IL01

PATIENTS'S INFORMATION AND CONSENT IN THE FIELD OF SURGERY AND INTENSIVE CARE PATIENTS

G. Aigner

Federal Ministry of Social Security and Generations, Head of Department VIII/D, Radetzkystraße 2, A-1031 Vienna/Austria

- Health legislation in Austria is providing patient's rights of informed consent, particularly in the field of surgery treatment.
- The patient's right of informed consent is directly related to conditions of urgency and serious indications: if the required information and consent of the patient would take too much time, causing danger of life or other serious disadvantages for the patient's health, the patient's right of informed consent is decreasing. In cases without any time of information, (emergency) treatment can take place without patient's consent.
- Therapeutical privilege (therapeutical reservation): certain information (e.g. terminal prognosis) can be hidden to avoid serious mental crisis (suicid).
- Under conditions of fully understanding and mental capacity, patients have the right to reject even life saving treatment (e.g. Jehovas Witnesses).
- Patient's testament: case reports are also dedicated for the documentation of patient's rejections against certain (intensive) treatment in the future, put into force under circumstances of patient's mental capacity is lost. Due to objections against euthanasia, the Austrian health legislation does not provide any legal binding of such patient′s testaments.
- Legal representatives are forced by law only to act in favour of those, they are entrusted to (e.g. parents-children). This means, that the decision of legal representatives is not legally binding, if rejected consent would cause danger of life or other serious disadvantages for the patient's health. In cases like that, a court′s decision has to replace the decision of legal representatives.

IL02

ALTERED BEHAVIORAL RESPONSES TO Δ^9-THC AND CHANGES OF BRAIN-TYPE CANNABINOID RECEPTOR CB1 EXPRESSION IN NEURONAL NITRIC OXIDE SYNTHASE KNOCK-OUT MICE

S.C. Azad, G. Marsicano, W. Zieglgänsberger, B. Lutz, R. Spanagel

Clinic of Anaesthesiology (LMU), Munich, Germany

The purpose of the present study was to investigate whether the nitric oxide pathway is involved in the central effects of Δ^9-Tetrahydrocannabinol (Δ^9-THC), the major psychoactive constituent of marijuana. For this reason body temperature, nociception and locomotion were measured both in neuronal nitric oxide synthase knock-out (nNOS-KO) mice and the wild-type (WT) littermates after intraperitoneal (i.p.) application of Δ^9-THC. In addition, the distribution of CB1 cannabinoid receptor mRNA and nNOS mRNA was determined in adult murine brains using in situ hybridization to reveal possible changes in CB1 gene expression in nNOS-KO as compared to the WT mice, and to reveal brain areas where CB1 and nNOS were coexpressed in the same neurons. We found that i.p. injection of 10 mg/kg Δ^9-THC led to the same increase of the hot plate latencies in both genotypes, indicating that Δ^9-THC-mediated central antinociceptive effects do not involve nNOS. In contrast, a significant Δ^9-THC-induced decrease of body temperature and locomotor activity was observed only in the wild-type mice, but not in the nNOS-KO. In situ hybridization experiments revealed significantly lower expression of CB1 in the ventromedial hypothalamus and the caudate putamen of the nNOS knock-out animals. These two areas are known to be among the regions involved in thermoregulation and cannabinoid-induced decrease of locomotion, respectively. A numerical evaluation of nNOS/CB1 coexpressing cells revealed that approximately 40 to 60% of nNOS-positive cells in the dorsolateral putamen also express low levels of CB1 mRNA. In situ hybridization of parallel sections of ventromedial hypothalamus with CB1 and nNOS radioactive riboprobe, respectively, revealed diffuse and weak expression of both mRNAs, suggesting that in the murine ventromedial hypothalamus, CB1-expressing cells contain, at least to some extent, also nNOS mRNA.

In conclusion, our behavioral and molecular findings suggest that there is clear evidence for a selective interaction between the cannabinoid system and the nitric oxide pathway. Possible physiological implications of these results will be discussed.

IL03

NEONATAL RESUSCITATION

R. Birnbacher

Dept. of Neonatology and Intensive Care, Univ. Children's Hospital Vienna

Resuscitation of the newborn infant presents a different set of challenges than resuscitation of the adult or even the older infant or child. Within the first minutes of life the dramatic transition from the intrauterine environment to the postnatal process of adaptation takes place.

Up to 10 % of newborn infants require some degree of resuscitation after birth, and up to 5% may need more extensive supportive therapy and assisted ventilation. Due to the fact that more than 5 million neonatal deaths occur each year, extensive knowledge and training is warranted for all providers of neonatal care.

Basically, neonatal resuscitation can be divided into four steps: basic steps including rapid assessment and initial steps of routine care (warmth, suctioning, stimulation, oxygen if appropriate); ventilation; chest compressions and administration of medications or fluids. Several circumstances and specific neonatal diseases have unique implications for resuscitation of the newly born infant. Prenatal diagnosis and perinatal history and course may alert the resuscitation team to these special circumstances. Asphyxia, meconium aspiration, multiple birth, prematurity, congenital heart disease and various disease resulting in impaired lung function are conditions with immediate implications for resuscitation. Postresuscitation issues include ongoing care and monitoring as well as appropriate diagnostic evaluation in an appropriate environment. Furthermore, care of the family and ethical issues including noninitiation or discontinuation of resuscitation have to be considered.

IL04

SPINAL ANAESTHESIA FOR DAY CASE SURGERY: PRO

M. Duregger, G. Mitterschiffthaler

University Department of Anaesthesiology and Critical Care Medicine, A-6020 Innsbruck

Introduction. Spinal Anaesthesia (SA) offers excellent alternative to general anaesthesia (GA) for day case surgery.

