammatory parameters and age.

RESULTS. Older patients (mean±SD, 58.4±8.7 years) had similar injury severity scores, thoraxtrauma severity and paO2/FIO2-values as compared to younger patients (32.1±7.4 years) (p>0.02). 3 of the older and 4 of the younger patients developed ARDS (p>0.2). Only one patient died 26 days after trauma. He was 71 years old and developed ARDS due to sepsis 2 weeks after trauma.
Intraalveolar IL-8 release and both pulmonary and systemic neutrophil activation as reflected by myeloperoxidase and lactoferrin concentrations were reduced in older compared to younger patients (p<0.05). Pulmonary inflammatory parameters decreased significantly with increasing age: BAL-neutrophils (Rho=-0.56, p=0.01), the inflammatory cell membrane phospholipid phosphatitylinositol 18:0/20:4 (Rho=-0,61, p=0.02), BAL-lactoferrin (Rho=-0.45, p=0.03) and BAL-IL-6 (Rho=-0.44, p<0.03).

CONCLUSION. In contrast to experimental data proinflammatory responses were reduced in aged individuals. It is tending to speculate that reduced immune competence instead of exacerbated inflammation may contribute to worse prognosis seen in the aged given an inflammatory insult.

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PRONE POSITION ATTENUATES INFLAMMATORY RESPONSE IN PATIENTS WITH LOCALIZED ACUTE RESPIRATORY DISTRESS SYNDROME DURING RECRUITMENT MANEUVER

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INTRODUCTION. To evaluate the effects of prone position mechanical ventilation (PPMV) on pulmonary and systemic inflammation in patients with localized acute respiratory distress syndrome (ARDS) after recruitment maneuver.

METHODS. Design: Prospective, randomized controlled study. Setting: Medical and surgical intensive care units in a university tertiary care centerPatients: A total of 80 patients with localized ARDS ready for recruitment maneuver (RM) were included. Intervention: Patients were randomized to receive mechanical ventilation (MV) in supine (SMV, control group) or in prone position (PPMV, study group). Both groups were ventilated with protective lung strategy (tidal volume 6 to 8 mL/kg). An RM was applied using a pressure control mode (PCV) with a 40 cm H2O and a 20 cm H2O PEEP for 30 s. PEEP was subsequently reduced by 2 cm H2O increments until a decrease in compliance was observed. A second RM was then performed and PEEP was set one step above the level at which compliance declined. PCV level was kept at 20 cm H2O during the determination of optimal PEEP.

RESULTS. Measurements and Main Results: Bronchoalveolar lavages (BAL) and blood samples were collected before randomization and at 48 hours to determine the concentrations of interleukine1^2 (IL-1^2), interleukine 6 (IL-6), interleukine 8 (IL-8) and tumor necrotic factor (TNF-±), PaO2/ FIO2. PaO2/FiO2 was improved and PaCO2 was lower in PPMV when compared with SMV with statistic significance. At 48 hours after RM, IL-1^2(p = 0.008), IL-6 (p = 0.026) and IL-8 (p = 0.023) in BAL was lower in the PPMV group than SMV group. The serum level of IL-6 (p = 0.015) and TNF-± (p = 0.008) were reduced with statistic significance and IL-8 was reduced also (p = 0.03) for the PPMV group.

CONCLUSION. PPMV may improve oxygenation and reduce PCO2 than in the SMV position in patients with the localized ARDS during RM. The pro-inflammatory cytokines can be reduced during PPMV, which indicates attenuation of VILI during PCV with PEEP recruitment maneuver for these patients.

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FATTY ACIDS N-3 REDUCE CYTOKINE RELEASE IN HUMAN ALVEOLAR CELLS EXPOSED TO BAL OF PATIENTS WITH ARDS

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INTRODUCTION. Inflammatory cytokines have been found to be elevated in bronchoalveolar lavage fluids (BALF) of ARDS patients. Mediators formed from n-3 fatty acids (FA) and those developed from n-6 FA have opposite influences upon inflammatory processes. The aim of this study was to investigate whether n-3 FA may modulate inflammatory cytokines release in a cell culture of human pneumocytes exposed to BALF of ARDS patients.

METHODS. Thirty-one patients (20males, 54±4yr, SAPSII 49±20) with ARDS (as defined by the American-European Consensus Conference) requiring mechanical ventilation were included in the study. The p. were divided into those with pulmonary ARDS [ARDSp, pneumonia (PN) n=16], and those with extrapulmonary ARDS (ARDSexp, sepsis n=9; other n=6) without PN. All p. were examined by BAL for clinical purposes within 24h after intubation. TNF-alpha, IL-1beta, IL-6 and IL-8 levels were measured in BALF. We exposed A549 cells, a human pulmonary cell line with type II pneumocyte properties, to the collected BALF. After 18h, FA were added as docosahexaenoic acid (n-3) and arachidonic acid (n-6) in two different n-3/n-6 ratios (1:1 and 1:7). 24h later, culture supernatants were collected to evaluate cytokine and prostaglandin (PG)E2 release. The FA percentage content was determined in phospholipids of A549 cells. Level of peroxisome proliferator-activated receptor (PPAR)gamma and NF-kB binding activity were determined.

RESULTS. Cytokine levels in BALF were found higher in ARDSp than ARDSexp (p<.05). The baseline n-3/n-6 FA ratio of 1:5 in A549 cell phospholipids approximately dropped to 1:12 and raised to 2:1 after 1:7 n-3/n-6 ratio and 1:1 ratio incubation, respectively. We found that PGE2 levels were significantly lower in A549 cells treated with the 1:1 ratio than those with 1:7 (p<.001). The release of cytokines from A549 cells was reduced by the 1:1 ratio (p<.01), but increased by the 1:7 (p<.05). NF-kB activity was induced in A549 cells by BALF. Addition of 1:1 ratio to the cells resulted in an increased expression of PPARgamma, whereas NF-kB activity was more inhibited compared to 1:7 (p<.05). Our results showed that increasing the n-3 share in n-3/n-6 FA ratio induces a significant reduction of pro-inflammatory mediator (cytokines,PGE2) release in stimulated A549 cells, whereas the administration of an n-6 FA predominance increases their release. Although different cytokine levels in ARDSp vs. ARDSexp, the cause of ARDS did not influence the effect of n-3 addition. FA are ligands for PPARgamma. Our results suggested that n-3 FA might exert their anti-inflammatory effects through direct actions on the intracellular signaling pathways which lead to activation of PPARgamma and inhibition of NF-kB activity.

CONCLUSION. Inflammatory response in A549 cells exposed to BALF can be modulated by n-3 FA, due to their incorporation into membrane phospholipid pools that modifies lipid-related intracellular signaling events.

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THE IMPACT OF THE PLASMINOGEN ACTIVATOR INHIBITOR-1 4G-5G POLYMORPHISM ON THE PROGNOSIS OF ALI-ARDS PATIENTS

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INTRODUCTION. Type 1 plasminogen activator inhibitor (PAI-1) is one of the primary regulators of fibrinolysis in vivo. A -675 4G-5G sequence polymorphism in the promoter of the PAI-1 gene has been described as response polymorphism, since its release is regulated by various inflammatory factors. Elevation of PAI-1 levels after stressful events is much more pronounced in patients with the 4G allele. Thus, the formation of microthrombi is no longer counteracted by the fibrinolytic system, resulting in impaired microcirculation, multiple organ dysfunction and poor outcome. Our aim was to study the impact of the 4G allele on the survival rate of ALI-ARDS patients.

METHODS. 23 ALI-ARDS (7 ALI) due to sepsis (7), pneumonia(5), aspiration(3), severe trauma (3), cardiac surgery (2), pancreatitis (1) and pulmonary embolism (2) were studied. The mean APACHE II score was 22±5. Identification of the 4G-5G polymorphism was based on polymerase chain reaction and reverse-hybridization. The comparison of the death rates between the two polymorphism groups (4G4G versus non-4G4G group) was done by means of a logistic regression model, with survival as the dependent variable and the polymorphism, as well as the APACHE score, as the independent variables.

RESULTS. 16 patients died (mortality 69.6%). 8 patients had a genotype 4G-4G, 10 patients were 4G-5G heterozygous, while 5 were 5G-5G homozygous. Apache scores were not significantly different between subgroups. The death rate among the 4G-4G patients was 75%, while in the non-4G-4G patients was 67%. The univariate analysis showed that the 4G-4G patients had 50% higher odds of dying compared to the non-4G-4G patients (Odds Ratio = 1.50, 95% CI: 0.22 to 10.30, P-value=0.68). In the multivariate analysis the 4G-4G patients had approximately 3.5 times higher odds of dying compared to the non-4G-4G patients (Odds Ratio = 4.48, 95% CI: 0.27 to 74.54, P-value=0.30). However results were not statistically significant.

CONCLUSION. Our findings suggest a negative effect of this polymorphism on the survival odds of ALI-ARDS patients. However, the small number of patients limited our power to detect a statistically significant difference regarding its influence on the prognosis of ALI-ARDS patients with disorders triggering the coagulation cascade. Our data might support further research on the relation between 4G-5G polymorphism and outcome of ALI-ARDS patients.

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INHIBITION OF NEURONAL NITRIC OXIDE SYNTHASE IN OVINE LUNG INJURY

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INTRODUCTION. Excessive production of nitric oxide by neuronal nitric oxide synthase (nNOS, NOS-1) is one major factor in the pathogenesis of acute lung injury and systemic inflammation after burn and smoke inhalation injury. We hypothesized that the use of the selective nNOS inhibitor 7-nitroindazole (7-NI) will block molecular mechanisms in ovine acute lung injury.

METHODS. Adult ewes (n=11) were chronically instrumented to determine cardiopulmonary hemodynamics and pulmonary transvascular fluid flux. After seven days of recovery, sheep were randomly allocated to either an injured untreated control group (n=6), or an injury group treated with 7-NI (n=5). The injury consisted of a 40% total body surface area flame burn and 48 breaths of cotton smoke. 7-NI (1 mg/kg/h) was continuously infused from 1 h post injury to the end of the 24-h study period.

RESULTS. This double hit injury was associated with oxidative stress, severe pulmonary derangements and systemic inflammation, as evidenced by a 2.5-fold increase in plasma nitrite/nitrate (NOx) levels, as well as 6-fold, 2-fold, 3-fold and 2-fold increases in interleukin-8 (IL-8), myeloperoxidase (MPO), malondialdehyde (MDA) and Poly-ADP-ribose-polymerase (PARP) lung tissue concentrations, respectively. Compared to untreated controls, 7-NI significantly reduced NOx plasma levels (8.4±1 vs. 26±10 μmol/L) and decreased IL-8, MPO (3.9±0.2 vs. 5.8±0.7 U/g tissue), MDA (2.7±0.3 vs. 6.6±1.1 nmol/mg protein) and PARP lung tissue content (3.4±0.7 vs. 6.7±0.7), thereby decreasing pulmonary obstruction (12.4±2.2 vs. 28.7±5.2 obstruction score) and increasing PaO2/FiO2 ratio (456±40 vs. 313±56, each p<0.05).

CONCLUSION. These data show that nNOS-derived NO plays a pivotal role in the pathophysiology of combined burn and smoke inhalation injury and suggest selective nNOS inhibition as a useful approach to attenuate pulmonary injury.

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ROLE OF THE LPS IN THE REGULATION OF HUMAN PULMONARY MICROVASCULAR ENDOTHELIAL CELL ANGIOTENSIN II RECEPTOR EXPRESSION AND FUNCTION

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INTRODUCTION. To analysis human pulmonary microvascular endothelial cells (HPMECs) angiotensinII (AngII) receptor expression and function under the treat of Lipopolysaccharide (LPS) in vitro.

METHODS. HPMECs were cultured, and used LPS with a gradient concentration (0ng/ml, 50ng/ml, 100ng/ml, and 200ng/ml) to stimulate the cells for 4h, 8h, 12h, and 16h. Subsequently, the experiments below were carried out. Total ribonucleic acid was extracted from the cells for reverse transcription polymerase chain reaction (RT-PCR) to identify the expression level of AngII receptor mRNA. The total protein was extracted from the adhere cells for western blot to identify the protein expression of the AT1 receptor. Radioreceptor assay (RRA) was used to obverse the affinity (Kd) and maximum receptor binding (Bmax) of AngII with its receptor after LPS stimulation.

RESULTS. RT-PCR demonstrated that AngiotensinII type 1 (AT1) receptor mRNA level escalated after varying concentrations LPS stimulating in 4h, 8h, 12h and 16h. There was obvious time-dependent increase in 50ng/ml group. The level of the AT1 receptor mRNA in 100ng/ml and 200ng/ml groups have not time-dependent increase. Irrespective of LPS stimulating or not, HPMECs didn't express mRNA of AngiotensinII type2 receptor (AT2). Western bolt presented that the protein level of AT1 receptor had a predominant increase followed the LPS treat compared with control group (0ng/ml). After stimulated for 8h, the level of AT1 receptor protein reached to the peak value in 200ng/ml group, and no notable difference was defined at every time after that. The significant dose-dependence was showed in every stimulating time, but the time-dependence was defined just in 50ng/ml and 100ng/ml groups. RRA was confirmed that there was no striking statistics difference between each group for Kd. As far as Bmax is concerned, Bmax of the three groups (50ng/ml, 100ng/ml, and 200ng/ml) had a significant increase compared with the control group. The groups of 100ng/ml and 200ng/ml had peak value at 12h and 8h respectively, and had a significant decrease after respective peak value time. The Bmax of the 50ng/ml group escalated to the peak value and demonstrated a notable time-dependence.

CONCLUSION. LPS had the ability to up-regulate the level of AT1 receptor mRNA and protein, and increases the Bmax of AT1 binding. Affinity of AT1 has not been changed under stimulation of LPS.

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EFFECTS OF HYPOXIA AND REOXYGENATION ON THE RESPIRATORY COMPARTMENT OF THE LUNG

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INTRODUCTION. Lung Ischemia and reperfusion in the pulmonary vascular compartment is an unavoidable consequence of transplantation. It is associated with release of inflammatory mediators promoting chemotaxis and adherence of neutrophils, which finally disrupt endothelial cell layer and increase permeability, possibly leading to acute lung injury (1). Rare data exist about similar mechanisms in the upper and lower respiratory compartment with tracheobronchial (TBEC) and alveolar epithelial cells (AEC). Purpose of this study was to evaluate the effect of hypoxia/re-oxygenation (H/R) regarding the inflammatory response in the respiratory compartment.

METHODS. AEC and TBEC were placed in a hypoxic incubator with 5% oxygen for 4 hours and re-oxygenated at 21% oxygen during 4, 6, and 8 hours. For each time point, control cells were left at 21% oxygen. Supernatants were analyzed performing a sandwich enzyme-linked immunosorbent assay (ELISA) for MCP-1 and CINC-1 (Pharmingen, San Diego, CA). Caspase-3 and LDH measurements were performed. Statistical significance was assessed by Student's t-test. (values: mean ±SEM).

RESULTS. Protein expression of MCP-1 and CINC-1 in AEC was decreased upon H/R: at 4h hypoxia with 2h re-oxygenation MCP-1 decreased fromm 623±92pg/ml to 291±22pg/ml (p< 0.05), CINC-1 from 109 ±5 pg/ml to 59±5 pg/ml (p< 0.05). At 4h/4h H/R no difference in MCP-1 and CINC-1 expression could be observed in comparison to control cells. Interestingly, inflammatory mediators released from TBEC did not show any differences upon stimulation compared to control cells. Caspase-3 activity in stimulated and unstimulated AEC was similar. In TBEC, however, caspase-3 activity was decreased by 48% at 4h/2h H/R, at 4h/4h by 41%, and at 4h/6h by 50% (p< 0.05). LDH values did not differ in stimulated and unstimulated AEC and TBEC, indicating that no process of necrosis is involved.

CONCLUSION. Upon H/R the lower respiratory compartment with AEC reacts with decreased production of inflammatory mediators, while the upper compartment with TBEC shows diminished apoptosis rate. Biological significance of this attenuation of epithelial injury upon H/R has to be further investigated.

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0568

ANGIOTENSIN? VIA AT1 RECEPTOR, REGULATES THE INFLAMMATORY RESPONSE IN LPS-INDUCED ACUTE LUNG INJURY IN RATS

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INTRODUCTION. To assess whether Angiotensin II (Ang II), via Ang II type 1 (AT1) receptor, plays a role in of inflammatory activation in LPS-induced acute lung injury.

METHODS. Sprague-Dawley rats were randomly divided into 3 groups: control group, ALI group and ALI+losartan group. ALI animals received 10 mg/kg of LPS, ALI+losartan animals received 10 mg/kg of LPS and 20ug/kg of AT1 receptor antagonist (losartan) 30 min before injection of LPS and continues infusion of losartan at the dose of 20ug/kg.min. Control animals received saline instead of LPS. Ang II concentration in the lung and plasma samples was determined by radioimmunoassay. Lung wet/dry weight (W/D) was recorded to assess lung injury. The total lung homogenates were prepared to detect nuclear factor-kappa B (NF-kepa B) activation by electrophoretic mobility gel shift assary (EMSA), tumor necrosis factor (TNF)alpha; and ATR1 mRNA expression by reverse transcription polymerase chain reaction (RT-PCR) and myeloperoxidase (MPO) by colorimetry. Plasma von Willebrand Factor (vWF) were assessed by enzyme-linked immunosorbentassay (ELISA). Protein was extracted from lung tissues for determination of ATR1 by Western blot analysis. The extent and location of apoptosis in injured lung tissues were studied by terminal transferase dUTP end labeling assay (TUNEL). Meanwhile, pathological changes were examined under optical microscope.

RESULTS. LPS administration resulted in up-regulated mRNA and protein expression expression of AT1 receptor and a significant increasing of Ang II concentration both in circulation and in lungs. The increase in lung W/D ratio induced by LPS was partly prevented by pretreated with losartan. Histologically, widespread alveolar wall thickening caused by edema, severe hemorrhage in the interstitium and alveolus, and marked and diffuse interstitial infiltration with mononuclear cells and granulocytes were observed in ALI group. Whereas, losartan effectively attenuated the LPS-induced lung hemorrhage, mononuclear cells and granulocytes infiltration in the interstitium and alveolus. AT1 receptor blocked prior to LPS administration decreased lung NF-kapa B DNA-binding activity, expression of TNF-alpha mRNA, MPO activity and plasma vWF level in the process of LPS-induced ALI. TUNEL staining showed that a lot of apoptotic bronchus and alveolar epithelial cell and granulocytes in the lung exposed to LPS. Pretreated with losartan 30 min prior to LPS administration decreased apoptotic index, but without reaching control values.

CONCLUSION. Ang II participates in the regulation of inflammatory activation in LPS-induced ALI, and LPS-induced lung injury may be mediated by the AT1 receptor.

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0569

EXPERIMENTAL STUDY OF OXIDATIVE INJURY TO PRECISION-CUT LUNG SLICES INDUCED BY HYDROGEN PEROXIDE

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INTRODUCTION. To evaluate the usefulness of precision-cut lung slices as an in vitro model system for studies of oxidative injury.

METHODS. Precision-cut lung slices were prepared and divided into five groups (n=8 per group). Lung slices were incubated in Krebs-Henseleit buffer and oxidative injury was induced by hydrogen peroxide (H_2O_2) at final concentration of 20 mmol/L for 0, 5, 10,15 and 20 min, respectively. MTT staining to the lung slices was performed 1h after oxidative injury and absorbance values were assayed by ELESA reader. LDH released into the supernate by lung slices and ATP contents of lung slices were measured at the same time.

RESULTS. Absorbance values of MTT staining was decreased significantly as the period of hydrogen peroxide injury increased. ATP contents of lung slices were reduced gradually while LDH release into the supernate was increased corresponding to the duration of oxidative injury. MTT staining was found to be negative to LDH release into the supernate while be positive to ATP contents of lung slices by partial correlation analysis.

CONCLUSION. Precision-cut rat lung slices could be considered as a reliable in vitro model system for the study of oxidative injury.

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0571

COMBINATION OF HIGH-FREQUENCY OSCILLATORY VENTILATION AND ARTERIOVENOUS EXTRACORPOREAL LUNG ASSIST REDUCES LUNG INFLAMMATION IN A LARGE PORCINE 24 H MODEL OF ARDS

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INTRODUCTION. Conventional mechanical ventilation (CMV) with low tidal volumes (VT) has been shown to reduce ventilator-associated lung injury (VALI) and mortality in acute respiratory distress syndrome (ARDS). Pumpless arteriovenous extracorporeal lung assist (av-ECLA) can remove up to 95 % of the systemic CO_2-production, thereby allowing ventilator settings prioritizing oxygenation and lung protection. High-frequency oscillatory ventilation (HFOV) may improve oxygenation while limiting the risk of further lung injury by using extremely small VTs. We tested the hypothesis that the combination of HFOV and av-ECLA would reduce VALI compared to CMV with low VT in a 24 h model of ARDS.

METHODS. ARDS was induced in 16 healthy pigs (54±4 kg) by repeated saline lung lavage until PaO_2 decreased to less than 60 mmHg. After a stabilisation period, the animals were randomly assigned to two groups: CMV: FiO_2 = 1.0, VT = 6 ml/kg, and HFOV/av-ECLA: FiO_2 = 1.0, frequency = 12-15 Hz. After lung recruitment, the PEEP in the CMV group and the mean airway pressure (mPaw) in the HFOV/av-ECLA group was set 3 cmH2O above the lower inflection point (LIP) of the P/V-curve. Gas exchange and hemodynamic data were determined hourly. After 24 h, mRNA expression of TNF-alpha, IL-1-beta, IL-6, IL-8 and IL-10 in lung tissue was quantified by real time PCR. Histopathologic analysis from the lungs was performed using a four point semi-quantitative severity based scoring system.

RESULTS. After lung recruitment, sustained improvements of the PaO_2/FiO_2-ratio (CMV: 519±49; HFOV/av-ECLA: 461±106) and oxygenation index (CMV: 5.9±1.2; HFOV/av-ECLA: 5±1.6) were seen in both groups compared to ARDS. MPaw and PIP were significantly lower in the HFOV/av-ECLA compared with the CMV group (mPaw: 21.4±2 vs. 30.1±4.4 cmH2O; PIP: 24.4±2 vs. 38.4±5.5). After 24 h LIP was significantly reduced in the HFOV/av-ECLA versus the CMV group (LIP: 25.3±5 vs. 21.6±2.3). Beside a lower mRNA expression of TNF-alpha in the upper lobe of the CMV group (deltaCT: -2.9±0.1 vs. -2.3±0.2), no differences of cytokine mRNA expression could be detected between the groups. Histologic analysis showed significantly less signs of inflammation in the dorsal lung regions of the HFOV/av-ECLA compared with the CMV group after 24 h of ventilation (1.3 (1-1.5) vs. 1.8 (1.4-2).

CONCLUSION. HFOV/av-ECLA allows a reduction of the mPaw and PIP compared to CMV with low VTs without negative effects on oxygenation. After 24 h histologic signs of lung inflammation were significantly reduced in the dorsal lung regions of the HFOV/av-ECLA animals. The combination of HFOV and av-ECLA may lead to a further reduction of lung injury.

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Poster Sessions
Metabolism – Clinical and experimental 0572-0585

0572

EFFECT OF H2S DURING PORCINE AORTIC-OCCLUSION-INDUCED ISCHEMIA REPERFUSION INJURY

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INTRODUCTION. Recently, Blackstone et al. demonstrated in mice that inhaled H2S can induce a "suspended animation"-like metabolic state (1). H2S also exerts a variety of cytoprotective effects in vitro and in vivo (2). Therefore, we tested the potential cytoprotective effect of infusing the H2S-donor NaHS during porcine thoracic aortic occlusion-induced ischemia/reperfusion(I/R)-injury.

METHODS. After random assignment to either NaHS (n=8); 2mg/kgxh started 2 h before and continued until 8 h after aortic occlusion) or vehicle (n=6) anesthetized, ventilated and instrumented pigs underwent 30 min of aortic occlusion using inflatable balloons placed immediately downstream the A.subclavia and upstream the aortic bifurcation. During aortic occlusion, mean arterial pressure (MAP) was maintained between 80-120 % of the baseline levels using continuous i.v. esmolol, nitroglycerine and ATP. During the reperfusion continuous i.v. noradrenaline (NA) was titrated to maintain MAP>80 % of the baseline level. DNA damage in blood samples was evaluated with single cell gel electrophoresis (tail moment in the comet assay). Data are median (range), within group effects over time were analyzed using a Friedman ANOVA on ranks, intergroup differences with an unpaired rank sum test.

RESULTS. Infusing NaHS resulted in significantly lower heart rate and cardiac output, while MAP and stroke volume remained unchanged. NaHS significantly reduced the NA requirements needed to achieve the hemodynamic targets, significantly decreased glucose turnover, and completely blunted the I/R-induced DNA damage (see table, # $p<0.05$ vs. before drug infusion, § $p<0.05$ vs. vehicle).

TABLE 1.

Tail moment	Before drug infusion	Before clamping	1 h after declamping	2 h after declamping	4 h after declamping	8 h after declamping
Vehicle	.15 (.09-.20)	.13 (.11-.19)	.17 (.14-.25)#	.23 (.14-.38)#	.15 (.08-.24)	.13 (.09-.21)
NaHS	.15 (.08-.25)	.12 (.08-.14)	.13 (.04-.24)§	.16 (.09-.32)	.15 (.12-.24)	.14 (.11-.26)

CONCLUSION. Infusing the H2S-donor NaHS appears to be beneficial during aortic occlusion-induced I/R-injury. The beneficial effects may be due to a combination of the metabolic modulatory and cytoprotective effects of this molecule.

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0573

DOES SOD ACITVITY AFFECT GLUCOSE OXIDATION IN HYPERDYNAMIC MURINE SEPTIC SHOCK?

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INTRODUCTION. Septic shock is associated with increased oxidative stress, which in turn depresses mitochondrial activity. The key antioxidant enzyme superoxide dismutase (SOD) was reported to restore mitochondrial function (1). Since glucose oxidation represents the most effective energy generating process, we investigated the effect of genetic CuZn-superoxide dismutase overexpression on glucose oxidation in a clinically relevant model of murine septic shock (2).

METHODS. 15 h after sepsis induction by cecal ligation and puncture (CLP) or sham-operation heterozygous (HE), homozygous (HO) SOD overexpressing and wildtype (WT) mice were anesthetized, mechanically ventilated and instrumented. In the CLP groups normotensive, hyperdynamic hemodynamics were achieved with colloid fluid resuscitation and intravenous noradrenaline (NA) titrated to maintain mean arterial pressure (MAP) >70mmHg. Glucose oxidation rate was calculated from simultaneous determination of 13CO2 enrichment and CO2 concentration (gas chromatography/mass spectrometry) in the expired gas during continuous i.v. stable-isotope 1,2,3,4,5,6-13C6-glucose infusion. Measurements were recorded 18, 21 and 24 h after CLP. Within group effects over time were analyzed using a Friedman ANOVA on ranks, intergroup differences with an unpaired rank sum test.

RESULTS. All parameters of gut and liver macro- and microcirculatory perfusion and oxygenation were well maintained. NA infusion rates did not differ between CLP groups. Glucose oxidation (percentage of the infused 13C6-glucose) did not differ between groups nor over time. Liver SOD-activity prior to anesthesia and surgery was 2.7-fold and 4-fold higher in HE and HO mice, respectively. While it decreased by about 25% in the septic HE and HO mice, SOD activity was not significantly affected in the WT animals.

CONCLUSION. Given the comparable parameters of macro- and microcirculatory perfusion and oxygenation, the lacking NA-induced increase in glucose oxidation rate confirms the sepsis-related defect in energy metabolism. The higher tissue SOD-activity did not restore the impaired carbohydrate utilisation, possibly due to a sepsis-related loss of tissue SOD and/or catalase activity.

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0574

STUDY OF IRON METABOLISM REGULATION IN A MOUSE MODEL OF INTENSIVE CARE ANEMIA

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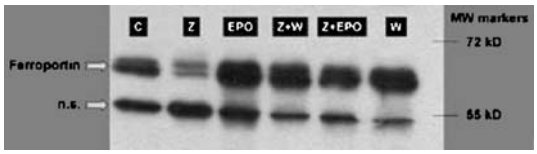
INTRODUCTION. Anemia is frequent in ICU and involved both functional and true iron deficiency due to inflammation and blood loss. Hepcidin (Hepc) is a negative regulator of iron recycling by macrophages. Its synthesis is highly inducible by inflammation and repressed by iron deficiency and stimulation of erythropoiesis. We explored iron metabolism and Hepc gene expression in this complex situation of ICU anemia.

METHODS. We developed a model of inflammation in C57BL/6 mice, by ip injections of Zymosan (Z), combined or not with repeated blood withdrawals (W). We followed blood numeration and tissue iron concentrations. Using qRT-PCR, we quantified Hepc and IL-6 mRNA in the liver as well as erythropoietin (EPO) mRNA in the kidney (normalised to S14 mRNA and expressed as a ratio to controls (C)). Hepatic ferroportin protein concentrations were assessed by western-blot. Kruskal-Wallis or ANOVA were used for comparisons of mean±SD. $p<0.05$ significant.

RESULTS. Anemia was found already 5 days after Zymosan injection, and was more severe blood withdrawals, either alone (W) or following Z (Z+W). At day 5, EPO mRNA expression was stimulated in both W (14.9±6) and Z+W (28±23.8), as compared to C(1±0.6) or Z (1.6±1.2)($p<0.01$). As expected, Z injection induced IL-6 mRNA expression (4.5±2.3 for Z; 6.1±7.8 for Z+W). Interestingly, Hepc mRNA was induced following Z injection (3±3.6) but the combination of inflammation and W repressed Hepc mRNA expression (0.1±0.1). To confirm that it was due to erythropoiesis stimulation, we injected EPO on 4 consecutive days following Z and found that it prevented activation of Hepc mRNA(0.8±1.1). In mice undergoing W or EPO injections, spleen iron was reduced, as opposed to C and Z (159±36, 183±16, 157±28, 136±14 vs 371±119 and 255±33 μg/g for Z+W, W, Z+EPO, EPO, C and Z). Ferroportin was reduced in Z and increased by W and EPO (western-blot).



CONCLUSION. In this mouse model of inflammation, induction of Hepc gene expression is prevented by repeated W or EPO ip. It seems that the signalling pathway which represses Hepc expression in response to activation of erythropoiesis dominates over the pro-inflammatory signal. Furthermore iron exporter ferroportin is also induced. These results raise the possibility that iron supplementation might be proposed for critical care patients' anemia.

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0575

GLUTAMINE INFLUENCES VIABILITY AND HEAT SHOCK PROTEIN CONTENT OF C2C12 MOUSE MYOBLASTS IN CULTURE

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INTRODUCTION. Studies examining the effect of glutamine supplementation in critical illness have demonstrated significant beneficial effects in animals and man although the mechanisms by which this protection occurs are not understood. We aimed to examine the effect of various glutamine concentrations on the ability of C2C12 myoblasts to differentiate and its effect on Heat shock protein expression (HSP).

METHODS. C2C12 myoblasts were raised under standard conditions. Differentiation to multinuclear myotubes was induced by replacing FCS with 2% horse serum. Cells were supplemented with glutamine at concentrations between 0 and 10mM throughout and this was replaced every other day. Photographs were taken at day 6 of differentiation. HSP content of cells was determined using western blotting as described previously (Maglara et al, 2003).

RESULTS. At low levels of glutamine (0 – 1mM), cell survival was greatly impaired and differentiation was reduced. However HSP70 content of cells grown in media of 0.5 M and1 M Glutamine showed an increased HSP 70 response compared with cells grown and differentiated in physiological glutamine concentrations. No effect of higher glutamine concentrations (between 2.5 – 10mM) on cell viability or HSC70 and HSP 70 content was evident.

CONCLUSION. Glutamine supplementation affects Heat Shock Protein (HSP) expression in various cell types. Several authors have suggested that exposure of cells to relatively high concentrations of glutamine results in increased HSP expression and an enhanced cell survival (Wischmeyer et al.1997) Skeletal muscle degeneration occurs following a number of insults and muscle repair is reliant upon activation and differentiation of stem cells or myoblasts to form mature multinucleated muscle. Transgenic studies in our laboratory have demonstrated that the ability of skeletal muscle cells to produce HSPs during stress and development is crucial to the correct maturation and functioning of these cells (McArdle et al, 2004). Our data suggests that the glutamine concentration for optimal myoblast proliferation and differentiation is ~2mM. Reduction below this value resulted in reduced cell viability and modified HSP although levels higher than physiological had little effect on cell growth and differentiation. This might suggest that reduced Glutamine concentrations in it self acts as a stressful stimulus. Further reduction however renders the cell unable to respond at all.

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0576

CORTISOL AND GHRELIN CIRCADIAN RHYTHMS IN PATIENTS WITH ACUTE CORONARY SYNDROME

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INTRODUCTION. Ghrelin (G) is a peptide hormone (28 aa) mainly produced in stomach, which circulating levels are altered in situations of acute metabolic stress in animal models. In addition G regulation might be linked to other stress hormones, such as cortisol (C) and prolactin, in rats and humans in physiological conditions. Our aim is to study the circadian variations of cortisol and ghrelin plasma levels in patients with Acute Coronary Syndrome (ACS) admitted to the Intensive Care Unit.

METHODS. Eight male (63±7 years old) patients with ACS were studied. Seven showing non-ST-elevation and one with ST-elevation. Within the first 24 hours of admission, blood samples were taken every 3 hours (nine samples) in all ACS patients. Patients were kept nothing per os during the sample drawing period. Eight patients admitted in the Department of Internal Medicine in a stable clinical situation were studied on the day before being discharge, as control group. G and C levels were measured in all samples using specific RIA (Phoenix Pharm. USA).

RESULTS. Control subjects showed a cortisol circadian rhythm with peak values at 8:00 a.m. (105,11±25,85 mcg/dl) and nadir values around 23:00 p.m. (28,5 ±7,28 mcg/dl). In this patients G levels also present circadian variations, with peak values at 5:00 a.m. (282,9±39,6 pg/ml) and nadir values at 17:00 p.m. (216±36,7 pg/ml). In contrast, patients with ACS showed a very demised C circadian rhythm, and the amplitude of the circadian variations of G levels is markedly reduced, showing a shift of the peak values to 23:00 p.m.(234,8±38,9 pg/ml) and nadir values around 5:00 a.m. (202,2±27,2 pg/ml).

CONCLUSION. There is a circadian rhythm of ghrelin with a peak ranging from 2:00 a.m. to 5:00 a.m. in hospitalized subjects. Those variations are 180º shifted in phase respect to cortisol rhythm. Opposite, in patients with ACS the circadian variations of ghrelin levels are lost.

0577

INCREASED RISK OF MORTALITY ASSOCIATED WITH ABNORMAL LIVER FUNCTION TESTS ON ADMISSION TO THE GENERAL INTENSIVE CARE UNIT

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INTRODUCTION. Abnormalities of liver enzymes are common in the critically ill patient for a number of reasons. Liver enzymes are routinely tested daily but the significance of abnormal liver function tests (LFT) is not clear. We sought to define the incidence of abnormal LFT (bilirubin, alanine transaminase (ALT), alkaline phoshatase (AKP) and gamma-glutaryl transferase (gammaGT)) and investigate effect on 30 day mortality.

METHODS. The results of LFT of patients admitted to the General Intensive Care Unit of a large teaching hospital in South London, between 1st December 2006 and 28th February 2007 were obtained from the Chemical Pathology department. Mortality statistics were obtained from the hospital electronic patient record. LFT of patients who were readmitted were excluded.

RESULTS. A total of 355 patients had a first admission to the general ICU during the three months studied. The average age was 58.4yrs (SD 18.1), 55% were male and the mean length of stay was 3.9 days (range 1-26). Mortality rate at 30 days was 16% (57/355). At the time of admission only 132 (37%) patients had entirely normal LFT. Patients with cholestatic LFT above the normal range on admission were more likely to be female (AKP odds ratio: 2.28 (1.14-4.57), gammaGT OR: 1.74 (1.12-2.71)). Abnormalities in ALT, AKP and gammaGT on admission, were associated with a higher likelihood of death at 30 days (table). Average length of stay was greater in those with abnormal LFT but only reached statistical significance with AKP above the normal range (table).

TABLE 1.

Average length of stay and 30 day mortality by LFT on admission to GICU

	Bilirubin Normal	Bilirubin >ULN	ALT Normal	ALT >ULN	AKP Normal	AKP >ULN	gammaGT Normal	gammaGT >ULN
Length of stay (d)	3.8	4.1	3.7	4.7	3.9	4.4*	3.9	3.9
30 day mortality	32/228	25/125	38/285	19/69*	46/317	11/38*	30/235	27/120*
Odds ratio (95% CI)	1.55	(0.9-2.8)	2.47	(1.3-4.6)	2.4	(1.1-5.2)	1.98	(1.1-3.5)

*ULN: upper limit of normal , CI: confidence interval, *p<0.05*

CONCLUSION. Abnormality of liver function tests is common in the critically ill patient admitted to the General Intensive Care Unit. Even relatively minor elevations of LFT are associated with an increased risk of death within 30 days. The cause of these abnormalities is likely to be multifactorial and further studies are needed to elucidate the cause.

0578

MYXEDEMA COMA WITH EXTREME HYPOTHERMIA: A CASE REPORT

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INTRODUCTION. A patient is presented with an undiagnosed hypothyroidism which progressed to myxedema coma with extreme hypothermia, bradycardia, anaemia and somnolence.

METHODS. Case report
A 76 year old male patient, with a history of hypertension and a cerebral vascular accident, was admitted to the emergency room after a collapse. During several months he showed progressive disability due to fatigue, unstable gait and chilliness. The last weeks his condition worsened leading to muscle weakness, dysarthria, dysphagia, cognitive dysfunction and somnolence. Upon physical examination we saw a somnolent patient with a GCS (Glasgow coma scale) of 3-6-4, with hyporeflexia and pareses of the lower extremities. Respiratory rate of 10 per minute. Blood pressure was 110/70 with a heart rate of 30 beats per minute. The patients temperature was 31.4 oC. The patients GCS decreased to 1-4-1 upon which an endotracheal tube was placed and mechanical ventilation instituted. Laboratory tests showed a haemoglobin of 3.0 mmol/L (ref 8.2-11), hematocrit 15%, MCV 73 fL (ref 87-98), normal electrolytes, white cell count and C reactive protein. After ruling out a new cerebral vascular accident by CT scan, hypothyroidism was considered. Additional laboratory tests showed a FT4 < 2.0 ρmol/L (ref 8-18), TSH 31 mU/L (ref 0.4-3.5) and T4 < 10 μmol/L (ref 60-150). Normal adrenal function test. One day after thyroid hormone substitution (200 μgr T4 intravenously on day one, followed by 50 μgr T4 once a day, 25 μgr T3 orally every 8 hours on day one only), the patients regained consciousness. His heart rate increased to 55 beats per minute after normalisation of body temperature. Gastroscopical evaluation showed an ulcus duodeni. Despite of a ventilator associated pneumonia the patient recovered well.

RESULTS. Discussion
Hypothyroidism may lead to a variety of symptoms ranging from malaise and fatigue to specific organ related complaints. Especially in the elderly the symptoms may be mistakenly attributed to the physiological aging process, psychiatric, neurological illnesses or even dementia. Numerous precipitating factors can evolve untreated hypothyroidism to myxedema coma. In our patient infection, cold exposure, gastro intestinal bleeding or iron deficiency could have played a role. The elderly patient is already prone to hypothermia due to physiological changes, in myxedema this may lead to an extreme low temperature.

CONCLUSION. Myxedema in its classical, full clinical presentation is a rare occurence in present times. Especially in the elderly patient it can cause pronounced hypothermia.

0579

INTENSIVE INSULIN THERAPY IN THE ICU

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INTRODUCTION. According with surviving sepsis guidelines we must control blood glucose levels to a less than 150 mg/dl after 24h of admission to an ICU. Objectives: To evaluate the results obtain with the use of an intensive insulin treatment (IIT) in a polyvalent Intensive Care Unit.

METHODS. We conducted a prospective cohort study in a 10-bed polyvalent ICU in a portuguese university hospital. Adult patients who were assumed to require at least 5 days of intensive care were eligible for inclusion. The study was carried out during 24 months. Capillary blood glucose (CBG) levels were measured on admission and subsequently every two or four hours in all patients during 5 days. With the IIT, insulin infusion was started when the blood glucose level exceeded 150 mg per decilitre.

RESULTS. We enrolled 418 patients, age: 57,62 ±18,02(59,00), SAPSII: 34,68±10,71(34,00), SOFA: 6,95 ± 3,36 (7,00), length of stay in ICU: 15,36 ± 11,58 (12,00), mortality rate: 29.7%. 12,44% of the patients were diabetes. Incidence of hypoglycemia – 5,74%.

TABLE 1.

GLUCOSE LEVELS / INSULIN INFUSED / CBG DETERMINATIONS

	Day 1	Day 2	Day 3	Day 4	Day 5
CBG determination / day	6,67	11,1	10,72	10,31	9,86
Mean CBG levels (mg/dl)	163,18	151,6	144,42	144,66	144,89
Amount of Insulin infused / day	9,6	22,61	23,42	22,32	23,1

CONCLUSION. After 24h of admission we reduced the blood glucose level under 150 mg/dl with the infusion of ± 20 Units of insulin /day and with a low incidence of hypoglycemia episodes.

0580

CATHETER RELATED BLOOD STREAM INFECTION, EFFECT OF ANATOMICAL LOCATION IN A TOTAL PARENTERAL NUTRITION POPULATION

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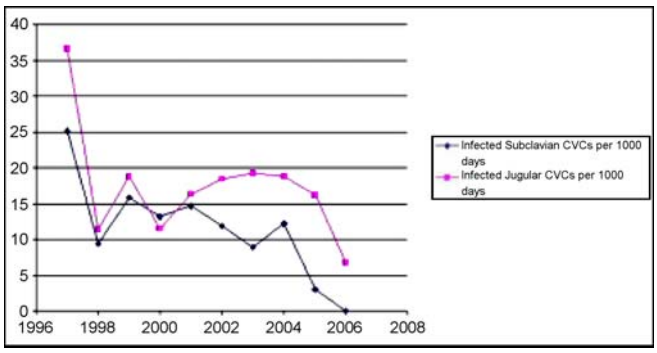
INTRODUCTION. To examine the effect of Central Venous Catheter (CVC)location on the incidence of Catheter related blood stream infection (CRBSI) in a total parenteral nutrition (TPN) population over a 10-year period (1997-2006).

METHODS. 525 bed university hospital. TPN population includes all medical and surgical patients hospital-wide referred for TPN. Service based in Intensive Care. TPN committee meets quarterly to examine prospectively collected data.

RESULTS. 2021 CVCs were included. We compared incidence in different anatomical locations(figure). Femoral CVCs were rarely used for TPN and so were excluded. Subclavian CVC insertion was associated with a peak incidence of CRBSI of 25 per 1000 CVC days in 2007 which dropped to 0 in 2006. Peak incidence of CRBSI in Internal Jugular CVCs was 37 per 1000 CVC days in 1997, 7 per 1000 CVC days in 2006.



CONCLUSION. This study prospectively examines the effect of anatomical location on CRBSI. CRBSI in subclavian CVCs remains almost consistently lower than Internal Jugular throughout study. This correlates with published data in the literature1 and CDC recommendations for use of subclavian site in preference for CVC insertion2.

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0581

DYNAMIC OF AMINO ACIDS SPECTRUM AND PROTEIN METABOLISM DURING "ALL-IN-ONE" PARENTERAL NUTRITION WITH GLUTAMINE ADDING

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INTRODUCTION. Patients after urgent abdominal surgery require adequate nutritional support. We aimed to assess the effectiveness of Parenteral Nutrition (PN) by "all-in-one" system with adding of glutamine to eliminate metabolic disturbances in patients after small bowel obstruction surgery.

METHODS. 30 patients after small bowel obstruction surgery (mean age 47.5±9.2 years) was divided into 2 groups. Control group (N=15) received standard basic intensive therapy including PN by "all-in-one" system "OliClinomel" in first hours after an operation. Glutamine group patients (N=15) received additional glutamine (Dipeptiven – 2ml/kg/day). Plasma whole protein and its fractions, amino acids spectrum, transferrin concentration, glucose and insulin levels, as well as standard laboratory and instrumental data were assessed before, at 3rd and 6th day of PN.

RESULTS. In all patients metabolic disturbances with protein status shifts was revealed. Dynamic analysis of data showed faster compensation of these disturbances in glutamine group. In both groups whole protein and albumin/protein ratio decreased gradually while amino acid sum, essential and nonessential amino acid concentration, glucose and insulin levels remained normal. By 6th day glutamine group showed faster increasing of transferrin concentration (2.14±0.23 g/l vs. 1.78±0.37 g/l) and Fisher index (2.96±0.34 vs. 2.53±0.25). In control group Glutamine + Threonine level had a tendency to decrease and by the 6th day of treatment was below normal values (411.73±31.16 mkmoll/l [before PN]; 337.08±71.26 [3rd day] and 207.62±53.98 [6th day]), while in glutamine group there was no Glutamine + Threonine level decrease (360.44±72.33 mkmoll/l; 338.70±66.28 and 349.98±43.46 respectively).

