method for many applications of peripheral nerve blocks in order to achieve an increase of success rate and to reduce the risk of complications.

**Methods.** In order to perform ultrasonic guided interscalene brachial plexus blocks, the use of transducers with frequencies between 7.5 and 12 MHz are essential for good quality imaging. The sonographic image of peripheral nerves is described either as hypoechoic or hyperechoic. There are several reasons that influences the sonographical appearance of nerves such as the size of the nerve, the frequency used, and the angle of incidence of the ultrasound beam. The sonographic imaging of the brachial plexus is very feasible in the space between the anterior and middle scalene muscle. Nerves are visualised as multiple round or oval hypoechoic areas encircled by a relative hyperechoic horizon. Ultrasonic guided brachial plexus blocks are not only determined by the visualised positioning of the tip of needle, but rather by monitoring of the injection of local anaesthetics as they encircle the roots of the brachial plexus. In the case of assessment of the needle with corresponding distribution of local anaesthetic, the needle position can be altered through this method until normal distribution is seen.

**Results.** In several studies (2,3) the use of ultrasound have been shown to be beneficial for success rate, onset time and the reduction of risk of complications.

**Conclusion.** Ultrasonography is an ideal method to detect peripheral nerve structures. Thus, this mean can be used for region anaesthetic blocks for needle guidance as well as local anaesthetic control resulting in a perfect blockade and a visible reduction of risk factors.

**References**

IL09

OUTCOME OF PATIENTS WITH ACUTE RESPIRATORY FAILURE: IS THERE A TREND TO THE BETTER?

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Acute respiratory failure (ARF) or ARDS are one of leading causes resulting in ICU admission. Dependent upon age, occurrence of additional organ failures or complications, this syndrome carries a high mortality rate in the range of 40-70%. Krafft et al. (1) demonstrated in a literature analysis on 101 clinical studies, that outcome of ARDS patients was unchanged between 1967 and 1994. The question remains whether improved supportive care and recent technical equipment (e.g. NO inhalation, gravitational therapy, ECMO) resulted in a significant improvement within the last decade. So far all randomized controlled studies—with the exception of the NIH low tidal volume trial (2)—failed to demonstrate any impact of a new therapeutic approach on the outcome of ARDS patients (e.g. NO, lisofylline, ketokonazole, gravitational therapy).

To the contrary, studies reporting a trend to an improved outcome have been published within the last years. Several of those studies were either not randomized or were reported by single centres evaluating ARF/ARDS mortality over time using historical controls! Furthermore, good outcomes in randomized controlled trials might also reflect restrictive inclusion criteria enrolling less severely ill patients (e.g. 88% of patients screened for the NIH network trial (2) were excluded; mortality was higher than those of included patients!).

In a recently published 28-day international study, Esteban et al. (3) investigated 5183 patients requiring mechanical ventilation and reported mortality rates of 31% for ARF and 52% for ARDS. Similar results have been published from 132 Scandinavian ICUs (1231 ARF pts: mortality 41%) (4), French (ARF mortality 31%, ARDS mortality 60%) and Italian ICUs (ARDS mortality 49%) (5). In conclusion, there might be a slight improvement within the last decade. So far all randomized controlled studies—including patients with additional organ failure, elderly patients or patients with severe underlying disease might result in a too optimistic view of ARF/ARDS mortality.

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IL10

NOSOCOMIAL INFECTIONS ON ICU: EPIDEMIOLOGY, PREVENTION AND THE IMPORTANCE OF ANTIMICROBIAL RESISTANT BACTERIA

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1. Quality of structure and process determine the quality of results

The incidence of nosocomial infections (NI) varies between 7% and 30% on intensive care units (ICU). That is why the determination of the infection rate is not sufficient for the assessment of the hygiene standard. On the same ICU, however, surveillance of NI may be useful to see
changes of the rate, e.g. as an effect of interventions. Incidence rates are considered to be more valid in comparison to prevalence rates. Example will be presented. The main emphasis in prevention should focus on hand hygiene, invasive procedures, antisepsis, wound care based on the stage of the wound, aseptic change of dressing, reprocessing of instruments and beds, identification of undetected sources for potentially pathogenic microorganisms and strategies for chemotherapy. Monitoring the compliance will help to establish this standard. Common mistakes will be demonstrated based on the EURIDIKI study.

2. The ubiquitous presence of pathogenic microorganisms requires a multi-barrier concept to prevent transmission

Prevention of cross infections is crucial. Antimicrobial measures and ‘non touch’ techniques must be complementary. The immediate environment of the patient is the most critical one. Based on our own study on the contamination on ICU we present the concept that has been implemented on ICU to minimize transmission of microorganisms.

3. The increasing spread of antibiotic-resistant bacteria (ARB) requires a microbiological monitoring and a valid outbreak management

Effective isolation and sanitation or therapy depending on the type of microorganism are necessary if a patient is infected or colonized with ARB. Surveillance of staff may be inevitable which may lead to their sanitation or therapy. Data will be shown regarding MRSA colonization.