Pro-discussion: Avoidance of general anaesthesia with all typical risks (i.e. intubation problems and risks)
Clear anatomy, exact landmarks, well accepted positioning
Easy performance: the first book trainees learn
Low failure rate: 0,5% even with trainees
Fast onset in contrast to peripheral blocks, not slower than GA
Reliable duration: mepivacain versus bupivacaine
Choice of few local anaesthetics: levobupivacaine and ropivacaine
Modification with different concentrations
Flexible anaesthesia: i.e. unilateral spinal anaesthesia
Low or no risk of systemic toxicity
Costs and economy : SA versus GA, pencil point versus Quincke needle
Good acceptance of patient and surgeon
Opioid spinal block: pethidin or sufentanil
Adjuvants to decrease concentration and intensify quality of block.

Side effects, risks and complications: relative low in contrast to GA: Hypotension, Nausea and vomiting, backache, PDPH, TRI or TNT, technical problems prolonged neurologic deficit, urinary retention and cardiac arrest.

IL05

PLANNING ANAESTHESIA SERVICES IN A DEVELOPING COUNTRY- A CASE STUDY AND LESSONS LEARNT

E. Egan

Royal Naval Hospital Gibraltar

Background. Prevention is correctly emphasised in developing countries where AIDS, Malaria and infectious diseases predominate. The increasing incidence of trauma and high maternal mortality necessitate safe efficient anaesthetic services within National Health plans. This is a case study of the planning and implementation of a donor funded project with a nation wide impact in a Sub Saharan African country using a systematic planning approach.

Materials and Methods. A situation and needs analysis was conducted using a range of management instruments to set national objectives and select strategies. Action plans were created from a number of chosen strategies designating actors, time frames, indicators of success and quality assurance. Data was obtained by a variety of methods predominantly surveys, questionnaires and external project reviews.

Results. Poverty was extensive in a mainly rural population with a large burden of disease. This is mainly AIDS, TB, Malaria and Trauma. There is high infant and maternal mortality. Primary Care and Prevention guide national policy and paramedic staff provides most services.

Over 90% of anaesthetics are for emergency procedures and over 75% are 'woman' related. Specialist Anaesthetists play a marginal role in service delivery. There are major shortages of equipment and irregular supplies of electricity, water and oxygen.

The strategy chosen was to:

- Develop paramedics by formal training
- Supply hospitals with EMO OMV kits
- Provide student and staff housing

Results (a selection)

- 100 clinical officers and 350 nurses trained
- 50 Hospitals receive kits and servicing tools
- Construction of student and staff housing
  Network of supportive agencies

Conclusion. Anaesthesia has a low priority. External agencies may have a useful role, provided that assistance is provided in a culture sensitive, co-ordinated manner. It should be context specific and not try to replicate western models. The standard project model with a cut off point after localisation is inappropriate. On going 'Lifelines' should continue to external institutions after the project terminates.

IL06

REPORT FROM KOSOVO

W. Fliedl

KH Rudolfstiftung, Dept. of Anaesthesia and Intensive Care, Vienna Austria

By force of Serbian military intervention under Milosevic in 1991, approximately 1 to 1.5 million people living in the Kosovo region were expelled from their native country in Ex-Yugoslavia. In April 1999 a camp had been established by the Austrian Federal Army on a shut-down airport near Shkodra. The camp had a capacity of up to 5,000 refugees from the Kosovo. The field hospital – as a part of the ATHUM/ALBA contingent of the Federal Army – was first equipped as an out-patient department and then extended into a medical specialist facility covering gynaecology and obstetrics, dentistry, small-scale surgery and paediatrics. As an anaesthetist, emergency doctor and general practitioner I found a broad range of tasks in the field hospital. I had two anaesthetic apparatuses of the type Livius and Fabius at my disposal. These are Dräger - Germany machines, which proved to be in perfect working order and up to western standards.

Additionally, I had a well-adjusted monitoring at my service. Unfortunately, however, it was extremely susceptible to interference owing to climatic conditions.

There were also all usual medicines for the anaesthetic procedure on stock, like opiates, Propofol, muscle relaxants, Thiopentone, Ketalar etc., ensuring the standard of, say, a country hospital. As for surgery, wound dressing was carried out, we had to deal with bullet wounds, operate on hernia, perform gynaecological scrapings, a Caesarian and child surgery. An important part of my work consisted in preventive and general medical treatment. As there were numerous children, infants and babies, but also old people among the refugees, instances of exsiccosis constituted a major problem. On some days, up to 30 persons had to be treated by infusions, or infants and babies, respectively, had to be treated by way of oral rehydration. A central problem were indigenous Albanian non-refugees. As – due to lacking medicines and technical equipment – local medical care was more than restricted – again and again indigenous people came for treatment at the field hospital. The great contrast between the well-off refugee camp and the poor surroundings triggered ethical, organisational and even diplomatic conflicts, which culminated in an attack on the refugee camp launched by the Albanian Mafia.

IL07

HEMOSTASIS IN GERIATRIC PATIENTS

H. Gombotz and I. Pabinger-Fasching

Dept. of Anaesthesiology and Intensive Care, AKH Linz and Division of Hematology and Blood Coagulation, University of Vienna, Austria

Geriatric patients are at increased risk for arterial and venous thrombosis as well as for thromboembolism. Whereas the risk of thrombosis is mainly related to arteriosclerosis, venous thromboembolism (VTE) is caused by an increased prothrombotic status either primary or related to diseases known to increase the risk of thrombosis (e.g. malignancy or heart failure) (1). Compared to the overall adult population the risk of VTE in subjects 70-90 years of age increases from 600/100,000 to 117/100,000.

Evaluation of the coagulation system revealed increased levels of fibrinogen, coagulation factors VII and VIII and markers of activated coagulation like prothromin fragment 1+2 and thrombin-antithrombin complex on the one hand, and on the other an increase of coagulation inhibitors like AT III, Prot. C and S (2). In subjects over 100 years of age free of thrombosis a striking increase of prothrombin fragment 1+2, thrombin-antithrombin complex and D-dimer was detected. In postmenopausal women hormone replacement is associated with a two- or threefold increase of VTE but probably with a long-term decreased risk of arteriosclerosis.