CONCLUSION. Restoration of metabolic activities confirms adequate nutritional support in both groups but glutamine adding provides faster improvement of protein disturbances and helps to avoid glutamine deficiency.

0582

THE EFFECT OF ALANYL-GLUTAMINE DIPEPTIDE ON INSULIN RESISTANCE AND OUTCOMES IN CRITICALLY ILL PATIENTS WITH COPD AND RESPIRATORY FAILURE

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INTRODUCTION. To investigate the effect of supplementation with Alanyl-glutamine dipeptide on insulin resistance and outcome in critically ill COPD and respiratory failure patients.

METHODS. Prospective, randomized and controlled study. Patients who were admitted to West China Hospital ICU between Jan 2005 and Feb 2006 were selected and randomized into two groups which were given the similitude nutrition support protocol. Two groups' nonprotein calorie were 25kcal/kgd, 50% were provided by fat emulsion. The nitrogen supply were 0.2g/kg in each group. In treatment group 20%-25% of nitrogen was given from the parenteral nutrition by the alanyl-glutamine dipeptide, the rest was the equilibrium amino acids. In the 3rd and 4th day, blood glucose clamp were performed in both groups, and blood glucose was rigidly controlled between 4.4 to 6.1mmol/L. Daily blood gas, glucose and insulin dosage and 30th day mortality , length of stay (LOS) in hospital and in ICU, duration of mechanical ventilation (DMV) and the costs of ICU and hospital were measured respectively.

RESULTS. 30 patients completed the research. There was no difference in blood gas between two groups, but PaO2 rose gradually. Compared with control group, the five day's blood glucose level have a decreasing trend in treatment group. During the five days, the average insulin dosage have an obviously decreasing in treatment group. There were no difference between two groups in 30th day mortality, LOS in hospital and the costs of hospital. But the LOS in ICU and DMV have a decreasing trend in treatment group.

CONCLUSION. Alanyl-glutamine dipeptide have not improved pulmonary function in critically ill patients with COPD and respiratory failure. However, Alanyl-glutamine dipeptide have contained certain function at attenuated insulin resistance and stabilized the level of blood glucose. Alanyl-glutamine dipeptide did not reveal the effect of improving outcome in critically ill patients with COPD and respiratory failure, the 30th day mortality, LOS in hospital and the costs of hospital. But the the LOS in ICU and DMV have a decreasing trend in treatment group.

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0583

A PROSPECTIVE STUDY ON ADRENAL CORTEX RESPONSES AND OUTCOME PREDICTION IN ACUTE CRITICAL ILLNESS: RESULTS ON A LARGE COHORT OF 203 MIXED ICU PATIENTS

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INTRODUCTION. Adrenocortical dysfunction is a common finding in severe illness. However, it remains currently unclear whether adrenocortical responses predict outcome in acute critically ill patients.

METHODS. To investigate this, 203 (158 men) acute critically ill patients, with a median age of 53 years were studied. Admission diagnoses included multiple trauma (n=93), medical (n=57) or surgical (n=53) critical conditions. Within 24 hours of ICU admission, a morning blood sample was obtained to measure baseline cortisol, corticotropin (ACTH), and dehydropiandrosterone sulphate (DHEAS). Subsequently, a low-dose (1 mcg) ACTH test was performed to determine stimulated cortisol. The incremental rise in cortisol was defined as stimulated – baseline cortisol.

RESULTS. Overall, 149 patients survived and 54 patients died. Non-survivors were older and in a more severe critical state, as reflected by the higher SOFA and APACHE II scores. Furthermore, non-survivors had a lower incremental rise in cortisol (5.0 vs. 8.3 mcg/dl, p<0.001) along with lower DHEAS than survivors (1065 vs. 1642 ng/ml, p=0.002). The two groups had similar baseline and stimulated cortisol. Multivariate logistic regression analysis revealed that age (odds ratio=1.02, 95% C.I. 1.01-1.04, p=0.001), SOFA score (odds ratio=1.36, 95% C.I. 1.19-1.56, p<0.001), and the incremental rise in cortisol (odds ratio=0.88, 95% C.I. 0.81-0.97, p=0.005) were independent outcome predictors.

CONCLUSION. In mixed critically ill patients a blunted cortisol response to ACTH within 24 hours of ICU admission is an independent predictor for poor outcome. In contrast, baseline cortisol or adrenal androgens are not of prognostic significance.

0584

EFFECT OF INOS DELETION ON HEPATIC GLUCONEOGENESIS IN HYPERDYNAMIC MURINE SEPTIC SHOCK

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INTRODUCTION. Recently, we showed that endogenous glucose production is depressed during hyperdynamic murine septic shock (1). The role of NO has been controversially discussed in this context (2,3). Therefore, we investigated the effects of genetic and pharmacologic iNOS deletion on hepatic glucose production during normotensive, hyperdynamic, volume-resuscitated murine septic shock.

METHODS. 15 h after induction of sepsis by cecal ligation and puncture (CLP) mice were anesthetized, mechanically ventilated and instrumented. Immediately after surgery, wildtype (WT) and iNOS-k.o. mice received 5µg/g i.p. of the selective iNOS inhibitor GW274150 (n=8) or vehicle (n=12), respectively. WT mice with vehicle injection (n=13) served as controls. Normotensive, hyperdynamic hemodynamics were achieved with i.v. colloid fluid resuscitation and noradrenaline (NA) infusion. All mice received continuous i.v. stable isotope labelled 1,2,3,4,5,6-13C6- glucose. Measurements were recorded at 18, 21 and 24 hours after CLP. Data are median (range). Within group effects over time were analyzed with a Friedman ANOVA on ranks, intergroup differences with an unpaired rank sum test.

RESULTS. In iNOS-k.o. and GW274150 mice target MAP was achieved with less than 20% and 60% of the NA infusion rates required in WT mice, respectively (p<0.001). Macro- and microcirculatory perfusion and oxygenation of the gut and liver were well maintained. Despite the lower NA infusion rates, hepatic glucose production was significantly higher both in iNOS-k.o. and GW274150 animals (4.3 (3.2-8.4) and 5.0 (3.7-6.3) vs. 1.9 (0.4-2.9) mg/gxh, p<0.001). This was concomitant with a significantly higher hepatic phosphoe-nolpyruvate carboxykinase (PEPCK) activity (spectrophotometry) in the iNOS-deleted groups.

CONCLUSION. In normotensive, hyperdynamic septic shock, both pharmacologic and genetic iNOS deletion allowed maintaining hepatic glucose production, most likely due to maintained activity of the key regulatory enzyme of gluconeogenesis PEPCK.

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0585

THE HYPOTHALAMIC-PITUITARY-ADRENAL AXIS IN MAJOR SURGERY: INSIGHTS OBTAINED FROM SEQUENTIAL MEASUREMENTS OF FREE CORTISOL INDEX, CORTICOTROPIN, ADRENAL ANDROGENS, AND THE LOW-DOSE ACTH TEST

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INTRODUCTION. The perioperative hypothalamic-pituitary-adrenal (HPA) axis changes in patients undergoing major surgery remain incompletely understood.

METHODS. To further clarify this, 36 patients (20 men), with a mean±SD age of 68±years, undergoing major abdominal operations were studied. Blood samples were drawn pre-operatively, at the end of surgery and at the first and second postoperative days (POD1 and POD2). Total cortisol, corticotropin (ACTH), corticosteroid-binding globulin (CBG), dehydroepiandrosterone (DHEA), and its sulphate (DHEAS) were measured. The free cortisol index (FCI) was calculated. Furthermore, patients underwent preoperatively and on POD1, a low-dose (1 mcg) ACTH test to determine stimulated cortisol.

RESULTS. At the day of surgery, total cortisol, FCI, ACTH and DHEA increased, while DHEAS and CBG declined. At POD1, plasma ACTH was lower compared to its own preoperative levels, FCI remained elevated, DHEA, DHEAS and total cortisol returned almost to their baseline values, while CBG was still low. At POD2, ACTH and CBG were low and FCI returned to its preoperative levels. Stimulated cortisol (corrected for CBG levels) on the first postoperative day was higher than that on the day before surgery (0.72 vs. 0.54, p=0.01).

CONCLUSION. Early following major operations, elevated cortisol is associated with high ACTH. Despite this HPA activation and a concomitant rise in DHEA levels, DHEAS is temporarily decreased. Later on, a remarkable dissociation between ACTH (low) and cortisol (high) is observed. The enhanced reactivity to ACTH is at least partly a causative factor of this dissociation.

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Poster Sessions
AKI and renal replacement therapy 0586-0599

0586

TEICOPLANIN PHARMACOKINETICS IN CRITICALLY ILL PATIENTS ON CONTINUOUS VENO-VENOUS HAEMOFILTRATION

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INTRODUCTION. Teicoplanin is a gycopeptitide antibiotic for treatment of highly resistant Gram-positive bacteria such as methicillin resistant Staphylococci and Enterococcus faecalis. It is eliminated unchanged by the kidneys. In renal impairment the maintenance dose has to be reduced. Data on pharmacokinetics of teicoplanin in patients requiring continuous veno-venous haemofiltration (CVVH) are sparse. Therefore teicoplanin pharmacokinetics was assessed in critically ill patients during on CVVH.

METHODS. Teicoplanin serum levels were measured in adult critically ill patients requiring CVVH for acute renal failure after the first dose and at approximate steady state conditions (day 4-6 of therapy). CVVH was performed using 1.2 m2 polyetersulfone membranes; blood flow was 180 mL/min and the ultrafiltration rate amounted 35 mL/kg body weight. A loading dose of 1,200 mg of teicoplanin was administered (infusion time 1h). Subsequently the dosage was guided by serum levels and reduced to an average daily dose of 1040 ± 496 mg per day. Samples were drawn 1, 2, 4, 8, 12 and 24h after start of infusion. Teicoplanin was measured by a fluorescence polarisation immunoassay in serum and ultrafiltrate. Pharmacokinetics was calculated using a non-compartmental model by Kinetica 2000.

RESULTS. Concentration time profiles of 11 patients were determined after the first dose and of 5 patients during steady state. The teicoplanin peak concentration was 55.4 ± 15.9 μg/mL (mean SD) after the first dose and 75.2 ± 31.6 μg/mL at steady state. Trough levels amounted 6.4 ± 1.7 μg/mL and 21.3 ± 5.0 μg/mL, respectively. The half-life increased from 15.7 ± 5.7 h after the first dose to 35.1 ± 12.3 h at steady state, whereas the clearance declined from 2.95 ± 0.75 L/h to 0.61 ± 0.31 L/h. The apparent volume of distribution decreased from 63 ± 13 to 29 ± 12 L. The sieving coefficient of teicoplanin amounted 0.14 after the first dose and 0.20 after repeated administration.

CONCLUSION. A loading dose of 1,200 mg of teicoplanin followed by a maintenance dose of about 1,000 mg per day appears to result in adequate serum levels in a majority adult critically ill patients on CVVH. However, because of a considerable variability of teicoplanin pharmacokinetics in this group of patients, therapeutic drug monitoring is recommended to warrant safety and efficacy of treatment.

0587

ARGATROBAN IN A PATIENT WITH CVVH

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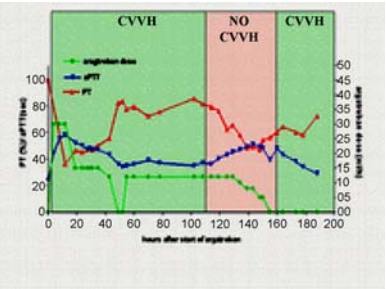
INTRODUCTION. Although heparin is the most frequently used anticoagulant in CVVH, alternatives to heparin are needed in case of heparin induced thrombocytopenia (HIT). Argatroban, a direct thrombin inhibitor approved for HIT is primarily metabolized by the liver, thus, should not accumulate in renal failure. However, there is only limited data regarding its use in continuous venovenous hemofiltration (CVVH). We report a patient with acute renal failure where anticoagulation by argatroban appears to be influenced by CVVH.

METHODS. A 54 years old woman was admitted to the ICU department with septic shock and acute renal failure. Bilateral infected crural ulcers could be identified as focus and therefore both calves had to be amputated. After 19 days of CVVH with heparin as anticoagulant a rapid drop in platelet count of more than 50% occurred, a suspected HIT was confirmed by heparin-PF4 antibodies (ELISA). Although there was no hepatic failure argatroban was started at 3 mg/h (0,5 μg/kg/min) because of cholestatic cholecystitis and severe sepsis.

RESULTS. aPTT increased from 24 to 44 seconds after 4 hours of argatroban infusion and further to 58 sec after 12 hours (Figure 1). At the same time PT fell from 99% to 36%. Therefore argatroban dose was reduced by 50 % to 1,5 mg/h. After 46 h CVVH had to be stopped for 6 h. After discontinuation of argatroban a decrease in aPTT from 43 to 34 sec, as well as an increase in PT from 55 to 83 % was observed. 58 h after argatroban was restarted at 1,2 mg/h, CVVH was stopped again for 50,5 hours without discontinuing argatroban. Shortly after CVVH was halted aPTT increased from 37 to 45 sec and PT decreased from 81 to 65 % within 20 hours. This trend continued even after stepwise reduction of the dose of argatroban to 0,8 mg/h. The trend could not be reversed until the dose was further reduced to 0,5 mg/h and argatroban was stopped. After restarting CVVH without argatroban infusion a further decline in aPTT as well as an increase in PT was observed.



CONCLUSION. This case demonstrates that argatroban may be influenced by CVVH and that dose may have to be substantially reduced in these patients.

0588

REGIONAL CITRATE ANTICOAGULATION IN HIGH VOLUME HEMOFILTRATION IN CRITICALLY ILL PATIENTS WITH A HIGH RISK OF BLEEDING

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INTRODUCTION. Regional citrate anticoagulation (RCA) is the recommended strategy when risk of bleeding is increased in continuous venovenous hemofiltration. We evaluated the feasibility and the safety of this method in high volume hemofiltration (HVHF) in critically ill patients with severe coagulopathy.

METHODS. 22 patients (62 ± 17 years, SAPS II 71 ± 21, SOFA 12.9 ± 2.4, 15 septic shocks and 7 SIRS) have been retrospectively studied between January, 2001 and December, 2006. Continuous renal replacement therapy, daily limited to 20 hours, was performed with a Frésénius 4008 HDFTM generator. Blood flow was 200 ml/min. The generated replacement fluid, calcium free, was used in pre-dilution. A citrate solution (ACDAR- FréséniusTM) was infused to target a prefilter ionised calcium level below 0.5 mmol/l whereas systemic calcium perfusion maintained normal plasmatic calcium level. Hemofiltration characteristics, filters lifetime and metabolic complications were the main collected data.

RESULTS. 73 HFHV days (79 filters needed) were analysed. Mean hemofiltration volume was 90 ml/kg per hour (about 7 l per hour or 133 l per day). 94 percent of the prescribed HFHV dose could be carried out. Mean filters lifetime was 17.6 hours. 25 percent of them prematurely clotted. Citrate and calcium perfusion flow respectively needed to be modified an average of 1 and 1,3 time per day. 16 metabolic alkalosis (pH>7.50), 10 hypocalcemia (Ca++<0.95 mmol/l), 3 hypercalcemia (Ca++>1.40 mmol/l), 3 hypernatremia (Na+>145 mmol/l) and one citrate intoxication (total to ionised calcium ratio>2,5) occurred. None of these events lead us to modify the anticoagulation strategy. Prefilter ionised calcium level in non clotting filters was 0,58 ± 0,12 mmol/l versus 0,67 ± 0,09 mmol/l in clotting filters (p=0,03). 50% of the patients died in hospital whereas predicted mortality was 75%.

CONCLUSION. RCA is a reliable and simple method for HVHF with high hemorrhagic risk patients. Frequent minor metabolic complications require a narrow biological monitoring. To improve our practices, prefilter ionized calcium levels should be decreased.

0589

BLOOD PRODUCTS REQUIREMENT IN PATIENTS TREATED WITH DROTRECOGIN ALFA (ACTIVATED) AND RENAL REPLACEMENT THERAPY

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INTRODUCTION. Drotrecogin alfa (activated), (DrotAA) is a potent anti-inflammatory and anti-thrombotic drug licensed for the treatment of severe sepsis and multiple organ failure. DrotAA is associated with an increased risk of bleeding particularly when administered with additional anticoagulants or in patients at high-risk of blood loss, such as surgical patients or those on renal replacement therapy (RRT). The aim of our study was to quantify the requirement of blood and blood products in patients receiving DrotAA during RRT, compared to the 96 hours post-DrotAA on heparin for RRT.

METHODS. This was a retrospective study on patients admitted to our ICU with severe sepsis and requiring RRT while receiving DrotAA. All biochemical and haematological data, number, and quantity of blood products transfused and the exact time were obtained from the electronic patient record. Patient data during the 96-hour infusion of DrotAA were compared to the immediate 96 hours post-DrotAA infusion (with the patients receiving heparin).

RESULTS. 35 patients (57% surgical) with severe sepsis and renal failure necessitating RRT were treated with DrotAA for 96 hours. There was no difference in the proportion of patients requiring blood transfusion during DrotAA infusion compared to the postDrotAA period (59% vs 50%; p=0.8). Although 3/35 patients required > 3 units blood transfusion during DrotAA and none post-DrotAA, there was no statistical difference in the median (IQR) of blood transfused during DrotAA [549 ml (292 to 747) vs 400 ml (269 to 565); p=0.4]. There was also no difference in the blood transfusion requirements between medical and surgical patients [320 ml (283 to 619) vs 342 ml (292 to 561); p= 0.9]. Similarly not significant, was the percentage of patients requiring platelet transfusion during DrotAA compared to the post-DrotAA period (38% vs 14%; p=0.2). Although the median (IQR) of platelets transfused during DrotAA was higher than during the post-DrotAA period, this difference was not statistically significant [507 ml (313 to 597) vs 290 ml (285 to 295); p=0.15]. By contrast, there was a significant increase in the number of patients who received fresh frozen plasma (FFP) during DrotAA (20% vs. 0%), with a median (IQR) of FFP transfused of 1186 ml (572 to 1906). The need for FFP transfusion was associated with a higher INR [1.4 (1.3 to 1.7) vs 1.3 (1.2 to 1.8); p=0.047] and a more prolonged APTT 57s (49 to 69) vs 44s (37 to 70); p< 0.0001.

CONCLUSION. The use of DrotAA in patients on RRT is not associated with an increased need for blood transfusions. There was a greater, albeit not statistically significant, need for platelet and FFP, which may be secondary to sepsis-induced coagulopathy. The reduced requirement for platelet and FFP in the post-DrotAA period could also be secondary to a beneficial effect of DrotAA on the sepsis-induced coagulopathy.

0590

EFFECT OF DROTRECOGIN ALFA (ACTIVATED) ON HAEMOFILTER SURVIVAL DURING RENAL REPLACEMENT THERAPY

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INTRODUCTION. Drotrecogin alfa (activated), (DrotAA) is a potent anti-inflammatory and antithrombotic drug licensed for the treatment of severe sepsis with multiple organ failure. Its main side effect is an increased risk of bleeding particularly when administered in conjunction with other anticoagulants. Patients who require renal replacement therapy (RRT) during DrotAA represent a challenge since the advantage of additional anticoagulation on the filter survival time (FST) must be balanced against the increased risk of bleeding. The aim of this study was to analyse the FST during DrotAA infusion with or without additional anticoagulants, compared to the 96 hours post-DrotAA.

METHODS. This was a retrospective study on patients admitted to our ICU requiring RRT while receiving DrotAA. All clinical data, including filter pressure parameters were retrieved from the electronic patient record. The main study variables were FST, filter pressures and coagulation parameters.

RESULTS. Of the 246 patients treated with DrotAA in our institution since 2002, 66 required RRT. Of these, 35 had a complete set of data and could be included in the study. On average, each patient had 2.5 filter changes, giving 89 filter episodes in total. The proportion of filter changes due to clotting of the filter, were similar during and after DrotAA (39% vs 36%). However, the majority of filter changes (61% and 64%) occurred because of clinical need (e.g. patient undergoing medical or surgical procedures). There was no difference in the FST of the filters changed because of clotting during DrotAA and post-DrotAA [22 h (15 to 34) vs. 16 h (8 to 26); p=0.08]. The median (IQR) FST during DrotAA infusion similar between patients on DrotAA alone [23 h (15 to 35)], DrotAA and heparin [21 h (14 to 37)], or epoprostenol [23 h (15 to 35)] or all three [34 h (11 to 36)] (p= 0.94, Kruskall-Wallis). There was no difference in the values of the filter pressure parameters during DrotAA and in the 96 hours post-DrotAA. We also examined the influence of clotting parameters on FST. There was no difference in the platelets count during DrotAA and post-DrotAA. There was however, a significant difference in the maximum value of INR (p=0.047) and in the APTT (p< 0.0001). Multivariate analysis of the factors associated with filter clotting showed that additional anti-coagulants and the levels of INR and APTT were not associated to filter clotting. The only predictive factor significantly, but weakly, associated with clotting during DrotAA, but not post-DrotAA, was the minimum value in platelet count: OR 1.007 (1.001 to 1.01; p=0.002).

CONCLUSION. FST during DrotAA is similar to that seen with heparin alone, post-DrotAA. Additional anticoagulation during DrotAA infusion does not improve FST. The decision to use prophylactic heparin should be taken independently from the decision to use DrotAA.

0591

ACUTE KIDNEY INJURY (AKI) IN THE INTENSIVE CARE UNIT, RIFLE CLASSIFICATION AND MORTALITY ASSOCIATION

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INTRODUCTION. The incidence of AKI in Intensive Care Units (ICU) is about 30% depending on the different series. There is a high association with mortality that sometimes exceed 60%, above all more severe forms in which dialysis is required. AKI is an independent risk factor of mortality. There is not a strict definition of AKI in critical care patients. The recognition of the beginning and/or middle stage renal failure has a great clinical importance. The AKI classification according to the ADQI group is defined by the RIFLE acronym: Risk, Injury, Failure, Loss and End-stage Kidney disease. The validation of this new criteria in ICU and its association with mortality is analysed in this study.

METHODS. We have carried out a retrospective cohort study, to analyse the incidence of AKI, in base of RIFLE classification, at ICU admission and during ICU stay, and the association with absolute and stratified mortality. The period of inclusion was from 2002 to 2006. Urgent admitted patients, both medical or surgical, were included in this study. Patients who had received dialysis before ICU admission were ruled out. AKI-admission is defined by RIFLE criteria during the first day in ICU. AKI-ICU is defined by the difference between the highest serum creatinine level during ICU stay and the lowest serum creatinine level during the first 24 hours in ICU. Admission creatinine clearance <60 ml/h is calculated by the Modification of Diet in Renal Disease (MDRD) formula, using the lowest creatinine level of admission day.

RESULTS. We analysed 1.731 urgent admitted patients. AKI-admission was found in 21'5% of them, finding a mortality association with Odds Ratio (OR) -1,447; Confidence Interval (CI) of 95% between 1'11 – 1'887, significance M-H Chi test = 0,006. Admission creatinine clearance < 60 ml/h was found in 26'6% of patients, with mortality association of OR 3,2644, 95% CI (2,567 – 4,151); significance p<0,000001. AKI-ICU is developed by 34'2% of patients, with mortality association of OR 2,506; 95% CI (1,983 – 3,167), p < 0,000001. Moreover, there is a lineal relation between AKI-ICU and absolute mortality with M-H test for trend significance, p <0,000001. This relation remains if an stratification in medical (1127 cases) and surgical (604 cases) patients is done. Medical patients OR 2,111; 95% CI (1,597 – 2,790); p<0,0001. Surgical patients OR 3,60,95% CI (2,33 – 5,57), p<0,0001. There is also a significant lineal relation (p < 0,00001) with mortality if RIFLE-stages stratification is done.

CONCLUSION. In our sample of patients,RIFLE classification identifies correctly AKI syndrome, including slight and moderate forms, and its association with mortality. The same results are found if patients are stratified as medical or surgical or according to their RIFLE classification. RIFLE category is a useful tool to determine the incidence and evolution of AKI syndrome in ICU.

0592

RENAL FAILURE REQUIRING RENAL REPLACEMENT THERAPY IN PATIENTS WITH CARDIOMYOPATHY: SURVIVAL AND DETERMINANTS OF OUTCOME

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INTRODUCTION. The aim of the study was to assess the impact of renal replacement therapy dependent acute renal failure (ARF) in patients with cardiomyopathy (CMP) on outcome.

METHODS. In a retrospective analysis, otherwise stable patients with cardiomyopathy (without cardiogenic shock) admitted to the acute dialysis unit for renal replacement therapy for ARF were analyzed. Data extracted: demography and morbidity (age, sex, BMI, cause of ARF, cause of death, type of CMP, co-morbidities), and data on a daily basis (serum electrolytes; serum osmolality; parameters of renal function (creatinine and BUN), liver function parameters, markers of inflammation (C-reactive protein), blood cell count, blood pressure, heart rate, systolic and diastolic blood pressure and the fluid balance after dialysis). Cardiac function was assessed by echocardiography, level of brain-natriuretic peptide and troponin T levels. Univariate regression analysis was performed to assess the influence of various parameters on outcome.

RESULTS. 46 patients with CMP who developed dialysis dependent ARF were studied (mean age=68 yrs, SD=10.4; BMI=28.9, SD=12.4). Ischemic CMP was the leading subtype of CMP (26 cases). LVF was available for 35 patients. 9 patients had normal to moderately decreased LVF and 26 patients had severely impaired LVF. RVF (available for 23 pts) was normal to moderately impaired in 18 patients, and severely impaired in 5 patients. Mean BNP level (available for 14 pts.) was 20556 before start of dialysis. Prerenal ARF was the major cause of ARF, present in 25 cases. Mean serum creatinine level at start of dialysis was 341 mmol/L, SD=145. Mean survival time of patients was 205 days from the day of first dialysis session, SD=363. None of the factors assessed in the univariate anaylsis had a significant influence on outcome of the patients.

CONCLUSION. The development of dialysis dependent ARF in patients with CMP is associated with an extremely grave prognosis. None of the factors usually associated with a poor outcome in CMP (such as anemia, inflammation, low BMI etc.) was significant in these patients, obviously, because the negative impact of ARF was so strong that it masked any other prognostic indicator.

0593

ASSESSMENT OF RENAL FUNCTION IN MULTIPLE TRAUMA PATIENTS WITH NORMAL SERUM CREATININE

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INTRODUCTION. To study the level of glomerular filtration rate (GRF) and accuracy of several creatinine-based estimation methods of GRF in a population of multiple trauma patients with a normal serum creatinine value.

METHODS. We conducted a prospective observational study in an intensive care unit of a University Hospital. Twenty consecutive critically ill trauma patients admitted within one week of their injuries. Patients had a normal (<125 µmol/L) and stable value of serum creatinine during two days. GFR was measured by Inulin plasmatic clearance (Clin) after a single bolus, in accordance with Brochner-Mortensen method corrected by Peters formula[1]. Creatinine clearance (Clcr) was measured over 3 h. We compared Clcr and equations for Clcr prediction (Cockcroft-Gault(CG), the Modification of diet in Renal disease equation (MDRD) and simplified MDRD equation (MDRDs). A correlation study and a concordance study (Bland and Altman method) were realized.

RESULTS. In your study group, Clcr (117.5 [43.6-240.3] mL/min /1.73m2) has been slightly increased when compared to a control population, whereas Clin stayed in normal range (82.7 [57.8-181.7] mL/min /1.73m2) The individual variability is high with a coefficient of variation >35% for all methods. Seven patients had a decreased Clin, despite having a normal Scr. 5 patients (25%) had a Clin below 80 mL/min /1.73m2 and in 2 patients, the Clin was below 60 mL/min /1.73m2. Foor patients (20 %)had a Clin>120 mL/min /1.73m2. Only Clcr was significantly correlated to Clin (r2 =0.64, p=0.0011). The Bland and Altman analysis showed that Clcr and estimating creatinine clearance formulas compared to Clin had small bias but high confidence interval (±2SD): for Clcr: b = 29.1 [-21 to 79]; CG: b = 5.6 [-72 to 84]; MDRD: b = -12.2 [-91.7 to 67]; MDRDs: b = 0.4 [-84 to 85.2]. The creatinine fractional excretion (FE= Clcr / Clin) has been increased (FE = 1.31 with a usual value of 1.2 in normal population). The distribution volume, which reflects the extra cellular volume (ECV), has been also increased (174.8 [104.7-334.4] mL/kg).

CONCLUSION. Multiple trauma patients with normal serum creatinine have an increased creatinine tubular secretion and a highly variable distribution volume resulting in an accuracy of all creatinine-based formulas. The individual predictive value of these formulas is low. Only the measured Clcr is able, with imperfections, to assess variation in renal function.

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0594

INTERMITTENT HEMODIALYSIS IN SEPTIC SHOCK PATIENTS-CUTTING COSTS; NOT CORNERS!

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INTRODUCTION. Continuous VenoVenous Hemofiltration(CVVH) or Hemodiafiltration (CVVHD) are the commonest Renal Replacement Therapies(RRT) prescribed to the patients with the septic shock having renal failure. Each CVVH session for 24 hours costs around € 250 in India as against Intermittent Hemodialysis(IHD),which costs around € 25 per 4 to 6 hour session. Hence IHD is still the commonest form of RRT in Indian ICUs. Major concern of IHD in septic shock patients is hemodynamic instability. Whether stringent hemodynamic monitoring and maintaining preset goals would reduce these instabilities & deliver optimal RRT is not clear. We undertook a prospective study to evaluate this concept.

METHODS. We attempted to achieve preset goals of keeping Mean Arterial Pressure (MAP) >75mm, Cardiac Output (CO) > 5 lit./min & Cardiac Index (CI) >2.5 lit./min/m2 throughout the session by following the protocol in the given sequence-:1) Fluid boluses 2) Increase in vasopressor or inotrope dose 3) Adjustment in ultra filtration rate between 700 - 250 ml/hr and 4)Adjustment in blood flow rate between 300-150 ml/min on hemodialysis machine. Dopamine, Norepinephrine, Vasopressin and Dobutamine were used alone or in combination to achieve these goals. Hemodynamic monitoring & data collection was done with Flotrac-Vigileo monitoring systemTM (Edwards Lifesciences,Irvine,CA,USA) and Intellivue MP20 (Philips,Germany).

RESULTS. 27 IHD sessions of 11 patients with septic shock needing vasopressor were monitored and managed in ICU. Base line APACHE II score was 24.37±4.98 and all patients had at least 3 organ failure. Average duration of IHD was 4.85 ±1.29 hrs and net negative fluid balance achieved per IHD session was 1962.96 ±570.53 ml. Table 1 showing hemodynamic parameters before IHD and during IHD Preset goals were maintained without any intervention in 3 sessions, with fluids alone in 8 sessions, fluids and escalation of vasopressor in 7 sessions and fluid bolus plus vasopressor escalation plus reduction in ultra filtration & blood flow in 7 sessions. Only 2/27 sessions were terminated at 120 & 90 min. due to development of new myocardial infarction in one and persistent hypotension in the other. Additional cost of C. O. and C.I. monitoring was about€ 25 per session.

TABLE 1.

Hemodynamic Parameters Before and During IHD

	Pre IHD	60 min On IHD	120 min On IHD	180 min On IHD	240 min On IHD
MAP mm hg	80.30 ± 11.52	81.74 ± 12.40	81.74 ± 15.87	81.69 ± 14.36	82.23 ± 14.40
C.O. lit/min	6.37 ± 2.03	6.38 ± 2.06	6.34 ± 2.47	6.66 ± 2.25	6.58 ± 2.12
C.I. lit/min/m2	3.57 ± 0.95	3.60 ± 0.95	3.52 ± 1.17	3.74 ± 0.99	3.70 ± 0.90

CONCLUSION. Hemodynamic goal directed intermittent hemodialysis is reasonably optimum and cost effective form of RRT especially when CVVH/ CVVHD cannot be offered due to cost constraints.

0595

SOLUTE CLEARANCE IN THE FIRST 24 HOURS OF CVVH

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INTRODUCTION. Continuous veno-venous haemofiltration (CVVH) clears solutes and improves acidosis in critically ill patients with renal failure and sepsis. We studied solute clearance and filtration quantity prospectively in the first 24 hours of 34 patients requiring CVVH on two teaching hospital intensive care units.

METHODS. Data collected included demographic data, reason for starting CVVH, blood biochemistry prior and after starting CVVH as well as duration of CVVH, including reasons for any interruptions. Blood tests were collected once in a 24-hour period. Data was collected for the entire period that patients required CVVH. Solute clearance on CVVH within the first 24 hours was expressed as a percentage change of urea and creatinine levels compared with levels prior to CVVH. Quantity of haemofiltration was calculated over the interval between the first two blood tests and expressed in relation to bodyweight.

RESULTS. Data from 31 patients is presented (3 patients died before blood samples on CVVH was taken). The main indication for commencing CVVH was sepsis/acidosis in 15 patients and renal failure in 19 patients. The values for urea and creatinine on admission differed considerably between both groups. Patients with sepsis/acidosis received a median CVVH-dose of 36.4 mls/kg/hr, whereas patients with renal failure were treated with a median CVVH-dose of 34.0 mls/kg/hr. Table 1 shows the respective median values for urea and creatinine prior to CVVH and from the first sample on CVVH, as well as the median (interquartile range;IQR) CVVH dose delivered in the period between the two samples.

TABLE 1.

	Urea (pre-CVVH) [µmol/l]	Urea (post-CVVH) [µmol/l]	Creat (pre-CVVH) [µmol/l]	Creat (post-CVVH) [µmol/l]	CVVH exchange [mls/kg/hr] (IQR)
ALL	15.7	11.6 (-25.8%)	355	210 (-40.8%)	35.7
Sepsis/Acidosis	12.9	5.6 (-60.5%)	324	128 (-56.6%)	36.4 (36.3)
Renal Failure	17.8	13 (-26.9%)	410	272 (-33.7%)	34.0 (13.6)

CONCLUSION. Despite receiving similar median doses of CVVH, with little difference in total CVVH time lost (7.1% for sepsis group; 9.6% for renal failure group) clearance of urea and creatinine is higher in the sepsis group by a factor of 2.25 and 1.68, respectively compared with the renal failure group. This is likely due to the considerably larger range of CVVH-doses delivered to patients in the sepsis group. It is noteworthy that the non-septic patient group received doses (median dose 34 ml/kg/hr) very similar to the regime employed in the study that reported improved survival in septic patients requiring CVVH[1], with some patients even receiving considerably larger doses (range 16.5 - 55.2 mls/kg/hr). CVVH dosing regimes have an immediate impact on solute clearance and great care is required to accurately calculate and deliver this form of treatment.

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0596

THE IMPACT OF ANTICOAGULATION ON INTERRUPTIONS TO CVVH DELIVERY AND FILTER CLOTTING

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INTRODUCTION. CVVH (Continuous Veno-Venous Haemofiltration) is the commonest form of renal replacement in UK intensive care units. CVVH dosing may influence patient outcome(1). A recent observational study showed that 74% of CVVH time was lost due to filter clotting(2). We therefore studied the effect of anticoagulation on CVVH delivery.

METHODS. Over a four month period data from 34 patients across 2 adult intensive care units was recorded. The number and reasons of interruptions and subsequent time lost as well as the type of anticoagulation was documented. Infusion of heparin into the circuit was the primary form of anti-coagulation. Heparin was started at 8 units/kg/hr and adjusted according to local protocol to achieve a target heparin ratio (APTR) of 1.5 – 2.0. APTRs taken from the circuit within the previous 2 hours were defined to represent the degree of heparinisation at the time of a filter clotting off.

RESULTS. A total of 4006.5 patient hours of CVVH was delivered. Filter clotting was implicated in 88 of 118 interruptions (75%). Table 1 shows the various forms of anticoagulants used, the number of interruptions and total time lost due to filter clotting. In the heparin group, 234 APTRs were recorded. Only 29% of these were therapeutic and 59% were sub-therapeutic. 17 APTRs were recorded within the 2 hours prior to filter clotting, representing 40% of all clotting events occurring on heparin. 2 clotting events occurred with a therapeutic APTR, 14 with recorded subtherapeutic ratios (relative risk 3.75), and 1 event with an APTR >2.

TABLE 1.

	CVVH time available (hrs)	Filter clotting episodes (% all interruptions)	Delivery time [hrs] lost (%)
Heparin (Circuit)	1891	43 (77)	126 (78)
Flolan (Circuit)	1619.5	29 (71)	100 (68)
Heparin + Flolan (C)	131	4 (100)	25 (100)
Xigris	388	5 (83)	5 (50)
Other	354.5	7 (64)	23.5 (70)
Total	4384	88	279.5

CONCLUSION. Filter clotting is by far the most common cause for interruptions in CVVH delivery (75%). Adequate anticoagulation of CVVH circuits with heparin is problematic and failure to achieve the terget APTR carries a considerable risk of filter clotting. 59% of APTRs were subtherapeutic despite use of a written protocol, suggesting that many patients are exposed to an increased risk of filter clotting regardless of other causative factors. Whilst we recognise that the aetiology behind filter clotting is multifactorial, reducing these interruptions with adequate anticoagulation is important and may have positive effects on patient outcome.

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0597

PRELIMINARY REPORT OF AN ENOXPARIN DOSE PROTOCOL BASED ON ANTI-XA ACTIVITY IN CONTINOUS RENAL REPLACEMENT THERAPY (CRRT)

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INTRODUCTION. During continuous renal replacement therapy (CRRT) anticoagulation of the extracorporeal circuit is generally required to prevent clotting of the circuit, preserve filter performance, optimize circuit survival, and prevent blood loss due to circuit clotting. Unfractionated Heparin (UFH) and Low molecular weight heparin (LMWH) are generally used to perform this strategy. However, this anticoagulation may cause dangerous bleeding especially in acute renal critical patients. In these patients, it's very difficult to predict bleeding or thrombosis correctly during CRRT.

OBJECTIVE. To asses the safety and efficacy of the use of an enoxiparin dose protocol based on anti-Xa activity in CRRT.

METHODS. From September 2005 to December 2006, 26 patients were submitted to 55 CRRT sessions. All sessions used an enoxparin dose protocol based on anti-Xa activity (target 0,25-0,4 U/mL). The endpoints analyzed were circuit time (in hours) to judge efficacy and death (30 day mortality) and serious bleeding (red cell transfusion) to judge safety.

RESULTS. Continuous veno-venous hemodiafiltration (CVVHDF) was the method more used in 53 sessions (96,4%). The average circuit time was 41,6 ± 26,6h. Ten patients received red blood transfusion (19 transfusions required) related to CRRT and four patients had bleeding complications (retroperitoneal hemorrhage, hemothorax, puncture complication, acute gastric lesion). No death was reported during 30 days follow-up.

CONCLUSION. In this series, the use of an enoxiparin dose protocol based on anti-Xa activity in CRRT was considered relatively safe and effective. The circuit time of 41 hours was acceptable in effectiveness and efficiency.

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ACE-INHIBITORS IMPROVE PROGNOSIS IN ACUTE CORONARY SYNDROME PATIENTS WITH HEART AND RENAL FAILURE

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INTRODUCTION. To investigate the impact of heart failure (HF) and renal dysfunction (RD) on the prognosis of patients hospitalized with acute coronary syndrome (ACS).

METHODS. 470 consecutive patients with ACS was admitted to a coronary care unit of terciary hospital between 2004-2005, 116 patients presented heart failure during their hospitalization. Clinical, ECG, echocardiographic, features were prospectively investigated. We also took blood samples in the first 24 hours of their admittance to the CCU for a complete hemogram, levels of total cholesterol, HDL cholesterol, LDL cholesterol, triglycerides, Creatinine, Clearance of creatinine (MDRD equation), glucose, HbAc1, High Sensibility-C reactive Protein (HS-CRP) and a follow up of levels of Troponine, CK and CK-MB. We determined the presence of microalbuminuria (MA) (> 3mg/dL in a 24-hour urine sample). All patients were submitted to a coronary angiography in the first 72 hours. We defined RD if the clearance of creatinine < 60 mL/min/1.73m2.

RESULTS. Non-ST segment elevation myocardial infarct (NSTEMI) was the most frequent cause of heart failure (58.6%). The RD was present 56% of HF. The patients of this group was oldest, more diabetes mellitus, more previous myocardial infarct more anterior descendent occlusion. Moreover, the patients with HF and RD had a lowest hematocrit (36% vs 40%), troponin I peak concentration (51.8 ng/ml vs 112 ng/ml) and had higher of creatinine (1.77 mg/ml vs 1.23 mg/ml), MA, admission glycemia (239 mg/dl vs 175 mg/dl), NT proBNP (11230 pg/ml vs 43303 pg/ml) and cystatin C (1.19 vs 0.86). Both group present similar reduced ejection fraction (42% vs 40%). This group presented higher incidence of post infarct angina (23%; p=0.01). In-hospital mortality was in patients with HF and RD 34% vs 20% in HF without RD (p= 0.003). In the follow-up (median 400 days) the mortality of patients with HF and RD was 44% (p= 0.005). The mortality of the group with RD and treatment with ACE-inhibitors was 29% vs 56% without ACE-inhibitors (p=0.04). The multivariate analysis identified the RD was a independent predictor of mortality in the patients with heart failure (3.28; CI 95% 1.35-7.97, p=0.008) and the impact negative of RD was reduced by ACE-inhibitors (OR=0.40, CI 95% 0.20-0.96; p=0.04).

CONCLUSION. The RD is common and a strong predictor of mortality in patients with HF complicating acute coronary syndrome. It is associated with a worse risk profile. ACE-inhibitors improve the prognosis this group of patients.

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CRITICALLY ILL PATIENT – ACUTE RENAL FAILURE RISK FACTORS

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INTRODUCTION. Acute Renal Failure(ARF)may result from a wide variety of clinical conditions that induce ischemic injury or direct nephrotoxicity. ARF is a frequent clinical problem, particularly in the intensive care unit,where it is associated with a mortality of between 50 and 80%(1). Our aim was to analyse ARF prevalence,risk factors,management and outcome in our critically ill patients.

METHODS. A prospective observational study was carried out. All the patients admitted to our intensive care unit (ICU) from Jan 2005 until Dec 2006 were enrolled. Demographic and epidemiological data was collected. ARF prevalence,risk factors,management and outcome were analysed.

RESULTS. Six hundred and thirty-six patients were admitted to our unit during the study period,with 240(37.74%)of them presenting ARF. According to RIFLE criteria,50.8% of patients were classified as having renal failure risk, 22.5% as having renal injury and 26.67% renal failure. SAPS II and SOFA scores at admission were 51.64±15.85 and 9.41±4.43,respectively,with a male:female ratio of 147:93 and a mean age of 60.81±17.91 years. Admission was due to medical illness in 154 cases, pos-operative of urgent surgery in 52 cases, trauma in 33 cases and elective surgery in one case. From all ARF patients, 186 presented with shock, 152 with sepsis and 177 with MOD. Rhabdomyolysis was present in 170 patients, while sixty had received radiological contrast and 53 nephrotoxic drugs. ARF was pre-renal in 195 patients, renal in 43 and post-renal in 2 patients. According to Urine output classification 68 were oliguric,142 non-oliguric and 30 anuric. Blood urea and creatinine (mg/dl) at ICU admission were 78.75 ± 54.82 and 1.92 ± 1.36. The maximum urea and creatinine values were 107.82±66.47 and 2.65±4.38). ARF treatment was conservative in 190 patients, conventional dialysis in 4 and sustained low efficiency dialysis in 46 patients. Overall mortality was 46.25% (111 patients). From survivors,103 patients recovered regular renal function, while 26 remained with chronic renal failure. Twelve of these patients needed chronic dialysis.

CONCLUSION. Acute renal failure is a very frequent problem in the critically ill patients and contributes to their high mortality. The most frequent cause is sepsis,usually in the context of multiple organ dysfunction. The more prevalent admission cause in our ARF patient were medical illness and pos-operative urgent surgery. The ARF patients presented higher SAPS II and initial SOFA scores. The most common risk factor was shock;other factors frequently seen were sepsis,MOD and rhabdomyolysis. The mortality rate measured was lower than that referred in the literature.