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IL11

MONITORING – THE IMPORTANCE OF INVASIVE DEVICES

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Optimal monitoring of critically ill patients still remains a challenge. Whereas there was a tremendous increase in the availability of monitoring devices in the past decades, today’s controversy continues as to whether monitoring is able to enhance patients safety or even improve outcome. Accordingly, less invasive monitoring has become more popular because of lower risks and increasing experience.

The introduction of the pulmonary artery catheter (PAC) for the assessment of cardiac output (CO) and pressure derived cardiac function indices, has once revolutionised monitoring. However, today the PAC is criticized due to the strong suspicion of increased mortality, although it is still recognized as the ‘gold standard’ of CO measurement. Less invasive alternatives like echocardiography or a continuous pulse contour monitor, which provides a CO and volumetric parameters of cardiac function (intrathoracic blood volume, extravascular lung water) and CO devices based on Doppler principles or partial rebreathing methods have been introduced into clinical practice. In some of them clinicians still miss validity.

It has been further established that inadequate oxygenation and tissue perfusion contribute to worse outcome, thus microcirculatory monitoring gained extensive interest. Tonometry and miniaturised implantable electrodes as well as near infrared spectroscopy have been proposed to quantify information on splanchnic perfusion and oxygen tension of other regions. Their widespread use in clinical practice has improved knowledge on pathophysiological processes especially in sepsis and multiple organ dysfunction syndrome. On the other hand diagnosis of severe vital functions derangements has become more complex. In contrast to the ability to monitor aspects of almost every organ on a tissue level, correct interpretation, which helps to guide appropriate therapeutic measures remains the burning point.

It may thus be stated that it is no question of invasive or non-invasive monitoring, but the choice of adequate monitoring which offers accurate and reproducible results for the treatment of critically ill patients. This is the basis of enhanced patients safety and improved outcome in times of cutted expenses.

IL12

ACTIVE RESOURCE MANAGEMENT IN THE INTENSIVE CARE UNIT

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Intensive Care Medicine and it’s cost development remains of great interest for the medical community and the public. Patients receiving medical care in ICUs account for nearly 30% of acute care hospital costs, yet these patients occupy no more than 10% of inpatients beds (1). With the aging of the population, greater demand for critical care services will occur. At the same time cost development and the increasing number of preventable adverse events in elderly patients focus attention to provide more effective and efficient care to the ICU patients. As a result of the social and economic pressures, there is a need to provide more data about the type and quality of clinical care delivered in the ICU.

The RIYADH-ICU program is used since 1996 to control the working process and it’s efficiency in the ICU (31 beds, 3500 pts/year, 9000 treatment days/year) at the Central Hospital Links der Weser, Bremen. Between January 1, 1997 and December 31, 2001 16,615 patients were admitted to the ICU. Between 01/97 and 12/00 55.0% of all pts. were older than 65 years but 60.7% between 01-12/01. Preexisting chronic diseases at the end of 2001 were Diabetes, Hypertension, Renal Insufficiency, and Obesity. In the ICU patient population increased the incidence of multiple organ failure (>2 organs) from 14.3% (486 pts. in 1997) to 20.9% (687 pts. in 2001). The mean ICU mortality decreased from 7.5% in 1997 to 4.6% in 2001 and the Hospital mortality decreased from 9.2% to 6.7%. On the other hand the total number of TISS points increased from 330,205 (1998) to 366,777 (2001) and the total costs rose from Mill. €8,43 to Mill. €9,83 for the same period. Effective cost per survivor (ECPS) in patients ventilated artificially for more than 7 days decreased from €67,082 (161 pts. in 4 years i.e. 40.3 pts. as a mean per year) between 01/97 and 12/01 to €57,236 (51 pts. in 2001).

But the number of pts. with acute renal failure (mainly following a growing number of prolonged episodes of hypotension) rose in the last 3 years from 165 (1999) and 242 (2000) to 264 (2001). Because the decrease in the mortality rate (53.4% in 2000 to 40.7% in 2001) the ECPS fell from €41,661.99 (2000) to €18,533.06 (2001). We conclude that intensive control of efficiency and adversed event control is a must in every high demanding professional ICU environment. But the increasing workload increases corresponding costs.

Reference

IL13

THE CRITICAL HAEMATOCRIT – AN ENDLESS JOURNEY?

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The quest for a universally applicable ‘Critical Hematocrit’ is based upon three major assumptions that have essentially never been challenged until recently:

1. Anemia is associated with a high risk. 2. This risk may be altered by increasing hematocrit (htc) and 3. there is one uniform hct value that indicates the threshold for critical oxygen transport capacity for all patients in all situations. These hypotheses shall be discussed critically.

2. Anemia has been found to be associated with increased risk for mortality and morbidity, both in large epidemiological studies in the general population, and in the peri-operative setting and in the critically ill patient (1). This risk is inherent to anemia by virtue of low levels of oxygen carriers potentially resulting in tissue hypoxia, but it is also complicated by the underlying disease for which anemia is often a symptom. Specific hct values for subgroups of patients with different extent of comorbidity, especially cardiovascular, are difficult to establish.