Malignancy or liver impairment is the most common cause of bleeding. For perioperative setting only few data are available concerning the risk of perioperative bleeding in geriatric patients in comparison to the younger population. The risk of development of gastrointestinal bleeding or perforation secondary to medication with nonsteroidal anti-inflammatory drugs is dramatically increased in the elderly (risk ratio 9.2)(3). Oral anticoagulant treatment to prevent thromboembolism in patients > 70 years is also associated with an increased risk of bleeding (relative risk 1.75).

Coagulopathies predominantly occurring in elderly patients are rare but may cause severe and life threatening bleeding perioperatively. Under normal circumstances there are acquired inhibitors against F VIII, F V or von Willebrand factor or severe chronic disseminated intravascular coagulation secondary to malignancy.

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IL08

EFFECTIVENESS OF DIFFERENT BLOOD CONSERVATION METHODS

H. Gombotz

Department of Anesthesiology and Intensive Care, General Hospital Linz, Austria

Blood conservation methods have become standard of care in modern perioperative medicine. Nevertheless, optimal blood coagulation management, precise surgical technique and especially restrictive transfusion regimens are not only the most effective way to avoid allogeneic transfusion but also associated with lower mortality in subgroups of patients.

Predeposit of autologous blood (PDAB) decreases exposure to allogeneic blood but increases exposure to any transfusion. There is also a direct relationship between the transfusion rate in the control group and the benefit derived from PDAB, which suggests that other methods of decreasing blood transfusion such as surgical technique and transfusion protocols may be as important as PDAB (1). Recombinant human erythropoietin (EPO) when given alone or to augment PDAB decreases exposure to peri-operative allogeneic transfusion in orthopaedic and cardiac surgery. It may be most effectively used in patients with mild anaemia undergoing routine surgical procedures that commonly require blood transfusion but may be as effective and with less risk of anaemia than PDAB in nonanaemic orthopaedic patients (2).

The calculated red cell net gain of normovolaemic hemodilution (NHDL) is small. Nevertheless NHDL has been shown to be as effective as PDAB in with regard to allogeneic transfusions. Its effectiveness can be improved by preoperative augmentation of hemoglobin using EPO or by accepting extremely low hemoglobin values using artificial oxygen carriers intraoperatively (3). Cell salvage in orthopaedic surgery decreases the risk of patients' exposure to allogeneic blood, whereas postoperative cell salvage with devices that do not wash is only marginally effective. In addition, besides other undesired side effects, unwashed shed blood may contain substances that induce the release of thromboxane B2 leading to an increase of right ventricular afterload. A cost-effective and safe reduction in allogeneic blood transfusion, however, can only be obtained with a comprehensive multimodality blood conservation program on the basis of bleeding and transfusion risk.

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IL09

INTRATHORACIC AND GLOBAL END-DIASTOLIC VOLUMES AS PRELOAD PARAMETERS IN CRITICALLY ILL PATIENTS

T. Gondos

Semmelweis University, Department of transplantation and surgery, Budapest

Background & goal of lecture: The recently introduced transpulmonary thermodilution technique gives the possibility to measure directly the volumetric preload parameters of the heart, namely intrathoracic blood volume (ITBV) and global end-diastolic volume (GEDV). The clinical usefulness of this method was proved in wide range of critical illness. In this lecture I would like to summarise the newest results in this field and I would like to focus on our experience in mixed critically ill patients.

Materials & methods. In our intensive care unit since 1998 the COLD and PiCCO systems (Pulsion, Germany) have been used for hemodynamic monitoring in critically ill patients. Both less invasive technique enable us to measure ITBV and GEDV as frequently as necessary.

Part A: In the first year we compared the effectiveness and clinical usefulness of the transpulmonary indicator dilution approach with the previously used pulmonary artery catheterization in the perioperative phase of liver transplantation (8 patients, 130 data set).

Part B: We guided the therapy during hemodialysis according to the volumetric parameters of the PiCCO system in app. 100 cases. Main results and interesting case reports will be discussed.

Part C: We compared the usefulness of conventional hemodynamic monitoring (body weight control group and central venous pressure control group) and volumetric preload monitoring (GEDV control group using PiCCO system) during the perioperative period of kidney transplantation (20 patients in each group).

Results & discussion. Part A: The correlation between preload pressure values was significant (CVP-PCWP, r=0.78) but no correlation was found between preload pressure and volume parameters (PCWP - GEDVI, ITBVI, r=0.02). The relationships between the changes of cardiac output and volumetric preload parameters were more significant (r=0.64) then between the changes of preload pressures and cardiac output (r=0.28). Volumetric preload hemodynamic monitoring seems superior than conventional pulmonary artery catheterization. Part B: The patients, during preload guided hemodialysis showed excellent hemodynamic stability in spite of the fact that the cause of acute renal insufficiency was multiple organ failure syndrome more then 80% of the cases. Part C: We found the best posttransplantation kidney function in the GEDV control group.

IL10

DOES PERIOPERATIVE DEVELOPMENT OF ACUTE OPIOID TOLERANCE EXIST?

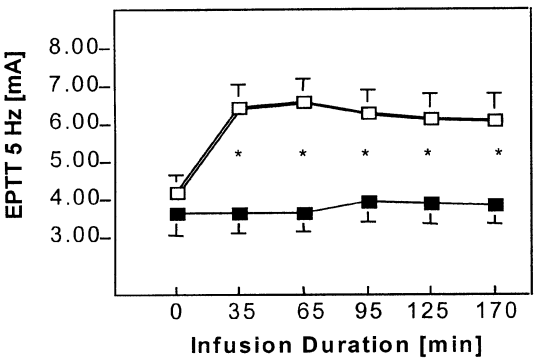
B. Gustorff, DEAA

Dept. of Anesthesia & General Intensive Care (B), University of Vienna, Austria

Background. The development of acute opioid tolerance within hours has been shown in animals (1, 2). In humans in a non-blinded study remifentanil lead to the development of tolerance already after 90 minutes of continuous infusion (3), whereas postoperative patient-controlled remifentanil or alfentanil infusions over 6 and 24 hours respectively did not produce tolerance (4). During high-dose remifentanil based anaesthesia no tolerance was found compared to a low-dose group (5). However, postoperative morphine consumption significantly increased in the high-dose remifentanil group. Thus, at date the development of acute tolerance in humans remains controversial.