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0600

MEDICAL SIMULATION WHILE BLINDFOLDED: A NOVEL APPROACH TO IMPROVE CRITICAL RESUSCITATION SKILLS

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INTRODUCTION. Teamwork, communication, and personnel management (skills known as Crisis Resource Management (CRM)) are essential during acute resuscitation.1 Furthermore, many licensing boards mandate healthcare workers become not just factual experts, but proficient communicators and collaborators.2 These goals are difficult to teach didactically. Therefore, Medical Simulation has become important for training and maintenance-of-competence.1-2

METHODS. Following a needs-assesment, realistic acute-care simulations were designed using a modified delphi approach. Didactic instruction was given regarding CRM strategies including "the three C's of communication": Clear instructions, Citing names, Closing the loop (eliciting feedback following instructions).1 Teams of four: two physicians (a leader and an assistant);a pre-briefed critical-care nurse (RN) and critical-care respiratory therapist(RT), then responded to standardized simulation scenarios, delivered using a Laerdal High-fidelity Mannequin in a working critical care unit.

RESULTS. We found insufficient CRM skills on the first simulation (suggesting poor retention from didactic instruction alone) with gradual improvement following the three simulations (suggesting simulation offers a supplementary technique but may still be insufficient). We therefore made the team perform a fourth resuscitation, but with the physician-leader blindfolded. We found immediate/marked improvement in CRM skills: Physicians elicited help sooner and ensured instructions were completed. Other members were quicker to volunteer changes in vital signs. Debriefing confirmed that this novel approach was well received and participants reported enhanced understanding of the importance of teamwork.

CONCLUSION. In the early stages of undifferentiated shock we are essentially "blind" to the diagnosis, and hence must rely on others. This strategy is also useful for trainees whose first language is not English: blindfolding forces them to focus on communication, with the result of increasing their confidence and reassuring supervisors. This technique allowed us to emphasize CRM principles. We now expectat senior trainees to perform at least one blindfolded simulated-resuscitation. It is no longer an exaggeration to say our teams are "good enough to resuscitate blindfolded"!

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0601

ORGAN DONORS OPTIMIZATION IN A HOSPITAL WITH NO NEUROSURGERY SERVICE

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INTRODUCTION. In current Spanish population around 20% of people are over 65 years of age. In our country, life expectancy is 78 years. It is obvius that this population aging has modified some approachs in organs donation and transplantation process, forcing to include older people in waiting lists. The increase in the organs demand for transplantation has conditionated changes in the donor profile, therefore the evaluation, acceptance and rejection criteria of donors have been changing. The acceptance for older donors with associated comorbidity provide transplantations with acceptable results getting to reduce tranplant waiting lists and mortality. The consequence that arise from it is the concept of expanded criteria donor (ECD).

METHODS. we studied retrospectively 90 donors from a hospital with no Neurosurgery service from January 2000 to December 2006, comparing donation potential between over and under 60 years of age donors.

RESULTS. four of the donors younger than 60 years (n: 47) were not appropriate (8,5%) whereas older than 60 years (n: 43) were 7 (16,27%) (p-NS). Donors older than 60 years provided 51 kidneys and 24 livers available for transplantation (59,3% and 55,8% of total organs, respectively) whereas younger than 60 years group obtained 71 kidneys and 31 livers available (75,5% and 65,9% of total organs, respectively). Number of useful organs per donors was 2,48 and 1,74 for younger and older than 60 years donors, respectively (p: 0,0026).

CONCLUSION. in our serie, age was not a predictor variable for hepatic usefulness whereas it was for renal usefulness. Nowadays DCE are indispensable and age can not be an exclusive factor in this donors evaluation.

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GRANT ACKNOWLEDGEMENT. To professionals responsable for organ donation.

0602

PERCUTANEOUS TRACHEOSTOMY IN OUR ICU PATIENTS: INDICATIONS, TIMING AND SURVIVAL

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INTRODUCTION. Percutaneous tracheostomy (PCT) is becoming the procedure of choice in ICU patients, since it can be made at bedside, being safe, easy, quick, with better cosmetic results than the surgical tracheostomy and literature suggests it has less complications and costs. PCT has many indications in ICU patients, mainly prolonged mechanical ventilation / weaning difficulties and airway protection in comatose patients. The Consensus Conference on Artificial Airways in Patients Receiving Mechanical Ventilation recommended translaryngeal intubation for an anticipated need of up to 10 days and a tracheostomy if an artificial airway for more than 21 days is anticipated. However this decision should be individualized. The aim of this study is to analyse the indications and timing PCT in our ICU patients, and ICU and Hospital survival.

METHODS. We conducted a retrospective study, analysing 37 patients submitted to PCT, in 28 months: since the technique was implemented in our ICU in December 2004, until March 2007. We reviewed their age, gender, APACHE II score, length of ICU stay, ventilation time before and after PCT, ICU and Hospital survival. Patients were stratified in 2 groups, based on the indication for the PCT: prolonged mechanical ventilation (N=19) and airway protection in comatose patients (N=18). Data was treated in SPSS programme, using the Mann Whitney test.

RESULTS. The results presented are in mean values.

TABLE 1.

	ICU stay days	Ventilat. days prior PCT	Ventilat. days after PCT	Hospital days after ICU	ICU survival	Hospital survival
Prolonged mech vent N=19	28,21	19,23	9,12	21,27	94,7%	44,4%
Airway protect comat pts N=18	14,47	9,64	2,07	11,38	83%	13%

CONCLUSION. 1)The indications for PCT in our ICU were prolonged mechanical ventilation (N=19) and airway protection in comatose patients (N=18), a reduced sample size to analyse. 2)There was no significant difference in age (64 years), gender, APACHE II (15,4) and SAPS II (34,7) scores. 3)Comatose patients submitted to PCT for airway protection had less ventilation days prior (9,64 vs 19,23 p=0,0051) and after (2,07 vs 9,12 p=0,0399) tracheostomy. Their length in ICU was shorter (14,47 vs 28,21 p=0,0002). They had a lower hospital survival rate (13% vs 44,4% P=0,0297), although there was no significant difference in ICU survival. 4)94,7% of patients submitted to PCT due to prolonged mechanical ventilation were discharged alive from our ICU, but only 44,4% were discharged alive from Hospital. Recent literature suggests that early PCT (in 5-10 days) could have had an influence on this high mortality hospital rate. 5)Overall ICU survival rate is 89%, but hospital survival is only 30% - a high mortality rate is seen after discharge from ICU, in Hospital wards.

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0603

INTRODUCING COMPETENCE MANAGEMENT ON A HIGH CARE UNIT: EXPERIENCES AND RESULTS

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INTRODUCTION. The VU University Medical Centre (VUmc) has chosen to integrate Competence Management (CM) within the Human Resource structure. Functioning as an health care professional is not only about performing medical or nursing interventions. CM explicates not only knowledge and skills, but also attitude. CM contributes in developing abilities to cope with complex medical and nursing situations. CM is about managing professional behavior for reaching personal and organizational objectives. CM also contributes to an organization wide understanding of achieving the mission statement objectives.

METHODS. After introducing CM to the High Care (HC) nursing staff, the set of (chosen) competences was integrated within the unit's mission statement (September 2005). During team sessions competences were described to fit into the daily organizational and professional practice (October 2005). Personalizing CM is performed during an (competence based) assessment (December 2005). Strengths and weaknesses are determined. Personal objectives are integrated within a defined educational and development structure guided by the clinical supervisor educator.

RESULTS. Although CM is relatively new in our organization and the return on investment is hard to determine, some results are clear. With CM observable behaviors were defined and thereby manageable, next to the set of nursing skills definitions (already defined as part of the primary training course and daily practice). Increased employee responsibilities led to 75% more (non mandatory) training course attendance. During 2005 the HC nurse attended 9 full training course hours. In 2006 the training course attendance increased to 16 full hours for each HC nurse. With CM the relation between organizational and individual performance objectives is more clear. A Prismant survey proclaimed decreasing sickness absence when CM is implemented. This result was confirmed on our ward. Sickness absence decreased from > 10% to < 4%. Because most of the personal development targets were easy to combine, the educational/training course budget was not exceeded. CM provides more different development levels, thereby individual talents are easier to discriminate. The employee satisfaction with CM is growing.

CONCLUSION. CM was successfully implemented on our HC unit within a 4 month period. Starting with a manageable package of competences the rollout strategy was easy to cope with for the HC supervisor and nursing staff. There are a few conditions the organization has to facilitate. CM must be integrated in the organization mission statement and adopted by hospital management. Nursing supervising staff, including the clinical supervisor educator, must be capable to apply and practice CM. Span of control and educational/training budgets must be fitted for applying CM. CM is a well manageable and applicable tool to increase and improve nursing outcomes.

0604

CHANGING ATTITUDES OF DOCTORS IN TRAINING TO "BREAKING BAD NEWS"

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INTRODUCTION. "Breaking bad news" (BBN) is an essential part of intensive care medicine. The manner in which "bad news" is imparted, influences patients and relatives coping strategies and their perception of quality of care (1, 2). BBN has become more prominent in medical training in Australia and the UK over the last 7 years.

METHODS. In 1998, 90 doctors in training in ICM and other specialties in Mersyside hospitals, UK filled in questionnaires with statements related to BBN to a virtual terminally ill conscious cancer patient. They were asked to disagree/agree with these statements on an ordinal scale from 0 – 5 (0: total disagreement, 5: total agreement). 6 statements related to the doctors perception of his/her competence, training, liking, satisfaction and depression when BBN, 3 statements related to the role of relatives when BBN and 5 statements concerned patients expectations as presumed by the trainee. In 2006, 54 trainees at the Royal Darwin Hospital in Australia filled in the same questionnaire.

RESULTS. In the '98 cohort, 51% of trainees felt depressed after BBN (3-5 on answer scale). These trainees were less likely (p<0.01 Whitney Mann) to: Feel competent to BBN, feel satisfied after BBN or like BBN. They were significantly more likely: To prefer someone senior to BBN, to disclose the prognosis to the patients relatives rather than to the patient, and to believe, that patients are not able to understand their disease.
Fewer trainees in the 2006 cohort felt depressed after BBN (44%). None of the dispositions associated with feelings of depression found in the 98' cohort were detected in the 2006 cohort. Trainees in the 2006 cohort stated to have received better training in BBN (p<0.02, Whitney-Mann) than those in the cohort from '98. There was a non-significant trend among all trainees in the 2006 cohort: To feel more satisfied after BBN (median 2 in '98, 3 in 2006) and fewer felt someone more senior should BBN (median 2 in '98, 3 in 2006). In neither cohort were any differences detected between ICM and other trainees.

CONCLUSION. In 2006, fewer trainees felt depressed after BBN and trainees felt to have received better training in BBN. Among trainees, who had feelings of depression, those were not associated with feelings of incompetence, dissatisfaction or the tendency to speak to relatives rather than the patient. We think that this change is due to improved training in BBN introduced over the last 7 years in Australia and the UK.

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0605

OUTCOME OF CRITICALLY ILL ELDERLY PATIENTS IN A MEDICAL ICU

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INTRODUCTION. Admission of older patients to Intensive care units is a controversial issue. The outcome of elderly patients with critical illness in India has not been previously studied.

METHODS. Retrospective chart review of males > 65 years & female > 60 years from May 2006 till November 2006. Data collected included age, gender, disease category, comorbidities, Mechanical Ventilation days, Length of stay in ICU and hospital, APACHE II, SOFA, premorbid functional state and mortality.

RESULTS. In 398 admissions to MICU, 55 were critically ill elderly [26 (47.3%) males, 29 (52.7%) females]. Premorbid functional state assessment showed: independent (49.1%), partially dependent (29.1%) and wholly dependent (21.8%). At admission, organ involvement was Respiratory [26 (47.3%)], Renal [13 (23.6%)], Neurology 7(12.7%), Metabolic 5 (9.1%) and Cardiac 4 (7.3%). Mean APACHE II and SOFA scores were 17.58 + 8.33 (median 18). and 1.89 + 2.31 (median 1.00) respectively. Mean Length of stay (LOS) in ICU was 7.26 days + 10.04 and 10.19 days + 10.28 in hospital. Mean ICU stay was 6.68 + 10.66 & in hospital was 10.63 + 10.62 in 60 – 75 year age group, vs 8.71 + 9.37 and 10.82 + 10.21 in the over 75 group [0.18]. Total Mechanical ventilation days were 187 (range 1 – 58). 11 died (20%) of which [7 / 34 (20 %)] were in 65 - 75 yrs and 3 / 19 (15.8%) in > 75 yrs [NS]. Decisions to limit life support were taken in 10/11 cases (90.9%), DNR in 3 (30%) and withholding in 7 (70%). APACHE score > 20 correlated with mortality (10 deaths in score>20; 1 death in score < 20 (chi square test 0.000). There was no correlation between premorbid functional status and mortality.

CONCLUSION. Respiratory involvement was the predominant cause of admission. The hospital mortality for the elderly was only 20%. APACHE II score correlated with mortality. The sample size was too small to detect any significant differences between age groups in terms of LOS and MV days. 91% of the deaths were preceded by EOL decisions.

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0606

ABDOMINAL COMPARTMENT SYNDROME IN THE MICU; A PRELIMINARY REPORT

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INTRODUCTION. The phenomenon of increased intra-abdominal pressure and the resultant physiologic compromise were first described in the late 1800s. ACS has been defined as the cardiovascular, pulmonary, renal, splanchic, abdominal wall and intracranial disturbances resulting from elevated IAP. Korn and associates first used the term ACS in 1980. Malbrain et al found during one day point prevalence study in 13 ICUs had 8.2% of patients has ACS.

METHODS. Intra Abdominal Pressure (IAP) was measured in 49 consecutive patients (age range 17-93; 32 males: 17 females) who were admitted to the MICU with diverse clinical problems. IAP was routinely measured using the Transurethral measurement of Urinary bladder pressure using a Foley's catheter.

RESULTS. Abdominal Compartment Syndrome (defined as > 25 cm H2O) was found in 15 patients (age range 28-82, 10 males; 5 females). Of these 15patients 12 had Primary ACS, 3 had Secondary and 4 had Recurrent ACS. The mean APACHE II score was 25 and SOFA score was 9.33 in the ACS group; the APACHE II score was 22.11 the SOFA score was 6.79 the group without ACS. (P value not Significant) Out of 15, 13 patient with ACS had a surgical intervention to reduce IAP (PD catheter in 3, decompressive celiotomy in 11). The indications for intervention were unexplained respiratory deterioration seen as in increase in plateau pressure or fiO2, fall in urine output despite adequate MAP and fluid resuscitation and IAP>25 cm of water. 5/15 in the intervention group died (33.33%). 2 patients in the raised IAP group managed conservatively with fluid restriction and diuretics. The mortality in the patients without ACS was 29.41%. In addition, increased IAP alone gave a clue to the need for surgical intervention in 4/12 patients; these would have otherwise been managed conservatively.

CONCLUSION. Our study suggests that routine IAP measurement of patients in the ICU is beneficial because of the presence of unsuspected ACS in a significant proportion of patients (40%) irrespective of the primary disease. ACS may cause renal, hemodynamic and respiratory compromise that can be improved by judicious and timely intervention. Further, raised IAP alone may sometimes give a clue to the need for a surgical intervention, which may beneficially affect the clinical course.

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0607

CHANGES IN AIRWAY AND TISSUE MECHANICS IN VENTILATED ACUTE LUNG INJURY (ALI) PATIENTS AFTER NEBULIZED BRONCHODILATOR AGENT

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INTRODUCTION. The low-frequency respiratory impedance (Zrs) has been shown to reflect the respective contributions of the airway and tissue mechanical properties accurately in healthy subjects. Little information is available, however, on the values of airway and tissue parameters derived from low-frequency Zrs data in ALI patients before and after bronchodilator therapy.

METHODS. Zrs was measured with small-amplitude forced oscillations between 0.4 and 6 Hz at three PEEP levels (3, 7 and 10 hPa) before and after nebulised Berodual in 12 mechanically ventilated patients including 7 with severe pneumonia and 5 with postoperative respiratory failure, without any previous pulmonary disease. Airway resistance (Raw) and inertance (Iaw), and constant-phase tissue damping (G) and elastance (H) were estimated from Zrs spectra by model fitting.

RESULTS. Raw decreased with PEEP, and on the administration of Berodual in both groups. In the postoperative patients, G decreased with PEEP, and G and H decreased following Berodual inhalation; this indicates that bronchodilation was accompanied by recruitment of previously closed regions of the lungs. There was no change in Iaw and hysteresivity (G/H), suggesting that the peripheral airway inhomogeneity was not markedly affected by the intervention. The decreases in Raw reflect the presence of reversibly elevated airway resistance in all patients. The decreasing G/H in the pneumonia patients after Berodual indicates improved homogeneity in the mechanical properties of the peripheral lung with consequent improvement in ventilation, although the changes did not reach the level of statistical significance.

TABLE 1

	Raw (hPa*s/l)	Rawi (hPa*s/l)	G (hPa/l)	Gi (hPa/l)	H (hPa/l)	Hi (hPa/l)	G/H	(G/H)i
Postoperative	5.0±1.4	3.3±1.2*	10.8±5.1	8.7±3.3*	31.4±13.1	25.9±10.1*	0.37±0.2	0.35±0.1
Pneumonia	2.1±1.1	1.6±1*	5.3±3.5	5.1±3.5	25.7±8.4	26.4±10	0.24±0.17	0.20±0.11

**p<0.05 by Wilcoxon signed rank test, i = after inhalation; values: mean±SD*

CONCLUSION. Berodual inhalation results in improved tissue properties of the respiratory system, i.e. decreases in elastance and tissue damping, which is associated with the bronchodilator effect. Overall, the low-frequency oscillation technique proves to be an informative and accurate method for bedside monitoring of critically ill patients.

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0608

DIALYSIS DISEQUILIBRIUM SYNDROME – REPORT OF 2 CASES

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INTRODUCTION. Dialysis disequilibrium syndrome (DDS) is a central nervous system disorder occurring in pts (pt), either during or within 24 hours of dialysis. DDS is unknown in pt who are on dialysis for some time and no case had been reported in ventilated pts.

METHODS. Report of 2 cases of fatal DDS in ventilated pts with acute renal failure (ARF) on haemodialysis (HD) for more than a week.

RESULTS. Case 1: A 31 year old male pt victim of motor vehicle accident, spleenic and bowel injury. CT head normal, GCS 15/15. He underwent spleenectomy, Hartman's procedure and abdominal packing. Post-op, he was in DIC and haemorrhagic shock. He remained hypotensive, adrenaline and noradrenaline were started. Pt was oliguric and developed ARF on day 4, daily HD was started over 4 hours, normal bath and heparin free. On day 7, pt was trying to obey commands. On day 8, pt developed sepsis and meropenem was started. On day 16, pt underwent HD, became unresponsive after 1 hour and pupils fixed-dilated. CT brain showed severe oedema and herniation. EEG was flat and brain stem reflexes absent. Diagnosed as brain dead on day 18 and expired same evening. Case 2: A 32 year old male pt fell from height, on arrival GCS was 15/15. He had severe chest trauma and liver laceration,underwent laprotomy, haemostasis and packing of abdominal cavity. On day 3, pt developed ARF, started on slow HD (3-4 hours), low sodium, potassium and heparin free. CT brain on day 6 was normal. On day 9 pt developed septic shock, started vancomycin and ciprofloxacin. Pt required noradrenaline. On day 11, during HD (increased potassium, heparin free), pt developed hypotension, pupils became dilated and fixed. HD was stopped, mannitol was given and pt was hyperventilated. CT brain showed severe oedema and herniation of brain. Brain stem functions were absent. EEG was flat and heart stopped after 6 hours.

TABLE 1.

Serum electrolyte (mmol/L)	Case 1 Pre-DDS	Case 1 Post-DDS	Case 2 Pre-DDS	Case 2 Post-DDS
BUN	16.9	9.6	23.2	-
Creatinine	483	289	590	-
Total bilirubin	254	247	834	-
Sodium	143	142	146	-
Potassium	6.1	4.3	4.2	-
Bicarbonate	27	26	21	-
Osmolarity (mosm/kg)	294	292	311	-

CONCLUSION. 1. In pt on HD, developing severe sepsis or septic shock, DDS can occur after repeated sessions of HD. 2. The acute care physician, intensivist and nephrologists should be aware of the risk of DDS, when pts on regular HD develop septic shock or severe sepsis. 3. To our knowledge, these are the first 2 cases of DDS occurring after more then 1 week of HD.

Poster Sessions
Infection and immunomodulation 0609-0622

0609

PHARMACOLOGICAL INDUCED SLEEP DEPRIVATION DOES NOT CAUSE IMMUNOPARESIS

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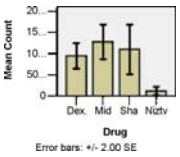
INTRODUCTION. In Vivo studies of propofol, midazolam [1] and dexmedetomidine[2] have shown immune modulatory effects. The alpha 2 agonist dexmedetomidine produces sedation more analogous to NREM sleep compared to traditional agents[3]. Obstructive sleep apnoea and depression are known to alter both sleep architecture and immune function. We postulated that immune modulation could be produced by pharmacologically altered sleep pathways.

METHODS. 15 PVG Hooded Lister rats (Harlan)were randomly allocated to midazolam, dexmedetomidine or sham infusions. All animals were instrumented with implanted telemetry 1 week, and jugular lines 1 day prior to the infusions. Infusion rates were targeted to maintain deep sedation, 5mg/kg/hr for midazolam and 0.5–1mcg/kg/min for dexmedetomidine. Infusions were commenced at 8am, and continued for 12hrs during the sleep phase, and recommenced 12 hours later for a further 12hrs. Animals were then given 1mg/kg ultrapure e.coli LPS at 8am the following day. Blood was taken every 90 mins for FACS and cytokine analysis. At 450mins post LPS animals were sacrificed and their brains and lungs harvested. Lungs were macerated and the samples were stained for OX42 and CD11b and analysed by FACS.

RESULTS. There was no statistical significance difference between the groups at any time points for serum TNF,IL-6,IL-10, CRP, total blood PMN and monocytes, platelet-leukocyte aggregates. There was a non-significant trend to lower monocyte/neutrophil margination into the lung bed in the dexmedetomidine group.



CONCLUSION. In this underpowered study pharmacological manipulation of sleep does not produce immunoparesis in a rat model of ICU sedation and sub-lethal endotoxaemia. From these data 25 animals in each group would be required to detect a true difference.

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0610

CRITICALLY ILL CARE AND GUT MICROBIOTA

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INTRODUCTION. Gut microbiota is a stable community with high biodiversity index and plays a key role in maintenance of health status. Several factors of gut ecology alteration occur during the critical patients(pts) care:luminal hypoxia/hypercarbia, gastric-secretions inhibitors, vasoactive, sedation, nutrient/fiber scarcity, antibiotics, sepsis/injury, digestive surgery. Ecological balance disruption of gut microbial community often results in reduced protection against pathogens,including opportunistic ones. We studied faecal microbiota changes in critical pts during ICU stay.

METHODS. Consecutive pts expected to need mechanical ventilation (MV) for>4 days were enrolled. Exclusion criteria: hospital stay and/or antibiotic treatment before ICU admission, opportunistic/autoimmune diseases, cancer/steroid therapy. Faeces were collected at ICU admission(T0) then weekly(T1,T2,T3). Pts were excluded if T0 or T1 samples could not be harvested. Total bacterial DNA pattern analysis was performed by Denaturing Gradient Gel Electrophoresis (DGGE). The % of similarity between the T0-DGGE profile and the following ones in each pt was used as index of microbiota modification. A similarity value > median at T1 versus T0 was defined as index of microbiota biodiversity preservation. New dominant DNA bands were analyzed to identify bacteria species.

RESULTS. 15pts (2peritonitis, 10lung infections, cellulitis, meningitis, trauma) were enrolled. 8 pts (6 alive) were discharged before T2, 3pts (2 alive) before T3, and 2pts (1 alive) after T3. SAPS2/SOFA ranges were 23-68/3-14. Median ICU-LOS was 12 days [IQR=7]. All received MV for 11 [IQR=9] days, sedation, antibiotics, enteral nutrition from the 2nd day, 13pts had insulin, 6pts vasoactives. T0-DGGE profile was normal for all. % similarity between T0 and T1-DGGE profiles was 62.06±27.11, median 68%. 8pts had banding profile similarity > median value. In 8pts (not the same) a very intense band of Enterococcus spp. appeared in T1-DGGE patterns. The T2-DGGE profiles similarity vs T0 (7pts) was 41.1±16.6%. The deep Enterococcus band was still present in 4 pts, appeared in one, and 2pts remained not affected. The 7pts with "modified DGGE profile" at T1 had higher SOFA (5.4±2.6 vs 2.6±2.2, p=0.023) and higher ICU mortality (4 out of 7 vs 0 out 8, p=0.026). The % of DGGE profiles similarity (variation of faecal flora) found at T1 is quantified by: 139.9 - 3.8 SOFA(T1) – 8.8 MV days(T0 to T1) R2=0.60, p=0.007. Determinants of Enterococcus appearance during the whole ICU stay were:
a) the % of DGGE profiles similarity vs T0 < 68% (p=0.006),
b) clindamycin treatment (p=0.006).

CONCLUSION. Our findings underline:
a) the negative impact of even a single week of critical illness on the maintenance of gut ecosystem and its influence on clinical outcome,
b) the specific risk of clindamycin treatment for Enterococcus overgrowth.

0611

RECOMBINANT FACTOR VII (ACTIVATED) FOR HAEMORRHAGIC COMPLICATIONS OF SEVERE SEPSIS TREATED WITH RECOMBINANT PROTEIN C (ACTIVATED)

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INTRODUCTION. Drotrecogin alfa (DA) remains the only approved drug for the specific treatment of severe sepsis. The most dangerous of the drug's adverse effects is an increased risk of serious haemorrhage including intracranial bleeds. The aim of this study is clinical evaluation of safety and efficacy of rFVIIa, as a rescue haemostatic therapy in patients with severe bleeding treated with DA.

METHODS. rFVIIa was used in 5 adult patients aged between 41-54 (mean 45±9) years average BMI 25.48±4.02 underwent massive perioperative haemorrhage. All patients were admitted to ICU with the diagnosis of sepsis or severe sepsis. All septic patients has been received DA therapy within 4-6 hrs of ICU admission. The following diseases were diagnosed: post abdominal surgery bleeding (severe sepsis after surgery: laparoscopic cholecystecomy, laparotomy due to peritonitis) – 1 pts, gastrointestinal bleeding (severe sepsis in acute pancreatitis) – 1 pts, postpartum bleeding (septic shock in the course pyelonephritis and right hydronephrosis) – 1pts, intracranial bleeding (septic shock in pregnancy) -1 pts. We used the questioners of Novo Nordisk to asses the indications and effectiveness of treatment. We compared haemoglobin level, haematocrit, number of platelets and laboratory coagulation profile parameters before treatment, 2 hours and 12 hours after treatment. The dosage of rFVIIa was 52.33±25.75μg/kg.

RESULTS. Patients received DA for a mean duration of 78.8+29.8 hours (range 25-96 hours). Indications for administration of the rFVIIa were considered when there was a postsurgical bleeding (exceeding 500mL/h) in absence of surgical sources of the bleeding and lack of efficacy of the conventional haemostatic procedures. All patients achieved significant reduction in blood loss. The mean blood loss via abdominal drains 6 hrs before and 2 hrs after NovoSeven administration were 741 mls/hours vs. 157 ml/hrs. On average 5.3 units/patient of packed red blood cells, 2 pools/patient of platelets, 20 ml/kg/patient of FFP and 150 mls/patient of cryoprecipitate were used prior to NovoSeven administration. 3 patients required further blood transfusion with a mean of 2.1 units/patient over the next 12 hrs. 2 patients who didn't benefit from initial rFVIIa administration recived additional drug in dose 48.35μg/kg with good results. One patient developed thromboembolic complications and died after completing 96 hours of DA therapy to intracranial haemorrhage.

CONCLUSION. Our results have shown that combined treatment DA and NovoSeven is safety and effective as a rescue haemostatic therapy in patients with uncontrolled bleeding. Despite its high cost, there is an advantage in terms of effectiveness to support its use.

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GRANT ACKNOWLEDGEMENT. grazyna

0612

IMMODIN® IN REVERSAL OF IMMUNOPARALYSIS IN CRITICALLY ILL PATIENTS

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INTRODUCTION. The aim of the study was to evaluate the potential of immunoregulatory product Immodin® (Sevapharma, CZ) to reverse immunoparalysis in critically ill.

METHODS. Randomized, double blind clinical trial was designed. ICU patients in whom immunoparalysis (CD14+HLA-DR+ < 40%) was measured during ICU stay were randomized to either 5 days Immodin (I; 1 amp s.c. daily) or placebo (P; saline).

RESULTS. Forty five (25 I and 20 P) out of 179 patients monitored were enrolled (M/F 29/16; age 60 (54;65). No difference was found in ICU mortality [I - 23 survived (S) and P - 15 S; p=0.21]), ICU stay [I - 11.6 days (8.2;14.9) and P 12.6 days (9.1;16.1); p=0,659] and nosocomial infections (I - 4/25 and P 4/20 patients; p=0.78). During the 5 days of active treatment no difference was also found in the course of SOFA score (p=0.95), SIRS days (p=0.61) and sepsis/severe sepsis (p=0.45 and 0.25, respectively).
Immunologic and biochemical parameters also did not differ (CD14+HLADR+ - p=0.46, TN-Falpha production of the whole blood - p=0.80, IL-6 - p=0.34; IL-10 - p=0.27; CRP - p=0.67, PCT - p=0.71).

CONCLUSION. The effect of 5 days treatment of immunoparalysis with Immodin® in critically ill is similar to placebo.

GRANT ACKNOWLEDGEMENT. Supported by grant IGA MZCR; NR 7777-3

0613

PROLONGED IV MAGNESIUM THERAPY FOR SEVERE TETANUS IN THE ICU: A REPORT OF THREE CASES

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INTRODUCTION. Tetanus is rare in developed countries, but can result in life-threatening complications, including respiratory failure due to generalized muscle spasm. Magnesium (Mg) infusion has been reported as treatment for spasticity in tetanus, and its effectiveness is supported by case series(1,2) and a recent RCT from Vietnam(3). We present three tetanus patients (pts) who required prolonged mechanical ventilation, received intravenous (IV) Mg for up to 26 days (significantly longer compared to previous reports) and had good outcome after a long ICU stay.

METHODS. Three men with tetanus were admitted to a general 12 bed ICU in 2005 and 2006 for respiratory failure due to generalized spasticity. ICU care included antibiotics, hydration, enteral nutrition, diuresis, early tracheostomy and mechanical ventilation. Continuous IV Mg infusion (2 gm/hour, no loading dose) started immediately after ICU admission and was adjusted as needed to control spasticity. Plasma Mg levels were measured twice a day and remained in a narrow range (3-4 mmol/L).

RESULTS. Demographic, treatment and outcome data are presented in Table 1. Mg therapy controlled spasticity without need for additional muscle relaxants. We did not observe hemodynamic instability, arrhythmias or other complications related to Mg therapy, which continued for 26 days in two cases. All pts improved and left the ICU in stable condition.

TABLE 1.

Demographic, treatment and outcome data

Case	Age	PMH	Mg Dose	Mg Therapy	MV	ICU stay	Outcome
A	77	HTN, Tob	277 gm	7 d	14 d	22 d	Good
B	50	IVDA, Tob	337 gm	26 d	22 d	30 d	Good
C	30	IVDA,Tob,HCV	758 gm	26 d	28 d	32 d	Good

MV = Mechanical Ventilation, IVDA = IV Drug Abuse, Tob = Tobacco, HCV = Hepatitis C

CONCLUSION. Continuous IV Mg infusion is effective for spasticity due to tetanus. Compared to previous reports, our case series contributes meaningful additional data, as Mg therapy was applied effectively for up to 26 days without major toxicity, and all pts had good outcome. IV Mg therapy has been proposed as first-line treatment for tetanus(2), but the optimal dose and maximum duration of therapy are unknown. We believe that IV Mg is a promising treatment option but, until more data are available, it should be reserved for carefully selected tetanus cases.

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0614

MARKERS OF QUALITY FOR THE USE OF ANTIMICROBIALS IN CRITICALLY ILL PATIENTS

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INTRODUCTION. OBJETIVE: To determine reference values of different markers of quality for the use of antimicrobials (AMC) in critically ill patients.

METHODS. Observational, prospective, multicenter study in which patients admitted to the ICU during the periods of the ENVIN study for the years 2005 and 2006 were included. The following rates as markers of quality were defined: 1) rate of AMC use, 2) rate of directed treatments, 3) overall rate of changes in the AMC used for therapy, 4) rate of AMC change due to inappropriate treatment, 5) rate of AMC change due to adjustment of treatment or de-escalating therapy, 6) rates of use of selective digestive decontamination (SDD), and 7) duration of prophylaxis of cefazolin, amoxicillin-clavulanate, and cefuroxime. Data of all variables in 2005 and 2006 are compared.

RESULTS. Of a total of 20,430 patients, 11,799 (57.8%) received 25,770 antimicrobials. For the years 2005 and 2006, indicators of quality of AMC use were:1)No. days of AMC use /no. days of ICU stay x 100: 109.0 and 109.4. 2)No. directed AMC treatments/ no. AMC used for treatment x 100: 24.33 and 24.11. 3)No. AMC changed /no. AMC used for treatment. x 100: 23.4 and 24.6. 4)No. AMC changed for inappropriateness/no. total empirical AMC x 100: 24.0 and 22.6. 5)No. AMC changed for adjustment or de-escalating/no. total empirical AMC x 100: 20.9 and 25.1. 6)No. patients with SDD / no. patients with mechanical ventilation x 100: 3.2 and 5.0. 7)No. of SDD-days/no. days on mechanical ventilation x 100: 4.4 and 6.6. 8)Days of use of antibiotic prophylaxis (mean: Cefazolin, 2.32 and 2.39; Amoxicilline-clavulanate,4.3 and 4.4;Cefuroxime, 2.5 and 2.8.

CONCLUSION. High rate of use of antimicrobials in the ICU. Twenty-five percent of antimicrobial agents were used as directed therapies and in 25% of cases, antimicrobials were changed. Changes for inappropriate treatment decreased, whereas changes for adjustment of treatment increased. There was an increase in the use of SDD. Duration of prophylaxis with antimicrobials was is longer than the length of days prescribed.

GRANT ACKNOWLEDGEMENT. Grant of Sanofi-Aventis

0615

1,3 BETA-D-GLUCAN IN CRITICALLY ILL PATIENTS

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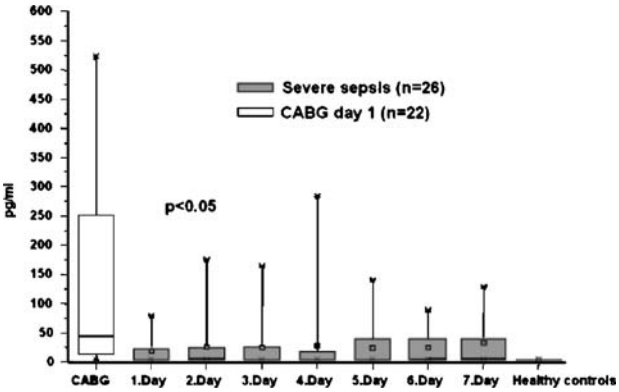
INTRODUCTION. The saccharide 1,3-beta-D-glucan (BG)is a main component of the fungal cell wall. Markedly elevated serum levels of beta-D-glucan were found in patients with systemic fungal infections [1,2]. Our goal was to evaluate this marker in critically ill patients with severe sepsis and SIRS.

METHODS. 26 patients with severe sepsis and 22 patients after coronary artery bypass grafting (CABG) have been included in this pilot study. Plasma samples have been collected daily in the sepsis group or on day 1 after surgery in the CABG-group. BG was measured with the turbidometric assay (Wako Pure Chemical Ind.) with a cut-off of 11 pg/ml.

RESULTS. BG levels were elevated after uncomplicated CABG and differed to the sepsis group. Median concentrations were in the normal range in sepsis patients but fraction of elevated beta-glucan levels tend to increase with length of stay and were higher in nonsurvivors.



CONCLUSION. This first observational study demonstrated consistent results of higher BG levels in different populations of critically ill patients. While bacterial translocation has been suspected as reason for SIRS after CABG, this has never been associated with fungemia. This finding and higher BG levels in nonsurvivors with sepsis warrants further research.

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GRANT ACKNOWLEDGEMENT. The study was supported by Wako Pure Chemical Industries, Osaka, Japan

0616

CANDIDEMIA IN THE CRITICALLY ILL: AN ECONOMIC ANALYSIS OF DAILY ANTIMICROBIAL THERAPY RELATED COSTS

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INTRODUCTION. Over the last decades, pathogens causing nosocomial bloodstream infection (BSI) have changed considerably. As such, candidemia has become a significant problem throughout the healthcare system. Costs related to nosocomial candidemia are mostly caused by prolonged hospitalization, associated with an increased use of resources including healthcare personnel, diagnostic, and therapeutic procedures. Regarding the financial impact of the latter, yet little data are available. The objective of this study was to evaluate the daily cost of antifungal therapy in the critically ill with candidemia.

METHODS. All adult patients with a microbiologic documented nosocomial candidemia admitted to the ICU between 1 January 2003 and 31 December 2006 were enrolled. For patients who developed more than one episode of candidemia, only the first episode was considered. Daily cost per infected patient was calculated taking into account box prices (based on the 2007 prices provided by the hospital pharmacy) multiplied by the number of prescribed doses.

RESULTS. During the four year study period, 495 episodes of nosocomial BSI were observed. Of these, 60 were caused by Candida spp., diagnosed in 38 patients. Mean overall daily antifungal cost was €208.02. This was the most expensive for candidemia with unknown focus (€274.04), followed by candidemia with catheter-related (€183.79), and abdominal (€115.56) focus of infection. Compared to Candida albicans (n=24), candidemia caused by Candida non-albicans (n=14) was more costly to treat, €353.34 vs. €123.25, however, this difference was not statistically significant. The daily antimicrobial cost per patient infected with fluconazole-resistant candidemia was about ten times more as compared to those infected with by fluconazole-susceptible strains (€879.12 vs. €82.19, P=0.001). Of all antifungal agents, fluconazole was prescribed the most frequently. Caspofungin (prescribed eight times) accounted for the highest overall cost (€4.265.84, respectively).

CONCLUSION. Our findings underscore the burden of candidemia in terms of daily antimicrobial costs. Prevention through evidence-based recommendations may reduce candidemia-related hospital costs.

0617

ABDOMINAL SEPSIS AND INTRA-ABDOMINAL FLORA

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INTRODUCTION. In intra-abdominal infection resulting from a perforated digestive tract, many different micro-organisms can be cultured from abdominal fluid. We evaluated a cohort of patients with abdominal sepsis admitted to the intensive care to obtain more insight in the type of micro-organisms involved and the efficacy of treatment.

METHODS. A 5-year prospective observational cohort study was performed. Included were patients with abdominal sepsis defined as a perforation of the digestive tract and admission to the ICU. Results of cultures from abdominal fluid were obtained from the microbiology lab database. The treatment protocol was cefotaxim (qid 1 gr), ciprofloxacin (bid 400 mg), metronidazole (tid 500 mg) and amphotericin B (0.5 mg/kg/day by continuous infusion). This combination of antibiotics was continued for at least four days. The treatment was then tailored according to the microbiological results. Selective decontamination of the digestive tract (SDD) was administered to prevent secondary endogenous infections.

RESULTS. Cultures from abdominal fluid were taken in 221 patients with abdominal sepsis. In 52.9% aerobe Gram-negative bacteria (AGNB) were found in abdominal fluid at the time of operation, 45% were E. coli; in 36% of patients more than one AGNB was found. Incidence of AGNB was highest in colorectal perforations (68.6%) and perforated appendicitis (77.8%) and lowest in gastric perforations (12.5%). Gram-positive bacteria were cultured in 42.5% of patients and most frequently in rectal perforations (69.2%). Enterococci en streptococci were the most common Gram-positive bacteria. Candida was found in 19.9% of patients, 59.1% was Candida albicans. In gastroduodenal perforations the incidence of Candida was 41.0% whereas the incidence was 11.8% in colorectal perforation. In 38.5% anaerobic bacteria were cultured. In 77.8% of patients with perforated appendicitis anaerobic bacteria were cultured. Over time, the prevalence of AGNB in abdominal fluid decreased from 117 patients (52.9%) in the first culture to 1 patient (6.7%) in week 4 (efficacy 87%). The prevalence of Gram-positive bacteria increased from 42.5% to 86.7% in 4 weeks time.

CONCLUSION. The intra-abdominal flora found in critically ill patients with abdominal sepsis varies depending on the location of the perforation. The efficacy of combined surgical and antibiotic treatment was 87% in 4 weeks for AGNB. However, the absence of treatment for Enterococci and coagulase negative Staphylococci resulted in an increasing prevalence over time. The high prevalence of (non-albicans) Candida may imply routine antifungal treatment in case of gastroduodenal perforation.

0618

CHANGES OF THE CONSUMPTION OF ANTIMICROBIALS IN THE SPANISH ICU. TRENDS IN THE 2003-2006 PERIOD

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INTRODUCTION. OBJECTIVE: To describe changes in the consumption of antimicrobials in patients admitted to the spanish ICU over the past 4 years.

METHODS. A prospective, observational and multicenter study in which an analysis was made of antimicrobials used in patients admitted to the spanish ICU during the time periods of the ENVIN study. The present report includes data for the years 2003 to 2006. Reasons for the use of antimicrobials included community-acquired infection, extra-ICU nosocomial infection, and as a prophylactic measure. Empirical or directed treatments were also differentiated. The antimicrobial drugs most frequently used for each indication as well as the mode of therapy are described. Rate of antimicrobial use is expressed as percentage of patients in which one or more drugs were administered. Descriptive statistics are presented.

RESULTS. Of a total of 33,069 patients admitted to the ICU during the study period, 18,843 (57%) received 45,716 antimicrobials. Changes in the number of antimicrobials and rates of antibiotic use are shown in Table 1. Table 2 shows the distribution of antimicrobials according to reasons of prescription and modes of use Antimicrobial agents most frequently used in the 4-year study period were amoxicillin-clavulanic acid, piperacillin-tazobactam, cefazolin, and vancomycin. Data of the drugs most frequently used in each category are available.

TABLE 1.

	2003	2004	2005	2006
Patients included	6,074	6,565	8,969	11,461
Patients given AMC	3,446	3,598	5,270	6,529
Antimicrobials (no.)	7,334	7,702	11,656	14,114
AMC/patiens given AMC	2.13	2.14	2.21	2.16
Patients given AMC/ patiens included	0.57	0.55	0.59	0.57

TABLE 2.

	2003	2004	2005	2006
Community-acquired infections (%)* 0.001	22.9	23.8	23.9	24.7
Extra-ICU nosocomial infections (%)	17.7	19.5	19.4	19.5
Intra-ICU nosocomial infections (%)	27.2	27.1	29.6	28.0
Prophylaxis (%)* * p<0,001	31.1	27.9	26.9	26.3
Empirical treatment	75.5	73.6	75.3	75.3
Directed treatment	24,5	26.4	24.3	24.7

CONCLUSION. High use of antimicrobials in the ICU, decreasing the indications of antibiotics for prophylaxis (p<0.001) and increasing for community-acquired infections (p<0.001). No changes in the percentages of empirical and directed treatments.

GRANT ACKNOWLEDGEMENT. The study was supported by an grant from Sanofi-Aventis

0619

EPIDEMIOLOGY AND OUTCOME OF CANDIDA ALBICANS VERSUS NON-ALBICANS CANDIDEMIA IN ICU

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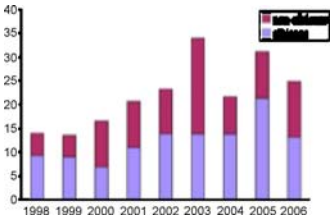
INTRODUCTION. Candidemia is a major cause of morbidity and mortality in modern ICUs. Candidemia rates and patterns in ICU appear to be changing over time. Non-albicans spp, especially C. tropicalis and C. glabrata may be associated with higher mortality (1). We describe the epidemiology and outcome of candidemia caused by Candida albicans and non-albicans spp.

METHODS. From 1998 to 2006, consecutive cases of candidemia in a general medical-surgical ICU were identified from the computerized microbiology database. APACHE II scores, demographic and clinical data were abstracted from clinical records. Antibiotic usage was retrieved from the pharmacy database.

RESULTS. 128 cases of candedemia were identified, giving an incidence of 22(95%CI 18-26) per 10000 patient-days. Candidemia rates (per 10000 patient days) increased, with non-albicans making up a greater proportion over time (fig.1). Antibiotic use did not change significantly over time. Non-albicans species made up 44% of isolates - C. Tropicalis (23.3%), C. Glabrata (12.4%), C. Parapsilosis (5%), C. Krusei (2.5%), C. Guillermondi (0.5%). Risk factors more commonly present in non-albicans species were: haematological neoplasm (P=0.02) and neutropenia (P=0.04). C. albicans was associated with diabetes (P=0.04) and male sex (P=0.01). Baseline APACHE II scores for non-albicans vs C. albicans (Median, IQR 24, 19-31 vs 26, 18-31) were similar, however patients with non-albicans had a higher ICU mortality (78% vs 62%, P=0.04), and a trend towards higher hospital mortality (86% vs 73%, P=0.1).