No opioid tolerance in a human pain model.

Own data of a randomized placebo controlled, double blind cross-over study in human volunteers using thermal and electric pain perception models will be presented. They show, that a 3 hour continuous infusion of remifentanil does not lead to opioid tolerance (6).



Electric pain tolerance threshold (EPTT) at 5 Hz. during constant infusion of remifentanil (□), ■ = placebo, $p < 0.05$.

Discussion & Conclusion. Absence of intraoperative development of opioid tolerance is concluded and the development of postoperative hyperalgesia after rapid offset of opioids will be discussed.

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IL11

HEMOGLOBIN-BASED ARTIFICIAL OXYGEN CARRIERS (HBOC)

O. Habler

Clinic of Anaesthesiology, University of Munich (LMU), Munich, Germany

Although safer than ever before the transfusion of allogeneic blood is still associated with risks for the patient (clerical error induced hemolysis, infection, immuno-suppression). Moreover due to a growing imbalance between potential blood-donors and recipients, the costs for allogeneic blood products will rise in the next years. The availability of an easily producible, long-term storable, safe and effective artificial oxygen carrier (AOC) might substantially ease this situation. Actually two types of AOC are under preclinical and clinical investigation. Perfluorocarbon (PFC)-based compounds are synthetically produced substances that increase the physically dissolved part of arterial oxygen content (CaO_2). In contrast, HBOC increase the Hb-bound part of CaO_2. The Hb-molecules, these solutions are based on are extracted from (1) outdated human red blood cell (RBC) units, (2) from bovine blood or are (3) genetically produced by bacteria, yeast, plants or large transgenic animals. Safety concerns having occured during application of first-generation HBOC (namely (1) renal toxicity due to spontaneous dissociation of the Hb-tetramer outside the RBC and (2) vasoconstriction due to nitric oxide scavenging by free Hb) could be attenuated by chemical modifications of second generation Hb-molecules (cross-linking of Hb-subunits, polymerisation of single Hb-molecules, conjugation of Hb-molecules to macromolecules). In numerous animal studies HBOC could reproducibly be demonstrated effective in maintaining or restoring adequate tissue oxygenation during extreme normovolemic hemodilution and resuscitation from severe hemorrhagic shock respectively. However the basic intention for the development of HBOC i.e. the reduction of allogeneic RBC transfusion in patients suffering from severe trauma or extreme intraoperative bleeding could not be demonstrated until today. Main reason might be the low and short-term dosage of HBOC in existing clinical studies. Nevertheless, Hemopure® (Biopure Inc., Cambridge, Mass, USA), a bovine HBOC has obtained as the first AOC in medical history regulatory approval in South Africa for the treatment of adult surgical patients who are acutely anemic and for the purpose of eliminating, delaying or reducing the need for allogeneic RBC.

IL12

BASICS AND CLINICALLY RELEVANT PROPERTIES OF INHALED ANAESTHETICS: FROM HALOTHANE TO XENON

A.F. Hammerle, C. Tatschl, C. Baumgartner

Department of Anesthesia and General Intensive Care Medicine, University of Vienna

Background. Halothane, developed in 1956 was replaced by isoflurane and enflurane in the 1980s because of its liver toxicity. Sevoflurane and desflurane are more commonly used today. Xenon attracted attention in the 1990s due to its almost ideal properties. Nitrous oxide (N_2O) is used in combination with other volatile anaesthetics to reduce their consumption.

Experimental Data. Most volatile anaesthetics are known to enhance the activity of inhibitory $GABA_A$ receptors. Xenon and N_2O seem to inhibit NMDA receptors, explaining their analgesic potency. Xenon, in contrast to all other volatile anaesthetics, seems not to trigger malignant hyperthermia. Prolonged exposure to N_2O can cause haematological, fetotoxic and neurological effects due to its interaction with vitamin B12. Studies conducted with xenon so far indicate that xenon is unlikely to have these effects.

Clinical Data. Xenon seems to have no effect on the cardiac index, myocardial contractility, blood pressure or peripheral resistance. Enflurane, sevoflurane and isoflurane produce EEG changes, minimal changes in intracranial pressure, a dose-dependent depression in respiration but, in contrast to desflurane, have virtually no irritant effect on the airways. Xenon may increase intracranial pressure, can produce EEG changes and seems to lower plasma adrenaline levels. Surgical stimulation causes a haemodynamic stress response, which xenon seems to be able to suppress. Patients appear less sedated and more clear-minded after xenon anaesthesia. Xenon emergence times do not correlate with anaesthesia duration and, due to its extremely low blood gas partition coefficient, are shorter.

Conclusion. Despite the high costs of xenon and the special machinery that is required, it appears to be an attractive alternative especially for cardiovascular high-risk patients. Xenon may be useful in ambulatory anaesthesia especially if combined with short-acting opioids.

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IL13

REGIONAL VS. GENERAL ANAESTHESIA: WHO DOES EVIDENCE BASED MEDICINE (EBM) AWARD WITH THE GOLDEN APPLE?

A.F. Hammerle, C. Tatschl

Department of Anaesthesia and General Intensive Care Medicine, University of Vienna

Introduction. The term 'EBM' is defined as the conscientious, open and sensible use of the best proof for decision making on the treatment of the patient. Clinical expertise in harmony with the optimal documentation of systematic research is essential to reach these ends. The idea to create an Anaesthesia Review Group was born in 1997 and was registered in the Cochrane Collaboration in 2000. Regional anaesthesia (RA) as one of the 8 topics is listed for systematic reviews (6).