CONCLUSION. Despite stable antibiotic usage, candidemia rates are progressively increasing over time, with non-albicans making up a higher proportion of cases. Mortality rates were higher than generally reported, but may be partly related to the high baseline illness severity. The comparatively higher mortality of non-albicans candidemia may be related to the high incidence of C. tropicalis and C. glabrata, which made up >80% of non-albicans spp. Risk factors associated non-albicans were identified and could help guide early empiric therapy in this group.

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0620

DIABETES MELLITUS IS AN INDEPENDENT RISK FACTOR FOR BLOOD-STREAM INFECTIONS (BSI) IN CRITICALLY ILL PATIENTS

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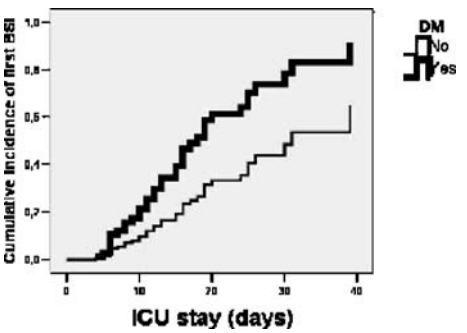
INTRODUCTION. Previous studies have investigated the role of diabetes mellitus(DM) as risk factor for infections. Tight glycemic control has recently been proved to reduce morbidity in ICU patients. The aim of our study was to assess the association of prior DM history with BSI in ICU patients.

METHODS. We prospectively studied medical patients admitted to a 7-bed general ICU, during a 40-month period. History of DM, age and APACHE II at admission were recorded. All patients were under tight glycemic control and were followed up for the development of BSI during ICU stay. Cox proportional hazards regression models were fitted for each consecutive BSI episode. Statistical significance was set at p<0.05.

RESULTS. One hundred twenty consecutive patients (72 males,48 females) were included in the study. Age (mean±SD) was 65.9±15.2 years, APACHE II was 19.7±6.3. Nineteen patients (15.8%) were diabetic. Nine out of 19 (47.4%) diabetic patients and 28 of the 101 (27.7%) non-diabetic developed 19 and 51 episodes of BSI,respectively (p=0.02). DM [hazard ratio(HR)=2.33,95% confidence interval(95%CI):1.07-5.07,p=0.034] and APACHE II [HR=1.08,95%CI:1.03-1.13,p=0.002] were independent predictors of the first BSI episode. ICU stay until median cumulative incidence for first BSI episode was 17.9 and 30.9 days for patients with and without DM, respectively(figure). ICU survival was not significantly influenced by DM nor by BSI episodes.



CONCLUSION. In our study, DM in ICU patients independently predicted the development of at least one BSI episode.

0621

THE INCIDENCE OF COMPLICATIONS OF CENTRAL VENOUS CATHETERS (CVC) AT AN INTENSIVE CARE UNIT (ICU)

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INTRODUCTION. Central venous catheters (CVCs) are widely used in critically ill patients throughout the world. They permit hemodynamic monitoring and allow reliable access for the administration of fluids,etc(1). CVC placement in the intensive care unit (ICU) is a common practice. Their use is associated with both mechanical and infectious complications.

METHODS. This was a retrospective review of all central venous catheter inserted over 4 year's period from October 2002 to December 2006.we studied the infectious and mechanical complication rates of percutaneously placed femoral and non-femoral central venous catheters in critically ill adult patients in retrospective manner in an adult medical, surgical, neuro-surgical ICU over 4 years period from October 2002 to December 2006, the monthly admission to this ICU is 45-50 and average APACHE II is 22 with mortality 17%. Data were collected as part of day-to-day ICU auditing system including APACHE II, Central lines were defined as subclavian, internal jugular, femoral lines. Mechanical complication was defined as a pneumothorax, hematoma, bleeding, line misplacement, or hemothorax and in fectious complications defined as tip colonization.

RESULTS. There were 12 mechanical complications and 128 infectious complications total of 1319 CVCs placed (Table 2). Total 1319 CVCs were inserted using Seldinger technique. Forty-two percent of the 1319 central venous catheters placed during this interval were femoral. Noninfectious complications were recognized 1.5 % of femoral catheters and 0.5 % of non-femoral catheters, out of 464 internal jugular catheters two hematoma were formed in the neck which did not required any intervention or blood transfusion and developed two pneumothorax during subclavian vein catheter insertion out of total 200 subclavian vein catheter inserted and both patient required chest tube, and 9 patients developed hematomas during femoral venous catheter insertion of total 597 femoral catheter inserted out of this 1 was fatal due to ilio-femoral deep vein thrombosis and 3 patients required blood transfusion and 5 patients required pressure bandage, (Table 2).

TABLE 2.

Procedures and complications data:

Total CVC	1319	complications	Organism %
IJV approach	464,234 tips for c/s	2 (0.43 %)	-
Subclavian approach	276,131 tips for c/s	2, (0.72 %)	-
Femoral approach	579,247 tips for c/s	9,(1.5 %)	-
Total Line infections	128, (9.7%)	-	-
IJV	20, (4.3 %)	sta.epi.50%,acinet.10	staph.aur.40%
Subclavian	28, (10.1%)	sta.epi.40%,kleb.11%	pseudo10%,E.coli 9%
Femoral	88, (15.1%)	sta.epi.34%,st.au 26%	kleb.9%,acinet 6%

IJV = internal jugular vein,C/s = culture and sensitivity,sta.epi. = Staph. epiderm

CONCLUSION. The CVCs mechanical complication rate in the ICU at this institution is 1.1% and infectious complications are 9.7%.

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0622

INCIDENCE AND CAUSATIVE ORGANISMS OF VENTILATOR-ASSOCIATED PNEUMONIA IN A SCOTTISH INTENSIVE CARE UNIT

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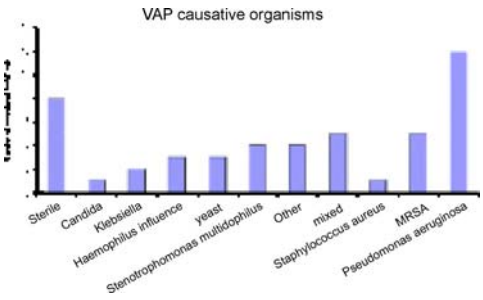
INTRODUCTION. The incidence of ventilator associated pneumonia (VAP) varies from 9 - 27%, or 16.9 / 1000 ventilator days in Europe (1, 2). Common causative organisms include Gram negative enteric bacilli such as Pseudomonas aeruginosa as well as Staphylococcus aureus (1). We prospectively studied the incidence and causative organisms over an eighteen month period.

METHODS. A dedicated surveillance nurse collected daily data from all patients remaining > 2 calendar days between 01/09/05 and 28/02/07. Patients meeting HELICS (Hospitals in Europe Links for Infection Control through Surveillance) criteria for VAP were noted; as were isolated organisms.

RESULTS. 395 patients were admitted for > 2 calendar days. 267 required invasive mechanical ventialtion. 46 patients developed VAP (17%, 18.2 / 1000 ventilator days). Figure one details microbiological results.



CONCLUSION. The incidence of VAP is comparable with rates reported in Europe. P.aeruginosa (n=12, 26%) and MRSA (n=5, 10%) were the most common organisms isolated.

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GRANT ACKNOWLEDGEMENT. This study has been conducted independently.

Poster Sessions
Evaluation of cardiac function I 0623-0636

0623

MYOCARDIAL SYSTOLIC DYSFUNCTION IN SIRS AND SEPSIS: AN ECHOCARDIOGRAPHIC STUDY

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INTRODUCTION. Although myocardial systolic dysfunction is common in sepsis/SIRS, its time course over longer periods in severely ill patients is not well investigated. The aim of this project is to investigate the time course of left ventricular (LV) systolic function over a period of 7 days in patients with severe sepsis/SIRS using transthoracic echocardiography (TTE), and to evaluate the adequacy of different TTE methods.

METHODS. 27 patients with severe sepsis/SIRS with circulatory failure despite adequate fluid resuscitation were included. TTE examinations were performed daily for a total of 7 days. LV systolic function was assessed by eyeballing ejection fraction (EB), Simpson's biplane method in the 4 chamber view, atrioventricular plane displacement (AVPD) with M-mode in the septal, lateral, anterior and inferior view, tissue velocity imaging (TVI) in the mitral annulus and stroke volume in the left ventricular outflow tract (SV-LVOT). Data were analysed for differences over time using ANOVA.

RESULTS. Systolic function was impaired and there were statistically significant changes with time in the measured parameters except TVI. Table 1. AVPD, EB, TVI, SV-LVOT and Simpson's were obtained in 89%, 86%, 73%, 65% and 42% respectively of all possible measurements.

TABLE 1.

Systolic parameters over 7 days

	EB	Simps	AVPD	TVI	SV-LVOT
Day 1	44±11	50±20	10 [7-13]	8[7-10]	56±15
Day 2	46±10	48±14	10[9-12]	9[7-12]	61±15
Day 3	45±9	49±14	10[8-14]	9[7-12]	60±13
Day 4	47±8	54±12	12[9-13]	11[8-13]	65±10
Day 5	48±8	51±11	11[9-13]	9[9-12]	62±12
Day 6	50±9	61±11	12[10-13]	10[9-13]	67±12
Day 7	52±6	62±14	13[10-14]	13[9-15]	66±9
p	0,001	0,001	0,001	ns	0,001

CONCLUSION. LV systolic function was impaired in this heterogeneous group of patients as expected[1]. All parameters improved significantly throughout the observation period reaching normal values by Day 4. Simpson's biplane method was difficult to perform due to poor imaging quality. The EB method was inconclusive in several patients due to hyperdynamic status. The fact that TVI was not significantly improved was unexpected and may be due to small sample size, wall filter settings and variations in sampling volume. The AVPD method was easy to obtain and seemed the most consistent marker of systolic function in this group of patients. The small sample size of this study precludes subgroup analysis however it would be relevant to study differences, eg. between survivors and non-survivors.

REFERENCE(S). 1. Poelaert J et al. LV systolic and diastolic function in septic shock. ICM 1997; 23:553-60

0624

REGRESSION OF LA AND LV DIMENSIONS AND IMPROVED FUNCTIONS FOLLOWING CARDIOVERSION OF AF. AN ECHOCARDIOGRAPHIC STUDY

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INTRODUCTION. In view of the adverse consequence of AF "chronic or paroxysmal" comprising hemodynamic deterioration, risk of thromboembolic complications, and the intolerable fast palpitation, etc., cardioverting AF to sinus rhythm seems an ideal goal. There had been some controversy concerning the effects of AF on atrial and ventricular dimensions as well as functions.

METHODS. The present work addresses the latter issue through trial of cardioverting 54 patients(27 females and 27 males) with a mean age of 53.55 years (range from 26 to 74 years). Underlying cardiac examination revealed rheumatic heart disease in 23 pts, hypertension in 18, ischemic heart disease in 7, and lone AF in 3 pts. Only one pt had cardiomyopathy and one pt had thyrotoxicosis. Prior to cardioversion, all pts were subjected to clinical evaluation, and transthoracic echocardiography (TTE). Transesophageal echocardiography (TEE) was done only in 5 cases with heparin or warfarin anticoagulation for at least 21 days. Standard M-Mode, cross sectional and pulsed Doppler echocardiography were obtained using Hewlett-Packard Sonos 100 echocardiograph. Echo parameters measured before cardioversion comprised left ventricular end diastolic diameter (LVEDD), left ventricular end systolic diameter (LVESD), fractional shortening (FS), and left atrial dimensions (length, diameter and volume by planimetry). Left atrial function after cardioversion was expressed as atrial ejection force (AEF) and Doppler A-wave, with AEF defined as the force that the atrium exerts to propel blood into the LV and expressed as AEF=0.5*Mitral orifice area*(Peak A velocity)2. Effective mechanical atrial function (EMAF) was defined as A-wave more 0.5 m/s. The presences of LA thrombus or spontaneous echo contrast (SEC) were studied by TTE or TEE. Measures were recorded 2 weeks after cardioversion to avoid LA stunning.

RESULTS. Restoring sinus rhythm in 42 pts (78%) resulted in significant reduction of LA length (5.1 versus 6.2cm, p<0.001), LA diameter (3.96 versus 4.11cm, p<0.0001), LA volume (50 versus 57cm3, p<0.0001). There was also significant recovery of atrial function found in all 42 pts successfully 0.5 m/s was found in 17/42 (40%) pts≥reverted to sinus rhythm. However, A-wave successfully cardioverted after 2 weeks and in 17/21 (81%) of pts in sinus rhythm after 3 months. On the other hand LV function showed compensatory changes from pre to post-cardioversion status i.e. LVEDD decreased from (5.33 versus 5.19, p0.0001), LVESD decreased from (3.67 versus 3.35, p0.0001), and FS increased from (33 versus 36%, p0.001.

CONCLUSION. In the view of echo parameters showing regression of cardiac dimensions following cardioversion, the argument of rate versus rhythm control in AF would favor maintaining sinus rhythm. Additionally, favorable effects lessening the chances of blood stasis and reduced potential for LA thrombosis are expected.

GRANT ACKNOWLEDGEMENT. Prof. Sherif Mokhtar

0625

MANAGEMENT OF ATRIAL FIBRILLATION IN INTENSIVE CARE: A SURVEY OF CURRENT PRACTICE IN GERMANY

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INTRODUCTION. A recent survey of practice regarding the management of new-onset atrial fibrillation (AF) in the ITU environment in the UK[1] demonstrated a lack of agreement in treatment of this common problem. A paucity of literature describing European practice stimulated a follow-up study to observe if there was any greater uniformity of approach in continental Europe, using Germany as the model.

METHODS. A questionnaire was sent to the lead clinicians of ITUs in Germany inviting them to describe their current practice for the management of new-onset AF. The questionnaire sought to establish the type of hospital and unit in which the intensivist practiced, whether there was a protocol in place for the management of AF, satisfaction with current management strategies, and opinions about the immediate goals of treatment. In addition, colleagues were asked to identify and rank their choice of medical treatment.

RESULTS. There were 79 responses, with 40 describing their units as mixed medical-surgical, 27 as medical, 9 surgical and 3 cardiothoracic. Thirty were teaching hospitals, 30 district hospitals, and the remainder specialist or unstated. Sixty-seven had no protocol for treatment of AF in ITU patients, but only 7 expressed dissatisfaction with their current approach. Those who did use a guideline cited the European Society of Cardiology guideline most commonly. For 36 reversion to sinus rhythm was the goal of treatment, whilst for 30 ventricular rate control was satisfactory. For hemodynamically unstable AF in the ITU, 50 considered electrical cardioversion to sinus rhythm to be optimal treatment, 9 would use medication with the aim of reversion to sinus rhythm, and for 11 ventricular rate control with medication was sufficient. When medication was thought appropriate, the ranked choice of drugs is given in the table (findings for UK practice are given in parentheses, and percentages are used for easier comparison).

TABLE 1.

Drug/Rank Choice	1st	2nd	3rd	4th
Amiodarone	43%(58%)	23%(30%)	15%(6%)	8%(2%)
Magnesium	4%(40%)	4%(22%)	6%(16%)	3%(3%)
Digoxin	6%(5%)	18%(29%)	13%(35%)	9%(15%)
eta blocker	37%(2%)	25%(11%)	9%(15%)	3%(25%)
CCB	10%(0)	10%(2%)	9%(5%)	6%(5%)
Flecainide	4%(0)	8%(1%)	3%(2%)	4%(3%)

CONCLUSION. The lack of a uniform approach to the management of new-onset atrial fibrillation in the ITU is common to both UK and Germany. However, both consider amiodarone to be the first choice drug, while β-blockers and calcium channel blockers feature more prominently in Germany. The use of magnesium appears to be far more emphasised in the UK. We suggest a pan-European consensus to manage this prevalent problem.

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0626

LEFT VENTRICULAR PACING. IS IT ENOUGH?

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INTRODUCTION. Recently cardiac resynchronization therapy (CRT) using biventricular pacing (BVP) emerged as a promising technique to treat heart failure (HF)patients (pts) refractory to drug therapy. Other arguments support the concept that left ventricular pacing (LVP) alone by reversing intra ventricular dyssynchrony may be sufficient to improve LV function and clinical status to the same extent as BVP. We compare the short term clinical & hemdoynamic variables obtained by LVP and BVP in pts with advanced HF.

METHODS. 27 pts (19 males & 8 females) with mean age of 51.19+11.1 yrs with severe HF & ventricular dyssynchrony as evidenced by QRS duration >150 ms & intraventricular mechanical delay (IVMD)>60 ms by Tissue Doppler (TDI) were subjected to implantation of a multisite pacing device. All pts. were then randomized into 2 phases (3 months each) of LV and BV pacing in a crossover design. Only 20 pts completed the two phases of the study & at the end of each phase clinical & echo assessment were repeated & compared to baseline data.

RESULTS. Compared to baseline, both LVP & BVP caused similar improvement in EF% from 28.7+4.9% to 37.6+6.4% (P<0.001)& 39.1+8%(P<0.001)for LVP & BVP respectively, in mitral regurge area from 6.7+4.9cm2 to 5.2+4.3 cm2 (P=0.005)& 4.4+4.6 cm2 (P< 0.001) for LVP & BVP respectively. Both modes of pacing resulted in reverse remodeling evidenced by reduction of LVEDD from 74.6+10 mm to 71.6+12.1 mm (P=0.012),& 67.2+18 mm (P=0.04)for LVP and BVP respectively & reduction in LVESD from 63.1+10 mm to 59.1+12.2 mm (P=0.007)&57.2+12.5 mm(P=0.001)for LVP & BVP respectively. Both modes resulted in similar increase in the diastolic filling time from 224+78 ms to 282+87 ms(P=0.002)&296+107 ms(P=0.001)for LVP & BVP respectively. Both modes of pacing induced significant reduction of IVMD assessed by TDI from 114+61 ms to 56+28.8 ms (P<0.001) &47.3+28.6 ms(P<0.001)for LVP & BVP respectively. They resulted in almost the same improvement in clinical data: NYHA class from 3.3+0.5 ms to 2.2+0.7 ms (P<0.001) & 1.9+0.6 ms (P<0.001) for LVP & BVP respectively,6 minute walk test from 277+91 m to 358+106 m (P<0.001)&372+95 m(P<0.001) for LVP&BVP respectively&QOL score from 64+12.1 to 35.8+15.2(P<0.001)&33.1+14.8(P<0.001) for LVP & BVP respectively.

CONCLUSION. Our data show that, cardiac resynchronization can be achieved by both biventricular as well as pure LV pacing. The latter one could achieve correspondly similar though insignificantly less improvement in EF% and reduction in LV dimensions and MR area. LV pacing can serve as alternative to the costly more complex and more lengthy procedure of BV pacing in patient with refractory HF.

GRANT ACKNOWLEDGEMENT. Critical care Department

0627

ATRIAL FIBRILLATION IN PATIENTS ADMITTED TO A MIXED MEDICAL-SURGICAL INTENSIVE CARE UNIT

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INTRODUCTION. Atrial fibrillation is a common problem in the intensive care population, with a reported incidence between 5% and 26%. It is associated with an increased mortality, but there is some question whether this represents a true mortality increase, or whether it occurs in a group with a higher risk of dying. Few studies have defined the extent of the problem in the mixed medical-surgical intensive care population.

METHODS. All patients admitted to our intensive care unit for more than 24 hours were enrolled into the study over a six month period, with the exclusion of children and those who had an existent or treated tachyarrhythmia. They were then followed up prospectively for 28 days, with various parameters recorded, including the development of atrial fibrillation, the presence of sepsis, APACHE II score, treatments and interventions, and outcome at 28 days. The population studied were divided into those who developed new-onset atrial fibrillation (new-onset AF) and those that did not (no AF). Data from the two groups were then compared to determine any significant associations.

RESULTS. Two hundred and twenty-eight patients were admitted over a six month period, with one hundred and twenty-two meeting the inclusion criteria (excluded were 67 for duration of stay less than 24 hours; 36 who already had AF or a pacemaker; and 3 who were children). Twenty-eight patients developed new-onset AF (23%). Of the 38 patients who had sepsis, 14 (37%) developed AF, as opposed to 14 out of 84 (17%) in the non-septic group. The AF group tended to be older (mean age 72 vs 62) and more ill (mean APACHE 24 vs 21), with a higher mortality rate (39% vs 28%). When the mortality rate was standardised (observed/predicted mortality), the AF group still appeared to have a worse outcome (SMR 0.87 vs 0.76). This result is in contrast with a recent finding that showed SMR to be similar in the two groups1. Our study found no association with low serum potassium or magnesium levels. Findings are summarised in the table.

TABLE 1.

	New-onset AF	No AF
Total	28	94
Sepsis	14	24
No sepsis	14	70
Mean age (range)	70 (39 - 90)	62 (18 - 92)
Mean Apache II score	24	21
Mortality rate (28 days)	39%	28%
SMR	0.87	0.76
Surgery patients	8	43
Medical patients	20	51

CONCLUSION. The rate of new-onset AF in our mixed medical-surgical intensive care unit is 23%. There is a strong association with sepsis, with over one third of septic patients developing AF (37%). Our findings of older age and greater degree of illness being independent risk factors for AF concur with other studies, but we have also shown an increased standardised mortality rate associated with AF, suggesting that the arrhythmia confers a higher risk of death.

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0628

ARTERIAL LACTATE LEVELS IN ACUTE MYOCARDIAL INFARCTION ARE RELATED WITH TIMI-FLOW BEFORE PRIMARY INTERVENTION

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INTRODUCTION. After myocardial infarction, venous lactate levels as determined in the central laboratory are known to be increased. The relationship between systemic lactate levels and hemodynamic parameters at presentation is largely unknown. We hypothesized that arterial lactate immediately measured in the catheterization laboratory provides optimal information to study this relation. We determined arterial lactate with a point-of-care analyzer (POC) in patients with ST-elevation myocardial infarction (STEMI) prior to primary percutaneous intervention (PCI), and investigated if lactate was related with blood flow in the involved coronary vessel.

METHODS. We prospectively measured arterial lactate levels (reference values 0,6-1,5 mmol/L) in patients with STEMI directly before treatment with primary PCI. Patients on mechanical ventilation were excluded. All blood samples were analyzed within 5 minutes from sampling. Thrombolysis in myocardial infarction (TIMI-)flow in the infarct-related vessel at first angiogram was recorded for all cases and dichotomized as TIMI 0-1 (inadequate) and 2-3 (adequate). Additional data was taken from the medical chart. Lactate levels were analyzed after lognormal transformation.

RESULTS. Lactate levels were sampled and analyzed in 442 patients. Geometric mean lactate was 1.45 mmol/L. For patients with inadequate TIMI-flow (64%) mean lactate level was 1.56 compared to 1.28 mmol/L in patients with adequate TIMI-flow (p<0.001) High lactates were also associated with shock (1.97 vs. 1.35, p=0.037), tachycardia (1.50 vs. 1.33, p=0.023), proximal lesions (1.54 vs. 1.37, p=0.006), diabetes (1.75 vs. 1.39, p=0.003) and higher body mass index (p=0.006). Remarkably, smoking was related with a decrease in lactate levels (1.32 vs. 1.51, p=0.005). With multivariate analysis, shock, body mass index, tachycardia, smoking and especially TIMI-flow were independently related with lactate levels. The relation of TIMI-flow with lactate was more pronounced than the relation of TIMI-flow with heart rate and blood pressure.

CONCLUSION. In patients with myocardial infarction, systemic arterial lactate measured before revascularisation with a POC-device allowed detection of a strong relation between poor TIMI-flow and elevated arterial lactate levels.

0629

PLEURAL PRESSURE MEASUREMENT WITH THE USE OF PULMONARY ARTERY CATHETER

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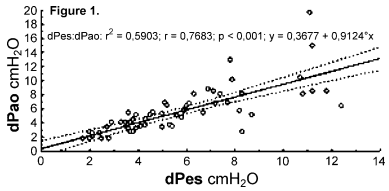
INTRODUCTION. In clinical setting esophageal pressure measurement (Pes) is often used as a substitute to direct pleural pressure measurement (Ppl). It seems that extracardial-pleural pressures are transmitted to pulmonary circulation and therefore are reflected in occlusive pressure (PAOP)(1). The aim of our study was to compare PAOP and Pes changes during mechanically controlled breathing.

METHODS. Study was approved by local EC and written consent of the next of kin. Only patients with pulmonary catheter (PAC) in situ were recruited (7.5F, Edwards, Life Sciences, USA, monitor Datex Ohmeda S/5). Data were collected and analyzed by commercially available program (Datex-Ohmeda S/5 Collect, Version 4.0). For Pes measurement esophageal catheter(Smarth Cath, Bicore) was introduced, position verified by occlusion test and Pes measured on Avea ventilator (Viasys^{TM}, Healthcare USA). During the study patients were heavily sedated and in some of them muscle relaxants were also administered. All patients were ventilated in volume controlled mode (VCV). PAC was wedged and controlled breath was applied followed by inspiratory occlusion lasting 3-4 s. Then balloon was deflated and the same procedure was repeated 8-15 times with tidal volume (Vt) in range 350-1000 selected at random. dPes and dPAOP were calculated as inspiratory and expiratory difference in Pes and PAOP recorded simultaneously, the value of dPao was calculated to cmH20 using standard formula. Values are mean (±SD) and product moment correlation with Pearson r calculation was used for statistical comparison.

RESULTS. Sixty nine measurements were performed in 6 patients. dPes (5.4 ±2,6 cm H_2O) and dPao (5.3 ± 3.1 cm H_2O) closely correlated (r2 = 0.69; p<0.001) – Figure 1.



CONCLUSION. Changes in PAOP and Pes correlate closely. It seems that monitoring of PAOP changes during mechanical breathing could be used as an estimate of Ppl changes.

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0630

BLOOD AND PLEURAL FLUID BNP LEVELS IN CRITICAL CARE PATIENTS WITH PLEURAL EFFUSIONS

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INTRODUCTION. Light's criteria remain the reference standard for distinguishing exudates from transudates. However, many misclassifications may happen in the case of septic patients and the use of diuretics. Recently, pleural BNP levels has been used to distinguish transudates from exudates. To investigate the levels of brain natriuretic peptide in blood (BBNP) and pleural fluid (PBNP) in transudates and exudates in critical ill patients, and their ratio in different aetiologies.

METHODS. The classification of the effusions as exudative and transudative was made by two experienced clinicians (MM, EZ). Hemodynamic measurements, using a right ventricular ejection fraction (RVEF) thermodilution catheter, and transthoracic or transesophageal echocardiography were performed when indicated. Transudates were due to heart failure (HF) or hypoalbuminemia. Parapneumonic effusion was the usual cause of exudates.

RESULTS. Thirty seven patients were enrolled. a) Nine patients (75±8 yr) with HF-transudates, BBNP 1670±430 pg/mL, b) 10 patients (64±7 yr) with septic shock of any origin (4 patients with transudates, 745 pg/mL, 6 with exudates, 994 pg/mL), BBNP 934±220 pg/mL, c) 7 patients (71±7 yr) with hypoalbuminemia with or without sepsis but without pneumonia or septic shock, BBNP 157±112 pg/mL, and d) 12 patients (61±10 yr) with parapneumonic effusions without septic shock, BBNP 55±53 pg/mL There was a significant correlation between pleural and blood BNP levels (r=0.55, p< 0.01). In all cases the ratio of PBNP to BBNP was < 0.5, indicating leakage of blood BNP via the pleura. BBNP or PBNP levels in transudates were significantly different between heart failure and hypoalbuminemia (p<0.01). BBNP or PBNP was increased in HF compared to septic shock (p<0.05) but there was a significant overlap. However, values of BBNP> 2270 or PBNP> 410 pg/mL could differentiate transudates from heart failure from other causes of transudates or exudates, with 94% specificity (sensitivity 55%). Light's criteria misclassified 7 transudates (35%) as exudates.

CONCLUSION. In conclusion, BNP was increased in blood and pleural fluid in transudates from heart failure, but not from hypoalbuminemia. PBNP did not offer any additive diagnostic value to BBNP to differentiate transudates. Septic schock was characterized from increased BBNP and PBNP levels, overlapping with these from heart failure.

0631

MYOCARDIAL DIASTOLIC DYSFUNCTION IN SIRS AND SEPSIS: AN ECHOCARDIOGRAPHIC STUDY

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INTRODUCTION. There are few echocardiographic investigations of myocardial dysfunction in SIRS and sepsis. The aim of this project was to investigate left ventricular diastolic function over a period of 7 days in patients with SIRS/sepsis and circulatory shock using transthoracic echocardiography (TTE).

METHODS. 27 patients with severe sepsis/SIRS were included. TTE examinations were performed daily for 7 days. Diastolic function was assessed by transmitral pulsed Doppler with E/A ratio, deceleration time(dt), and tissue velocity imaging (TVI) in the mitral annulus. Patients were subdivided into < and > 50 years of age. Changes in these parameters over time were analyzed using ANOVA.

RESULTS. Median values for dt, E/A, E/É and É for all patients were calculated. There were no differences with time for all parameters except É (Table 1). In patients <50 y.o., subnormal values for E/É and É were seen (Table 2).

TABLE 1.

	dt	E/A	E/É	É
Day 1	160[118-193]	1,1[0,9-1,6]	10,4±4,2	8,5[7-10,8]
Day 2	165[145-220]	1,3[0,9-1,8]	10,9±5,6	8,8[7,3-10,8]
Day 3	160[120-180]	1,6[1-1,9]	10,74,4±	9,4[8,4-11,3]
Day 4	180[155-190]	0,9[0,8-1,4]	10,4±4,7	10[8,7-13]
Day 5	160[140-180]	1,3[1,1-1,8]	10,4±5,4	9,8[8,8-12]
Day 6	170[155-103]	1,0[0,8-1,5]	10,7±6,0	10[9,1-11,6]
Day 7	160[150-200]	1,0[0,8-1,6]	9,3±3,9	10[9,2-11,8]
p	ns	ns	ns	0,015

TABLE 2.

	E/É	É
Day 1	8,7±1,9	9,2±2,1
Day 2	9,1±2,1	9,9±1,9
Day 3	7,9±3	10,1±2
Day 4	6,8±2,1	10,2±1,6
Day 5	8,8±0,3	11,7±2,7
Day 6	7,8±1,1	11±1,8
Day 7	7,9±1,1	10,6±1,9
p	0,003	0,067

CONCLUSION. Diastolic dysfunction was seen in this population, with subnormal E/E' and E'. There was a tendency for improvement over 7 days demonstrated by increasing É. The other parameters were difficult to interpret. Even in younger patients where diastolic dysfunction would normally be unexpected, we observed decreased É. There was improvement over the 7 days but not returning to normal. It is unknown how long diastolic dysfunction persists in sepsis/SIRS, and a follow-up is planned to investigate this further.

0632

CARDIOLOGIC FINDINGS IN INTENSIVE CARE PATIENTS DEVELOPING ATRIAL FIBRILLATION

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INTRODUCTION. Atrial fibrillation (AF) is a common arrhythmia in the general population and frequently associated with cardiac pathologies. However, not much is known about causes and incidence of AF in critical illness [1].

METHODS. In a retrospective study we screened daily management charts and case notes of all patients admitted to a general Intensive Care Unit during a 6 month period for occurrence of AF. Echocardiographic findings and Troponin t levels were recorded. Underlying cardiac and non-cardiac diagnoses, treatment of AF and use of inotropes were also documented.

RESULTS. 54 of 222 patients screened developed AF during their stay on ICU (24,3%). The mean age was 67,5 (± 11,6) years. APACHE II score was 22,1 (± 6,1), with a mortality rate of 22,6%. 35 (66,0%) patients fulfilled criteria of sepsis. 5 patients were hypokalemic. Mean potassium levels were 4,1 ± 0,6 mmol/l and mean magnesium levels 0,81 ± 0,19 mmol/l. Troponin T levels were determined in 30 (55,6%) patients, but were negative in only 3 (5,6%) patients. 33 (62,3%) patients were treated with amiodarone, 6 (11,3%) patients received digoxin, and 4 patients (7,5%) were given beta-blockers. One patient (1,9%) was cardioverted electrically. 21 (39,6%) patients had more than one episode of AF. 44 (83,0%) patients needed inotropes during their stay on ICU. Transthoracic echocardiography was performed in 20 of the patients who developed AF (37%). 12 (80%) echocardiographic examinations revealed a significant valve pathology, and 8 (42,1%) patients were diagnosed with reduced left ventricular function. The most common valve pathology diagnosed by echocardiography was mitral regurgitation, which was found in 8 (42,1%) patients. Only 5 (25%) patients had normal echocardiographic findings.

CONCLUSION. Underlying cardiac pathologies are common findings in ICU patients developing AF. Approximately 50% of ICU patients with AF had positive troponin T levels. Echocardiography revealed abnormal left ventricular or valvular function in 75% of intensive care patients with AF and may be a useful tool to identify contributing pathologies. Further studies are warranted to assess the influence of AF and associated diagnoses on outcome in intensive care.

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0633

CARDIAC OUTPUT MONITORING IN ICU: COMPARISON OF FLOTRAC/VIGILEO SYSTEM AND CONTINUOUS THERMODILUTION

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INTRODUCTION. The recently introduced Flotrac/Vigileo TM system (Edwards Lifesciences) is a semi-invasive cardiac output (CO) monitoring device. Based on tha analysis of arterial pressure waveform, this tool does not need external calibration and provides a continuous assessment of CO. As limited validation data are available, the aim of our study was to compare CO measurements provided by the Flotrac/Vigileo TM system with continuous thermodilution using a pulmonary artery catheter (TD-PAC).

METHODS. We conducted a clinical prospective, single center study, to evaluate both devices in 20 ICU patients monitored by TD-PAC and arterial line as part of routine care after cardiac surgery. Cardiac index (CI) measurements collected from the Flotrac/Vigileo TM system and the TD-PAC method were continuously recorded at 60-second intervals for the whole duration of TD-PAC monitoring. Statistical analysis was performed using Bland and Altman method to assess agreement between the two methods. Bias and precision (1,96 SD of the bias) were calculated for the whole data and for low and high TD-PAC derived values, defined by a CI < 2L/min/m2 and >3.5L/min/m2 respectively.

RESULTS. Patients included in the study were mostly males (80%) classified ASA III (80%), with a median age of 65 [56;78] years, and a mean body mass index of 25 ± 4 kg/m2. A total of 23733 pairs of CI measurements were recorded. Flotrac/Vigileo TM system and TD-PAC CI values ranged from 0.1 to 7.5 and 1.1 to 6.2 L/min/m2 respectively. In the low CI and high CI subgroups, 2681 and 1763 pairs of data were compared. Results of the Bland and Altman analysis are shown in Table 1.

TABLE 1.

	All Data (n=23733)	CI < 2L/min/ m2 (n=2681)	CI > 3,5L/min/ m2 (n=1763)
Bias (L/min/m2)	0.05	0.58	-1.04
Precision (L/min/m2)	1.50	0.86	2.67
Percentage error (%)	54	38	43

CONCLUSION. The continuously recording design of this study allowed to compare a large number of CI measurements by the Flotrac/Vigileo TM system and the continuous TD. CO measured by the Flotrac/Vigileo TM system showed only moderate agreement with continuous TD. In clinical situations with abnormal CI, the agreement between both methods seems better for low CI values than for high CI values.

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CARDIAC INDEX MEASUREMENT USING THE PULSE CONTOUR ANALYSIS OF THE PICCO-SYSTEM IN CRITICALLY ILL PATIENTS RESULTS IN RELIABLE VALUES INDEPENDENT OF RECALIBRATION OF THE SYSTEM BY TRANSPULMONARY THERMODILUTION

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INTRODUCTION. Reliable continuous hemodynamic monitoring of critically ill patients is essential for effective volume management and adequate administration of vasoactive drugs. The PiCCO-system (Pulsion, Germany) allows continuous measurement of cardiac index (CI) using arterial pulse contour analysis. Calibration of this system by transpulmonary thermodilution is recommended every 8 hours. In this study we examined the reliability of the continuous measurement of the cardiac index using the arterial pulse contour analysis (CIpc) compared to the cardiac index acquired by the transpulmonary thermodilution (CItd) when calibrating the system.

METHODS. Our study includes 538 measurements in 40 critically ill patients (25 male, 15 female, age 27-84 years, mean 64.2 ± 12.6) requiring hemodynamic monitoring with the PiCCO-system. 18 patients had an infection, 7 hepatorenal syndrome, 6 gastrointestinal bleeding, 6 acute pancreatitis and 3 were admitted to the ICU for other reasons. First the CIpc was recorded immediately before the next calibration and afterwards the CItd was measured 3 times what resulted in a simultaneous calibration of the pulse contour algorithm of the PiCCO-system. We performed a mean of 13.5 ± 14.3 measurements per patient (1-58). The time-lag between the measurements was 15h 20min ± 9h 13min (33min-49h 48min).

RESULTS. The comparison of CIpc immediately before calibration and the calibration-derived CItd resulted in a correlation coefficient of 0.89 with a p-value of <0.001. In mean the aberration between CIpc and CItd was 0.44 ± 2.37 l/min*m2. In the Bland-Altman-analysis the CIpc was in mean 0.05 l/min/m2 lower than the mean of CItd and CIpc. The standard deviation was 0.69 l/min/m2. There was no correlation of the time-lag between the calibrations and the difference of CIpc and CItd (r=0.02; p=0.13). There was an increase of the aberration of CIpc and CItd in low and high CIpc values. Reliable CIpc values with an aberration from CItd less than 0.5 l/min*m2 can be obtained with a CIpc in-between 2 and 7 l/min*m2.

CONCLUSION. 1) The PiCCO-system allows a reliable continuous measurement of the CI using the pulse contour analysis.
2) In our study we could not find an increased difference of CIpc and CItd even with longer time periods in-between the calibrations using transpulmonary thermodilution.
3) Reliable CI values using the pulse contour analysis can be obtained in-between 2 and 7 l/min*m2.
4) Because calibration is easy to achieve and additional data for the intrathoracic blood volume and the extravascular lung water are obtained a 8-12 hours period in-between the calibrations is reasonable.

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COMPARISION OF NON-INVASIVE AND INVASIVE MEASUREMENTS OF CARDIAC OUTPUT BY ELECTRICAL VELOCIMETRY AND PULMONARY ARTERY CATHETER

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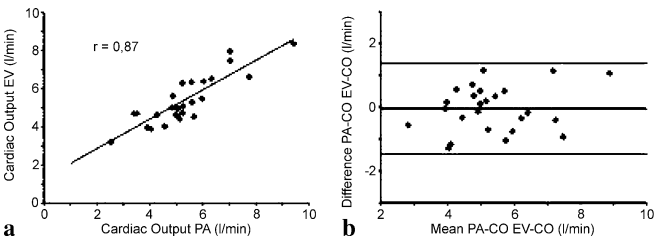
INTRODUCTION. Cardiac function monitoring in patients at risk for cardiac failure is a very useful tool to recognize and treat cardiac dysfunctions. The objective of this study was to compare a new method of non-invasive determination of cardiac output (EV-CO) based on electrical velocimetry with invasive cardiac output measurements performed with a pulmonary artery catheter (PA-CO).

METHODS. Twenty-five patients (22 male,3 female) were included into the study during a three month period. The non-invasive measurements of cardiac output (CO) were obtained with a new cardiovascular monitor (Aesculon Eletrical Velocimetry, Osypka Medical GmbH, Berlin, Germany). Simultaneous invasive measurements of CO were made by injection of iced 0.9% saline and the recording of thermodilution curves with a pulmonary artery catheter (Baxter Swan-Ganz catheter, 7.5 French, Edwards Life Sciences, Irvine, USA). The analysis of the data was performed based on statistical methods recommended by Bland and Altman for evaluation studies(1).

RESULTS. In all patients invasive and non-invasive CO values could be obtained. The analysis of CO showed a strong linear correlation (r=0.87) between EV-CO and PA-CO (Fig. A). The mean difference between EV-CO and PA-CO was -0.05±0.71 litre*min^{-1} (mean±SD). The lower and upper limits of agreement for the comparison of EV-CO with PA-CO were -1.47 litre*min-1 and 1.37 litre*min^{-1} and are defined as the mean difference±2SD (Fig. B). The percentage error between EV-CO and PA-CO was 26.5%.



CONCLUSION. In this present study we found a good correlation between the haemodynamic values measured by electrical velocimetry and those obtained from pulmonary artery catheter measurements. Therefore, electrical velocimetry, a new ICG algorithm, is a suitable method to evaluate haemodynamic parameters with clinically acceptable accuracy.

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CARDIAC FUNCTION INDEX A VALUABLE MARKER OF MYOCARDIAL CONTRACTILITY IN CRITICALLY ILL MEDICAL PATIENTS

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INTRODUCTION. The pulmonary artery catheter (PAC) is still used to assess the hemodynamic status in cardiac patients, because it allows the measurement of pulmonary artery occluded pressure (PAOP), an indirect marker of left ventricular function. We studied the relationship between the cardiac function variables derived from PAC and those provided by the transpulmonary thermodilution technique (PiCCO) in patients with acute heart failure (HF) and severe sepsis or septic shock.

METHODS. Twenty-one patients with circulatory failure requiring invasive hemodynamic monitoring were included. ICU diagnosis was HF in 12 and severe sepsis or septic shock in 9 patients. All patients were monitored with a PAC (Edwards Lifesciences, USA) and a PiCCO catheter (Pulsion Medical System, Germany). The following parameters were simultaneously assessed during the first day in each patient: cardiac index by either method (CI-PAC, CI-PiCCO), PAOP, cardiac function index (CFI), global ejection fraction (GEF), and global end-diastolic volume index (GEDVI). Pearson correlation, Bland-Altman analysis and non-parametric Mann-Whitney U test were performed, as appropriate. Results are given as median (interquartile range, IQR).

RESULTS. A total of 84 simultaneous measurements were performed during the first 24 hours after ICU admission (4 measurements in each patient). The overall correlation showed a Pearson correlation coefficient between CI-PiCCO and CI-PAC of 0.92 (p<0.001). Bland-Altman analysis showed a mean bias of 0.19 L/min/m^2 and limits of agreement (± two standard deviations) -0.96 to +1.35 L/min/m^2. Using the PAC the median (IQR) CI in HF and septic patients was 2.6 (1.9-3.2) and 4.2 (3.6-5.5) L/min/m^2 (p<0.001), respectively. The PAOP was 20 (15-24) in HF and 16 (15-18) mmHg in septic patients (p=0.008). The GEDVI in HF and septic patients was 995 (849-1172) and 907 (748-1133) mL/m^2 (p=0.16), respectively. In HF patients the CFI was 2.7 (2.2-3.0) and in those with sepsis 6.1 (3.5-6.8) min-1 (p<0.001), and the GEF was 14 (10-16) versus 20 (16-30) % (p<0.001), respectively.

CONCLUSION. In critically ill medical patients, assessment of cardiac function using transpulmonary thermodilution technique is a valuable alternative to the more invasive pulmonary artery catheter. Cardiac output and cardiac function index better discriminate between patients with and without impaired cardiac function than pulmonary artery occluded pressure.

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EFFECT OF NOREPINEPHRINE ON CARDIAC OUTPUT AND PRELOAD IN SEPTIC SHOCK PATIENTS

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INTRODUCTION. Because of its predominant α-agonist effect, Norepinephrine (NE) is assumed to increase vasomotor tone and hence mean arterial pressure (MAP). A potential beneficial effect on cardiac index (CI) can be expected from its venoconstrictor α-agonist mediated effect combined with inotropic β1 agonist effect, provided that the increase in left ventricular afterload is not too excessive.
Aim: To examine the cardiovascular effect of NE when this drug is administered with the aim of inducing marked changes in MAP (> 15 %) in patients with septic shock.

METHODS. In an observational study, 64 patients resuscitated for septic shock already equipped by a PiCCO device were prospectively included. We collected the transpulmonary thermodilution-derived variables: CI, Global End Diastolic Volume index (GEDVI), Stroke volume index (SVI), Cardiac function index (CFI).
Two subgroups of patients were separately analysed. The first subgroup (MAPincr) consisted of 40 patients (age: 62±12 years) in whom MAP increased by > 15 % in response to either initiation of NE infusion or increase in NE dose (from 0.35 to 0.65 μg/kg/min). The second subgroup (MAPdecr) consisted of 24 patients (age: 59±17 years) in whom MAP decreased by more than 15 % in response to the decrease in NE doses (from 0.60 to 0.35 μg/kg/min).

RESULTS. In the MAPincr subgroup, MAP increased from 57±8 to 81±12 mmHg (p< 0.05) while CI (from 3.4±1.1 to3.8±1.2 L/min/m2), SVI (from 38±12 to 42±12 mL/m2) and GEDVI (from 703±165 to 770±184 mL/m2) significantly increased and CFI did not change. Similar findings were observed in the subset of 20 patients with LVEF < 50% as well as the in the other subset. In 20 patients SVI increased by >15% with NE and this was related to a significant increase in preload (GEDVI: 682±153 to 776±167 mL/m2) as well as in contractility (CFI: 3.9±1.6 to 4.3±1.6). In the MAPdecr subgroup, MAP decreased from 94±12 to 71±8 mmHg (p< 0.05) while significant decreases in CI (from 3.8±1.7 to3.3±1.1 L/min/m2), SVI (from 42±19 to 38±15 mL/m2) and GEDVI (from 855±403 to 765±330 mL/m2) were observed.

CONCLUSION. In our septic shock patients, changes in MAP resulting from an increase or a decrease in the doses of NE, were associated with parallel changes in CI, SVI and in GEDVI (cardiac preload) and in some patients in cardiac contractility evaluated by CFI.

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INFECTIONS WORSEN CARDIAC FUNCTION, HOSPITAL COURSE AND LONG-TERM OUTCOME OF CRITICALLY ILL PATIENTS WITH ACUTE HEART FAILURE

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INTRODUCTION. Epidemiological studies performed in hospitalised patients with acute heart failure (AHF) reported infection rates around 20% (1). Despite this high frequency, the types of infections and their impact on the patient's hospital course have not yet been investigated. The aim of this study was to investigate the impact of infections both present on intensive care unit (ICU) admission and occurring during the ICU stay, on cardiac function, hospital course and outcome in AHF patients.

METHODS. We performed a prospective observational study with 6-month follow up in the medical and cardio-surgical ICU of the University Hospital Zürich, Switzerland. AHF was diagnosed in the presence of one or more of the following criteria: a) underlying heart disease with clinical heart failure symptoms, b) cardiac index <2.2l/min/m2 with a pulmonary artery occlusion pressure >14mmHg, c) need for treatment with inotropes, d) need for mechanical cardiac support. Patients undergoing elective cardiac surgery (n=81) were excluded from the assessment of infections on ICU admission, but included in the analysis of nosocomial infections during the ICU stay.

RESULTS. We screened 355 ICU patients and included 184 patients with AHF in the analysis. Infections were present in 24% of all non-elective admissions. These AHF patients had higher creatinine levels (144 (61-558) vs 98 (57-2'277), p<0.01), more vasopressor requirements (60% vs 32%, p=0.02), and longer ICU (5 (2-38) vs 3 (1-36), p=0.03) and hospital (18 (2-68) vs 10 (2-170), p=0.03) stays than patients without infections. Infectious complications during the ICU stay occurred in 17% of all AHF patients. Left ventricular ejection fraction was lower in these patients than in patients without infectious complications (35 (10-60) vs 45 (15-75), p<0.01). Nosocomial infections during the ICU stay significantly increased the mortality at 30 days (34% vs 14%, p=0.01; OR 3.2, 95% CI 1.4-7.6) and 6 months (49% vs 18%, p<0.01; OR 3.7, 95% CI 1.6-8.7).

CONCLUSION. Infections were diagnosed in almost a quarter of all non-elective ICU admissions with AHF. Infections present on ICU admission related to more organ dysfunction and prolonged the length of ICU and hospital stay. Nosocomial infections during the ICU stay occurred in one out of six AHF-patients, were related to lower left ventricular ejection fractions, and had a negative impact on short and long-term mortality.

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THE EFFECT OF OPEN-HEART SURGERY WITH CARDIOPULMONARY BYPASS ON PERIPHERAL LYMPHOCYTE APOPTOSIS IN INFANTS AND YOUNG CHILDREN

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INTRODUCTION. Lymphocyte apoptosis plays an important role in regulating immune responses[1-4]. This study was undertaken to investigate the rule and probable pathway of lymphocyte apoptosis after cardiopulmonary bypass (CPB) and open-heart surgery in infants and young children.

METHODS. Twenty patients undergoing CPB and open-heart surgery were enrolled, and 20 healthy blood donors were included as controls. Peripheral venous blood samples were taken 24 hours after termination of the operation. Peripheral blood lymphocyte (PBL) was separated using Ficoll-Hypaque density gradient method. The lymphocyte apoptosis was quantitated by detecting Annexin+/PI- cells using flow cytometry. The expression of Fas on lymphocyte was also detected by flow cytometry.

RESULTS. The peripheral blood lymphocyte count was decreased significantly after CPB, reaching the lowest point at the first day after CPB, while the peripheral blood leukocyte and neutrophil counts were increased significantly after CPB and peaked at the same time. The proportion of PBL apoptosis in patients was (12.08±4.56)%, compared with (4.55±1.06)% in the controls (P<0.01). The expressions of Fas in patients and controls were (52.35±11.56)% and (30.08±14.56)% respectively, with a significant difference (P<0.01).

CONCLUSION. Apoptosis was probably an important mechanism leading to lymphopenia after CPB and open-heart surgery in infants and young children, and the death-receptor pathway via Fas was probably a main pathway of lymphocyte apoptosis.

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ENDOTOXIN TOLERANCE IN HUMANS: PRESENCE AND MECHANISM

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INTRODUCTION. Endotoxin (lipopolysaccharide, LPS) tolerance is characterized by a reduced sensitivity to subsequent challenge of LPS. In animal models LPS tolerance is closely associated with marked, unbalanced production of pro- and anti-inflammatory cytokines as several animal studies have shown a decrease in proinflammatory cytokines and an increase in IL-10 (anti-inflammatory cytokine). The presence and mechanism of LPS tolerance in humans is unclear. The aim of this study was to test whether 5-day administration of endotoxin leads to LPS tolerance by an enhanced anti-inflammatory response and a suppressed proinflammatory response.

METHODS. 7 healthy volunteers received iv bolus injections of 2 ng/kg Escherichia coli LPS on 5 consecutive days. Blood samples (TNFα, IL-10, IL-1β, IFNγ and IL-6) were drawn before (t=0) and after (t=30, 60, 90min, 2, 4, and 6 hrs) administration of LPS on day 1 and 5 and on t=0 hrs on day 2 till 4. Symptom scores were obtained including nausea, vomiting, headache, muscleache, backache and shivering. The volunteers were asked to score above mentioned complaints ranging from 'nihil' (score 0) up to 'severe'(score 5) every half hour after administration of LPS on five consecutive days.

RESULTS. Both TNFα (proinflammatory cytokine) and IL-10 (anti-inflammatory cytokine) showed a peak level the first day which was almost completely abolished on the fifth day (ANOVA repeated measures between day 1 and 5: p<0.0001, figure 1). All 7 volunteers experienced the expected and transient influenza-like symptoms on the first day, 3 at t=1.5 hrs after the administration of±maximum clinical symptom score 4.7 0.0 (p±LPS. The symptom score on day 5 was 0.0<0.0001)(figure 2).

CONCLUSION. Endotoxin tolerance developed after 5 consecutive days of LPS administration as demonstrated by the attenuated release of proinflammatory cytokines on the fifth day. In contrast to animal studies, the attenuated cytokine response was not limited to the proinflammatory response, but also the anti-inflammatory response was diminished. This human endotoxin tolerance model appears to be useful in exploring the possible beneficial effects of endotoxin tolerance, for example, in ischemia-reperfusion damage.

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EFFECTS OF NOREPINEPHRINE ON REGIONAL PERFUSION ASSESSED BY NEAR INFRARED SPECTROSCOPY IN PATIENTS WITH SEPTIC SHOCK

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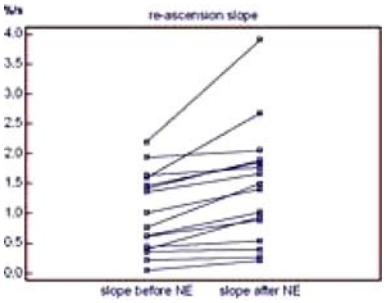
INTRODUCTION. The near infrared spectrometry (NIRS) assesses the haemoglobin saturation in the tissue (StO_2). Induction of transient ischemia followed by hyperaemia (forearm occlusion and release) is assumed to provide additional information through the analysis of the StO_2re-ascension slope.

METHODS. We included 16 patients with septic shock equipped with a PiCCO" monitoring system. The thenar muscle StO_2 was continuously measured with Inspectra". StO_2 model 640 (Hutchinson Technology) before and during pneumatic cuff inflation (until StO_2 by 40% is reached) and after deflation, which allowed calculating the StO_2 re-ascension slope. All hemodynamic and StO_2 measurements were performed before and after that MAP increased by > 15 % in response to either initiation of norepinephrine (NE) infusion (n=13) or increase in NE dose (n=3). We also collected StO2 and StO2 re-ascension slope in 9 healthy volunteers.

OBJECTIVE. To examine whether administration of NE aimed at increasing mean arterial pressure (MAP) in septic shock patients is able to affect regional microcirculation assessed by NIRS indices.

RESULTS. NE increased MAP from 56±11 to 84±17 mmHg(p=0.0001) and cardiac index (CI) from 3.47±0.97 to 4.03±0.78 L/min/m2 (p=0.016). In the 9 healthy volunteers StO_2 and StO_2 re-ascension slope were 79±5% and 1.95± 0.34%.sec-1, respectively. In the septic shock patients, the increase in the dose of NE did not change the baseline StO2 (78±13 to 80±14%), but increased the StO_2 re-ascension slope towards normal values (0.89±0.66 %.sec-1 to 1.46±0.97 %.sec-1, p<0.0001).



CONCLUSION. In patients with septic shock, administration of NE aiming at increasing MAP by more than 15% increased CI and did not alter StO_2, which was already in the normal range. In contrast, NE improved the StO_2 slope measured after transient ischemia/hyperaemia, suggesting a beneficial effect on the microcirculation function.

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HAEMORRHAGIC SHOCK INDUCES THE PRODUCTION OF SUPEROXIDE RADICAL IN THE GUT, LIVER AND LUNGS: INTRODUCTION OF A NEW IN VIVO ASSAY

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INTRODUCTION. Many studies have shown that haemorrhagic shock (H/S) is associated with increased oxidative stress. Up to date, only indirect methods have been used to monitor in vivo oxidative stress (1). These comprise of the determination of antioxidants and total antioxidant capacity, as well as the detection of oxidized biological markers. The direct, in vivo quantitative measurement of the production of superoxide radical, an important parameter of the oxidative load, is difficult due to its low concentration and a short half life (2). In this study, the effect of H/S and resuscitation on the oxidative state in 4 vital organs (gut, liver, lungs, kidneys) was estimated for the first time by measurement of the production of superoxide radical in vivo, using a new superoxide assay.

METHODS. 16 male Wistar rats were divided in two groups (n=8): sham and H/S group. H/S was induced by withdrawal of blood targeting to a mean arterial blood pressure of 30 - 40 mmHg, which was maintained for 60 minutes. At the end of the shock period, rats were resuscitated with re-injection of the removed shed blood volume. Tissue samples were collected 3 hours after resuscitation and the oxidative load was assessed by a new superoxide assay which directly measures the production of superoxide radical and an established lipid peroxidation assay which measures the production of organic hydroperoxides. Statistical analysis was performed using ANOVA.

RESULTS. Animals that underwent H/S exhibited a statistically significant increase in the production of organic hydroperoxides in the gut (P<0.001), liver (P< 0.001) and lung (P< 0.001) tissues, whereas no change was observed in the kidneys. The rate of production of superoxide radical increased more in the gut and the liver (P< 0.001 respectively) and to a lesser extent in the lungs (P < 0.05), while kidneys were not affected as well.

CONCLUSION. This study demonstrates an increase in oxidative load in the gut, the liver and the lungs after H/S- resuscitation, which was estimated by two different methods. Moreover, and for the first time in a model of H/S, the new superoxide assay directly and more precisely estimates oxidative stress in vivo, since the formation of superoxide radical seems to play a pivotal role in the cataract of reactions that lead to the oxidation of biological structures. These results suggest that predominantly the gut and the liver, and to a lesser extent the lungs, but not the kidneys are the organs primarily affected by H/S in this model.

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0643

ARGININE VASOPRESSIN IS INEFFECTIVE TO REVERSE VASOPRESSOR DEPENDENCY IN PATIENTS WITH CHRONIC ACE INHIBITOR THERAPY AND PROLONGED POSTOPERATIVE HYPOTENSION

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INTRODUCTION. In this retrospective analysis, we examined if a low-dose AVP infusion (2 IU/h) can reverse isolated postoperative vasodilatory hypotension and prolonged vasopressor requirements (>24 hrs) in fifteen patients under chronic ACE inhibitor treatment.

METHODS. Hemodynamic and laboratory parameters were recorded 24, 12, 6 hrs, and immediately before start of AVP therapy, 4, 6, 12, and 24 hrs after start of AVP, as well as 6, 12, and 24 hrs after cessation of AVP infusion. The primary endpoint was to evaluate hemodynamic effects and changes in phenylephrine dosages during AVP infusion. The secondary endpoint was to evaluate changes in laboratory parameters during AVP.

RESULTS. AVP infusion did not show any significant effects on hemodynamic variables. Only mild, non-significant effects on MAP (+10.4%, p=0.239) and phenylephrine (-38.5%, p=0.619) dosages were observed during the first 24 hrs after AVP infusion. There were no changes in laboratory parameters during AVP infusion.

CONCLUSION. A supplementary, low-dose AVP infusion proved to be ineffective to improve hemodynamic function and reverse vasopressor dependency in patients with chronic ACE inhibitor therapy and prolonged postoperative hypotension.

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0644

AN OBSERVATIONAL STUDY OF THE USE OF ACTIVATED PROTEIN C IN SEPTIC SHOCK PATIENTS WITH EMPHASIS ON HEMODYNAMIC EFFECTS

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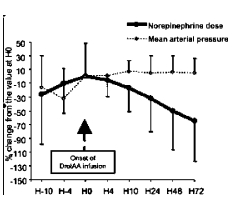
INTRODUCTION. Drotrecogin alpha Activated (DrotAA) has been demonstrated to reduce mortality of septic shock patients in randomised controlled trials. For evidencing the effects of DrotAA resulting from its use in the real life, we observed all patients treated with DrotAA in our unit focusing on hemodynamic failure.

METHODS. In all patients of our unit treated with DrotAA from 2003 to 2007 according to European recommendations, we recorded demographic data, bleeding events, and the organ failures time course.

RESULTS. DrotAA was administered in 53 patients [59±15 years old, Simplified Acute Physiology Score (SAPSII): 57±16]. A community acquired infection was the causal infection in 78% of cases. 51 patients had >2 organ failures before the DrotAA onset (hemodynamic failure in 51patients,respiratory in 49). All patients received hydrocortisone (started 11±8 hours before the onset of DrotAA) and 36 patients received hemofiltration (started 8±7 hours before the onset of DrotAA). Serious bleeding events occurred in 3 patients. Interestingly, the ICU mortality was 28% while mortality predicted from SAPS II was 58%. We observed a significant improvement in the PaO2/FiO2 ratio and in the blood lactate level after the onset of DrotAA (H0) (Table 1). In patients treated with norepinephrine (n=51), we also observed a rapid decrease in the vasopressor dose after DrotAA onset while the mean arterial pressure was maintained stable in the same period (Figure).

TABLE 1.

TIME (hours/H0)	H0-10	H0-4	H0+4	H0+10	H0+24	H0+48	H0+72
PaO2/FiO2 (mm/Hg)	181±116	177±100	178±85	202±107	214±116	215±100	236±106
Lactate (mmol/L)	4.6±5.2	4.5±3.7	4.2±5.6	3.5±2.4	3.3±3.3	2.9±2.7	2.5±2.2



CONCLUSION. In this observational study, we evidenced significant improvement in the hemodynamic and respiratory failures and a decrease in blood lactate after the onset of DrotAA administration.

0645

CYTOKINE, COMPLEMENT AND C-REACTIVE PROTEIN RESPONSES TO CARDIOPULMONARY BYPASS WITH COLLOID OR CRYSTALLOID FOR PUMP PRIMING OF CARDIOPULMONARY BYPASS

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INTRODUCTION. Systemic inflammatory response occurs frequently after coronary artery bypass surgery, and it is strongly correlated with the risk of postoperative morbidity and mortality. We have analysed the effects of gelatin priming versus Ringer's lactate priming on cytokine release and during the inflammatory state following coronary artery bypass surgery with cardiopulmonary bypass.

METHODS. A prospective, randomized study was designed. Forty four patients undergoing elective coronary artery bypass grafting were allocated randomly to one of two groups: 22 patients with Ringer's lactate prime and 22 patients with gelatine containing prime during coronary artery bypass surgery. The study protocol was approved by the ethics committee of the 'Clinico' Hospital of Valladolid. Written informed consent was obtained from each patient. Plasma levels of interleukin IL-6, IL-8, TNF-alpha, C-reactive protein (CRP), complement (C4), and SRIS score were measured along the surgery and within the first 48 postoperative hours at various time points. Cytokine levels were measured by enzyme-linked immunosorbent assay from plasma sample obtained. The SPSS program (version 13) was used for the statistical analysis of the data. Differences from baseline and between the groups were evaluated by two-way analysis of variance for repeated measurements (ANOVA, followed by Scheffe's test). Correlation analysis between variables was calculated using Pearson's correlation coefficient. A probability value of $p < 0.05$ was considered significant.

RESULTS. There were no significant differences between the groups regarding pre-operative data. Patients were similar with regard to type of procedure, bypass time, aortic cross-clamp time and number of grafts. In both groups the serum levels of the proinflamatory cytokines (IL-6, IL-8, TNF-alpha), SRIS score, C4, CRP, and leukocytes increased significantly over baseline, with no difference between either the colloid or crystalloid group. The operation time, blood loss, need for inotropic support, extubation time, and length of intensive care unit stay did not differ significantly between the two groups.

CONCLUSION. Priming with gelatin versus Ringer's lactate produces no significant differences in the inflammatory response in patients undergoing coronary artery bypass grafting with cardiopulmonary bypass.

0646

BLOOD LACTATE AND MEAN ARTERIAL PRESSURE AS PREDICTORS OF DEATH IN EXPERIMENTAL HEMORRHAGIC SHOCK

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INTRODUCTION. A prerequisite to evaluate resuscitation from hemorrhagic shock is a reproducible experimental model, which leads to a predictable outcome. In order to evaluate the best predictor of death, blood lactate was compared to mean arterial pressure in hypotensive animals submitted to severe controlled hemorrhage.

METHODS. Forty immature pigs were anesthetized with ketamine, atropine and halothane, intubated and maintained breathing spontaneously with atmospheric air and halothane. Pulmonary, femoral and jugular vein catheters, were inserted in order to measure cardiac output, mean arterial pressure (MAP), blood gases and blood lactate. Group I (n=10) was hemorrhaged to a MAP of 30mmHg breathing room air with halothane 0.5%. Group II (n=10) remained as control of Group I, breathing room air with halothane 0.5% and no bleeding. Group III (n=10) was hemorrhaged to a MAP of 30mmHg breathing room air with 1.5% halothane. Finally, Group IV (n=10) remained as control of Group III breathing room air with halothane 1.5% and no bleeding. Variables were recorded every ten minutes with no further intervention for 120 minutes, when anesthesia was discontinued in the surviving animals. Death of the animals was registered up to twenty four hours after the experiment.

RESULTS. All animals in Group I died. All animals in Group III survived, despite the fact that both Groups had equal degree of hypotension (MAP = 30mmHg). However, only Group I exhibited high levels of blood lactate. Receiver Operating Characteristic (ROC) curve analysis with death of the animals as the variable of interest, demonstrated that only blood lactate exhibited 100% sensitivity, 100% specificity and a ROC curve area of 1.0. Mean arterial pressure was less accurate in predicting the death of the animals.

TABLE 1.

	Sens	Specif	ROC Area	Accuracy	Cut-off	p
MAP	80%	93.3%	0.94 (0.86-1.0	90%	28 mmHg	<0.001
Lactate	100%	100%	1.0 (1.0-1.0)	100%	7.05 mM/L	<0.001

CONCLUSION. Metabolic markers should be preferred as variables indicative of the end-point to initiate and compare different regimes of volume resuscitation in experimental models of hemorrhagic shock. Such metabolic model was used by the authors in an experimental volume replacement investigation (Anesth Analg 2005;101:1785–91). Surprisingly, most hemorrhagic shock models are based on fixed pressure models rather than on metabolic markers. Treating non-lethal hypotensive animals may lead to questionable conclusions.

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0647

CHANGES IN TISSUE OXYGEN IN DIFFERENT ORGAN BEDS DURING ACUTE HYPOXAEMIA

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INTRODUCTION. Tissue oxygen tension (tPO_2) represents the balance between local supply and demand and may be a useful monitoring modality. We previously reported that lipopolysaccharide infusion produced different responses in four organ beds studied (1). In the present study we sought to compare peripheral tPO_2 measurements (bladder, muscle) against those measured in more vital organs (liver, renal cortex) during acute hypoxaemia.

METHODS. Under isoflurane anaesthesia, male Wistar rats (approx 300g weight) underwent left common carotid and right jugular venous cannulation for blood sampling/BP monitoring and fluid administration, respectively. Flow in the descending aorta (ABF) and left renal artery (RBF) were monitored by ultrasonic flow probes (Transonic Systems, USA). Arterial PO_2 was measured using a blood gas analyser (Radiometer, Copenhagen, Denmark). Tissue PO_2 was determined using Oxylite probes (Oxford Optronix, UK) placed in thigh muscle, between the right and left lobes of the liver, in the left renal cortex and within the bladder lumen. After a 30-min stabilisation period, fluid-resuscitated rats (20 ml/kg/h, n-saline) were subjected to progressive increases in hypoxaemia (15, 12.5 and 10% inspired oxygen). Comparisons were made to time-matched controls breathing room air. Statistics were performed using two-way RM-ANOVA and post-hoc Tukey's test.

RESULTS. Data shown as mean (± SE), *p<0.05 between control (C; n=10) & hypoxaemia (H; n=6); $p<0.05 between timepoint & baseline.

TABLE 1.

FiO_2 (Group)	BP (mmHg)	ABF (ml/min)	Arterial PO_2 (kPa)	Muscle tPO_2 (kPa)	Bladder tPO_2 (kPa)	Liver tPO_2 (kPa)	Kidney tPO_2 (kPa)
0.21 (C)	95 (3)	47 (4)	10.1 (0.8)	5.6 (0.4)	7.6 (0.4)	2.8 (0.3)	2.1 (0.3)
0.21 (H)	93 (1)	48 (3)	10.7 (0.5)	7.0 (1.0)	8.2 (0.5)	2.6 (0.4)	1.9 (0.5)
0.15 (C)	93 (5)	45 (3)	9.3 (0.4)	5.8 (0.4)	7.5 (0.5)	2.6 (0.4)	2.1 (0.3)
0.15 (H)	79 (3)	44 (1)	7.2 (0.8)$^{\$*}$	4.5 (0.8)$^{\$}$	5.1 (0.5)$^{\$*}$	1.8 (0.4)	1.2 (0.3)$^{\$*}$
0.125 (C)	100 (5)	39 (3)	9.6 (0.5)	6.3 (0.5)	8.2 (0.4)	3.0 (0.4)	2.7 (0.4)
0.125 (H)	65 (5)$^{\$*}$	34 (2)	5.2 (0.4)$^{\$*}$	3.9 (0.7)$^{\$*}$	2.5 (0.4)$^{\$*}$	0.8 (0.3)$^{\$*}$	1.4 (0.4)*
0.10 (C)	99 (5)	37 (2)$^{\$}$	9.3 (0.5)	6.2 (0.5)	6.1 (0.4)$^{\$}$	2.9 (0.4)	3.1 (0.5)$^{\$}$
0.10 (H)	45 (8)$^{\$*}$	14 (5)$^{\$*}$	6.9 (2.1)$^{\$*}$	2.2 (0.7)$^{\$*}$	1.0 (0.4)$^{\$*}$	0.6 (0.5)$^{\$*}$	0.8 (0.4)$^{\$*}$

CONCLUSION. In this short-term model of hypoxaemia, changes in tPO_2 in peripheral organs (muscle, bladder) matched those of deeper organs (liver, renal cortex) both in terms of direction and magnitude. This contrasts with our findings in short-term models of hypodynamic endotoxaemic sepsis and haemorrhage (1, 2), indicating varying tissue PO_2 responses depending on the shock state.

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0648

WEANING OF NOREPINEPHRINE IN SEPTIC SHOCK

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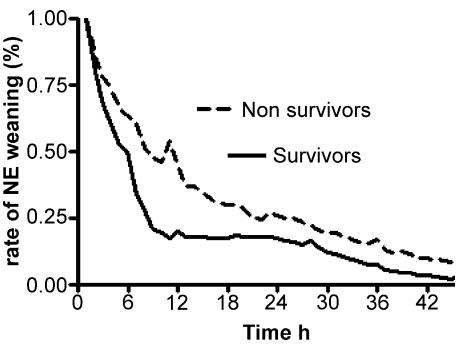
INTRODUCTION. To our knowledge, there are only few data available in the literature on the norepinephrine (NE) weaning procedure in septic shock patients. Our study was aimed at describing the weaning of NE in a cohort of patients with septic shock.

METHODS. Forty mechanically ventilated patients (age: 48 (18) yrs; SAPS 2: 46 (19); SOFA: 10 (3)) were retrospectively included. Hemodynamic monitoring was performed using a Picco system. The weaning of NE was considered as the time from the maximal rate of infusion to the end of infusion (null rate). A nurse driven protocol consisted on reduction of rate of infusion by 0.2 μg/kg/min every 30 min if mean arterial pressure was > 65 mmHg. Failure to wean was defined as death occurring during NE infusion. Results were assessed according to survivors (n = 26) and non survivors (n = 14). Results are expressed as mean (SD).

RESULTS. The duration of NE weaning was 36 (31) hours in the survivors. The maximal rate of infusion, was 1.8 (1.5) μg/kg/min. The actual level of mean arterial pressure (MAP) was constantly above 85 mmHg. In the non survivors, the patients died from 4 to 126 hours after the onset of NE infusion. The rate of infusion was higher than in the survivors at all time. Twelve hours after the onset of weaning, the rate was reduced by 50% in survivors, versus 35% in non survivors.



CONCLUSION. In the survivors, one to two days are required to wean NE. A fast weaning rate during the fist hours seems assocatied with good outcome. The MAP is elevated during the weaning, which means that an aggressive protocol is needed to shorten the duration of NE administration.

0649

PROPORTIONAL ASSIST VENTILATION COMPARED WITH PRESSURE SUPPORT VENTILATION IN INTUBATED SPONTANEOUSLY BREATHING PATIENTS WITH ACUTE LUNG INJURY

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INTRODUCTION. The use of partial ventilatory support in patients with acute lung injury (ALI) let them to perform an active inspiration, while it acts in providing the amount of work that patient's muscles are not able to achieve themselves. Both pressure support ventilation (PSV) and proportional assist ventilation (PAV) are partial ventilatory supports. In contrast to PSV, PAV is designed to give inspiratory airway pressure in proportion to the subject's inspiratory effort. The aim of this study was to compare PAV and PSV in intubated patients with ALI.

METHODS. Twenty intubated spontaneously breathing patients with ALI were included in this study. Patients received PSV and different assist levels of PAV (80%, 60%, 40% respectively) in random order. Each step lasted 30 min. Breathing pattern, arterial blood gases, respiratory mechanics and hemodynamic parameters were measured at the end of each of the four steps. Respiratory comfort was estimated also.

RESULTS. No significant difference of tidal volume (VT), respiratory rate (RR), minute ventilation (VE), peak inspiratory pressure (PIP) and P0.1 were observed between PAV and PAV80%. Compared with PAV80%, mean airway pressure (Pawm), patient's inspiratory work of breathing (WOBp) and imposed work of breathing (WOBimp) was markedly higher during PSV ($P<0.05$). During PAV, PIP, Pawn and VT decreased but RR, P0.1 and WOBp increased significantly as the level of assistance was deceased, but VE did not change. The coefficient of variation (CV) of VT during PSV was lower then the three PAV modes (13% vs 21% -PAV80%, 17% -PAV60%, 16%-PAV40%) ($P<0.05$). No significant difference of CV of RR was found during all the four modes. Heart rate (HR) was lower during PAV80% compared to PSV, and HR increased slightly as the level of assistance was deceased. Mean arterial pressure, central venous pressure, arterial blood pH and arterial oxygen tension did not differ between the four modes. With PAV 40%, arterial carbon dioxide tension increased compared to PSV and PAV80%. In addition, respiratory comfort during the PAV80% trial was significantly higher than during the PSV one.

CONCLUSION. In patients with ALI, PAV80% and PSV were associated with comparable gas exchange and hemodynamic parameters, whereas WOBp, WOBimp and Pawm were lower during PAV80%. During PAV, patients can breath as their ventilatory centers seem fit, and this was felt as more comfortable.

GRANT ACKNOWLEDGEMENT. This work was supported by Program for New Century Excellent Talents (The Ministry of Education) (NCET-04-0476)

0650

DISPARITY BETWEEN MICROCIRCULATORY AND SKIN PERFUSION IN SEPSIS

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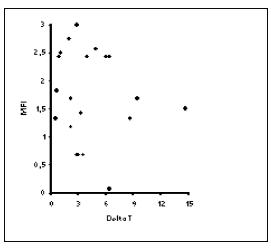
INTRODUCTION. In the past few years new insights in the role of microcirculatory alterations during sepsis have been elucidated by means of Orthogonal Polarization Spectral (OPS) imaging. Persistent alterations appeared to have prognostic value. Several other techniques, such as Near Infra Red Spectroscopy, laser Doppler and peripheral temperature have been used to asses peripheral circulation. However there is unclarity about relation between peripheral and microcirculation during sepsis. Aim of this study was to evaluate the relation between peripheral and microcirculatory alterations during sepsis.

METHODS. We performed a single centre observational study in patients with <24h severe sepsis/septic shock. OPS imaging of the sublingual region and semi-quantitative analysis were performed as described in detail elsewhere[1]. Skin perfusion was measured as central-to-toe temperature difference (DeltaT). Non-parametric rank correlation is expressed as Spearman's rho(r_s).

RESULTS. 20 consecutive patients were enrolled in the study; median APACHE II score was 18.5 (IQR 14-25), all patients were ventilated. Median microcirculatory flow, expressed as microvascular flow index (MFI) was 2.4 (IQR 1.6-3), median DeltaT 3.2 (IQR 2.1-6.2). Correlation coefficient between MFI and DeltaT was 0.16 (fig).



CONCLUSION. Patients with early sepsis/septic shock show no significant correlation between microcirculatory flow alterations and skin perfusion, as expressed by DeltaT. Under these conditions alterations in skin perfusion therefore do not "represent" microcirculatory abnormalities.

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Poster Sessions
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0651

CONTINUOUS MEROPENEM ADMINISTRATION IN DOSE OF 1 GRAM PER 6 HOURS PROVIDES RELIABLE SERUM MEROPENEM CONCENTRATIONS IN RELATION TO MICS OF PATHOGENS

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INTRODUCTION. Beta-lactam antibiotics efficacy depends on the duration of time in which serum concentration exceeds minimum inhibitory concentration (MIC) of pathogen. The aim of open prospective study was to compare serum meropenem concentrations with MICs of causing infection pathogens during continuous administration of meropenem in critically ill patients.

METHODS. Patients admitted on interdisciplinary ICU suffering from infection indicated to meropenem administration received a 2 g iv loading dose of meropenem followed by a daily 4 g continuous infusion (1g during 6 hour period). Blood samples for measurement of meropenem concentration were collected after 48 hours of meropenem administration. Serum meropenem concentrations were determined using high-performance liquid chromatography (HPLC) assay. MICs of meropenem in identified pathogens were determined by using Etest (AB BIODISK, Solna, Sweden) methodology. The study was approved by the Ethics Committee of University Hospital.

RESULTS. A total 16 patients (7 men and 9 women) with normal renal functions (median MDRD 1,3 ml/sec/1,73 m2 [interquartile range 0,87-1,4]), mean age 44,6 ± 18,1 years, mean weight 68,6 ± 15,2 kg, mean APACHE II 17,2 ± 7,5, suffering from pneumonia (n=9), intraabdominal infection (n=4), blood stream infection (n=2), mediastinitis (n=2) and sinusitis (n=1) were enrolled in study. Six pathogens causing infections were identified and MICs of meropenem were determined. A total of 30 blood samples were analyzed for serum meropenem serum concentration (MSC) assessment (table 1). Data expressed as median (interquartile range).

TABLE 1.

Pathogen	Meropenem serum concentration (mg/l)	MIC (mg/l)	MSC/MIC
***Enterobacter cloaceae* (n=4)**	6,6 (4,6-7,8)	0,19 (0,047-0,19)	34,7
***Escherichia coli* (n=3)**	7,3 (5,6-10,8)	0,28 (0,032-0,38)	26,1
***Pseudomonas aerug* (n=5)**	12,2 (9,2-13,5)	2,0 (4,0-0,5)	6,1
***Serratia marcescens* (n=2)**	11,9 (9,1–11,9)	0,12 (0,064-0,19)	99,2
***Acinetobacter baum* (n=3)**	12,8 (7,6-13,8)	2,0 (1,0-2,0)	6,4
***Klebsiella pneumoniae* (n=13)**	7,6 (5,8 – 12,2)	0,064 (0,047-0,094)	118,8
ALL pathogens (n=30)	9,7 (7,4-12,1)	0,24 (0,14-1,57)	40,4

MSC - meropenem serum concentration, MIC - minimum inhibitory concentration

CONCLUSION. We conclude that continuous infusion of meropenem in dose 1g per 6 hours in critically ill patients provides reliable serum meropenem concentrations in relation to MICs of meropenem sensitive pathogens.

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0652

SCOPING THE NEED FOR SPEECH & LANGUAGE THERAPY (SLT) IN CRITICAL CARE

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INTRODUCTION. Although several key documents recommend that SLT should be integral to the multidisciplinary care of critically ill patients[1,2,3,4]these services are often not funded. Without this input there is increased risk of nosocomial pneumonia, malnutrition and dehydration. Antibiotic prescription and length of stay may increase with higher dependency and a slower transition through levels of care. Communication difficulties may also impact on the patient experience. As per Royal College of Speech & Language Therapists guidelines[4]our project explored unmet need and defined the potential role of SLT at Hope Hospital, a regional neuroscience centre.

METHODS. SLT provided daily input to critical care patients for a 2 month period. Prospective data were collected detailing referrals and SLT management, and were compared with retrospective data from 2 months prior to the project. Stakeholder evaluation was carried out using pre and post project staff questionnaires, and by collecting anecdotal evidence from patients and staff.

RESULTS. Referrals to SLT increased by 125% (20 pre-project versus 45 during the project). Pre project, 25% referrals(5) were inappropriate and 20% (4) transferred before asessment. 100% referrals (45) during the project were appropriate and assessed. 60% of pre-project referrals were seen on the day of referral compared to 96% during the project. Pre-project SLT intervention focused on assessment and advice alone. The project promoted earlier identification of needs, early management of clinical risk and contributed to multidisciplinary care. Major training and education needs were identified. Stakeholder evaluation was overwhelmingly positive, demonstrating SLT contribution to multidisciplinary care and the patient experience.

CONCLUSION. Dedicated SLT input in critical care increased referrals to SLT. The number of inappropriate referrals and the time to SLT assessment decreased. Input promoted the identification of clinical risk, facilitating early intervention and rehabilitation. Training needs and additional roles for SLT (weaning, decannulation and risk management) were identified. Stakeholder evaluation demonstrated improved patient experience. These findings form the basis of a business case to expand SLT resources in critical care.

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0653

ANTIBIOTIC FAILURE IN SPONTANEOUS BACTERIAL PERITONITIS. A RETROSPECTIVE STUDY

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INTRODUCTION. Spontaneous bacterial peritonitis (SBP) is a life-threatening condition in cirrhotic patients usually caused by gram-negative enteric micro-organisms. Whereas several studies established cefotaxime, or other 3rd generation cephalosporins, amoxicillin/clavulanic acid and oral quinolones as effective first-line antibiotic regimens in community-acquired cases, little is known about the spectrum of antimicrobial resistance, impact of an effective initial antibiotic regimen on survival and the spectrum of causative micro-organisms in hospital acquired cases.

METHODS. All cases of SBP diagnosed in a university hospital between January 2002 and August 2006 were retrospectively analysed.

RESULTS. 101 cases (77m, 24f) were retrieved. Mean (± SD) age was 56 (±10) years. MELD-score was 23.4 (±8.7) at the time of the diagnostic tap. In 31 patients the infection was community acquired, in 70 patients hospital acquired. 48 patients (47.5%) died in the hospital. The initial antibiotic regimen was a third generation cephalosporin in 53, an ampicillin/sulbactam in 15 and a quinolone in 13 cases. 15 cases (all hospital-acquired infections) were initially treated with a carbapenem and vancomycin had been added in 14 cases. In 32 patients the antibiotic regimen had to be changed during the course of treatment. Survival was not worse in hospital-acquired cases than in community-acquired cases, but hospital-acquired cases were more often treated with broader antibiotic regimens at the onset of therapy. Patients in whom the initial antibiotic treatment had to be modified had a higher mortality than patients in whom the initial treatment was continued (66% vs. 39%; p=0.011). In 38 patients with positive culture results, an effective first-line antibiotic regimen was associated with lower mortality (52% vs. 90%; p=0.036). Binary logistic regression analysis found MELD-score at diagnosis (p=0.002, 95% confidence interval (CI) 1.034 – 1.162), ascitic fluid cell count (tsd) (p=0.025, 95% CI 1.020 – 1.356) and an escalation of antibiotic therapy (p=0.028, 95% CI 1.130 – 8.475) to be independently associated with mortality. The most commonly cultured micro-organism was e. coli (n=16), followed by enterococcus faecium (n=10). Among culture positive cases the causative micro-organism was resistant to ceftriaxone in 13 (35%), to ampicillin/sulbactam in 16 (42%) and to ciprofloxacin in 17 (46%).

CONCLUSION. The incidence of resistance to one of the recommended standard regimens is high in hospital-acquired and community-acquired cases of SBP. Failure of the initial antibiotic regimen is associated with higher mortality. Broader antibiotic regimens should be considered as initial approach.

0654

COLISTIN IN ICU INFECTIONS

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INTRODUCTION. The multidrug-resistance (MDR) of Gram (-) strains in the ICU is a severely growing problem, so colistin has been recently reintroduced in clinical practice. Colistin had fallen out of favour after 1970 due to nephrotoxicity, neurotoxicity and poor pharmacokinetics in lung tissue. The aim of this clinical trial is to study the efficacy and safety of colistin in MDR Gram (-) nosocomial infections (NI) in the ICU during the last 27 months.

METHODS. We enrolled retrospectively 56 ICU patients (pts), 42 men (75%) and 14 women (25%), who developed a MDR Gram (-) NI. Mean age: 49.4±20.6 years, mean stay: 37.4±12.2 days. Underlying diseases: Multiple trauma 36, complicated surgery 14, other 6. The pts were treated (63 courses) with intravenous (IV) colistin 3.000.000 IU x 3 daily (adjusted for creatinine clearance) in combination with carbapenems or b-lactamase inhibitors. In 15 pts aerosolized colistin (500.000 IU x 4 daily) was added to IV colistin.

RESULTS. The 63 NI treated were: 32 pneumonia (50.8%), 17 central venous catheter-related infection (27%), peritonitis 12 (19%), 2 central nervous system infection (CNSI) (3.2%). Pts with CNSI additionally received colistin intrathecally. The responsible bacteria were: Ac. baumannii 33 (46.5%), Ps. aeruginosa 31 (43.7%) and Kl. pneumoniae 7 (9.9%), with double pathogen in 8 episodes of NI. Clinical success (important lessening of the signs and symptoms of NI) occurred in 38 NI (60.3%); microbiological success (eradication of the pathogen in cultures of blood, peritoneal fluid, bronchial secretions or celebrospinal fluid) was obtained in 45 (71.4%). Nephrotoxicity was observed in 3 pts (4.8%); it was reversible. Mortality rates: 16/56=28.6%.

CONCLUSION. 1) Colistin in combination with other antibiotics is an effective treatment of severe MDR Gram (-) NI in the ICU. 2) The incidence of adverse events is low; a close surveillance of renal function is needed. 3) When aerosolized colistin was included in treatment, microbiological success was accelerated (p<0.05). 4) Pneumonia was the NI best corresponded to colistin than other sites of NI, but not statistically significantly (p<0.1). 5) Prognosis was independent of type of invading Gram (-) microorganism.

0655

CONTINUOUS VERSUS INTERMITTENT INFECTIOUS DISEASE CONSULTATION AND THE DECREASE OF MULTI-RESISTANT STAINS IN INTENSIVE THERAPY UNITS

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INTRODUCTION. The biggest concern in infection epidemiology in Intensive Care is the emergence of multidrug-resistant gram-negative (Pseudomonas aeruginosa, Klebsiella pneumoniae and Acinetobacter baumannii) and gram-positive (Staphylococcus aureus) organisms.

METHODS. Two periods of six months were analyzed for each ICU: in the first six months (from Mar/2006 to Aug/2006) no infectious disease advice was given in any; in the following six months (Sep/2006 the Fev/2007) infectious disease consultation was given in ICU 1 when requested, as opposed to ICU 2, where it was continuously provided by an infectious disease consultant with degree in intensive care. The number of multi-resistant organisms grown was then compared. A t-test for two independent samples was used in statistics.

RESULTS. The species distribution of the pathogens evaluated in ICU 1 is summarized in Table 1. There was reduction in the occurrence of P.aeruginosa 44% (29-60,1%), A.baumannii 23% (7,5-50%) and S.aureus 30% (10,3-60,8%), with significant p value for P.aeruginosa, the most common microorganism.* K.pneumoniae percentage of increase = 27,2 %. Table 2 summarizes the results in ICU 2, where the decrease in growth of the multi-resistant stains was higher: 60% for P.aeruginosa (38,6-78,1%), 62,5%for K.pneumoniae (42,6%-78,9%) and 43 % for S.aureus (15,7-75%) also with significant p value for P.aeruginosa.

TABLE 1.

ICU 1 : Microrganism	Occurrence Mar/06	Occurrence Aug/06	Occurrence Sep/06 Fev/07	% of fall	95% confidence interval	P value
P.aeruginosa	34		19	44 %	29-60,1%	P=0,0364
K.pneumoniae	16		22	* 0%	13-48%	P=0,42
A.baumannii	13		10	23 %	7,5-50%	P=0,64
Saureus	10		7	30 %	10,3-60,8%	P=1,00

TABLE 2.

ICU 2 : Microrganisms	Occurrence Mar/06	Occurrence Aug/06	Occurrence Sep/06	Occurrence Fev/07	% of fall	95% confidence interval	P value
P.aeruginosa	20		8		60%	38,6-78,1%	0,03
K.pneumoniae	24		9		62,5%	42,6-78,9%	0,09
A.baumannii	5		5		0%	51-100%	1,00
S.aureus	7		4		43%	15,7-75%	1,00

CONCLUSION. The continuous presence of an infectious disease consultant with experience in intensive care in the ICU environment, especially during the decision-making steps, may considerably improve the incidence of multi-resistant microorganisms. This has been proven significant in regards to P.aeruginosa. The rationale for the use of antimicrobial agents, the awareness of the institutional (and its different units') resistance patterns, together with the knowledge of an intensive care frequenter, have possibly played a role.

0656

INTENSIVE CARE UNIT-ACQUIRED INFECTIONS IN PATIENTS WITH EXTRARENAL DEPURATION

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INTRODUCTION. Evaluate the incidence of ICU-acquired infections related to invasive techniques in patients admitted in ICU with extrarenal depuration (ERD) needs, compared to the rest of ICU hospitalized patients.

METHODS. A multicenter prospective study was performed between April and July 2006 in 107 ICUs of 99 Spanish hospitals. We included patients with ERD admitted for at least 24 hours until ICU discharge or a 30-day period. Demographic characteristics, infections developed during ICU stay (I-ICU) expressed in rate by 100 patients or for 1000 days (DI), etiology and resistance patterns were collected. Infection sites studied were: ventilator-associated pneumonia (VAP), urinary tract infection (UTI), primary bacteriemia and catheter-related bacteriemia (BP/CB) and secondary bacteriemia (SB).

RESULTS. Among 11,461 evaluated patients, 397 (3,46 %) required ERD. Characteristics are shown in table 1. Invasive procedures: Mechanical Ventilation (MV): 41,7 / 75 %, Central venous catheter (CVC): 71,4 / 95,2 %, Parenteral Nutrition (PN): 12,7 / 49,8 %. Nosocomial infections and outcome (see table 2). Patients with ERD presented different etiologies, principally P aeruginosa, Acinetobacter and Candidas and higher-resistance patterns. Infection/colonization by multiresistant bacteria were: ESBL 0,79 / 2,77 %, MRSA 1,8 / 6,3 %; Acinetobacter 1,7/ 8,3 %, MR P aeruginosa 0,9 / 6,8 %. Antibiotics were administrated to 28,3 /58,1 % of patients before ICU's admission and 56,9 / 86,3 % during ICU stay. The number of antibiotics/patient was 2,1 /3,9 respectively.