Results. A series of randomised studies on the possible benefits and drawbacks of regional anaesthesia have been included, partially in a meta-analytical form in recent works (1-5). Among the advantages of RA are a shortened length of hospitalisation, positive effects on lung and heart functions, earlier mobilisation and reduction of metabolic and neurohumoral stress response. The complications include epidural hematoma in connection with anticoagulant therapy and neural toxicity when using large doses of local anaesthetics. An additional benefit of RA is the extended postoperative pain relief. No advantage in respect of cardial morbidity and general mortality could be observed in patients with peripheral vascular interventions under RA as opposed to general anaesthesia (GA) (2). In a recent meta-analysis of 15 controlled studies on 2162 patients with hip fractures a reduced one-month-mortality and a lessened incidence of deep venous thrombosis could be demonstrated in the RA group (4). In addition, this group showed a decreased incidence of myocardial infarction, dizziness and postoperative hypoxic periods. However, patients in the GA-group could profit from fewer cerebrovascular incidents and intraoperative hypotensive occurrences. The results of the study show marginal advantages for RA over GA taking early mortality and the risk of deep

venous thrombosis into account. Although there is no doubt about the importance of EBM, why do we encounter so many difficulties in the application of these principles ?

There is a deficit of hard data. 'Evidence' exists but is difficult to apply. Even if 'evidence' is available it is often not accepted as it conflicts with individual preconceptions and personal interests (6).

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IL14

CLINICAL RELEVANCE OF EXTRAVASCULAR LUNG WATER

P. Faybik, A. Roberti, C.-G. Krenn

Dept. of Anaesthesiology and Intensive Care Medicine, University of Vienna, Austria

Extravascular lung water (EVLW/ ⊥values 4-8ml/kg) is the morphologic correlate of intraalveolar and interstitial pulmonary edema and a basic pathologic manifestation of lung injury, which is more reliable than blood gas measurements or chest radiographs.

Increased EVLW is a common finding of various diseases such as acute respiratory distress syndrome (ARDS), congestive heart failure, acute renal failure, sepsis and hypervolemia, where values up to 20-25 ml/kg are observed.

Methodical difficulties of EVLW measurements once restricted it to experimental studies, although the exact correlation with the gravimetric measurement of extravascular lung fluid made it a highly desireable diagnostic parameter. Newer fiberoptic thermal dye dilution techniques allow the intensivist reliable detection and precise quantification at the bedside, which made the measurement of EVLW suitable for treatment decisions. Futhermore this method is not influenced by changing cardiac output or PEEP-ventilation, though it is dependent on intrinsical perfusion of the lung.

Extracorporeal circulation (ECC) in cardiac surgery causes the release of various pro-inflammatory mediators, with EVLW increase proportional to the duration of ECC, and poses the patients at higher risk of postoperative respiratory failure. Assessment of EVLW is thus helpful to guide volume replacement, mechanical ventilation including weaning and drug therapy. Similar pathomechanisms were thought to affect pulmonary function during orthotopic liver transplantation (OLT). In a recent study significant increases of shunt fraction related to increases of intrathoracic blood volume with minor impact on EVLW were observed. This suggests mechanisms protecting oxygenation and blocking EVLW increases during reperfusion of OLT. EVLW measurements might furthermore be used as a guide parameter for the treatment and the adaptation of particular modes of mechanical ventilation. At different levels of EVLW the response to ventilatory settings can vary. In particular the immediate application of PEEP-ventilation is more effective to reduce EVLW than delayed one.

Hence, EVLW measurement has become a specific and reliable parameter of pulmonary function, which provides relevant information on the therapeutic efficacy of treatment.

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IL15

SPINAL ANAESTHESIA FOR DAY CARE SURGERY - CON

Vlach W., Hartmann T., Schiller E.

Department of Anaesthesia and General Intensive Care Medicine, University of Vienna, Waehringer Guertel 18-20,A-1090 Vienna, Austria

Background. Spinal anaesthesia (SPA) for day care surgery (DCS) is still discussed controversially (1). There is an increasing number of reports describing severe side effects of SPA (2). Mainly headache, transient neurological symptoms, urine retention and back pain, need exact postoperative surveillance. The main goal of DCS should be reducing the recovery time and improving patients discharge criteria. Additionally arising problems for the patients during their first night are more difficult to manage at home than in the hospital. Patients safety, comfort, preference and cost effectiveness are major points, which have to be considered for the decision of the anaesthesia technique. However the development of new short acting anaesthesia drugs as remifentanil, sevoflurane and propofol and the increasing application of the laryngeal mask have shown very few side effects and have proven to be a safe method for general anaesthesia (GA). Convincing data clearly demonstrating reduced side effects or better outcome of SPA are missing.

Discussion and Conclusion. Preoperative evaluation should be performed some days before the ambulatory procedure to determine ASA status. This contains the necessity of a sufficient ambulatory evaluation of the patient. No randomised study comparing SPA and GA in ambulatory anaesthesia in a signifying number of patients have been published up to now. An increased incidence of post-dural-puncture headaches may be seen due to early mobilisation of the patients (3). Therefore it is in fact possible to perform SPA for outpatients, but nevertheless GA seems to be the first choice. Especially for ASA 1-2 patients the side effects of GA are less in comparison to SPA (3). If there is no necessity for SPA like pulmonary disease, adipositas or suspected difficult airway management, we suggest GA for DCS.

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IL16

PICCO-MONITORING IN CLINICAL ROUTINE

H. Hetz, P. Faybik, C.-G. Krenn, H. Steltzer

Anaesthesiology and General Intensive Care, University of Vienna, Austria

The Picco system is able to compute Continuous Cardiac Output (CCO) from pulse contour analysis after calculating arterial compliance from bolus-thermodilution measurement. Extravascular lung water (EVLW) and intrathoracic blood volume (ITBV) can be measured by single thermal dilution method.