TABLE 1.

	Patients N	Age	APACHE II	Coronary	Medical	Surgical	Trauma	Inmunosup.
Total	11.461	61,4	14,1	27,2	38,1	24,5	10	8,2
ERD	397/3,4%	61,7	24	9,5	60,7	23,9	5,7	24,6

CONCLUSION. Patients with ERD have higher severity and more frequently immunodepression and medical pathology. They needed more invasive procedures and antibiotic therapy so infection rates and resistance patterns are superior to the rest of ICU patients.

0657

INTRAVASCULAR CATHETER RELATED BLOODSTREAM INFECTIONS — 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 impact on costs. In our unit, according to a quality political, it had established standards on prevention, diagnosis and treatment of nosocomial infections, with a periodic review of the ours rates. We will describe the managerial model chosen when we noticed an increase of the catheter related infections incidence: outcome management.

METHODS. In December 2006 it was created a multi-professional work group (4 doctors, 6 nurses and 2 respiratory therapists) who performed a weekly 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 had established corrective measures, deadlines and ways for execution.

RESULTS. Measures chosen: team for catheter insertion; using full-barrier precautions for insertion of central venous catheters; using of semipermeable and transparent dressings; avoiding the jugular and the femoral sites; routine replacement of the catheters after ten days insertion; removal of the unnecessary catheters. Target was return of catheter related infection rate to level of the previous year. In the first three months after the intervention, we noticed a reduction of the median rate of catheter-related bloodstream infection per 1000 catheter-days: 13,08 infections to 5,8.

CONCLUSION. Catheter-related bloodstream infection is the nosocomial infection par excellence: costly, common, and frequently fatal. Efforts to improve patient safety must focus on simple and inexpensive interventions and prevention measures. The managerial tool showed us main causes of the problem and caused the adhesion of all staff around the catheter related infections and the correct measures to solve it.

0658

VANCOMYCIN IS NOT INFERIOR TO LINEZOLID FOR THE BLIND TREATMENT OF INFECTION IN THE ICU

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INTRODUCTION. Limited data suggest that Vancomycin when given by intermittent injection may not be as affective as Linezolid for the treatment of ventilator acquired pneumonia and this inferiority may be negated by administering Vancomycin by continuous infusion (1). Administration in this fashion may improve the drug's tissue penetration and is easier to control but a double blind randomised controlled trial has not been carried out.

METHODS. The way in which vancomycin was administered in our ICUs was changed in May 2005 so that any patient with central venous access was given vancomycin by continuous infusion according to a strict protocol (2). Data from our electronic prescribing system was correlated with ICNARC data for mortality. We conducted a retrospective audit from December 2004 to October 2006 comparing ICU outcome in patients who were treated with one agent only. Patients who received both Linezolid and Vancomycin or were on a BD and infusion regiment were excluded.

RESULTS. 219 patients were treated with vancomycin infusion, of whom 19.6% died. This was not significantly different from the mortality for vancomycin when given by intermittent injection of 23.7%. Interestingly the mortality for those treated with linezolid in an unmatched group of patients was 40.4% ($p<0.01$).

TABLE 1.

	Dead (n)	Alive (n)	Mortality (%)
Vancomycin Infusion	176	43	19.6
Vancomycin BD	258	80	23.7
Linezolid	34	23	40.4
Total	468	146	23.8

*Degrees of freedom: 2; Chi-square = 10.71 – *p < 0.01*

CONCLUSION. Contrary to previous audits, our data suggest that vancomycin is not inferior to linezolid for ICU mortality. The mode by which vancomycin is administered does not affect mortality. The increased mortality found in patients treated with linezolid has yet to be explained. Further analysis is required.

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0659

INFECTION CONTROL MEASURES ARE NOT ALWAYS NECESSARY TO AFFECT MRSA INFECTION RATES IN ICU

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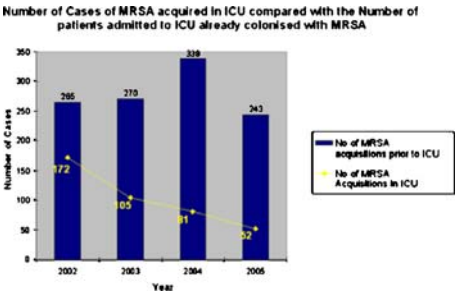
INTRODUCTION. There are recommendations for control and prevention of Methicillin-Resistant Staphylococcus Aureus (MRSA) (1); Surveillance Reduction in antibiotics use, Screening, Nasal and skin decolonization, Handwashing, Isolation, Decontamination of clinical areas, Adequate staffing. These recommendations however, are frequently based on large series and case reports rather than randomised trials (2). Of those recommendations, only two (handwashing and adequate staffing) are reliably carried out in our ICU. Even conventional 'deep cleaning' has been shown to be unreliable (3).

METHODS. All patients admitted to ITU at University Hospital Birmingham between June 2002 and May 2006 were retrospectively studied so that any microbiological sample that was positive for MRSA was correlated with the date of ICU admission.

RESULTS. The number of patients admitted to ICU already infected/colonised with MRSA in 2002 was 265 and 172 new cases occurred. By 2005 the number of new cases in ICU had fallen significantly to 52 despite the number of patients admitted to the ICU already carrying MRSA was 243 ($p=0.001$, 4*2 Chi squared = 60.05 Degrees of Freedom = 3).



CONCLUSION. There has been a steady decline in the number of primary MRSA infection occurring in our ICU whilst the number of cases admitted has remained constant. Colonisation pressure from patients admitted to ICU is independent of MRSA acquisition. The reasons for our decline in MRSA infection remain unclear as full recommendations to inhibit MRSA spread can not be implemented.

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0660

COMPLIANCE WITH RESTRICTED MEROPENEM PRESCRIPTION IN A SURGICAL ICU

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INTRODUCTION. In our tertiary surgical ICU, antibiotic policy restricts prescription of meropenem to 1) the empirical treatment of suspected bacterial severe sepsis in patients with risk factors for antimicrobial resistance or with documented colonisation with multiresistant gram negative (MRGN) organisms, or 2) the directed treatment of infections caused by MRGN organisms. To evaluate compliance with these restrictions, the indications for meropenem use were reviewed, and the feasibility of a de-escalation strategy in case of empirical meropenem prescription was evaluated.

METHODS. We performed a retrospective study of all meropenem prescriptions in the surgical ICU from 1/1/2005 to 31/12/2005. Patients who received more than one dose of meropenem were included in the analysis. Age, APACHE II, prior length of stay, duration of meropenem administration, antibiotic prescription other than meropenem, microbial etiology and site of infection were recorded. The presence of risk factors for antimicrobial resistance, i.e. either previous exposure to broad spectrum antibiotics or a hospital stay for longer than 7 days prior to infection were documented. Data are presented as mean (standard deviation).

RESULTS. Data from hundred and thirteen meropenem prescriptions were available for analysis. Mean age of the patients was 60 (15.9), and the mean APACHE II score was 19 (5.8). Pulmonary (46%) and intraabdominal (31%) infections were the most frequent sites of infection. Meropenem was prescribed according to the restricted indications in 100/113 patients (88%). In 44 patients it was initiated empirically with both risk factors for antimicrobial resistance present, and in 15 patients it was used because of documented colonisation with MRGN organisms prior to the current infection; in 41 cases it was used after identification of a MRGN organism as the causative organism of the infection. In the other patients (n=13), meropenem was started empirically with no or only 1 risk factor for resistance and without documented colonisation with MRGN organisms. Empirical prescription of meropenem was de-escalated in 38 patients (53%). Reasons for not de-escalating were the identification of MRGN organisms or uncontrolled polymicrobial infections.

CONCLUSION. Compliance with the restricted indications for meropenem in our ICU was high. Empirical prescription of meropenem was de-escalated upon culture results in half of the cases.

0661

POSITION AND TURNING FREQUENCY OF PATIENTS IN ICU

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INTRODUCTION. Patient position in ICU is important for preventing complications such as pneumonia [1]. Two hourly turning is a common standard of care [2]. Evidence suggests that patients may not be turned this frequently [3]. We therefore conducted a prospective observational study of patient position and turning in ICU and the factors that may affect the frequency of turns.

METHODS. Forty eight of 351 UK ICUs contacted agreed to participate in this study. The position of each ICU patient was recorded every hour over two 24 hour periods, one midweek and one weekend. The patient age, gender, estimated height and weight, diagnosis, whether intubated and ventilated, hourly sedation score, nurse:patient ratio and number of patients on the unit were also recorded. Patients could be on their back, front, left or right side. A turn was defined as a change from one of these positions to another. The degree of rotation and whether patients were flat, head down or head up was also noted. Analysis of the relationship between the average time between turns and factors that may be associated with this was performed using multiple regression on the log transformed dependent variables.

RESULTS. 393 sets of observations were analysed. 5 patients were prone at some time. Other positions are in the table. The average time between turns was 4.85 hours, median 4.0 (range 1.2-24; interquartile range 3-5.5). There was no significant association between the average time between turns and age, gender, respiratory tract-related diagnosis, intubated and ventilated, sedation score, day of week or nurse:patient ratio. There were significant differences between hospitals in the frequency with which they turned patients on their unit.

TABLE 1.

% (SD) of time in each position

position	back	left	right	head down	flat	head up < 45 deg	head up >= 45 deg
average % of time	46.1	28.4	25.5	0.2	2.3	50.7	46.7
(SD)	24.1	17.0	16.1	3.1	9.7	35.4	35.8

CONCLUSION. Patients are rarely nursed flat. Some patients go for prolonged periods without a change in their position. There was no association between the average frequency of turns and the patient and organisational factors we examined. However there are differences between hospitals in the practice of turning patients.

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0662

INTERMITENT ASPIRATION OF SUBGLOTIC SECRETION IN PREVENTING VENTILATOR-ASSOCIATED PNEUMONIA

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INTRODUCTION. This study compares the incidence of VAP in traumatic patients receiving mechanical ventilation for >72 hours with a endotrachealtube with a dorsal lumen for intermitent drainage of subglotic secretions with others that received mechanical ventilation with a conventional endotracheal tube.

METHODS. Traumatic patients admitted to the Reanimation unit of the Complexo Hospitalario de Ourense from march 2006 to august 2006 that received mechanical ventilation for at least 72 hours were eligible for study. The follow-up period consisted of the patients remaining stay in the reanimation unit. Demographic and clinical characteristics of patients were collected on admission. VAP was suspectted in patients with a Clinical Pulmonary Infection Score 6 or more. The diagnosis was done by tracheal aspiration and protected specimen brush. The bacteriologic examination was done by cuantitative and cualitative methods.

RESULTS. 18 patients were included inthe study (7 that received intermitent drainage of subglotic secretions and 11 in group control). There were not early-onset pneumonia on patients with intermitent drainage of subglotic secretions. There were not significative stadistycal differencies in incidence, duration of ventilation, reanimation length of stay or mortality.

CONCLUSION. this study didn't find statystical differences between the two groups because of the short number of patients; but it is important that inthe group wich received intermitent drainage of subglotic secretions there weren't eppisodies of early-onset pneumonia.

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0663

EVALUATION OF THE REGULATION OF GLYCOPEPTIDES (GP) IN AN INTENSIVE CARE UNIT

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INTRODUCTION. To analyze the indications and the quality of the prescription of glycopeptides (GP) in an intensive care unit of 10 beds.

METHODS. A 24-months retrospective study. The treatment was indicated if it answered the recommendations were selected. It was correct if:correct initial dose,corrects glycopeptides concentrations,serum dose obtained with fixed levels, antibiogram justifying the prescription of a GP in the event of bacteriological documentation.

RESULTS. SAPS II 55,3 (± 21,4), age 64 years (± 17,07),gender (M/F) 1,4. 72,7% of the patients presented a renal insufficiency. Treated pathology:44 pneumoniae(49%),20 septic shock(24%),8 intra-abdominal infections (11%), 6 blood stream infections,6 hyperthermia of unknown origin (3%), 2 infections of the skin (3%),2 pyelonephritis (2%). Frequency of organism recovery was:28 coag-neg staphylococci (including 14 OXA-R),27 staphylococci aureus (including 19 MRSA),5 entérococcus (including 1 AMPI-R),others :21. The indications of regulation were largely respected but the methods of use of the GP were failing. Even when the regulation was correct (n=65), the fixed serum rate was reached only in 74% of the cases. There is no difference between this 20 patients in septic shock and other patients. Taking into account the profile of the patients of intensive care unit, it seems difficult to predict that a treatment will be effective and that sub-inhibiting serum concentrations will be avoided even if the recommendations were respected. The situation becomes more and more delicate because of the increasing bacterial resistance.

TABLE 1.

	TEICOPLANIN	VANCOMYCIN (continuous treatment)	TOTAL
number of evaluated treatment	72 (81.8%)	16 (18.2%)	88 (100%)
treatment indicated	64(88.9%)	16 (100%)	80 (91%)
correct initial dose	71 (98.6)	14 (87.5%)	85 (96.6%)
if so ,correct posology	56 (78.9%)	11 (78.6%)	67 (78.8%)
correct posology of maintenance dose	60(83.3%)	14 (87.7%)	74 (84.1%)
realization of GP concentrations	46 (63.9%)	13 (81.3%)	59 (67%)
if so, corrects GP concentrations	27 (58.7%)	12 (92.3%)	39 (66%)
corrects treatment	26 (36%)	9 (56.3%)	35 (40%)

CONCLUSION. An improvement of the methods of regulation and of the monitoring of treatments are essential if we take into account the increasing bacterial resistance. If glycopeptides are still the initial standard treatment of serious infections, new therapeutic strategies should be emerging, depending on the confirmation of presented innovations.

GRANT ACKNOWLEDGEMENT. Manica Vasseur,microbiologiste-CHSA Maubeuge

0664

FACTORS PREDICTING BACTERIAL INVOLVEMENT IN SEVERE ACUTE EXACERBATIONS OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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INTRODUCTION. The aim of this study was to determine factors predicting bacterial severe acute exacerbations (AE) of COPD.

METHODS. Prospective observational cohort study, performed in a 30-bed ICU. All COPD patients with AE who required intubation and mechanical ventilation were eligible. At ICU admission, information on endotracheal aspirate purulence, and hyperthermia was collected. In all patients, Gram stain and quantitative endotracheal aspirate culture (positive at 10^6cfu/mL) were performed. In addition, leucocytes count, C-reactive protein (CRP), and procalcitonin (PCT) levels were measured. Univariate and multivariate analyses were used to determine variables associated with bacterial severe AECOPD. Positive predictive value and negative predictive value were calculated for variables independently associated with bacterial severe AECOPD.

RESULTS. 98 severe AECOPD were diagnosed in 92 patients. 49 bacteria were isolated at significant threshold in 40 exacerbations. S. pneumoniae (16%), methicillin-sensitive S. aureus (16%), and H. influenzae (14%) were the most frequently isolated bacteria. Age (67±9 vs 69±11), male gender (77% vs 67%), SAPS II (44±15 vs 44±14), duration of mechanical ventilation (16±15 vs 13±13d), and mortality (25% vs 22%) were similar in patients with bacterial severe AECOPD and those with nonbacterial severe AECOPD. Rate of patients who received prior antibiotic treatment was significantly lower in patients with bacterial severe AECOPD than in patients with nonbacterial severe AECOPD (30% vs 58%, p = 0.005). No significant difference was found in rates of patients with hyperthermia (27% vs 29%), purulent endotracheal aspirate (77% vs 65%), and leucocytosis (70% vs 63%) between the two groups. Although leucocytes, CRP and PCT levels were similar in the two groups, rates of patients with PCT >0.5 ng/mL (45% vs 29%, p = 0.084), and patients with positive Gram stain of endotracheal aspirate (87% vs 24%, p<0.001) were higher in patients with bacterial severe AECOPD than in patients with nonbactrerial severe AECOPD. PCT > 0.5 ng/mL (OR [95% CI] = 3.7 [1.1-13], p = 0.037), and positive Gram stain of endotracheal aspirate (29 [8-102], p <0.001) were independently associated with bacterial severe AECOPD.

TABLE 1.

	PPV (%)	NPV (%)
Positive Gram stain	71	90
PCT>0.5 ng/ml	51	65
Positive Gram stain or PCT>0.5	58	97

CONCLUSION. Positive Gram stain of endotracheal aspirate, and PCT > 0.5 ng/mL are independently associated with bacterial severe AECOPD. These results could be helpful for future interventional studies aiming at reducing antibiotic use in these patients.

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Infection: New aspects 0665-0677

0665

PROFILE OF PATIENTS IN NOSOCOMIAL PNEUMONIA IN SPECIALIZED ICUS OF A TERTIARY HOSPITAL

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INTRODUCTION. Nosocomial pneumonia (NP) continues to be an important cause of morbidity and mortality in the ICU. The type of ICU (medical, Md or surgical, Sg) has been described as an important factor to influence their etiology.

METHODS. Prospective, observational study conducted between 11/04 and 07/06 in 5 specialized ICUs of a tertiary hospital. All patienst who fulfilled clinical criteria (2 of 3) of NP were included. Epidemiological and microbiological features were registered. The patients were grouped according their origin from a Md or Sg ICU.

RESULTS. We included 82 patients (Md, n=64 and Sg n=19). Age 62±16 yrs. ICU admisión APACHE II 16.5±6. The distribution of infections between ICUs was for Md and Sg respectively: ventilator-associated pneumonia (VAP) 54% vs 57%, ventilator-associated tracheobronchitis (VAT) 8% vs 21%, and NP 37% vs 29%. We could not find significant differences in epidemiological characteristics (except age 65±12 vs 53±22, p=0.047), risk factors for NN and blood test between the groups. 49 patients (59%) had microbiological diagnosis (Md=38 vs Sg=11). The most frequent microorganism producing pneumonia in these patients were MRSA and MSSA (same distribution: 6,16% vs 3,27%, p=0.41), followed by P. Aeruginosa (11,28% vs 0%, p=0.05). The inadequate initial AB therapy was slightly higher in Sg patients (23% vs 36%, p=0.44) and the mortality rate was not influenced by this variable. The ICU and hospital LOS were alike and hospital mortality rate was significant higher in Md than Sg ICU patients (31,55% vs 3,16%, p=0.017). For a predicted mortality of 26% and 21%.

CONCLUSION. We find some differences in this small cohort of Md and Sg ICU patients with NP. The microbiology profile showed important differences between the groups. The main limitation of this study is the small sample size.

GRANT ACKNOWLEDGEMENT. IDIBAPS. Universidad de Barcelona.

0666

A SINGLE HIGH DOSE OF AN AMINOGLYCOSIDE DOES NOT FURTHER DETERIORATE RENAL DYSFUNCTION IN PORCINE ENDOTOXIC SHOCK

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INTRODUCTION. Renal insufficiency is a frequent complication of septic shock. Aminoglycosides are highly potent bactericidal antibiotics that together with beta-lactam antibiotics will result in a broad antibacterial coverage. Yet, the use of these antibiotics in the treatment of early Gram-negative septic shock has been hampered by the assumption that aminoglycosides may be nephrotoxic even in short term therapy. As this is very difficult to investigate in the clinical setting, an experimental study was set up, the aim of which was to evaluate whether the addition of tobramycin further deteriorates kidney function in pigs with endotoxin-induced renal damage.

METHODS. The animals were anaesthetised, catheterized, mechanically ventilated and randomised to 4 groups. Groups I (n=8) and II (n=8) received endotoxin infusion in a dose of 1 mcg x kg-1 x h-1 for 6 h, whereas groups III (n=4) and IV (n=4) received corresponding amounts of saline. Groups I and III received a 20-min infusion of tobramycin sulphate in a dose of 7 mg x kg-1 starting 20 minutes after the initiation of the endotoxin infusion, whereas groups II and IV received corresponding amounts of saline. In parallel with the tobramycin/saline infusions, a cefuroxime infusion in a dose of 20 mg x kg-1 was given to all pigs. Renal function was evaluated by cefuroxime clearance, creatinine clearance, plasma cystatin C, plasma urea, urine output and urine NAG (N-acetyl-beta-D-glucoaminidase) excretion.

RESULTS. There was no significant difference in physiological baseline variables between the groups of pigs. The elimination rate of cefuroxime 1-5 h decreased in both endotoxemic groups whereas it was constant in the non-endotoxemic groups. At 6 h cefuroxime concentration and cystatin C were higher in endotoxemic vs. non-endotoxemic pigs ($p<0.05$ and $p<0.01$, respectively), whereas urine output and creatinine clearance were lower ($p<0.01$ for both). However, there were no differences between groups I and II or III and IV in cefuroxime elimination, urine production, cystatin C or creatinine clearance. Plasma urea and urine NAG did not differ between any of the groups.

CONCLUSION. Endotoxin in the dose administered caused a significant renal dysfunction in this porcine model. The results indicate that the addition of a high single dose of tobramycin seems not to further aggravate the endotoxin-induced renal injury.

GRANT ACKNOWLEDGEMENT. This work was financed by grants from the Nielsen-Olinder foundation.

0667

DOES OROPHARYNGEAL DECONTAMINATION WITH CHLORHEXIDINE GLUCONATE PREVENT NOSOCOMIAL INFECTION IN PATIENTS UNDERGOING OFF PUMP CABG?

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INTRODUCTION. The purpose of this study was to test the effectiveness of oropharyngeal decontamination on nosocomial infections in a comparatively homogeneous population of patients undergoing off pump coronary artery bypass surgery.

METHODS. This was a prospective, randomized, double-blind, placebo-controlled clinical trial. Experimental and control groups were selected for similar infection risk parameters.
Setting: Cardiothoracic and Vascular Surgery Unit of a tertiary care hospital.
Patients: Four hundred fifty four consecutive patients undergoing off pump coronary artery bypass grafting, were randomized to an experimental (n=239) or control (n=215) group. Patients converted to Cardiopulmonary Bypass were excluded from the study.
Interventions: The experimental drug chosen was 0.12% chlorhexidine gluconate (CHX) oral rinse.

RESULTS. The overall nosocomial infection rate was decreased in the CHX-treated patients by 65% (29/215 vs 11/239; $p<0.01$). We also noted a 69% reduction in the incidence of total respiratory tract infections in the CHX-treated group (20/215 vs 7/239; $p<0.05$). Gram-negative organisms were involved in significantly less ($p<0.05$) of the nosocomial infections and total respiratory tract infections by 59% and 67%, respectively. No change in bacterial antibiotic resistance patterns in either group was observed. A reduction in mortality in the CHX-treated group was also noted (13/215: 6.05% vs 4/239: 1.67%).

CONCLUSION. Inexpensive and easily applied oropharyngeal decontamination with CHX oral rinse reduces the total nosocomial respiratory infection rate in patients undergoing off pump CABG surgery. This results in significant cost savings for those patients.

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0668

PHOTODYNAMIC THERAPY TO TREAT MRSA WOUND INFECTIONS

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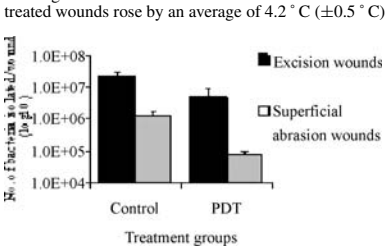
INTRODUCTION. The emergence of resistant strains of bacteria such as methicillin-resistant *Staphylococcus aureus* (MRSA) has sparked development of alternative anti-microbial strategies. One such approach involves the use of light-activated antimicrobial agents (photosensitisers), termed photodynamic therapy (PDT). Following excitation of the photosensitiser by light of an appropriate wavelength, singlet oxygen and free radicals are generated locally which directly attack the plasma membrane and lead to bacteriolysis. Although PDT is well established as an oncological treatment, its use in the treatment of wound infections, in particular those involving resistant strains of bacteria, has yet to be established.

METHODS. After anaesthesia and depilation, 8 week old female C57 Black mice received either a single excisional wound or a superficial scarified wound that were immediately inoculated with an EMRSA-16 bacterial suspension (10^8 CFU/wound) and treated after 1 hour with PDT using methylene blue (MB) as the photosensitiser and laser light with a wavelength of 670 nm to a dose of 360J.cm^{-2} per wound. At the end of treatment, the wounds were excised and processed to assess the total number of viable bacteria per wound. Two further experiments investigated the heating effect of PDT and possible collateral damage caused by PDT. Three control groups were used to sequentially test the effect of MB alone, light alone and an untreated group which received neither MB nor light illumination.

RESULTS. PDT treatment resulted in at least a 1 log reduction ($p<0.008$ Mann Whitney-U test) in the number of viable bacteria isolated from the wounds (Figure). There were no obvious histological differences between PDT-treated and untreated wounds. The temperature of the treated wounds rose by an average of 4.2 ° C (±0.5 ° C) at the end of the treatment.



CONCLUSION. PDT is effective in reducing the total number of viable MRSA in an inoculated wound and this effect is not due to local heat generation. There were no gross histological changes apparent between PDT-treated and untreated inoculated wounds.

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0669

RISK FACTORS FOR CANDIDA GLABRATA CANDIDEMIA IN NON NEUTROPENIC CRITICALLY ILL PATIENTS

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INTRODUCTION. Candida species have become the third most common nosocomial bloodstream isolates worldwide. An early adequate treatment is undoubtedly a major prognostic factor. On the basis of efficacy and cost considerations, the empirical treatment often consists in fluconazole administration. Yet, given the ever increasing incidence of potentially azole-resistant species such as Candida glabrata (which currently accounts for one fourth of cases), this therapeutic option may be ineffective and result in subsequent poor prognosis. Moreover, definite identification of Candida glabrata may take up to five days, thus delaying modification of initial antifungal therapy and further impairing prognosis. The purpose of this study was to identify early risk factors for Candida glabrata candidemia, likely to guide and improve the efficacy of the empirical treatment.

METHODS. All non neutropenic patients with blood culture-confirmed candidemia were included in this prospective study, performed in five French ICUs. For each patient, baseline characteristics and potential risk factors for Candida glabrata candidemia available at candidemia diagnosis were collected. Comparisons between patients with and those without Candida glabrata candidemia were based on Student's t-tests or chi-square tests, as appropriate. Variables with a p value < .1 were entered into a multiple logistic regression model to determine independent risk factors for Candida glabrata candidemia.

RESULTS. Of the 155 patients included over a 4-year period, 48 had a Candida glabrata candidemia. Independent risk factors for Candida glabrata candidemia were: age > 60 yrs (odds ratio -OR- 5.16, p < .001), recent abdominal surgery (OR 8.7, p < .0001), recent use of cephalosporins (OR 9.9, p < .0001), solid tumor (OR 5.3, p = .002), and diabetes mellitus (OR 0.16, p = .02). The model showed satisfying goodness of fit (Hosmer-Lemeshow statistic = .76) and discrimination (AUC = .86).

CONCLUSION. We found early available and easy-to-identify risk factors for Candida glabrata candidemia. When these factors are present, alternatives to fluconazole for the empirical treatment should be considered.

0670

UTILIZATION OF A TOOL TO HELP INTENSIVISTS ON THE IMPLEMENTATION AND MONITORING OF VAP BUNDLE PROTOCOL RUNNING IN AN ADULT MEDICAL — SURGICAL CRITICAL CARE UNIT

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INTRODUCTION. Ventilator-associated pneumonia (VAP) is an airways infection that must have developed more than 48 hours after the patient was intubated. VAP is the leading cause of death amongst hospital-acquired infections, exceeding the rate of death due to central line infections, severe sepsis, and respiratory tract infections in the non-intubated patient. Hospital mortality of ventilated patients who develop VAP is 46 percent compared to 32 percent for ventilated patients who do not develop VAP. [1] Reducing mortality due to ventilator-associated pneumonia requires an organized process that guarantees early recognition of pneumonia and consistent application of the best evidence-based practices. The Ventilator Bundle is a series of interventions related to ventilator care that, when implemented together, will achieve significantly better outcomes than when implemented individually.

OBJECTIVE. To evaluate the implementation effect of a VAP bundle in a general Intensive Care Unit (ICU), with the utilization of a software house made designed for this goal. (http://www.bundles.com.br)

METHODS. In a 15 bed general ICU, implementation of the bundle was done over 3 months beginning on January 2006. The key components of VAP bundle are: elevation of the head of the bed; daily "Sedation Vacations"; ventilation tube with subglotic aspiration system; Peptic Ulcer Disease Prophylaxis; Deep Venous Thrombosis Prophylaxis; oral feeding tube instead of nasal feeding tube and oral hygiene with chlorexidine twice a day. We compared the incidence density rate from April to December 2005 to the same period in 2006 (Software Stata 8.0).

RESULTS. The VAP incidence rate reduced from 21,15/1000 to 6,72/1000 mechanical ventilation days (p<0,01) – incidence rate ratio 3,15 (CI: 95% 1,2-9,5). After 5 months, the rate of VAP was zero. This period was the lowest incidence of VAP ever registered in the ICU. The incidence of multi-resistant gram-negative bacteria infections was also the lower than before bundle implementation.

CONCLUSION. After five months of a VAP bundle implementation with the aid of software house-made to help clinicians follow the results in daily basis, has demonstrated an important reduction in the incidence of VAP in our ICU. The impact of this system implementation for longer period should be followed.

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0671

AMPHOTERICIN B INHALATION IS POTENTIALLY ASSOCIATED WITH RENAL FAILURE AND INCREASED MORTALITY IN CRITICALLY ILL PATIENTS — AN OBSERVATIONAL STUDY

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INTRODUCTION. Amphotericin B desoxycholate (Ampho B) has been nebulized in transplant patients to prevent aspergillus infections, but also as part of selective digestive decontamination (SDD) to decrease fungal colonization and infection in critically ill patients. Severe adverse effects of Ampho B after systemic administration, particularly nephrotoxicity, led to its substitution by less toxic antimycotics. However, it is still unknown whether even small amounts of Ampho B found systemically after inhalation therapy (1) may be associated with organ dysfunction and increased mortality in critically ill patients subjected to SDD prophylaxis.

METHODS. Topical (polymyxin, tobramycin, Ampho B) and systemic (cefotaxime for 4 days) antimicrobial chemotherapeutics were routinely administered to ventilated surgical patients who were expected to remain in the ICU for more than 24 hrs. A prospective observational study was conducted to accompany the change in SDD regimen (6 months of data collection with nebulization of Ampho B (10 mg every 6 hrs) and 6 months without).

RESULTS. 149 patients were initially started on Ampho B. Nebulization of Ampho B was stopped in 31 patients (21%) for side effects (90% bronchospasm). 87 patients of the Ampho B group and 103 patients of the Control group finally qualified for statistical analysis. Initial SOFA and SAPS II scores as well as demographic data were well comparable between groups. The most frequent reasons for ICU admission were cardiac surgery (24% in the Ampho B vs. 26% in the Control group,), followed by neurosurgery (22% vs. 16%), abdominal surgery (13% vs. 22%), and multiple trauma (14% vs. 16%). Renal failure with renal replacement therapy for at least three days was found in 36 (41%) of the Ampho B and in 26 (25%) of the Control patients (p <.05). In the Ampho B group 24 patients (28%) died during the study period, as compared to 15 (15%) in the Control group (p<.05). Multiple organ failure occurred as the by far most common cause of death in 22% of the Ampho B and 14% of the Control patients. Days on ventilatory support did not differ between groups.

CONCLUSION. The use of nebulised Amphotericin B as part of a SDD prophylaxis was associated with an increased incidence of renal failure and increased mortality in this study. In the view of the nephrotoxic properties of Ampho B, this finding may be potentially explained by systemic effects after prolonged drug inhalation in predisposed critically ill patients. However, in the Ampho B group, there were a slightly higher percentage of patients suffering from pre-existing diabetes and renal insufficiency, and potentially nephrotoxic antibiotic regimens were administered more frequently in the study period.

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0672

INTENSIVE CARE UNIT-ACQUIRED INFECTION AND INFLAMMATORY RESPONSE

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INTRODUCTION. Systemic inflammatory response (SIR) in patients with infection clearly influences outcome. The aims were to study the SIR in ICU-acquired infection (I-ICU) according to the source and etiology and evaluate outcome impact.

METHODS. Multicentre prospective study from April to July 2006 in 107 UCIs of 99 hospitals. The number of patients admitted to ICU> 24h until ICU discharge or a 30-day period. I-ICU diagnosed according to the CDC's criteria, source, etiology and SIR were analyzed.

RESULTS. Among 11461 patients, 2683 developed infections, principally: pneumonias (VAP) 702, urinary tract infections (UTI) 397, primary and catheter-related bacteriemias (PB+CB) 387 and secondary bacteriemia (SB) 146, tracheobronchitis 355, catheter-related infection 210, surgical infection 206 and 53 nosocomial pneumonias not related to mechanical ventilation. Table 1 shows SIR, age, seriousness and mortality of the total of I-ICU and table 2 the SIR and mortality of I-ICU in ENVIN study. More frequent microorganisms and (%) of severe sepsis+septic shock: P aeruginosa 350 (31.1); ECN + S epidermidis 306 (22.5); E coli 298 (17.7); A baumannii 196 (34.1); C albicans 153 (35.9); MSSA 149 (24.8); MRSA 95 (29.4).

TABLE 1.

	N (%)	Age	APACHE II	Exitus (%)
No	902 (33,6)	61,3	19,7	16,9
Sepsis	1.135 (42,3)	61,3	19,6	17,5
Severe sepsis	361 (13,4)	59	19,3	38,2
Septic shock	285 (10,6)	60,4	20,9	65,2
	2.683			25,2

TABLE 2.

	VAP (N) Exitus (%)	UTI (N) Exitus (%)	PB+CB (N) Exitus (%)	SB (N) Exitus (%)
No	146/21,3	207/20	64/15,6	26/15,3
Sepsis	313/17,5	161/21	200/17,5	59/15,2
Severe sepsis	133/44,3	22/31	75/30,6	23/30,4
Septic shock	110/65,4	7/71	48/64,5	38/63,1
	702/30,9	397/22	387/25,5	146/30,1

CONCLUSION. 24 % of the I-ICU worsen in sepsis severe/septic shock. VAP and bacteriemias had more severe SIRS and UTI less frequent. Septic shock presented a high mortality (> 60 %) without significant differences in infection sites. C albicans, A baumannii and P aeruginosa developed the worst SIR.

0673

EFFECTIVE DRAIN SYSTEM FOR REFRACTORY SEPTIC FOCUS: CONTINUOUS HIGH PRESSURE ASPIRATION WITH DOUBLE LUMINAL DRAINING TUBE (DLD-CHPA)

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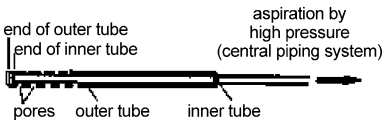
INTRODUCTION. Drainage for septic focus is the most important process in the management for severe sepsis and septic shock. However, there is no reliable evidence concerning the drainage technique, because the condition is usually so complexed and various that there can not be managed with the uniform standard technique. We have preferred double luminal drain with continuous high pressure aspiration method (DLD-CHPA) in patients with these conditions. The aim of this study is to clarify the effectiveness and safetiness of DLD-CHPA by clinical experience.

METHODS. DLD-CHPA was performed for 40 septic foci. The effectiveness of drainage was examined before and after DLD-CHPA. The structure of DLD is same as that of aspiration device used during surgery which consists of outer tube with multiple pore and inner tube directly connected with high pressure aspirating central vacuum system. The aim of DLD-CHPA is rapid and continuous removing of discharge and pus, to maintaining dry condition of the abscess and fistula, and stimulating granulation; which leads (a) to quickening the closure of the abscess and fistula and (b) prevention of worsening of local condition of localized abscess and leaking point of injured intestine until definitive surgery.

RESULTS. Mean grade of discharge soaking in gauze, a wash recovered in intermittent lavage, local inflammation of skin surrounding drain (DLD) improved after DLD-CHPA. Mean volume of discharge from wound and drain other than DLD was depressed after DLD-CHPA. The sum of volume of discharge and aspirated material after DLD-CHPA is smaller than before DLD-CHPA. The frequency of dressing change was decreased. In all cases, we could perform definitive surgery without worsening of local inflammation, especially inflammation of skin around drain. There was no complication with DLD-CHPA.

Fig. 1 The schema of double luminal drainage tube. Outer tube having multible lateral pores and inner tube which end is completely inside of the end of outer tube.



CONCLUSION. DLD-CHPA is useful and safe procedure for managing septic foci by draining mucinous purulent fluid effectively, which can prevent worsening of local condition of localized abscess, and keeping the local condition good until definitive surgery, if definitive surgery is necessary.

0674

PRE-DIALYSIS INFUSION OF FULL-DOSE AMINOGLYCOSIDE IN SEPTIC ACUTE RENAL FAILURE: A PILOT STUDY

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INTRODUCTION. To evaluate pre-dialysis full-dose aminoglycoside administration in septic anuric critically ill patients.

METHODS. In a prospective observational study, all septic patients with anuria received full-dose gentamycin (G), tobramycin (T) or amikacin (A) consisting in a 6 mg/kg (G/T) or 20 mg/kg (A) dose, infused 3 hours before daily dialysis. The pharmacokinetic study of serum dosages was compared to that of septic patients with normal renal function.

RESULTS. Dosages were compared to that of 8 patients with normal renal function who received 26 infusions and served as controls. Anuric patients' demographic data were as follow: mean age 66 [IQR 44-77], mean SAPS II 52 [IQR 39-63], former renal failure 41%, respiratory tract infection 64%, nosocomial infection 72%, ICU mortality 59%. Pre-determinated aminoglycoside peak concentration targets for G/T (16-20mg/L) and A (40-50mg/L) were achieved in respectively 68% and 70.5% of anuric patients versus 50 and 70% of controls.
Compared to target (theoretically non-toxic) trough 5mg/L for A), trough concentrations in$\leq$2mg/L for G/T and $\leq$concentrations (anuric patients were higher (G/T : median 3.6mg/L; A: median 5.8mg/L) than in normorenal patients (G/T : median 0.8mg/L; A: median 3.6mg/L). With aminoglycoside clearance due to intensive dialysis (median Kt/V 1.08/ session), delay in aminoglycoside infusion was reduced to 35 hours with an observed half-life of 11.3 hours.

CONCLUSION. This pilot study supports the feasibility of a new aminoglycoside dosing schedule consistent with full-dose administration three hours before dialysis in anuric septic critically ill patients. The prerequisite is that hemodialysis should be performed daily, using high efficacy membranes. Further randomised controlled trials are needed to confirm these results.

0675

CLINICAL IMPACT OF LABORATORY CONFIRMED BLOOD STREAM INFECTIONS CAUSED BY FERMENTATIVE AND NON-FERMENTATIVE GRAM NEGATIVE BACTERIA IN CARDIAC ICU PATIENTS

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INTRODUCTION. Bacterial blood stream infections (BSI) are serious infections associated with significant mortality and costs. Gram negative bacteremia carries higher risk of severe sepsis, septic shock and death than gram positive bacteria. Aerobic gram negative bacteria are divided into two groups; fermenters and nonfermenters. The aim of this study was to evaluate the clinical impact and the risk factors for laboratory confirmed BSI caused by fermentative gram negative bacteria (F-GNB) and non fermentative gram negative bacteria (NF-GNB).

METHODS. This study was conducted at Escorts Heart Institute and Research Centre, New Delhi, India. Between January 2005 and March 2006, patients admitted to the ICU (medical and surgical) with BSI due to F-GNB and NF-GNB were evaluated retrospectively.

RESULTS. 59 patients (46.5%) had BSI due to F-GNB and 68 (53.5%) had due to NF-GNB. On univariate analysis mean age (64.4 $\pm$ 10.1 vs 60.2 $\pm$ 10.7; p=0.023) and APACHE II score (12.4 $\pm$ 4.4 vs 10.8 $\pm$ 4.1; p = 0.041), were significantly higher in patients who had BSI due to F-GNB. Empirical treatment with Amikacin was significantly higher in patients who had BSI due to NF-GNB (15.3% vs 39.7%; p = 0.002). On multivariate analysis age (adjusted OR =0.96, 95% CI 0.926-0.995; p=0.027) was independent predictor of BSI due to F-GNB. The rate of adequate antibiotic therapy was not statistically different between the two groups. In bacteremia due to F-GNB, common pathogens isolated were Klebsiella 20 (33.9%), Enterobacter 18 (30.5%) and E.coli 18(30.5%) while in NF-GNB common organisms isolated were Burkholderia Cepacia 44(64.7%). Pseudomonas Species 8 (11.8%), Acinetobacter 5 (7.4%) and Stenotrophomonas maltophilia 3 (4.4%). Amikacin (86.4%), piperacillin tazobactum (71.2%) and imipenem (94.9%) showed highest activity against F-GNB. NF-GNB were less susceptible to amikacin (17.6%) and imipenem (19.1%) but were more susceptible to piperacillin tazobactum (86.8%). Mortality was 23.7% in F-BSI and 19.1% in NF-BSI (NS). Median ICU stay was significantly higher in patients who had BSI due F-GNB as compared to NF-GNB (Median ICU stay 15 days vs 9.5 days; p = 0.005).

CONCLUSION. Mortality in gram negative nosocomial infection remains high but the impact is greatest for NF-GNB due to their intrinsic resistance to many antibioitics, making selection and optimal therapy difficult. In our population, BSI due to NF-GNB was not associated with significantly increased mortality. This could be explained by older age in F-GNB cf NF-GNB. Our study highlights the importance of risk stratification to identify patients at risk.

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0676

EMPIRICAL COMBINATION ANTIMICROBIAL THERAPY IN CRITICALLY ILL PATIENTS WITH GRAM POSITIVE BACTEREMIA

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INTRODUCTION. Empirical combination antimicrobial therapy (ECAT) has been recommended for bacteraemia due to Gram positive microorganisms during many years, especially for *Streptococcus pneumoniae*, although its use still remains controversial. The aims of this study were to determine the prevalence of ECAT in ICU patients with gram positive bacteremia (GPB), to describe the main clinical, epidemiological and microbiological features of such patients comparing with monotherapy treatment and to know the impact of this strategy on related mortality to GPB in critically ill patients.

METHODS. During a ten years and a half period, from 1996 to 2006, 133 ICU-patients with GPB were prospectively evaluated. Empirically antibiotic combination or monotherapy regimen was administrated until the agent of infection was identified following the patient's physician criteria. The administration of two or more antibiotic with activity against gram positive microorganism was defined as ECAT. Clinical and microbiological variables were recorded. Logistic regression analysis was performed to deterrmine the impact of this strategy on related mortality to GPB.

RESULTS. Among 133 ICU-GPB, ECAT was applied in the 30.82% (n = 41). There were no significant differences in APACHE II (22.6$\pm$8.0 vs 20.3$\pm$8.1; p=0.23),SOFA score (7.0$\pm$3.1 vs 7.5$\pm$3.7; p=0.58) or the incidence of septic shock (41.4% vs 33.6 %;p=0.38) between ECAT and monotherapy group in the univariate analysis. There was a strong tendency to receive inadequate empirical antibiotic treatment (17.0% vs 32.6 %;p=0.06) in monotherapy group. Vancomycin plus aminoglucoside was the most frequent combination used (31,7% of ECAT group). The principal aetiologies in ECAT group were: *Staphylococcus aureus* (n = 13), *Streptococcus pneumoniae* (n = 11) and *Enterococcus faecalis* (n=8). Streptococcus pneumoniae isolates, respiratory tract and abdominal foci and community adquired infections were statistically more frequent in ECAT group. No differences were found in related mortality to GPB between two groups (21,9% vs 27.1%;p=0.52). Patients with *Staphylococcus aureus* bacteremia who receive combination therapy showed a statistically significant lower related mortality than monotherapy group (8.3% vs 36.6%; p=0.04) Logistic regression analysis confirmed that ECAT had not any impact on related mortality to bacteremia (OR 0.76; 95% CI 0.19-3).

CONCLUSION. Globally, our analysis did not support the routine use of ECAT for Gram-positive bacteraemia in critically iil patients. However the lower mortality of ICU-patients with *S.aureus* bacteremia who received ECAT require further investigations.

0677

MULTI-DRUG RESISTANT GRAM-NEGATIVE BACILLI OUTBREAK IN A CARDIAC SURGERY CENTER

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INTRODUCTION. Gram (-) bacilli including Multi-Drug Resistant Pseudomonas aeruginosa (MDR-PA) and Acinetobacter baumannii (MDR-AB) are responsible for severe ICU-acquired infections. The study aimed to determine the incidence of MDR Gram (-) bacteria in patients undergoing cardiac surgery, to elucidate the effectiveness of treating them with colistin and to identify if the additional measures to the recommended procedures were able to prevent the dissemination of the pathogens.

METHODS. A prospective study was conducted among 2374 patients from 01/01/2005 to 31/08/2006. We reviewed the prophylactic measures of the SICU and implemented a two scale multiple program. Scale 1 included classical infection control measures, i.e. strict contact and droplet isolation, surveillance of throat, nasal and anal flora for MDR pathogens on all patients transferred from other hospitals, separate nursing staff and strict antibiotic policy, while Scale 2 referred to the geographic isolation of all positive MDR-AB and -PA cases with exclusive medical and nursing personnel, use of separate supplies and facilities and environmental intense surveillance.

RESULTS. Over a 20-month period, 211/ 2374 patients were infected and 25 were colonized by strains of MDR Gram (-) bacilli susceptible only to colistin. All patients were mechanically ventilated. 21 patients presented respiratory tract infection while 2 patients suffered deep surgical site infection, 1 donor site infection and 1 patient catheter related infection. They were all treated with intravenous colistin in combination with aerolized colistin. Cure or clinical improvement was observed in 11 patients (44%) while 14 patients (56%) developed sepsis and Multiple Organ Failure.
Scale 1 measures were implemented for the whole 20-month period while Scale 2 for 3 separate periods of 3 weeks. Environmental specimens (n > 550) proved negative.

CONCLUSION. The increasing prevalence of MDR Gram (-) bacilli in ICU patients creates demand on the installation of strict screening and contact precautions as well as the application of combinations of older antimicrobials. Colistin retained significant "in vitro" activity, has an acceptable safety profile and should be considered as a treatment option in critically ill patients with infection caused by MDR Gram (-) bacteria.

0679

FOCUSED TRAINING FOR GOAL-ORIENTED HAND-HELD ECHOCARDIOGRAPHY PERFORMED BY NONCARDIOLOGIST RESIDENTS IN THE INTENSIVE CARE UNIT

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INTRODUCTION. Leading academic teams in Cardiology have lately reported their successful experience in developing focused training in echocardiography for medical residents without previous experience in ultrasound. Similarly, we sought to evaluate the efficacy of a limited training dedicated to residents without knowledge in ultrasound for performing goal-oriented echocardiography in intensive care unit (ICU) patients.

METHODS. During a two-month period, 61 consecutive adult ICU patients (SAPSII score: 38±17; 46 ventilated patients) requiring a transthoracic echocardiography were prospectively studied. After a curriculum including a 3-hour training course and 5 hours of hands-on, one of 4 noncardiologist residents and an intensivist experienced in ultrasound subsequently performed hand-held echocardiography (HHE), independently and in random order. Assessable "rule in, rule out" clinical questions were purposely limited to easily identifiable conditions by the sole use of two-dimensional imaging.

RESULTS. Residents performed a mean of 15 HHE studies (range: 11 to 20). When compared to residents, the experienced intensivist performed shorter examinations (4±1 vs 11±4 min: P<0.0001) and had significantly less unsolved clinical questions (3 [0.8%] vs 27 [7.4%] of 366 clinical questions: P<0.0001). When addressed, clinical questions were adequately appraised by residents: left ventricular systolic dysfunction (Kappa: 0.76±0.09 [95% CI: 0.59-0.93]), left ventricular dilatation (Kappa: 0.66±0.12 [95% CI: 0.43-0.90]), right ventricular dilatation (Kappa: 0.71±0.12 [95% CI: 0.46-0.95]), pericardial effusion (Kappa: 0.68±0.18 [95 CI: 0.33-1.03]), and pleural effusion (Kappa: 0.71±0.09 [95% CI: 0.53-0.88]). The only case of tamponade was accurately diagnosed by the resident.

CONCLUSION. In the ICU environment, limited training of noncardiologist residents without previous knowledge in ultrasound appears feasible. The influence of the learning curve on diagnostic accuracy and potential impact on acute care of critically ill patients remains to determine by further studies.

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VIDEO-BASED COMMUNICATION SKILLS TRAINING IN INTENSIVE CARE

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INTRODUCTION. Effective communication skills are seen as an important part of training in critical care. There is evidence that current practice could be improved. To achieve this, teaching and assessment techniques that are acceptable to both consultants and trainees must be developed. In other specialities video is used to teach communication skills, although its application to intensive care training has not been widely studied.

METHODS. After obtaining ethics approval, specialists in intensive care at 2 general hospitals in the north-east of England were invited to take part in the study. Participants were given a written scenario describing the admission to the ICU of an elderly woman with pneumonia. Data was included which suggested deterioration despite treatment and progression toward multi-organ failure. The consultants were then videoed conducting an initial meeting with the patient's closest relative (played by an actress). Questionnaires were used to record previous experience of communication skills training and reaction to the video exercise.

RESULTS. 12 consultants gave written, informed consent to take part. Only half of the participants had previous, limited experience of audio or video recording to teach communication skills. None felt 'significantly experienced' in this area or had used the technique with trainees. Most had developed their communication skills by sitting-in as an observer when colleagues were talking to relatives. 3 participants stated they had never had any formal teaching in communication skills either through lectures, workshops or role-play. The plausibility of the scenario and actress were rated highly by all the participants. Despite 3 individuals choosing to agree with the statement 'I was anxious and uncomfortable throughout the video exercise', none of the respondents disagreed with the statement 'I managed to settle into the normal style I use when speaking to relatives'. Only 2 participants did not support the statement 'overall I feel happy with the way the consultation went'. 10 of the participants disagreed or strongly disagreed with the statement 'I feel the video does not represent my normal practice of speaking to relatives.'

CONCLUSION. This study shows that video techniques can be used to reproduce realistic intensive care scenarios. The format was well received by a majority of specialists and despite no previous experience of being filmed, participants felt that the simulation closely replicated their normal practice. Teaching-training would be required to introduce these techniques as current specialists have received little formal training in communication skills.

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0680

CRICOID PRESSURE: KNOWLEDGE AND PERFORMANCE AMONGST INTENSIVE CARE STAFF

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INTRODUCTION. Cricoid pressure should be applied lightly (10N) before induction of anaesthesia and while the patient is still awake. Once the patient is unconscious the force should be increased to 30N (Vanner & Asai, 1999). A simple training aid using an air filled, capped 50ml syringe has been described (Ruth et al., 1998), but a lack of knowledge and poor technique amongst anaesthetic assistants has already been highlighted (Meek et al., 1999). The aim of this study was to investigate knowledge and skills of a group of intensive care unit nurses in performing cricoid pressure, using a structured interview questionnaire and simple practical test.

METHODS. We asked 100 intensive care nurses from Queen Elizabeth Hospital, Birmingham UK to participate in a structured interview. Volunteers were asked about their own experience, training and knowledge of cricoid pressure in a questionnaire conducted by one of the authors. Each subject was then asked to apply the force that they would normally use in clinical practice to the plunger of a Plastipak (B-D) 50ml syringe filled with air. The destination of the plunger was recorded (ml). The subjects were then informed of the recommendations stated above and allowed to practice the application of 30N on the syringe (32.9ml standard destination). They were than asked if they thought a simulator would be useful for training.

RESULTS. 40% respondents (n=100) were staff nurse with 3 to 6 years experience, and 44% performed cricoid pressure less than 6 monthly. Only 17% nurses had formal training and 46% described their training as 'totally inadequate'. 54.6-69% nurses applied and released cricoid pressure only on instruction by anaesthetist and 97.8% respondents did not know the optimum force to use. On simulation, the mean force applied was nearer 20N than 30N (mean plunger destination 35.47ml, less than 32.9ml standard. S.D = +/- 5.57, variance = 30.97). 89 of 91 (97.8%) respondents thought simulation training would be useful.

CONCLUSION. Intensive care nurses perform this procedure infrequently and become deskilled. This study also highlights the inadequacy of training they receive. Using a readily available training aid such as a 50ml syringe is reliable and may improve staff confidence, performance and patient safety.

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0681

HELPING RELIEVE STAFF STRESS IN THE ICU: EVALUATION OF A FOCUS GROUP AFTER 6 MONTHS

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INTRODUCTION. The policy of our 15-bed medical ICU includes helping members of the staff to cope with the burden of job stress. Our university hospital agreed to finance a focus group to help staff relieve their stress. We performed an evaluation 6 months after.

METHODS. A first non-anonymous survey was conducted in 01/2005 amongst the staff to know who was willing to attend a focus group. An independant family therapy psychologist was selected out of 4 candidates. A focus group was set up in 10/2005 open to any volunteer; 2-hour monthly reunions were conducted by the psychologist. An anonymous questionnaire was sent to all staff members in 04/2006.

RESULTS. Initial survey: 3 MDs/6,10 daytime nurses/18 (1 night nurses/13),7/10 auxiliary nurses,the secretary and the 2 chief nurses agreed to attend = 46,5% of the daytime staff.
The group held 4 reunions, attended respectively by 14, 7, 5 and 2 members of the staff. The group was then suspended.
Anonymous evaluation: 47/67 staff members answered = 70,1%.

TABLE 1.

Answers to the evaluation questionnaire on the focus group

	Yes	No	Without opinion/ no answer
Did you expect the group to be as it was ?	21 (45,6%)	9	17
Are you uneasy to participate in such a group ?	10	36 (78,3%)	1
Did the psychologist put you at ease ?	14	3	30
Was the way he handled the group embarassing	4	16 (34,0%)	27
Did he help you answer your questions?	9 (19,1%)	6	32
Did the presence of some people embarass you ?	11	36 (76,6%)	-
Do you want the group to stop definitely ?	8	14 (41,2%)	25
Should the group meet only in case of problem	42 (89,4%)	2	3
Do you feel you need help ?	12	31 (70%)	4

CONCLUSION. Nearly half the staff were willing to participate but actual presence at the reunions dropped dramatically over the 4 months. The way the psychologist conducted the sessions doesn't appear to be responsible for this but only 9 think he helped them find an answer to their questions. Presence of the head of the department or the chief nurse embarassed 1/4 of the staff. 9/10 people wished the focus group to gather only when especially difficult events occur. This was not the case at the time and explains why 2/3 reported not needing help.

0682

DIAGNOSIS OF LATE COMPLICATIONS AFTER TRACHEOSTOMY WITH VIRTUAL LARYNGO-TRACHOESCOPY

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INTRODUCTION. Tracheostomy (surgical and percutaneous) is a well-established procedure for prolonged mechanical ventilation in the critically ill adult patient. Fiberoptic laryngotracheoscopy(FLT)is used in the evaluation of the trachea following decannulation but it involves discomfort. Today it is possible to perform virtual endoscopy by multislice CT within seconds even in debilitated patients. Our aim was to confirm the value of virtual laryngo-tracheoscopy (VLT) in the diagnosis of cervical tracheal granulations and stenosis of various grades in clinic and in an animal model experiment.

METHODS. We examined 28 patients (19 males and 9 females) who were recruited from ICU after tracheostomy and decannulation. Examinations were performed between a few days and 12 months after decannulation on a multidetector CT scanner. Navigation through the laryngo-tracheal lumen as well as reformatted coronal and sagittal images were performed on GE AW 4 workstation. The animal studies were done on 10 adult dead pigs in three series. In the first series, normal parameters of the larynx and cervical trachea were examined with adult bronchoscope Olympus (FLT) and after that by VLT. In the next two series, cervical tracheal granulations and stenosis were simulated and examined by both methods. The parameters of the larynx and cervical trachea were accurately measured.

RESULTS. The pathological changes in the clinical study found with the help of VLT were: mural granulations, polypoid mass in the tracheal wall, tracheal wall flap and flap with a persistent tract. When the FLT was performed it showed the same findings. The animal study confirmed our supposition that endoscopic pictures and virtual images provided similar macroscopic appearance. In most lesions, the measurements and localization of the abnormalities with VLT were more precise and easy to perform compared with FLT.

CONCLUSION. Comprehensive evaluation of the trachea can be achieved by combining these two techniques. We suggest that in the evaluation of critically ill patients following decannulation VLT examination should be done first. In cases where endoscopic biopsy or treatment is required, FLT should be then performed. Prospective studies will help to find out patients with complicated healing after tracheotomy and give opportunity to treat them properly.

0683

PREVENTION OF HEMORRHAGIC COMPLICATIONS DURING PERCUTANEOUS TRACHEOSTOMY

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INTRODUCTION. Bleeding during percutaneous tracheostomy (PCT) may be a serious complication, requiring immediate surgery for hemostasis. One of the reasons of such complications is the undiagnosed abnormal or aberrant vessels crossing the cervical trachea. Ultrasound examination of anterior neck surface before PCT is a useful method to detect them, but not available every time. We found simple clinical method for diagnosis of these vessels before the procedure and the technique to avoid their damage during PCT.

METHODS. We retrospectively reviewed our clinical experience with PCT by Griggs technique performed in 215 critically ill adult patients (pts) in the period from April 1999 till August 2001. Before PCT every patient was put in Trendelenburg's position for 10 min to see and to mark all existing veins on anterior neck surface. Then this position was changed to the half sitting pose to empty the veins and palpation was done to detect aberrant arteries in this region. In the cases of abnormal neck veins, vertical skin incision with lateral distraction of soft tissue was done because the direction of veins was along neck axis. When high riding innominate artery was detected, horizontal skin incision was used with distraction of soft tissues and artery in caudal direction because it went across neck axis.

RESULTS. Abnormal vessels were found in 20 (9.3%) pts from 215. Variations in venous anatomy: symmetrical enlargement of external and anterior jugular veins with multiple collaterals (6 pts), asymmetrical isolated enlargement of anterior jugular vein (6 pts). Variations in arterial anatomy: high riding innominate artery was found in 8 pts. Small bleeding has happen during PCT in 7 (3.2%) from 215 pts and was not connected with damage of large vessels. Simple pressure was enough to stop it.

CONCLUSION. Trendelenburg's position and palpation of anterior neck showed to be effective for detection of abnormal vascular anatomy before PCT. Appropriate skin incision (vertical or horizontal) and dissection of soft tissue for PCT helped to prevent damage of abnormal vascular structures and severe bleeding during the procedure.

0684

TRAINING IN HIGH FREQUENCY OSCILLATORY VENTILATION (HFOV) USING AN INTERMEDIATE FIDELITY SIMULATOR

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INTRODUCTION. Human patient simulators are now established in developing and maintaining a broad range of clinical and decision-making skills in health-care settings. One application of particular importance is the use of simulation in relatively infrequently encountered yet 'high-stake' circumstances where technical expertise is often critical yet difficult to achieve and maintain in a large, multidisciplinary body of health care professionals. HFOV is relatively infrequently used in our critical care units [20-28 episodes/year ~ 3500 admissions/year] and many nursing, junior and senior medical staff find it daunting to either initiate or actively manage this mode of ventilation and its complications. Lecture-based and opportunistic bed-side training in HFOV has been the model of training delivery to date but candidates and trainers have perceived that this falls short of a realistic competency based training programme.
Aim: To establish if HFOV (Sensormedics 3100) could be used with an intermediate fidelity simulator (SimMan Laerdal) in a realistic and safe environment with appropriate clinical stressors and distracters. Specific training elements would need to include equipment preparation and management of circuit disconnection, transition to and from a conventional ventilator, lung recruitment, management of hypercarbia, and the recognition and management of changes in amplitude.

METHODS. 1. To protect SimMan from potential over distension from the high airway pressures that may be delivered with HFOV, we modified its chest wall by applying an elasticised strap.
2. To produce realistic changes in amplitude we experimented with a series of modified endotracheal tubes containing a small balloon that we could inflate and deflate remotely, ultimately employing a size 10 Portex ET tube containing a pulmonary artery flotation catheter with the balloon secured within the ET tube's distal lumen.
3. We developed and scripted a series of scenarios based on real patient experiences and reproduced their physiological responses using the SimMan software.

RESULTS. The simulation of the pre-defined training elements, in particular the remote manipulation of the balloon volume to produce changes in amplitude, was highly successful. Realism concerning the transmission of 'wiggle' to the abdomen and upper thighs was however limited. Feedback from the multidisciplinary groups that have participated in the training to date have been excellent.

CONCLUSION. We believe this is the first report of the successful use of an intermediate fidelity simulator with HFOV. Only relatively simple and readily available equipment is required to facilitate the delivery of clinically relevant scenarios concerning the use of HFOV. We intend to now formally assess its impact and effectiveness in achieving and maintaining clinical competence in our multidisciplinary team.

0685

PRE-ICU MEDICAL KNOWLEDGE OF OXYGEN PHYSIOLOGY IS SUB-OPTIMAL

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INTRODUCTION. Effective Pre-ICU therapy minimises organ failure and improves outcome in ICU. While the standard of pre-ICU therapy is variable amongst countries, in general pre-ICU clinical competence has declined in the general wards. Health system changes have led to acute care medicine being largely confined to emergency departments, ICU's and anaesthesiology services, a fact reflected in the composition of Code Blue teams and rapid response teams. This has led to the evolution, despite lacking concrete beneficial evidence, of medical emergency teams, rapid response teams, nursing emergency teams and liaison nursing services. Hypoxemia and hypotension are the commonest triggers for a referral to any ICU. We aimed to determine pre-ICU medical awareness of oxygen (O2) physiology.

METHODS. we surveyed 140 hospital doctors in Australia attending a post-graduate clinical course in acute care medicine. The voluntary survey entailed a questionnaire exploring their understanding of fundamentals of oxygen physiology and therapeutic implications. The survey was conducted before the lectures and practical sessions at the clinical course in acute care medicine (www.easternhealth.org.au/acm).

RESULTS. Of the 122 respondents (88 % response), 80 % were from post-graduate year (PGY) 3 and above. A third of all respondents were PGY5 and above and included 16 Consultants and Specialists. 63 % either held, or were training toward, Fellowship of the Royal Australasian College of Physicians. The remainder were training toward similar Fellowship in the Australasian colleges in Anaesthesiology, Emergency Medicine and Surgery.

TABLE 1.

Pre-ICU knowledge of Oxygen Physiology

Question Ideation	Yes %	No %	Unsure %
SpO2 more relevant than PO2	28	68	4
Anemia leads to low SpO2	20	76	4
CO poisoning lowers SpO2	37	55	8
SpO2 is low at 30000 ft	50	37	13
Optimal SpO2 main target	40	55	5
Shock always lowers SpO2	14	79	7
Normal SpO2 > 92 percent	50	46	4
Earlobe O2 sensor good	20	60	19

CONCLUSION. Pre-ICU medical professionals have a sub-optimal understanding of Oxygen physiology. An enhancement of this knowledge will contribute to better pre-ICU clinical management of acutely ill patients. Postgraduate Clinical training of hospital doctors should focus more on optimal pre-ICU stabilization of acutely ill patients and on the practical aspects of oxygen therapy.

0686

BEDSIDE-TEACHING IN INTENSIVE CARE: THE ROLE OF THE ICU NURSE VERSUS AN INTENSIVIST AS A TEACHER FOR MEDICAL STUDENTS

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INTRODUCTION. We conducted the present study to assess if there is a difference in both immediate self-reported ability and attitudes towards the ICU, whether the teacher was an ICU nurse or an intensivist. In the new Rotterdam curriculum an ICU oriëntation is mandatory. Since Medical school intake in Rotterdam has increased in 2004 by 64% since 1997 (249 students) with a intake for 2007 of about 410 students the growing numbers will put increased pressure on the ability to teach and meeting the needs of increasing number of medical students.

METHODS. Fourth year medical students attended a two-hour bedside teaching course in intensive care where observation, hemodynamics and organ support were the main topics. The students were at random dived in two groups: for 130 students the teacher was an ICU nurse, for 136 students the teacher was an intensivist. Most students (n=266, 175 females) attended the program and 263 students completed precourse and 266 students postcourse 5-point Likert questionnaires. Data are presented as mean±sd. The Mann Whitney test was used to compare responses before and after the teaching program. A p-value of <0.05 was considered statistically significant.

RESULTS. Overall attitudes towards the ICU as well as self reported skills improved significantly following the course in both groups. Fewer students pictured the ICU as a typical drama series ICU following the course ($p<0.001$). In addition the students felt they could better describe the organization and structure of the ICU team following the course 2.8±0.9 to 4.00±0.5 ($p<0.001$) when the ICU nurse was the teacher ($p<0.001$)and 2.7±0.9 to 4.19±0.6 ($p<0.001$) when the intensivist was the teacher. Self-reported ability to identify and qualify organ failure and hemodynamics improved significantly, i.e the ability to calculate the mean arterial pressure increased from 2.8±0.97 to 4.2±0.0.76 ($p<0.001$) in the ICU nurse group and 3.1±1.1 to 4.3±0.73 ($p<0.001$) when the intensivist was the teacher. Comparing both groups interest to qualify as an intensivist increased significantly ($p<0.001$) in the group where an intensivist was the teacher.

CONCLUSION. 1) In a two hour ICU oriëntation in the undergraduate curriculum the ICU nursing staff was as successful as the medical staff in improving understanding of the ICU organization as well as in improving the ability to recognize vital organ functions and principles of the monitoring of critically ill patiënts. This study suggests that ICU nursing staff can enhance learning the basic practical monitoring of undergraduates and can be successfully integrated into undergraduate medical education. In meeting the needs of increasing numbers of medical students there is a potential for this role to be to developed. 2) Interest to qualify as an intensivist increased significantly when the intensivist was the teacher.

0687

CPR IN AMBULANCE IN YOKOHAMA, TYPICAL URBAN CITY OF JAPAN

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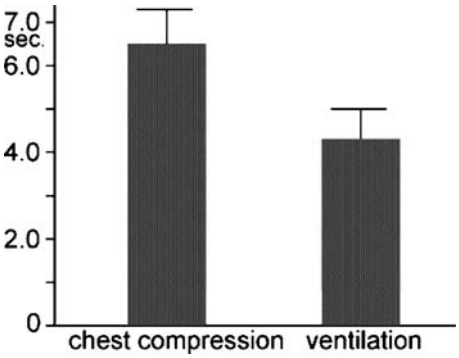
INTRODUCTION. Guidelines for CPR teach us to do 100 chest compression per 1 minute and to ventilate for a minimum time. However, paramedics tended to do chest compression more quickly and to do ventilation more slowly. In Japan, prehospital CPR has been performed by emergency life support techniciens (ELST), who belongs to the fire department. In this study, we tried to clarify the actual condition concerning prehospital CPR.

METHODS. Japanese ELSTs are licensed after 835 hours of lecture and 2,000 hours of experience, and they are trained repeatedly. In Yokohama, one supporting medical doctors is working in the central operation center of the fire department. They can detect the frequency of chest compression and ventilation during CPR in the ambulance. We recorded these frequency for and evaluate the quality of CPR by ELST.

RESULTS. In our system, ELST performed chest compression 15 times per 6.6 sec, that meant 138 times per 1 minute. They perfom 2 ventilations for 4.1 sec.



CONCLUSION. ELSTs perform inappropriate CPR in ambulances. We should train ELSTs more frequently and repeatedly and should use metronome, voice guide or AED with voice guide during CPR in the ambulance.

0688

PERCUTANEOUS VS SURGICAL TRACHEOSTOMIES IN OUR ICU PATIENTS: A CHANGE IN THE TECHNIQUE MEANS A CHANGE IN RESULTS? A COMPARATIVE STUDY

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INTRODUCTION. Tracheostomy is often required in ICU patients to prevent the consequences of long term translaryngeal intubation, indicated in prolonged mechanical ventilation and long term airway maintenance. It has lots of benefits like increasing patient comfort, less need for sedation, improving oral and bronchial hygiene, allowing oral nutrition, and ease the process of weaning from mechanical ventilation.
Percutaneous tracheostomy (PCT) as opposed to surgical tracheostomy (ST) has many advantages: it can be made at bedside (and be performed immediately once the decision is made), being safe and easy, with less operative time, and less intra and early postoperative complications (reduced stomal bleeding and infection, due to the tamponade effect of the tightly fitting tracheostomy tube). It is also associated with lower costs and has better cosmetic results than ST. The aim of this study is to compare the timing and outcomes of tracheostomies in our ICU, and Hospital mortality of these patients.

METHODS. We conducted a retrospective comparative study in 2 distinct periods: 2000 and 2001, when all patients in our ICU were submitted to ST (N=22); and 2005 and 2006 when patients were preferentially submitted to PCT (N=29). We reviewed their indications for tracheostomy, age, gender, APACHE II and SAPS II score, days to tracheostomy, length of ICU stay, ventilation time before and after tracheostomy, ICU and Hospital mortality.

RESULTS. The results presented are in mean values.

TABLE 1.

	APACHE II	SAPS II	Days to tracheostomy	Days of ICU stay	ICU mortality%	Hospital mortality%
ST (N=22) 2000-2001	19,9	43,9	16,6	21	18	91
PCT (N=29) 2005-2006	14,5	33,9	12,6	18,7	10,3	69,2

CONCLUSION. 1)There was no significant difference in indications for tracheostomy (prolonged mechanical ventilation and airway protection in comatose patients), age(63), gender, mean ventilation days prior to(12,4) and after(3,8)tracheostomy.
2)PCT was performed sooner (12,6 vs 16,6 day), and these patients had a sooner ICU discharge (18,7 vs 21 days).
3)Patients submitted to ST had higher APACHE II(19,9 vs 14,5) and SAPSII(43,9 vs 33,9)scores; higher ICU(18% vs 10,3%) and hospital mortality (91% vs 69,2%).

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0689

TILDA — TOOL FOR INTERACTIVE LEARNING AND DAILY ASSISTENCE

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INTRODUCTION. In Sweden there is a lack of effective tools for competency training for staff working in the national medical service. Staffs are expected to deal with high information flow and simultaneously assuming a legal responsibility requirement from The National Board of Health and Welfare, ensuring adequate knowledge to use medical equipment. Quality assurance, documentation and follow-up are limited. The aim was to invent an effective and secure tool for competency training. We call this tool TILDA, and this abstract describes how its running.

METHODS. In collaboration with the Institute for Interaction Design, the Department of Intensive Care (ICU) and the Department of Anaesthesia, Malmo University hospital we invented and tested TILDA. After two years(2005)of development, TILDA was implemented in the ICU. The application is available through internet and the education module and the study material are all built and secured by the staff. TILDA can quickly be extended to a large number of users. It is individual based and user adapted, with education modules tailored to professional needs (eg. doctors, nurses, nurses-aides, physiotherapists. Competency certificates are issued after required reading and a multiple choice test.

RESULTS. TILDA consists of two main units. With the administrative unit of TILDA, interactive training of medical equipment, methods for operator certification and specific ICU training issues are addressed. Training courses are fast and easy to create by means of TILDA's training course templates. Users taking part in the interactive training courses are guided through theoretical and practical knowledge and exercises. The theoretical, practical parts and the exercises are finished with a test and can be sandwiched with practical reviews. The second unit deals with quality control. The competency certificate is a confirmation that the user has taken part in the training course and attained sufficient knowledge, and hence acts as a quality control and safety tool for the caregivers and caretakers. The certificates also make it possible for administrative users to get a general view of the results of the training course in the department. TILDA is available on the internet 24 hours a day, making it easily accessible. Each user is given a personal account. Individual competencies are stored and a user may return to his account at any time.

CONCLUSION. The application is individual based and adapts to the users level of knowledge. Up to date TILDA has been adopted by at least 40 units and 20 hospitals and is recommended by The National Board of Health and Welfare for training within the medical service.

GRANT ACKNOWLEDGEMENT. The Swedish Association of Health Professionals (SAHP), The Swedish Society of Nursing(SSF, The Region Skåne, The board of south Sweden.

0690

COMPETENCE REQUIREMENTS IN INTENSIVE AND CRITICAL CARE NURSING

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INTRODUCTION. Competence is a complex concept in intensive and critical care nursing. Intensive and critical care nursing requires strong competencies. More systematic empirical research is needed into competence requirements in intensive and critical care nursing. The purpose of this study was to describe competence requirements in intensive and critical care nursing. Research questions were:
1. What kind of knowledge base there should be in intensive and critical care nursing?
2. What kind of skill base there should be in intensive and critical care nursing?
3. What kind of attitude and value base there should be in intensive and critical care nursing?
4. What kind of experience base there should be in intensive and critical care nursing?

METHODS. The study was a Delphi-study including two rouds. The results of round one is reported here. The study was carried out in Finland. The expert panel was formed of intensive and critical care nurses and physicians of five university hospitals and four central hospitals. Altogether 44 (=n) experts participated in first round. The experts completed a questionnaire which consisted of demographics and one essee question. Text were analysed according to research questions by content analysis.

RESULTS. Competence requirements in intensive and critical care nursing can be described as five main domains: specific 1) knowledge base, 2) skill base, 3) attitude and value base and 4) experience base of intensive and critical care nursing. Additionally competence can be described as several 5) personal attributes of competent intensive care nurse. Competence requirements can be divided into clinical and professional competence requirements. The sub domains of clinical competence requirements are implementation of principles of nursing care, implementation of clinical guidelines and implementation of nursing interventions. The sub domains of professional competence requirements are then ethical activity, decision making, development work and collaboration.

CONCLUSION. Competent nurse in intensive and critical care nursing has to have specific knowledge base, skill base, attitude and value base and experience base that differs from overall competence in nursing. Additionally competent intensive and critical care nurse has to have spesific personal attributes.

GRANT ACKNOWLEDGEMENT. We would like to thank the experts of university and central hospitals who participated in this study.

0691

CATHETER RELATED BLOOD STREAM INFECTION, EXPRESSION OF A DECREASE IN INCIDENCE IN THREE DIFFERENT WAYS

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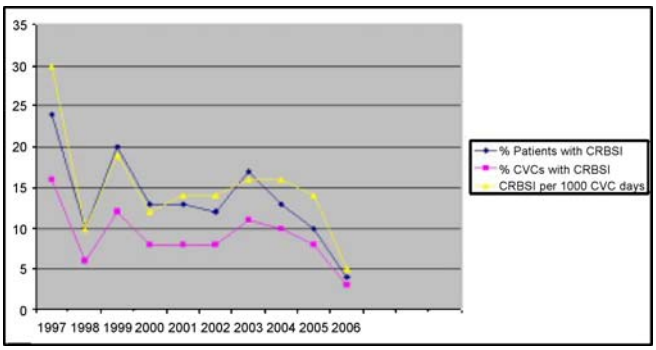
INTRODUCTION. To define examine catheter related bloodstream infections (CRBSI) over a 10-year period (1997-2006), and compare three expressions of incidence.

METHODS. 525-bed tertiary referral centre. Hospital-wide, total parenteral nutrition(TPN) service based at Department of Intensive Care. Quarterly meetings of TPN committee analyse prospectively collected data to examine CRBSI incidence. Effect of introduction of education protocols and appointment of dedicated TPN Nurse were assessed.

RESULTS. 1197 patients, 2093 CVCs were included. A consistent decline in incidence was observed, 24% of patients in 1997 to 4% in 2006 (Figure). Incidence may also be expressed as percentage of CVCs infected, decreasing from 16% of CVCs 1997 to 3% 2006. Finally, incidence is expressed per 1000 CVC days which peaked at 29/1000 CVC days 1997 dropping to 3/1000 CVC days 2006.



CONCLUSION. CRBSI occurs commonly in TPN populations, but published data remains limited. Irrespective of means of expression, our data demonstrates a falling incidence in CRBSI, which we attribute to the appointment of a TPN Nurse, ongoing education protocols regarding CVC insertion and maintenance. This data supports the Pronovost paper1 that an intervention may result in a sustained decline in the incidence of CRBSI.

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Poster Sessions
Risk management after surgery 0692-0704

0692

TRANSITORY COGNITIVE DECLINE AFTER CARDIOSURGERY

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INTRODUCTION. Dimension and course of cognitive ability change after elective coronary bypass (CABG) or valvular replacement (VR) interventions are discussed controversely. The aim of our study was (1) to measure the difference of cognitive abilities concerning attention, memory and fluid intelligence before and after cardiosurgery, (2) to investigate the outcome difference between CABG- and VR-patients and (3) to investigate the relevance of duration of bypass- and aortic-clamping as well as duration of anesthesia as predictors of cognitive outcome.

METHODS. Subjects: 29 consecutive patients; 18 CABG, 11 VR; 3 timepoints of measurement: T1: 1-2 days before intervention, T2: 3 days and T3: 5-8 days after intervention: cognitive assessment instruments: d2-test (selective attention), RBMT (memory), CFT-20 (fluid intelligence).

RESULTS. A significant decline of all measured cognitive functions at T2 compared to T1 could be demonstrated for the CABG- (d2: $p<0.001$; CFT 20: $p<0.05$; RBMT: $p<0.01$) as well as for the VR-sample (d2: $p<0.01$; CFT 20 and RBMT: $p<0.05$). Both groups showed a remission at T3 concerning memory and intelligence scores, only VR-patients had persistent deficits in selective attention ($p<0.05$). There were no significant differences between CABG- and VR-samples at any time of measurement.
No parameter of surgery reached significance as predictor for cognitive outcome in regression analysis.

CONCLUSION. In the early postacute phase (3 days) after CABG- and VR-surgery we could show deficits in various areas (attention, memory, fluid intelligence) of cognitive performance as well as rapid remission within one week. Despite expectations there were no significant differences between CABG- and VR-samples.

0693

ABDOMINAL COMPLICATIONS AND INDOCYANINE GREEN PLASMA DISAPPEARANCE RATE IN CARDIAC SURGERY PATIENTS

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INTRODUCTION. Abdominal complications in postoperative cardiac population are not frequent but may be catastrophic. Non-occlusive mesenteric ischemia appears when there is a mismatch between perfusion and metabolic demands. The symptoms and signs are not incontrovertible and the suspicion of this complication may improve prognosis. Indocyanine green plasma disappearance rate (ICG-PDR) has been proposed as a tool for the assessment of liver perfusion and function (1,2) so that it may help in diagnosis and to optimize treatment.

METHODS. A prospective study was conducted in cardiac surgery patients. ICG-PDR values were measured 12 hours and 24 hours after ICU admission transcutaneously by a commercially available system (LiMon; Pulsion Medical Systems, Munich, Germany). ICG-PDR values and other postoperative data were compared between patients suffering and not suffering from abdominal complications. Mann-Whitney and Wilcoxon tests were applied for statistics. Significance was considered when $p < 0.05$.

RESULTS. 108 patients were analysed but we did not find major abdominal complications. Minor abdominal complications were suspected in 17 because they suffer abdominal pain, ileus and higher serum amylase values. This group of patients were older (72±7 vs 65±10, p=0.017) and suffer from more hypertension (p=0,003). Their preoperative risk (numeric EuroSCORE) was higher(ES num 8±4 vs 5±3, p=0.017) and so was the APACHE II score (13±5 vs 9±4, p=0,002). Twelve hours after ICU admission ICG-PDR values were lower (16.6±5 vs 26±12,p=0.000) and normalized at 24 hours. Length of stay (LOS) was longer (ICU-LOS was 5±3 vs 3±2, p=0.016 and HOSP-LOS was 16±12 vs 11±9, p= 0.015). They had associated more complications : cardiovascular (p=0.021), renal (p=0.001), neurolgical disorders (p=0.000) and infectious (p=0.028). Procalcitonine (PCT) values were also higher(p=0.015). They suffer from higher preoperative pulmonary hypertension (PAP de 56±11 vs 48±11, p=0.013). Cardiac index values were lower 24 hours after admission (IC-24 2.7±0.5 vs 3±0.5, p=0.037). Serum amylase values were higher in first postoperative day (AMY-12 was 521±437 vs 86±61, p=0.000 and AMY-24 was 792±712 vs 113±235, p=0.000). and so were aspartate amino-transpherasa (AST) values 12 hours after admission (p=0.000). The incidence of gastrointestinal hemorrhage was also higher (p=0.001).

CONCLUSION. 1. Patients suffering from minor abdominal complications had worse ICG-PDR values 12 hours after admission. 2. They were were older and their preoperative risk and APACHE II score were higher. 3. They suffer more complications and their LOS was longer. 4. Serum amylase, AST, PCT, PAP and cardiac index values were worse in these patients.

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0694

USEFULNESS OF PREOPERATIVE INTRAAORTIC BALLOON PUMP THERAPY IN CORONARY ARTERY BYPASS SURGERY

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INTRODUCTION. Deployment of an intraaortic balloon pump is a technique that is used and recommended in high-risk surgical patients. This group includes patients with haemodynamically significant stenosis of the left coronary artery trunk and ejection fraction minor 30%, preoperative unstable angina, and intraoperative and postoperative cardiogenic shock. We examined the pre-and post-operative use of an intraaortic balloon pump in our surgical series and its association with morbidity and survival.

METHODS. We undertook a prospective, observational, cohort study of patients who underwent cardiac surgery with extracorporeal circulation between January 2004-June 2006 who were admitted to the polyvalent intensive care unit of our third-level hospital. The data collected were analysed statistically with SPSS 11.5.

RESULTS. The study included 283 patients, with a mean age of 64.4 ± 12.6 years and 55% were men. The incidence of IABP were: preoperative 2.8%, intraoperative 3.2%, postoperative 1.1%, technically imposible 1.1% and no need of IABP 92.6%. 44% had some degree of surgical morbidity (including atrial fibrillation). The overall mortality was 8% and the mean stay was 4.3 ± 4.6 days (range, 0-29 days). The indication were: ejection fraction 47%, unstable angina 38%, 3 vessel disease 15%. After an univariate analysis IABP and postoperative complications there was relation with low output or shock (the indication of IABP, p<0.0001). The others postoperative complications (mechanical ventilation > 48h, kidney failure, important haemorrhage and perioperative infarction) were no relationed and has the same incidence as the moderate-low risk interventions.

CONCLUSION. The intraaortic balloon pump is a commonly used technique in high-risk patients, reducing the incidence of postoperative complications to the limits of those in moderate- or low-risk patients.

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0695

ITU IMPLICATIONS OF USING MINIMAL EXTRACORPOREAL CIRCULATION (MECC) FOR CABG

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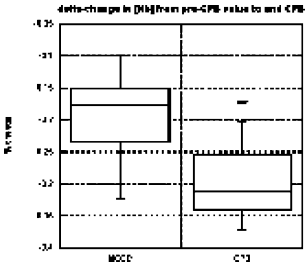
INTRODUCTION. MECC is a new approach to Cardio-Pulmonary Bypass (CPB). The system differs from conventional bypass (CPB) as follows: minimal priming volume (<800 ml); no venous reservoir (closed system); active venous drainage; no cardiotomy suction; heparin coating (tip-tip). Practical advantages of MECC include: minimal haemodilution; no blood-air interface; reduced foreign-body contact; less haemolysis; reduced heparin given. Potential improvements in clinical outcome in ICU as a result include: reduced requirement for inotropes; fewer blood transfusions; less systemic inflammation; reduced coagulopathy; improved end-organ function. These factors combine [1] to significantly reduce PRBC transfusion (U/patient) requirements with MECC (0.33 ± 0.73) compared with CPB (0.74 ± 1.55), or OPCAB surgery (0.64 ± 1.39).

METHODS. MECC has recently been introduced in the SWCC for routine CABG surgery. Intraoperative data were collected for quality control purposes (n=17), compared with historical controls (same surgeon and anaesthetist) but with CPB (n=10).

RESULTS. Mean Euroscore was higher for MECC (2.9) compared with CPB (2.3). Surrogate markers of peripheral perfusion ([lactate]), stress response ([glucose] and leucocytosis) and end-organ perfusion (%change [creatinine]), were the same between the two systems. Length of stay in ICU and hospital were the same. The most striking result was the improved Hb on bypass. No patient reached the transfusion trigger (7g/dl) during bypass with a mean fall in Hb of -19% ±0.06 with MECC compared with CPB (-30% ±0.06) (p<0.001).



CONCLUSION. An improved haematological profile (seen here with Hb, but theoretically reflected in other blood components) with MECC may reduce postoperative coagulopathy, costs and risks associated with blood and other blood product transfusion, and improved oxygen delivery and therefore end-organ function.

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0696

OUTCOME OF PROLONGED ICU STAY PATIENTS IN A CARDIOTHORACIC UNIT OVER A ONE YEAR PERIOD

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INTRODUCTION. Cardiothoracic units have high usage of intensive care unit (ICU) beds and patient flow-through affects their continued productivity and cost-effectiveness. Prolonged ICU stay patients are a small percentage but consume a disproportionate amount of resources and have a higher mortality. Our aim was to determine the type and the outcome of ICU patients requiring prolonged stays at our institution to determine if resources were used appropriately on patients with a reasonable chance of survival.

METHODS. Our institution is a cardiothoracic hospital specializing in adult cardiothoracic surgery and transplantation. A retrospective analysis of the institution ICU database was performed and all admissions with a duration ≥21 days from April 1 2005 to March 31 2006 were identified. The medical records of these patients were reviewed to determine individual risk factors for prolonged ICU stay. This data was compared to the overall ICU outcome audit data for that year.

RESULTS. There were a total of 1009 ICU admissions of which 52 (5.15%, 49 patients) were ≥21 days. The median ICU length of stay in the study group was 31.5 days (range 21-128). The patients had a cumulative total of 2134 bed days which was 35.8% of the total ICU bed days (5960). ICU mortality was 2.8 times greater than the overall unit mortality (23.1% versus 8.3%). Mean and median age was similar to that of the overall unit. The percentage of readmissions in the study group was 4.5 times greater than the overall percentage (32.7% versus 7.3%). In the prolonged stay group 32 patients (65.3%) survived the hospital admission: 19 were discharged home and 13 were transferred to another hospital for further rehabilitation.

TABLE 1.

Outcomes for prolonged ICU admissions

Case Type	Admissions n	Median ICU stay days	Median hospital stay days	ICU deaths n
Cardiac Surgery	23 (828)	31 (3)	68	2 (55)
Thoracic Surgery	2 (58)	30.3 (2)	46	1 (7)
Cardiology	2 (43)	30 (4)	40	0 (12)
Transplant / VAD	18 (71)	39 (5)	105	2 (9)
Thoracic medicine	0 (1)	-	-	-
Other	0 (8)	-	-	-
Total	52 (1009)	31.5 (3)	67.5	5 (83)

(figures in parenthesis are numbers for all ICU admissions for the year)

CONCLUSION. This analysis confirms that a small percentage of long stay patients occupy a large proportion of ICU patient-days. The mortality is higher in this group than the overall unit, but the survival rate of 65.3% could justify the extra resources required to treat these patients. Age does not appear to influence length of stay in this study. The patients who are most likely to have a prolonged length of stay are re-admissions, patients who are peri-transplant or have ventricular assist devices.

0697

THE EFFECT OF REMOTE ISCHAEMIC PRECONDITIONING ON ISCHAEMIA REPERFUSION INJURY IN HUMANS

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INTRODUCTION. Cardiac surgery necessitating cardiopulmonary bypass involves periods of ischaemia followed by reperfusion. Reperfusion of previously ischaemic tissue may itself result in tissue damage through the activation of neutrophils, production of oxygen free radicals and endothelial damage. This phenomenon has been termed ischaemia reperfusion injury (IRI). The consequences of IRI may be observed locally in the form of reversible cellular dysfunction or more remotely with effects observed in the lung, liver and cardiovascular system. Ultimately, a systemic inflammatory response syndrome (SIRS) may develop with the potential to progress to multiple organ failure in the most extreme cases. Remote ischaemic preconditioning (RIPC) is a technique which provides protection against experimental IRI in humans.

METHODS. We performed a randomised controlled trial to investigate the effect of RIPC on patients with triple vessel coronary artery disease undergoing CABG surgery (n = 13). RIPC was induced by 3 cycles of 5 minutes of inflation (200 mmHg) and deflation of a blood pressure cuff around the upper arm 24 hours prior to surgery. Patients were assessed post operatively for the development of SIRS. Blood samples were collected up to 72 hours post operatively. Myeloperoxidase (MPO), interleukin-6 (IL-6), C-reactive protein (CRP), and von willebrand factor (vWF) were measured as biochemical markers of neutrophil activation and endothelial damage.

RESULTS. SIRS developed in 31% of patients who had undergone RIPC compared to 38% in the control group (p = 0.7). MPO, IL-6, (table 1) CRP, and vWF (table 2) were elevated post operatively but no protection was observed in patients pre-treated with RIPC. Of note, the study was not powered to measure these variables as the primary outcome and thus it is possible that a protective effect may be observed in a larger study population.

TABLE 1.

MPO and IL-6 pre and 5 hours post CABG surgery. Values shown are mean ± SEM

	MPO (ng/ml) Ctl	MPO (ng/ml) RIPC	IL-6 (pg/ml) Ctl	IL-6 (pg/ml) RIPC
Pre op	136.6 ± 34.2	186.7 ± 31.6	3.2 ± 0.18	3.2 ± 0.14
5 hours	415.0 ± 93.6	284.9 ± 39.4	260.4 ± 66.5	235.4 ± 38.9

TABLE 2.

CRP and vWF pre and 48 hours post CABG surgery. Values shown are mean ± SEM

	CRP (mg/l) Ctl	CRP (mg/l) RIPC	vWF (IU) Ctl	vWF (IU) RIPC
Pre op	7.0 ± 1.7	6.1 ± 0.6	140.5 ± 13.8	142.0 ± 10.5
48 hours	140.0 ± 17.0	162.4 ± 14.6	257.1 ± 12.1	221.9 ± 16.2

CONCLUSION. RIPC provided no protection against the development of IRI resulting from CABG surgery necessitating cardiopulmonary bypass in our study population.