CCO obtained by PiCCO agrees well with CCO obtained by pulmonary artery thermodilution even in hemodynamically unstable situations[1]. Our own data indicate a narrow correlation between both methods in extremely changing cardiac preload (caval cross-clamping during orthotopic liver transplantation without venovenous bypass). After substantial changes in vascular tone recalibration of the system is necessary to get valid measurements.

EVLW reflects pulmonary edema in mechanically ventilated patients better than pulmonary artery occlusion pressure (PAOP)[2]

ITBV was found to correlate strong with stroke volume in critically ill patients and suggested to be more reliable than PAOP for assessing cardiac filling[3].

Compared with pulmonary artery thermodilution, arterial thermodilution and pulse contour analysis is a reliable, less invasive and cheaper method for monitoring continuous cardic output and assessing cardiac filling.

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IL17

EBM AND WEANING

M.J. Hiesmayr, A. Lassnigg, C. Schuh

Dept. of Cardiothoracic Anesthesia and Intensive Care and Dept. of Medical Informatics, University Hospital AKH, A-1090 Vienna Austria

Background. Local weaning methods based on subjective assessment of the patients status were most common until the mid 90's. As more RCT's on specific aspects of the weaning process have been published an evaluation based on the criteria of evidence based medicine (EBM) will address the following issues:
1. When should weaning be started?
2. How to determine whether weaning is possible?
3. Which additional therapies are useful?

Results. Weaning is performed earlier when patients are assessed daily for their capacity to breath spontaneously (1). No single parameter was a reliable indicator as to whether a patient may be extubated successfully. Thus typically a one minute test period for rapid shallow breathing (f/Vt<100/′) is followed by a period of spontaneous breathing of 30-120 minutes[2]. In addition to testing the respiratory system, the delivery of sedative and analgesic medications should also be assessed in short intervals (3). It remains unclear whether gradual reduction of ventilatory support offers any additional benefit. The level of individual organ failures that limit the capacity of a patient to be weaned needs further investigation. Maintenance of nutritional status may be essential for essential for weaning especially after prolonged ICU treatment.

Conclusion. Regular, at least daily evaluation of the ability to breathe spontaneously and of the reduction of sedative drugs based on protocols both reduce the duration of ventilation without additional risk for the patient.

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IL18

INTRAOPERATIVE BLOOD SALVAGE: EFFECTS ON LEUKOCYTE FUNCTIONAL RESPONSES

P. Innerhofer and F.J. Wiedermann

Department of Anaesthesia and Critical Care Medicine, University of Innsbruck

Intraoperative blood salvage (IBS) has become increasingly common in major surgery since salvaged blood lacks the undesirable side effects associated with the transfusion of allogeneic blood components. However, concerns on the safety of salvaged blood sustain because polymorphonuclear leukocytes (PMNL) might be activated to the priming threshold thus able to induce endothelial damage and severe pulmonary dysfunction, the so-called 'salvaged cell syndrome'. The association of IBS and severe lung injury has been shown in an animal model only.[1] Human studies showed in processed blood increased concentrations of complement factors, lipid mediators and increased expression of leukocyte adhesion molecules. Furthermore, the only two other studies focusing on functional responses of PMNL reported even contradictory results [2,3]. Our own data on chemotaxis response and respiratory burst (RB) of PMNL after processing of blood with a continuous autotransfusion device (C.A.T.S, Fresenius) and using heparin or sodium citrate for anticoagulation showed no statistically significant difference for any test of PMNL functional responses from the processed blood (paEC) as compared to pre- and intraoperative native blood samples from the patient. Median values of all RB measurements in the paEC were within the range of pre- and intraoperative values, indicating that PMNL contained in the paEC are neither impaired nor activated to the priming threshold. Our results confirm the clinical experience that IBS is safe to use during major orthopedic surgery and raises the question of the beneficial effect of special leukocyte-removing filters.

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IL19

ALTERNATIVE AIRWAYS

P. Krafft and T. Hartmann

Dept. of Anaesthesiology & Intensive Care Medicine, Waehringer Guertel 18-20, University of Vienna, A-1090 Vienna, Austria

The major responsibility of the anaesthesiologist or emergency physician is the maintenance of adequate ventilation and pulmonary gas exchange. Incidence of airway catastrophes resulting in emergency tracheostomy, brain damage or death is in the range of 0.01 to 2 / 10.000 anaesthesia procedures. To improve patients' safety, the ASA proposed an algorithm for the management of patients with difficult airways (1). Patients history, oral and maxillofacial anatomy, pharyngeal and laryngeal structures as well as cervical spine mobility have to be evaluated and awake fiberoptic intubation has to be performed in patients with signs of difficult airways. If intubation problems are encountered after anesthesia induction and mask ventilation is adequate, one must call for help and decide rapidly whether to awaken the patient or to proceed with alternative intubation techniques (e.g. different laryngoscope blades, flexible fiberoptics or other fiberoptic techniques (e.g. Bullard laryngoscope™), lighted stylets (e.g. Trachlight™), intubating larygeal mask (Fastrach™), retrograde intubation or surgical airway). In the potentially life-threatening 'cannot intubate, cannot ventilate' situation (risk of intraoperative death in the range of 1 to 28% (1)), either laryngeal mask airway (LMA) or esophageal-tracheal Combitube (ETC) have to be inserted or transtracheal jet ventilation (TTJV) or a surgical airway have to be performed immediately. The recent laryngeal tube might be another valuable alternative (2). All these recommended alternative airway techniques have to be taught and as far as possible trained under routine conditions in order to master these methods in real emergency situations.

In conclusion, preanaesthetic evaluation is of utmost importance and all patients with difficult airways should be managed by awake tracheal intubation. For the management of 'can ventilate, cannot intubate' situations, fiberoptic intubation or other alternative airway gadgets like e.g. lighted stylets, intubating LMA or rigid fiberoptics are available. 'Cannot ventilate, cannot intubate' situations must be managed by immediate insertion of LMA, ETC or the use of TTJV. The emergency situation is not the time for training! Call for help and do what you can do best!