GRANT ACKNOWLEDGEMENT. The Doverdale Trust & The Intensive Care Society

0698

EFFECT OF GENDER ON POSTOPRATIVE COURSE AFTER CORONARY BY-PASS GRAFTING

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INTRODUCTION. Gender differences in the coronary bypass surgery have been the focus of numerous publications in recent years. Compared to men, women undergoing coronary artery bypass grafting appear to have a higher morbidity and mortality, particular in the perioperative period. The aim of this study was to analyze which clinical parameter and laboratories data effect on gender differences in postoperative course.

METHODS. From May 2006. to the end of December 2006.,all patients on whom were performed elective coronary bypass surgery were included in this retrospective study. Age,EF,EUROSCORE,numbers of days in JIL,total numbers of day in hospital stay, Troponin T (T1-3 hours after addmision,T2-12 hours after addmision in JIL),lactate (L1,L2),cardiac output,Cardiac index were observed.
For all variables was made descriptive statistics. We used Student-T test and Mann-Whitney U test.

RESULTS. 81 patients (55 M and 26 F)were observed.
Analyzing age, EF,EUROSCORE,cardiac output and cardiac index we did not find statistical important differences man versus female.
Analyzing troponin T, level of lactate (particulary L2)we found statisticaly important higher levels in women group.
Women needed longer support with inotropes and are more likely to spend longer time in the hospital.

CONCLUSION. Fortunately, the last decade has produced a surge of public interest and scientific research in womens health, including gender issues related to CABG. It is now well accepted that there are major differences in the risk profile of man compared to the profile of woman undergoing CABG procedures. Even when both genders share a common risk factors, the relative impact of risk factor is often quite different in man as compared to woman.

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0699

PAIN CONTROL WITH CONTINUOUS INFUSION OF A LOCAL ANAESTHETIC AFTER ABDOMINAL AORTIC SURGERY — PRELIMINARY RESULTS

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INTRODUCTION. Reports regarding the benefit of continuous local analgesia after various surgical procedures are conflicting (1). The aim of this prospective, randomized, double-blind study was to investigate the efficacy of continuous local anaesthesia using the Pain Relief System (I-Flow Corp, USA) in patients after abdominal aortic surgery.

METHODS. After closing the peritoneum, two multi-hole catheters (length 25 cm) were placed in the opposite direction of the skin incision. Following skin closure, both catheters were connected to the elastomeric pump filled with 270 ml of an unknown solution (either sodium chloride [NaCl] 0.9% or ropivacaine 0.33%) and a continuous infusion of 2 ml.h-1 was started through each catheter. Every 4 hours until 68 h after surgery combined visual analog pain scale (VAS) and numeric rating scale (NRS), partial oxygen (paO2) and partial carbon dioxide pressure (paCO2), arterial oxygen saturation (SaO2), pulse rate, and mean arterial pressure were recorded. The serum concentration of ropivacaine, free ropivacaine and alpha-1-acid glucoprotein were measured daily. The total amount of intravenous morphine sulphate and nonsteroidal analgetics, ventilation time, length of stay in the ICU, and the condition of the removed catheters were documented.

RESULTS. Sixteen patients were enrolled, but one patient had to be excluded because of accidental catheter removal at ICU arrival. Demographic and surgical data were not different between groups. Ropivacaine was applied in 7, NaCl 0.9% in 9 patients. VAS/NRS was lower in the ropivacaine group during the first 24 postoperative hours (2.4 ±1.8) than in the control group (4.0 ±1.8), but this difference did not reach statistical significance. No significant intergroup differences were found with regard to morphine sulphate, metamizole and paracetamole consumption, paO2, paCO2, SaO2, ventilation time and length of stay in the ICU. Serum concentrations of free ropivacaine (0.11 ± 0.084 μmol/l) were well below toxic levels (0.547 ± 0.29μmol/l). In two thirds of the removed catheters >50% of the holes were closed.

TABLE 1.

Drugs	Ropivacaine 0.33%	Sodium Chloride 0.9%
Morphine sulphate (mg)	81.07 ± 46.8	99.7 ± 48.9
Paracetamol (g)	10.0 ± 1.9	9.1 ±1.9
Metamizole (g)	3.7 ± 4.5	2.6 ± 3.2

CONCLUSION. Continuous infusion of ropivacaine 0.33% 2 ml.h-1 using two multi-hole catheters at the surgical site in patients after abdominal aortic surgery did not reduce the consumption of intravenous morphine and nonsteroidal analgetic drugs.

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0700

PROSPECTIVE EVALUATION OF P-POSSUM, APACHE II AND APACHE III SCORES IN BRAZILIAN SURGICAL INTENSIVE CARE UNIT PATIENTS

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INTRODUCTION. Prognostic scores have been developed for assessing patients's risk of complications or death and are useful to identify high risk patients allowing specific interventions. Surgical scores have been developed but it is still not clear if they offer any benefit compared to general ICU scores. The aim of this study was to compare the accuracy of the scores APACHE II, APACHE III and P-POSSUM in a Brazilian surgical intensive care unit.

METHODS. 449 consecutive surgical patients admitted in the Surgical Unit were included prospectively from August 2006 to March 2007. Cardiac and neurosurgery, age < 18 and length of stay in the ICU < 24h were excluded. After exclusion, the scores were applied in 257 patients. We compared actual in-hospital mortality with those predicted by the APACHE II, APACHE III and P-POSSUM scoring systems applying Receiver Operating Characteristic (ROC) curve analysis by integrated methods using R-System 2.4.1. The physiological parameters of P-POSSUM score were obtained in the postoperative period. The operative parameters in orthopedic surgery were adapted.

RESULTS. The most common surgeries were: abdominal surgery (38.1%), orthopedic (27.2%), urologic (10.8%), vascular (7.39%), bariatric (7%) and thoracic (4.6%). Procedures done before 24h of hospital admission were 52 and before 2h of admission were 4. The average number of days in ICU was 2.8 (+- 2.4) and the mean number of postoperative days before discharge was 15.9 (+- 19.3). The rate of ICU readmission in 30 days was 13.6%. The median age was 66 years. Overall hospital mortality was 6.5%. The mean absolute values of APACHE II, APACHE III and P-POSSUM were 12.9 (+- 7.7), 48.4 (+- 2.1), 35.5 (+- 3.3) and mean predicted in-hospital mortality were 13.7%, 9.5% and 8.1%. respectively. The area under the curve from Receiver Operator Characteristic curve analysis for APACHE II was 0.69, for APACHE III was 0.85 and for P-POSSUM was 0.81.

CONCLUSION. These data suggest that P-POSSUM may provide a better estimate of the risk of mortality than APACHE II and is at least as accurate as APACHE III. P-POSSUM requires fewer individual patient parameters to be calculated and is thus easier than APACHE III to be generated.

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0701

CLINICAL PROFILE AND MORTALITY ANALYSIS OF SEVERE GESTOSIS ADMITTED IN ICU

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INTRODUCTION. Preeclampsia is a multisistemic disease that may occur in pregnancy or in the immediate post-partum period. The incidence of pregnancy induced hypertensive disease is observed in 2.23% in Spain. We analise the mortality and the clinical profile of this entity in our ICU.

METHODS. The study comprise prospectively women admitted in ICU with the diagnose of severe gestosis, from January 1998 to October 2006. We define preeclampsia, eclampsia and HELLP syndrome as used by the American College of Obstetric and Gynecology. We consider HELLP as a different disease as its mortality rises up to a 25%. Cualitative variables are shown as percentage and cuantitative variables as mean ± standard deviation or median and range in asymmetric variables. We used Chi Square test, t-test and multivariant testing for statistical analysis of the data.

RESULTS. We report data from 230 women admitted in ICU in the period January 1998 to October 2006. Clinical and demographical data are shown here:
Diagnose: Preclampsia 77,4% Eclampsia 6,5% HELLP Syndrome 16,1%. Risk Factors: Age 31 years(16-46) Smoker 3,5%Primipara 64,3%Obesity 10,9%High blood pressure 18,3%Gestational age 32,08 ±4,47 weeks. Complications in ICU: Seizures 7,4%Pulmonary oedema 7,9%Coagulopathy 2,6%Renal failure 6,1%. Delivery: Cesarean section 86,9%Vaginal 13,1%. Length of stay: 5 days(1-28). Newborn weight 1550 gr(370gr-4030gr). Mortality: Maternal 1,8 (n=4)Fetal 17,1 (n=38). We didn't find significant difference on systolic pressure between preeclampsia, eclampsia or HELLP nor in uric acid levels. There were significant differences in aminotransferase enzymes and platelet count between preeclampsia-eclampsia and HELLP. Gestational age was significantly lower in preeclampsia than in eclampsia or HELLP ($p<0,0001$) and, additionally, the weight of newborn were significantly lower in preeclampsia versus eclampsia and HELLP. Fetal death is associated with a birth weight below 1000gr ($p<0.01$), OR 11.9, CI 95% (5.6-25.6)). Maternal death is associated with renal failure, heart failure or coagulopathy ($p<0.048$) OR 3.5 (CI 95% 1.2-9.79). Multivariant analysis show that primiparity appears as a protection versus mortality, $p<0.029$ OR 0.034 (CI 95% 0.002-0.7) and pulmonary oedema as a risk factor $p<0.05$ OR 3.5 (CI 95% 0.96-9.6). Fetal mortality is associated in multivariant analysis with gestational age and consequently with low weight ($p<0.027$) and ($p<0.025$) respectively, OR 1.38, CI 95% 1.03-1.83 and OR 1.0003 CI 95% CI 1.001-1.005 respectively.

CONCLUSION. Women admitted to the ICU are mostly 31 years old, in the 32 week gestational age of their first pregnancy. In our environment, delivery mostly occurs in the following 5 to 7 days of admission. Maternal mortality is low but not so fetal mortality that rises up to 17,1%. Maternal mortality is associated with multiparity and complications such as pulmonary oedema, and fetal mortality mostly with gestational age and low birth weight.

0702

EXTENT OF LIVER RESECTION PREDICTS HIGHER POSTOPERATIVE BLOOD LACTATE LEVELS

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INTRODUCTION. In order to reduce postoperative morbidity and mortality following liver resection due to hepatic failure it is important to carefully monitor liver function. As lactate is mainly cleared by the liver, it has the potential to be a good indicator of liver performance. Many factors may determine liver function, such as the extent of the liver resection, pre-existent liver conditions, the amount of blood loss, and other patient and operation characteristics. We assessed the value of fast and inexpensive point-of-care lactate measurements as an indicator for liver function next to prothrombin time which is the current standard.

METHODS. In a retrospective observational study we included all patients admitted to the surgical ICU after liver resection between April 2005 and March 2007. Lactate levels were frequently measured in arterial blood with a point-of-care device (ABL radiometer). Maximal lactate during the first 8 hours after ICU admission were determined. Extent of liver resection, preoperative liver condition and red blood cell transfusions were recorded.

RESULTS. 57 patients were studied (33 males, 24 females) with a median age of 60 years (range 36-77). Abnormal liver parenchyma was present in 14 (25 %) patients. In 28 patients, more than 40% of the liver was resected (major resection). Red blood cells were administered in 18 patients with a mean of 1.4 (± 2.7) packed cells. 371 lactate measurements were performed during the first postoperative day. Multivariate analysis with the parameters volume percentage resected, peri-operative blood loss, age, gender, preexistent liver condition, showed that the extent of liver resection was significantly associated with lactate levels (P=0.007). Mean lactate levels were respectively 3.1 for major resections and 1.7 for minor resections. Blood lactate levels were significantly correlated to PT (Pearson's R=0.60; $p<0.05$).

CONCLUSION. The extent of liver resection was an independent predictor of lactate levels. Age, gender, amount of blood loss and preexistent liver disease were not associated with lactate levels. Lactate levels were clearly correlated with prothrombin time.

0703

ADRENALECTOMY FOR PHAEOCHROMOCYTOMA: DO THEY REALLY NEED ITU POSTOPERATIVELY?

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INTRODUCTION. Phaeochromocytoma is a rare chromaffin cell tumour predominantly arising in the adrenal medulla. Following pharmacological control, elective surgical excision is performed (1). Postoperative admission to ITU is standard as cardio-respiratory, renal and metabolic complications (hypertension, hypotension, pulmonary oedema and hypoglycaemia) may occur (2). The aim of this study was to identify postoperative complications following adrenalectomy, requiring critical care support. The data collected would allow us to evaluate the statement that, 'not every patient following adrenalectomy for phaeochromocytoma requires ITU admission'.

METHODS. Over 5 years, adrenalectomy patients with a clinical, laboratory and histological diagnosis of phaeochromocytoma, were studied retrospectively. Twenty three patients were identified from clinical databases and data collection followed a review of the perioperative records.

RESULTS. 30% of the adrenalectomies were open, the remainder were laparoscopic (3 were converted to open). Multiple anaesthetic techniques were used by four anaesthetists. 13% arrived on ITU intubated, but extubation followed within 2 to 6 hours. With a MAP between 60 and 70 mmHg, 17% received postoperative inotropic support (noradrenaline 0.2 to 0.8 mg/h) for 1 to 7 hours. One patient (4%) required inotropic support for 27 hours and remained intubated for 72 hours. Six developed postoperative respiratory infections (33% were open adrenalectomies); one of which required reintubation, ventilation and inotropic support. All of those that developed respiratory infections had morphine infusions or PCA for analgesia. Although the difference between the preinduction and peak intraoperative blood pressures (systolic and mean) were smaller in those receiving remifentanil, it was not statistically significant.

CONCLUSION. 1) Following adrenalectomy for phaeochromocytoma, few patients experienced significant perioperative morbidity and the traditional practice of electively admitting all patients to the ITU, should be reviewed. 2) An experienced team approach (1) is more likely to limit perioperative complications than using surgical duration, tumour size and urinary catecholamine concentration to predict postoperative complications (3). 3) Standardising the anaesthetic technique could increase the 'in theatre' extubation rate. 4) The routine use of epidural analgesia may reduce the incidence of postoperative respiratory infections and may influence the incidence of reintubation. 5) The role of remifentanil requires further investigation but prior to venous ligation of the tumour, it appears to improve intraoperative haemodynamic stability.

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0704

MORTALITY IN SURGICAL UNITS AND POSTOPERATIVE CARE

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INTRODUCTION. In the year 2005, there functioned 10 public health care institutions in the area of Lodz, having in their structure surgical unit classified as general, surgery unit. They were three university teaching, three provincial, three county and one departmental hospitals. The lowest percentage of mortality was noted in the surgical unit of University Teaching Hospital No. 5 in (UH No. 1) and it was 0,35%. The authors decided to analyse the causes of such low mortality in this hospital. Two remaining university teaching hospitals: University Teaching Hospital No. 1 (UH No. 1) and University Teaching Hospital No. 2 (UH No. 2) were selected for comparative analysis.

METHODS. The study is a retrospective analysis of mortality in general surgery units located at three university teaching hospitals. The study comprised 18911 patients treated in these units from 01.01.2003 to 31.12.2005. The available statistical material was analysed. In the first stage the statistical data were analysed of the Provincial Centre of Public Health in Lodz. In the second stage the structure of the analysed units and the structure of the selected groups of diagnoses were compared. A relative structure similarity index was used to compare the structure of hospitalised patients in the analysed units. The third stage was focused on explaining the reasons of significantly lower mortality among patients hospitalised in surgical unit of UH No. 5.

RESULTS. The relative structure similarity indices of the hospitalised patients in general surgery units in the selected hospitals acc. to the basic disease (in the years 2003-2005) were respectively: UH No. 1/UH No. 2 - 0,518; UH No. 1/UH No. 5 - 0,561; UH No. 2/UH No. 5 - 0,613 and 0,416 together for UH No. 1/ UH No. 2/ UH No. 5. To compare objectively the mortality, the most numerous group of patients with diagnosed K00-K93 was selected for further analysis. The mortality in this group was in UH No. 1 2,31%, in UH No. 2 0,96% and in UH No. 5 0,11%. Relative structure similarity indices were in the range of K00 - K93 diagnoses respectively: UH No. 1/UH No. 2 - 0,669; UH No. 1/UH No. 5 - 0,495; UH No. 2/UH No. 5 - 0,555 and 0,434 together for UH No. 1/ UH No. 2/ UH No. 5. After taking into account these indices (appropriate modification of the structure and number of deaths) the mortality was respectively : in UH No. 1 1,51%, in UH No. 2 0,92% and in UH No. 5 0,13%.

CONCLUSION. A detailed analysis of the selected diagnoses and of mortality allowed to state that early postoperative intensive care in severely ill patients and in cases of need immediate admission to ICU significantly decrease mortality (a model existing in UH No. 5).

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0705

BLOOD PRODUCTS USE IN PATIENTS UNDERGOING ELECTIVE THORACOABDOMINAL AORTIC ANEURYSM SURGERY

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INTRODUCTION. Thoracoabdominal aortic aneurysm (T(A)AA) repair is associated with major blood loss exceeding the intravascular volume and complex perioperative coagulopathies requiring transfusion of blood products. There have been three reports evaluating bloodproducts needs in T(A)AA repair. The combination of surgery induced tissue damage and massive blood products transfusion may enhance post operative organ dysfunction and infections. Mortality in CABG surgery is associated with number of bloodproduct transfusions. In T(A)AA surgery this relation has not been studied. This question might be of clinical importance as elective T(A)AA repair is associated with considerable mortality (7-15%) and morbidity (e.g. respiratory failure 30-43%).

METHODS. In this retrospective single centre study we identified all consecutive patients with TAA(A) surgery during the period 1998-2004. Patients records in an ICU database and transfusion database were combined and evaluated. Baseline characteristics, APACHE II score, respiratory failure (ventilator support > 72 hours), transfusion and mortality data were collected. Association between variables was determined with multivariate regression analysis. In all patients cellsaver was used.

RESULTS. 206 patients underwent T(A)AA surgery in the study period. 194 patients (110(56.7%) male and 84(43.3%) female) were identified in both databases. The mean age was 65.7 ± 10.4 years. In hospital mortality was 11.9%. Mean APACHE II score in the first 24 hours was 15 ± 5. RBC transfusion results in an significantly increased mortality risk (OR 1.1 (95%CI 1.0-1.2)). RBC transfusion was significantly associated with respiratory failure (OR 1.4 (95%CI 1.2-1.6)). Increased post operative Apache II score results in significantly more RBC infusion (p<0.01). These findings could not be demonstrated for FFP and Platelets infusion. We did not find a significant difference in blood transfusions and extent of aneurysm, as found by others. Our quantity of blood transfusion is much less than reported previously (with and without cellsaver use).

TABLE 1. Bloodproduct use and elective T(A)AA repair

Crawford type aneurysm		RBC Mean(±SD)	FFP Mean(±SD)	PLT Mean(±SD)
Type I	57 (29.4%)	7.1±5.2	9.1±4.3	1.7±0.9
Type II	100 (51.5%)	8.1±5.2	10.9±5.0	2.0±1.0
Type III	28 (14.4%)	6.1±4.7	8.0±3.7	1.5±0.9
Type IV	19 (4.6%)	4.2±2.5	5.6±2.9	1.0±0.5

Bloodproducts in Units

CONCLUSION. Large volume of blood transfusion may be necessary during and after T(A)AA surgery. RBC transfusion is associated with increased mortality rates. As APACHE II score is related to RBC transfusions, peri operative optimalisation might contribute to less blood transfusions. Blood transfusion in our population is less than reported previously.

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RECOMBINANT ACTIVATED FACTOR VII: EFFECTIVE MANAGEMENT OF UNCONTROLLED BLEEDING IN CARDIAC SURGERY PATIENTS

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INTRODUCTION. Cardiac surgery is occasionally complicated by refractory postcardiotomy bleeding, leading to increased mortality and morbidity.
Recombinant activated factor VII is being increasingly used as rescue therapy in such cases. We report our experience with the use of rFVIIa in our 16-bed CSICU.

METHODS. All patients who received rFVIIa as rescue therapy for intractable bleeding during or after cardiac surgery over a 2-year period was analyzed. We assessed and compared the use of blood products (RBC, FFP, PLT), coagulation indicators (international normalized patio [INR], activated partial thromboplastin [APTT], and fibrinogen), and platelet levels before and after rFVIIa administration.

RESULTS. 7 patients (mean age, 55,5 +/- 7,8 years) received a single dose of rFVIIa (77,8 +/- 48,5 microg/kg). Surgical procedures were aortic surgery (n=5), double valve operation (n=1) and left ventricular assist device (n=1). The men time between ICU admission and rFVIIa administration was 3 hours while1 patient received it intraoperatively. The mean blood product usage prior and after the administration of rFVIIa was the following: packed RBC, 12,6 versus 1,8 U; FFP, 8,8 versus 2 U; platelets 14 versus 0,5 U; Bleeding stopped in all cases and no patient needed reoperation. The mean coagulation results were PTT, 62,2+/- 12.6 versus 42,2 +/- 5,8 seconds; p=0,001; INR, 1,42 +/- 0,16 versus 0,9 +/- 0,05; p<0,001.
In all cases, blood loss decreased considerably after rFVIIa administration almost eliminating the need for additional blood products, and the prolonged prothrombin time normalized. No side effects of rFVIIa treatment were noted. There were no thrombotic complications, cardiac ischemic events or deaths.

CONCLUSION. Our results support the use of rFVIIa as rescue therapy in severe, uncontrollable, nonsurgical, postoperative hemorrhage after cardiac surgery as efficacious and safe. However the data are still limited, and further studies are necessary to determine the safety and efficacy of this new hemostatic agent.

0707

EFFECT OF PROTHROMBIN COMPLEX CONCENTRATE (OCTAPLEX®) ON COAGULATION AND BLOOD LOSS IN RATS TREATED WITH THE ORAL ANTICOAGULANT PHENPROCOUMON

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INTRODUCTION. Coumarin oral anticoagulants are widely used to prevent thromboembolic complications in patients at risk for such events. Rapid reversal of anticoagulant effects may be required in cases of severe bleeding or emergency surgery and the use of prothrombin complex concentrate (PCC) is recommended. As a surrogate marker International Normalised Ratio (INR) is used to evaluate the effective use of treatment with PCC. However, a clear correlation between correction of INR and improved haemostasis has not yet been established. This study intended to validate the correlation between the correction of INR, shortening of time to haemostasis, and reduction of blood loss in anticoagulated rats.

METHODS. Four groups of 10 female Wistar rats were used in the study. Rats in Groups 2 to 4 were anticoagulated with 2.5 mg/kg body mass of phenprocoumon on 2 occasions (0 and 24 hours), Group 1, the control group, received isotonic saline. Approximately 48 hours after the second treatment, 10 ml/kg body mass isotonic saline was administered intravenously (IV) in Groups 1 and 2. Groups 3 and 4 received 10 and 40 IU OCTAPLEX®/kg body mass. Fifteen minutes after treatment blood samples were taken. The tail tip was cut off and the tail immersed in isotonic saline at +37 ˚ C. Bleeding time and haemoglobin concentration in the saline were measured subsequently.

RESULTS. Mean bleeding time in Group 1 was 325 ± 509 s. In Groups 2 and 3, the maximum observation time of 30 minutes was recorded (except of one which died after 27 minutes). In Group 4 mean bleeding time was 927 ± 781 s, complete Cessation of bleeding was observed in 5 out of 10 animals. One animal died before 30 minutes and in the remaining 4 clotting was noted with markedly reduced bleeding. Haemoglobin concentrations in Groups 2 and 3 (1,881 μg/ml and 1,995 μg/ml) were significantly higher (p <0.05) than in Group 1 (203 μg/ml). No statistically significant difference was found between Group 4 (470 μg/ml) and Group 1.

TABLE 1.

Mean (SD) INR and haemoglobin (Hb) concentration after treatment Treatment Group	Group 1 (n=10)	Group 2 (n=10)	Group 3 (n=10)	Group 4 (n=10)
Pre-Treatment	isotonic saline	phenprocoumon	phenprocoumon	phenprocoumon
Treatment	10 ml/kg isotonic saline	10 ml/kg isotonic saline	10 IU OCTAPLEX®/kg	40 IU OCTAPLEX®/kg
INR Result	1.14 (0.06) n=9	Above detection	3.64 (0.50)	1.32 (0.08)
Hb Concentration (µg/ml)	203 (385) n=10	1,881 (1,183)	1,195 (1,337)	470 (612)

CONCLUSION. 1) The suitability of the correction of INR as surrogate marker for improved haemostasis was demonstrated. 2) INR results correlate with haemoglobin determinations and amount of blood loss. 3) Treatment with 10 and 40 IU OCTAPLEX®/kg body mass can reverse the effect of oral anticoagulation normalising INR levels with 40 IU OCTAPLEX®/kg body mass.

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THROMBOLYTIC THERAPY FOR POSTOPERATIVE PULMONARY THROMBOEMBOLISM

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INTRODUCTION. Pulmonary thromboembolism (PE) is a critical complication after general surgery with an incidence ranging between 0,1% and 2% and a mortality rate up to 40%. Systemic thombolytic therapy is the core treatment of submassive and massive PE but may be associated with severe bleeding complications after major surgery.

METHODS. We report a case series of four postoperative patients with suspected (n=2) or proven (n=2) massive, life threatening pulmonary thromboembolism. Diagnostic and therapeutic measures as well as decision-finding pro and contra thrombolytic therapy are discussed.

RESULTS. One female and three male patients (age 54 to 61 years) presented with acute hypoxemia and severe cardiogenic shock (n=2) or cardiac arrest (n=2) on postoperative day 1 to day 9 following major surgery. PE was suspected in all cases and confirmed by a computer tomography pulmonary angiography (CTPA) in two patients. Thrombolytic therapy with 100mg Alteplase (Actilyse®) was indicated in one patient under cardiopulmonary resuscitation and in two patients by severely impaired right ventricular ejection fraction, and was waived in one patient with moderately impaired right ventricular function. Immediate thrombolysis lead to successful resuscitation and to a marked improvement in right heart function and gas exchange within 15 min after administration. Bleeding complications following Alteplase injection occurred in all patients within the following hours requiring transfusion of 1-4 units packed red cells as well as minor surgical revision in two patients. Three Patients survived in good conditions and one patient died from progressive therapy-refractory right heart failure.

TABLE 1.

Pat	1	2	3	4
Surgery	neck dissection	spine surgery	esophagus resection	neck dissection
Onset of PE (postoperative day)	1	3	7	9
Symptoms	cardiac arrest	cardiac arrest	cardiogenic shock	cardiogenic shock
Thrombolytic therapy	-	15+85mg Alteplase	15+85mg Alteplase	15+85mg Alteplase
RBC Units	-	1	2	4
Outcome	restitutio ad integ.	died	restitutio ad integ.	restitutio ad integ.

CONCLUSION. Treatment of postoperative PE requires a precise risk-benefit-balancing of the hemodynamic consequences of the thrombembolic event versus possible hemorrhagic complications of a systemic thrombolytic therapy. Thombolysis is more implicitly suggested as hemodynamics are impaired. The decision pro or against thrombolytic therapy in submassive PE should be facilitated by repeated evaluations of right ventricular function.

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0709

HAEMOVISCOELASTOGRAPHY AS A PERIOPERATIVE MEASURE OF ENOXAPARIN ANTICOAGULATION THERAPY

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INTRODUCTION. Patients undergoing open prostatectomy are at risk, for venous thromboembolic complications for up to three weeks postoperatively. We evaluated the efficacy and saffety of postoperative rigemen of enoxaparin. Currently, there is no convenient test to measure the degree of anticoagulation from LMWH.

METHODS. We carried out a single-centre, prospective, randomized, double-blind trial with the aim of assessing the efficacy of postoperative prophylactic treatment. This prospective study examines the relationship of haemoviscoelastography (HVG) MEDNORD (Ukraine Co analyser), a viscoelastic test, measures clot formation and includes information on the cellular, as well as the plasmatic coagulation, system and serum anti-Xa concentration in patients treated with enoxaparin. 116 patients scheduled for open prostatectomy using epidural anesthesia were enrolled. Epidural catheters were removed the morning after surgery before the commencement of subcutaneous enoxaparin 20 mg once daily. Venous blood samples were obtained at: 1) the induction of anesthesia (baseline), 2) immediately before the third dose of enoxaparin operatively; 3) 4 h after the third dose postoperatively, and 4) immediately before the fifth dose postoperatively. Whole blood samples were obtained for haemoviscoelasthgraphy (HVG), activated clotting time, and anti-Xa level analyses at each of the four time intervals.

RESULTS. At the four sample intervals, the r time (mean ± SEM) (5,91 ± 0, 65; 7,5 ± 0,25; 9,5 ± 0,55 min) and the κ time (5,8 ± 0,1; 8,2 ± 0, 27; ± 9, 14 ± 0,2 min) of the HVG were significantly correlated with the expected peak and trough levels of LMWH and serum anti-Xa levels ($p < 0.05$). After fifth dose immediately, HVG r times exceeded the normal range in 29 of 116 patients (25%). Prolongation of r time and κ time on postoperative day 5 may indicate an exaggerated response to LMWH. Lowfrequency haemoviscoelastography is a test that could potentially correlate with the degree of anticoagulation produced by low molecular weight heparin enoxaparin.

CONCLUSION. Lowfrequency haemoviscoelastography MEDNORD (Ukraine Co analyser), a viscoelastic test, measures clot formation and includes information on the cellular, as well as the plasmatic coagulation system is a test that could potentially correlate with the degree of anticoagulation produced by LMWH. The r time from the haemoviscogram correlates with serum anti-Xa concentration. HVG is a convenient test to measure the degree of anticoagulation from LMWH.

0710

PERIOPERATIVE MONITORING OF COAGULATION IN PATIENTS AFTER ABDOMINAL SURGERY FOR CANCER

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INTRODUCTION. Despite the evidence of perioperative hypercoagulability in cancer patients, there are no consistent data evaluating the extent, duration, and specific contribution of platelets and procoagulatory proteins by in vitro testing. This study compared efficacy of haemoviscoelastography versus thromboelasthgraphy for monitoring of coagulation imbalance.

METHODS. 108 Patients undergoing open surgery for abdominal cancer received MEDNORD (Ukraine Co analyser) analysis (HVG), a viscoelastic test, measures clot formation and includes information on the cellular, as well as the plasmatic coagulation system. We examined the efficacy of a variety of coagulation tests. A complete coagulation screen, activated clotting time (ACT), thromboelasthgraphy (TEG) and haemoviscoelastography (HVG) were performed before surgery, at the end of surgery, and enoxaparin anticoagulation monitoring on postoperative days 1, 2, 3, and 7. There were analyzed for the reaction time and the maximal amplitude (MA).

RESULTS. We calculated the elastic shear modulus of standard MA (Gt) and HVG MA (GH), which reflect total clot strength and procoagulatory protein component, respectively. The difference was an estimate of the platelet component (Gp). There was a 14% perioperative increase of standard MA, corresponding to a 48% increase of Gt ($P < 0.05$) and an 80%-86% contribution of the calculated Gp to Gt. We conclude that serial standard thromboelas- tography and HVG viscoelastic test may reveal the independent contribution of platelets and procoagulatory proteins to clot strength. Using multiple linear regression, all coagulation, TEG and HVG variabities were used to model postoperative hypercoagulation. Results showed that some components of the TEG failed to identify hypercoagulation ($r < 0.2$, $P > 0.75$). However, three components of the routine coagulation assay, including bleeding time, prothrombin time, and platelet count could be modeled to show prolonged postoperative hypercoagulability ($P < 0.01$). We conclude that all components of the HVG test reflect postoperative coagulopaties, these results suggests that it may be usefull in determining the coagulation status of cancer patients perioperatively.

CONCLUSION. Postoperative hypercoagulability, occurring for at least 1 week after major cancer abdominal surgery, may be demonstrated HVG viscoelastotest. Hypercoagulability is not reflected completely by standard coagulation monitoring and TEG and seems to be predominantly caused by increased platelet reactivity. HVG provides a fast and easy to perform bedside test to quantify in vitro coagulation, may be usefull in determining the coagulation status of cancer patients perioperatively.

0711

COAGULOPATHIES IN PATIENTS AFTER OPEN PROSTATECTOMY: EPIDURAL VERSUS GENERAL ANESTHESIA MEASURED BY HAEMOVISCOELASTHOGRAPHY

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INTRODUCTION. Anesthetic techniques may affect blood coagulability and the subsequent incidence of thromboembolic events or bleedings. This study evaluated the effects of epidural versus general anesthesia on perioperative blood loss and the development of postoperative venous thrombosis in 119 patients undergoing open prostatectomy.

METHODS. In the epidural anaesthesia group (n = 68), haemoviscoelasthography (HVG) was performed after crystalloid preloading and during the immediate postanaesthesia course. In the general anaesthesia group (n = 51) HVG was performed before induction and during the immediate postanaesthesia course. HVG were repeated postoperativly at 1, 6 and 24 h.

RESULTS. Values for all HVG variables (platelet aggregation [Ar], reaction time [r], thrombin formation time [k], maximum amplitude [AM], total clot formation time [T], summary fibrinolytic activity [F] and coagulation index [Kk] in the preanaesthesia period were similar in both groups. Intraoperative blood loss was not significantly different between between the epidural and general anesthesia groups. There was no significant difference in measured coagulation variables between both groups, but there were significant differences in postoperative r, T and F variables ($p < 0,05$). In the postanaesthesia period r and T significantly decreased ($p < 0,001$), and Ar and F increased ($p < 0,001$) in general anaesthesia group. The total blood loss after open prostatectomy was correlated ($r = 0,72$; $p < 0,001$) with the prostatic tissue weight. When the tissue weight resected exceeded 35 g, blood loss was in excess of the linea correlation shown with the weight of resected prostatic tissue. 19 (15,9%) patients has significantly increased F (fibrinilytic activity) 1 and 6 h postoperatively.

CONCLUSION. The use of general anaesthesia for open prostatectomy is associated with accelerated hypercoagulability when compared with epidural anaesthesia. Perioperative blood loss in patients undergoing open prostatectomy is not affected by the anaesthetic technique and correlate with mass of resected prostate tissue.

0712

THROMBOELASTOGRAPHY IN GENERAL ICU PATIENTS: IMPACT ON CLINICAL MANAGEMENT

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INTRODUCTION. Thromboelastography (TEG) provides information on patients' coagulation status within minutes. The value of the TEG has not been established in general ICU patients. We present 3 cases of critically ill patients with bleeding tendency in whom clinical decisions based on conventional laboratory results were modified by TEG.

METHODS. We started implementing routine use of TEG (Haemoscope,USA). We describe 3 patients in whom TEG results changed clinical decisions that were taken before information from TEG was available.

RESULTS. Case 1-42 Y. O parturient admitted with massive pulmonary hemorrhage of unknown etiology. Because of concern of a bronchial tear and bronchial arterial source bleeding, angiography with embolization was performed. Despite this, bleeding recurred. There were no coagulation abnormalities and the patient was not thrombocytopenic. TEG showed significant early thrombolysis and therefore treatment with tranexamic acid begun. Within few hours bleeding stopped and did not recur. Case 2-24 Y. O man with autoimmune vasculitis presented with acute on chronic renal failure and epistaxis. After dialysis which was performed without heparin,the patient became hemodynamic unstable,was intubated and ventilated due to massive pulmonary hemorrhage. Blood samples showed INR 1.1,prolonged PTT,normal fibrinogen level,thrombocytopenia and hemoglobin 6.1 G/dl. TEG showed no primary fibrinolysis. Repeated TEG with heparinase showed normalization of the TEG tracing. It thus evident that the patient did receive heparin during dialysis and the diagnosis of DIC was negated. The patient was treated with packed red cells only,and further bleeding was not demonstrated. Case 3-78 Y.O man with status epilepticus due to an A-V malformation and brain edema,developed left arm compartment syndrome secondary to thrombophlebitis. The patient's platelet count was 80,000. He was operated uneventfully without correcting the thrombocytopenia. A few hours later there was bleeding from the operative site. A TEG test showed normal parameters. Therefore,despite an initial assessment by the surgical team that the reason for bleeding is a coagulopathy,the patient was taken for a re-exploration of the wound. An arterial bleeder was found which was coagulated.

CONCLUSION. Laboratory abnormalities are critical for making decisions in critically ill patients. Occasionally, the clinical setting of bleeding with mild coagulation and platelet count abnormalities, preclude the patient from receiving invasive procedures prior to correction of the abnormality. Thromboelastography can identify alteration in platelet number and function and abnormalities in the coagulation system. In our 3 cases TEG tracings were performed in addition to other coagulation tests. We found that in some patients as demonstrated here, the information provided by TEG is different from that derived from conventional coagulation tests and leads to a change in clinical decisions.

0713

THE IMPACT OF CANDIDA AIRWAY COLONIZATION ON MORTALITY OF SICU PATIENTS UNDERGOING OPEN HEART SURGERY

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INTRODUCTION. Candida airway colonization is common in mechanically ventilated ICU patients but the implications of this finding are not well appreciated. Fluconazole prophylaxis is a reasonable approach to decrease fungal infections in critically ill surgical patients and is routinely administered in all of our cardiac surgery patients that stay in SICU for more than 10 days. The present study was undertaken to evaluate the incidence and clinical significance of positive bronchial secretion cultures (BSC) for candida in mechanically ventilated cardiac surgery patients, who were febrile (T>380 C) after the first 24h in SICU.

METHODS. A total of 1428 adult patients (64.7±11.3 yo) underwent open heart surgery between October 1, 2005 and September 30, 2006 at OCSC (CABG 50%, valve(s) replacement, VR, 32%, combined CABG+VR 13% and others 5%). Among them, we identified 48 febrile SICU patients (68±10yo) with positive BSC for candida (CABG 31%, VR 29%, combined CABG+VR 25% and others 15%).

RESULTS. Positive BSC for candida developed in 3.3% of our general SICU population (2.1% after CABG, 3.1% after VR, 6.5% after CABG+VR and 10% in others). The average time for candida airway colonization of sputum was 5.9±5 d. The vast majority (83%) of patients developed positive BSC prior to initiation of fluconazole prophylaxis (29 pts within 1-5 d, 11 pts within 6-10 d and 8 pts after 10 d of SICU stay). The ICU stay (19±14 d), hospital stay (30±18 d) and mortality (35%) were significantly higher in patients with positive BSC for candida, compared to the general SICU population (ICU stay 2.9±5.8 d, hospital stay 9.56±2 d, mortality 2.8%).

CONCLUSION. Candida airway colonization of febrile cardiac surgery patients after the first 24 h in SICU is associated with a grave prognosis and could be a marker of compromised immune response. This colonization appears early in the course of ICU stay and therefore the initiation of earlier fluconazole prophylaxis may be necessary.

0714

ACTIVE INFECTIVE ENDOCARDITIS AND SURGICAL THERAPY: A SINGLE-CENTER ONE-YEAR EXPERIENCE

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INTRODUCTION. The current incidence of IE is estimated as 7 cases per 100.000 population per year and continues to increase. The prognosis is significantly influenced by proper diagnosis and adequate therapy. Cardiac surgery for active IE is established as a cornerstone therapy as it is required in 30% of patients but remains a challenging and high-risk procedure. The purpose of this study was to analyze the clinical characteristics of the patients underwent cardiac surgery for active IE in our center for a 12-month period. To evaluate principal indications for cardiac surgery and assess the major causes of surgical morbidity and mortality in IE patients.

METHODS. Retrospective review of IE cases who underwent cardiac surgery from 1 December 2005 to 30 November 2006 in our 16-bed CSICU. We collected age, gender, site of endocarditis, native or prosthetic, microbiological agent, indication of surgery, postoperative complications, ICU stay and mortality.

RESULTS. 10 patients with IE underwent surgical intervention in acute phase of infection. Their ages ranged from 40 to 77 years (mean 54,5) and 70% were males. The causative agents were: streptococci-enterococci (40%), staphylococci (40%), Candida spp (10%), Pseudomonas aeruginosa (10%). The principal indications for cardiac surgery were development of heart failure due to severe heart valve defects or prosthetic valve dysfunction and intracardiac abscess. All patients had positive blood culture endocarditis but only two were still positive before operation. 8 cases of aortic valve involvement were the most frequent, followed by 2 cases of mitral valve endocarditis. Native valve endocarditis prevailed over the prosthetic ones 7 versus 3. Surgery was performed using a mechanical prosthesis of the infected valve. In 2 patients the procedure was complemented with tricuspid valve annuloplasty. 2 patients underwent Bentall procedure. The mean ICU stay was 16,4 days (range 2 to 35). Thirty-days mortality of patients undergone surgery for IE was 20%, 2 patients died in the ICU.

CONCLUSION. Operation for active IE carries a relatively higher mortality in comparison with elective surgery. An indication of surgery depends on several clinical variables but the main indication remains heart failure due to severe heart valve defect or prosthetic valve dysfunction. A high degree of clinical suspicion, at an early diagnosis, and indication of surgical treatment prior to deterioration of ventricular function and installation of generalized sepsis may improve prognosis.

0715

PREDICTION OF THE DEVELOPMENT OF SEPSIS AND SEPTIC SHOCK AFTER ELECTIVE MAJOR SURGERY USING THE CHARLSON COMORBIDITY SCORE

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INTRODUCTION. Severe sepsis is a major cause of morbidity and mortality following major surgery. Factors that are associated with an increased risk of sepsis following surgery include emergency surgery, patient comorbidities and degree of surgical insult. The risk of developing severe sepsis following major surgery for cancer has been shown to relate to the Charlson comorbidity score1, with a higher score predicting a greater risk of developing severe sepsis2. We conducted a prospective observational study in order to investigate whether the Charlson score could be correlated to the risk of developing sepsis following elective major general surgery in patients without cancer.

METHODS. We collected data on 74 patients undergoing elective major surgery in a large teaching hospital. The Charlson comorbidity index was calculated preoperatively for each patient. The patients were followed up for 10 days postoperatively, and signs of the systemic inflammatory response syndrome (SIRS), sepsis and septic shock were documented each day. The source of sepsis was recorded, if present. Admission to critical care bed was also documented.

RESULTS. Data was complete on 74 patients, 50 (67.6%) were male, and 60 (81.1%) had cancer. The median age of the patients was 67 years. Mean operation time was 5 hours, and mean transfusion requirement intraoperatively was 0.7 units. The median Charlson score was 2. 15 (20.1%) patients were admitted to a critical care bed for reasons other than routine postoperative care.
47 (63.5%) patients developed SIRS postoperatively. 21 (28.4%) patients developed sepsis postoperatively, and 7 (9.5%) of these went on to develop septic shock. There was a progressive, but non-significant difference in Charlson score in those patients who developed septic shock or sepsis and those who did not. Those patients who developed septic shock had a mean Charlson score of 2.6, while those with sepsis had a mean Charlson score of 2.5. Those patients who did not develop sepsis had a mean Charlson score of 2.3.

CONCLUSION. Sepsis and septic shock are common after elective major surgery, but the Charlson comorbidity index was not a useful predictor of the likelihood of developing sepsis in our population of cancer and non-cancer patients.

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0716

EPIDURAL IN SEPSIS

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INTRODUCTION. Epidural anaesthesia is used for postoperative analgesia and reduction of respiratory failure in patients undergoing major abdominal surgeries.
Rate of neurological complications after central nerve blockade is < 0.04% (1) and spinal epidural abscess vary from 1:1000 to 1:100000 (2). We audited the complications following epidural analgesia in postoperative patients admitted to our critical care unit with sepsis.

METHODS. We performed a retrospective case note review of all septic patients who had epidural analgesia for postoperative pain relief or for weaning from mechanical ventilation. All patients who had a major laparotomy and sepsis were included. We looked into the complications of epidural during insertion, usage and after removal of epidural catheter. Patients were followed up by the critical care outreach and acute pain teams on discharge from the critical care unit. Data are presented as mean and standard deviation.

RESULTS. In a 3 year period there were 30 septic patients who had epidural analgesia.
21 of these were commenced immediately prior to the laparotomy and 9 were inserted in ITU to enable weaning from mechanical ventilation. The male: female ratio was 13:17 with an average age of 67.9 (14.6). There were 19 patients with 2 or more organ failure. Only 4 (13.3%) patients had positive blood cultures during the period of epidural analgesia. Multiple attempts at epidural insertion were found in 3 patients. Mean duration of epidural catheter was 4.26(1.3) There were 17 survivors and 13 non-survivors in this group.3 of the nonsurvivors died during the period epidural analgesia. The other 10 nonsurvivors were followed up for an average period of 48.3 days and a median duration of 11 days after the epidural catheter was removed. None of the 30 patients developed any complications attributable to the epidural.

CONCLUSION. The serious complications of epidural analgesia like epidural abscess and nerve injuries, although rare, are reported in case series(3). We did not note any adverse complications of epidural analgesia in this high risk group of septic patients admitted to the critical care unit.

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