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IL20

ARE MEDICAL DOCTORS' DECISIONS BASED BY EBM IN A POOR COST CUTTING SENSE?

W. Kuckelt

Dept. Anaesth/Crit Care Med, Ctr Hosp. Links der Weser, Senator-Wessling-St 1, D-28277 Bremen Germany,

EM: kuckelt@intensivmed.de

Evidence Based Medicine (EBM), whose intention ex-tend back to the late 19th century Austrian and German Medical Schools, remains of great interest for the medical community and the public. EBM in Intensive Care Medicine (ICM) is aimed to apply the best scientific evidence as possible to treat an individual patient by the most appropriate measures to save his life and to help to cure his underlying disease. The present scenario in ICM is characterised by the recognition of its limitation and questions like how we can make clear distinctions bet-ween 'critical illness' and 'terminal illness'. Today the limitations appear more and more as an increasing discrepancy between the things we can do and the compliance of the society to this with respect to emotions, ethics, and economics. Medical progress and the mass of data and information overwhelming all medical disciplines each day are very difficult to be handled by an individual medical doctor in the aim to find out the best way to treat a single patient using the best method and per-forming the highest standard. In addition, escalating healthcare costs are a world-wide problem in this respect and a consequence of medical progress, human error, in-sufficient treatment strategies and others. Furthermore, saving life in any individual case does not mean auto-matically that quality of life is guaranteed after intensive therapy. Today more than ever, economic pressures on the healthcare system will reach one of its most vulner-able parts: the ICM-Institutions. We have to realise that critically ill patients consume a very large proportion of the hospital budgets. The question is, how ICM community can deal with these conflicting problems properly. EBM seems to be an important tool in this respect. But it is clear now absolutely, that EBM is not the only one. Other types of evidence than randomised control-led trials or metaanalysis, fields like diagnosis, etiology, pathophysiology and others are important to. EBM is an instrument to understand what's known about the impact of different communication methods, different value systems, shared decision making, and clinical reasoning. EBM helps to provide best therapeutic measures in any individual case by translating solid evidence into sound of clinical decisions and better blend the science with our performance at the bedside in ICU. EBM is not training in cost cutting. But it helps to eliminate cost by malpractice, human error, poor organisation of working process, and poor culture at work.

IL21

AIMS (ANAESTHESIA INFORMATION MANAGEMENT SYSTEM)

Experiential Effects from an EDV-based Record of Anaesthesia within the Clinical Routine.

G. Mausser

Dept. of Anaesthesiology, University Graz

Background and Goal of Study. The goal of our observation was to evaluate the efficiency induced by the introduction of an EDV-based record of anaesthesia that simultaneously unites medical information previously separated between the doctoral and nursing staff.

Materials and Methods. Between August 2000 and April 2001, we documented the admission of 2400 patients through our ENT-department. For an EDV-based AIMS we employed the product 'RECALL' from the Draeger company. Our internal network directly connects the entire pre- to post- operative path, the anesthesia out-patient department; 6 anaesthesia work stations and 7 recovery room beds.

The patient's individual relevant medical history is available at every station, as well as current condition, prescriptions, etc. During and after the operation, the patient's vital statistics are automatically transcribed into the record. The anaesthetist's instructions for the recovery room staff can be saved on record and forwarded directly.

This anaesthetic record remains open until the patient is released from the recovery room back to the ward at which time the record is printed out. This document is authorised with the signature of the discharging anaesthetist.

Results and Discussion. This AIMS network has obviously eliminated mountains of paperwork while at the same time streamlining the search for information, statistics, etc. as well as bringing all stages of pre- and post-operative care in direct connection with one another. This electronic documentation meets all legal obligations as well as provides an archive for evaluating the Quality Control of the anaesthesia department within the university hospital.

Conclusion. Our AIMS remains for the moment an island network within the hospital as a whole. The implementation of a hospital-wide system, which should be available in the very near future, will provide all departments with prepared patient records. One of the most desirable benefits incurred through this enhancement of efficiency and communication is the increased personal contact between patient and medical staff.

IL22

THE NEW LOCAL ANESTHETICS FOR DAY CASE SURGERY

G. Mitterschiffthaler and M. Duregger

Department of Anesthesia and Intensive Care, University of Innsbruck, A-6020 Innsbruck, Austria

Regional anesthesia for day case surgery requires local anesthetics with a clear profile: fast onset, well-defined duration an early recovery from paralysis but with long analgesia for painfree discharge. Nearly any regional anesthesia technique is suitable, however, the new local anesthetics Ropivacaine (R) and Levobupivacaine (L) are long acting agents and differ concerning the differential blockade.

Spinal Anesthesia: short acting substances should be preferred. The efforts to shorten duration of bupivacain by lowering concentration down to 0,18% are well accepted. R. 0,25% was half potent as B but showed an increased incidence of back pain

Femoral and sciatic nerve blocks: R 0,75% compared to 2% Mepivacaine shows a long lasting analgesia up to 12 – 24h and seems to be appropriate for these blocks. Using equimolar doses of L the duration should not exceed bupivacaine.

Brachial plexus blocks: the multiple injection technique with selective nerve stimulation leads to short-acting blockade of the radial nerve (M 2%) and long-acting sensitive blockade (R 0,5%). This technique allows to reduce volumes and the risk of systemic toxicity.

Peribulbar blocks are used mainly in elderly patients for cataract surgery. R failed to show clinically significant differences in comparison to Lidocain. Persistent diplopia after long-acting LA (3) is a major problem for elderly patients.

Intravenous anesthesia is a domain for short acting local anesthetics. Only for long lasting operations R (0,2%) plus clonidin may be an alternative and safe method, as demonstrated by the studies of Hartmannsgruber and Chan

Discharge after regional anesthesia: The modified Aldrete scoring system by White and Song helps to bypass the PACU. However the problems of motor deficit and bladder dysfunction still remain major problems.

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IL23

REGIONAL ANAESTHESIA IN HIGH RISK PARTURIENTS

G. Mitterschiffthaler and M. Duregger

University Department of Anaesthesiology and Intensive Care Medicine, University of Innsbruck, A-6020 Innsbruck, Austria

Introduction. High risk pregnant mothers are now well recognised as ideal for vaginal child birth and Caesarean section (CS). The number of case reports describing the use of regional anaesthesia (RA) in pregnants with medical diseases is still increasing. All these patients are at higher risk of operative delivery. New techniques (combined spinal epidural anaesthesia and continuos spinal anaesthesia) and adjuvants to local anaesthetics for neuraxial blocks offer an optimal opportunity for painless labour and provide great haemodynamic and respiratory stability.

Antenatal anaesthetic assessment. Detailed medical history, examination by the anaesthetist and the arrangement with other medical specialists (cardiologist etc.) should be done around the 28th week of gestation and not in emergency situations. Obviously the anaesthetist must know the obstetrician's intention, if vaginal delivery with spontaneous or induced labour or CS is planned. The majority of cases will benefit from RA. Controversial discussions depend on the individuals concerned. The extent of invasively maternal monitoring must planned carefully.

Heart diseases in controversial discussion. Patients with fixed cardiac output (aortic stenosis, obstructive cardiomypathy) or raised pulmonary vascular resistance tolerate the reduction of systemic arterial pressure poorly. Low concentration of LA, the use of sufentanil and fentanyl provided stable haemodynamics. However, higher concentrations and high blocks up to T4 are essential for CS . Myocardial infarction near at the term rises the risk of mortality estimated up to 30%. Only regional anaesthesia can achieve high cardiovascular stability and should be used in these patients.

Respiratory disease. Asthma may be discussed controversially because high sympathetic blockade may favour parasympathetically mediated bronchoconstriction, but reveals good responsibility to sympathomimetics. Patients with cystic fibrosis, where CS is avoided, can be done under RA. In our institution patients with epilepsy, multiple sclerosis and AV malformations will get RA as first choice. Thombozytopenia: the lower level is 50 x 10^9/L, but we pay more attention to a rapid fall of the platelet count.

Conclusion. Timely information of the team by the obstetrician, patient's information and early baseline assessments will help to decide individually to benefit from RA.

IL24

PERIOPERATIVE MANAGEMENT FOR WAR WOUNDED 'WORKING IN A SURGICAL FIELD HOSPITAL (PAKISTAN)'

G. Polak

The Vienna Medical Association, Bureau for International Services & Dept of Anaesthesia and Intensive Care, Hospital Rudolfstiftung, Vienna, Austria

During the past decade the number of national conflicts, humanitarian emergencies and so-called complex emer- gencies has risen worldwide. These conflicts increasingly hit civilians who are forced to leave their homes and become refugees or internally displaced people. Two big actors provide humanitarian assistance; the UN-peace-keeping forces as well (inter)national military forces on the other hand International Organisations (IOs) and Non-Government-Organisations (NGOs). The International Committee of the Red Cross (ICRC) is the IO with the longest experience and know-how providing care in the field and in Surgical Field Hospitals (SFHs). IO/NGO-SFHs work with lower budget than military forces. These SFHs have a well-planned, structured and re-evaluated low-tech approach in patient management and ANA/Surgical care. ICRC SFHs provide first aid, definitive surgical treatment and rehabilitation. In contrary the military SFHs are structured in Echelons (I-III) of care, they have the doctrine to provide their servicemen with state of the art, western high tech medicine, relying on all kinds of heavy logistics. While military SFHs have a 1 : 2 proportion patient/staff, IO/NGO SFHs have a 5-10:1 proportion. Further on IO/NGO SFHs have only a few expatriate experts (surgical team/head nurse) who cooperate in a well functioning setting with a majority of local health professionals and MDs. Management for the wounded includes triage, first aid, operative treatment, post or icu and ward care, as well as rehabilitation. In order to be cost effective and to cope with unpredictable high patient influx the ICRC has created guidelines for ANA (procedures, treatment protocols) for Surgery (principles of war surgery, To Do's & Not to Do's), for medical equipment and drugs (WHO essential drugs list). ANA procedures in IO/NOG SFHs are Ketamine (~65%), General ANA (intubated + relaxant ~ 12%), Spinal (~ 13%), local blocks (~ 10%). The 5% rule says, that for every 100 wounded people, 20 will die inevitably within minutes, because of the severity of their wounds. About 75 are likely to survive long enough to be treated at a safe place. Only for about five an urgent treatment of any kind makes the difference between life and death. Survival depends on promptly initiated first aid and not on high tech surgery.

IL25

COAGULATION EMERGENCY – DOES THIS EXIST?

P. Quehenberger

Dept. of Medical and Chemical Laboratory Diagnostics, University of Vienna Medical School, Austria

There are several acute coagulation disorders known where rapid diagnosis is essential to make patient treatment efficient and also cost-effective.

The widespread deposition of fibrin, the so-called disseminated intravascular coagulation (DIC), is a common feature of many disorders. This process may cause ischemic damage to tissues and organs. Paradoxically, a systemic bleeding tendency due to depletion of clotting factors often dominates the clinical picture, and just few thrombi may be found postmortem. Standard laboratory tests for diagnosis of DIC include platelet count, measurement of global clotting times, of fibrinogen and antithrombin, and measurement of the C-reactive protein.

Other coagulation disorders which are rare but sometimes difficult to diagnose and to treat efficiently are caused by circulating anticoagulants. Especially diagnosis of spontaneous coagulation inhibitors is important, as substitution of coagulation factors may not be sufficient. In these patients a prolonged activated partial thromboplastin time (APTT) is the most noticeable finding. Therefore it is essential to distinguish these coagulation inhibitors from other affections leading to prolonged APTTs, e.g. other circulating anticoagulants like lupus anticoagulant and drugs.

Furthermore, drug induced disorders of coagulation like the heparin-induced thrombocytopenia have to be mentioned as an acute coagulation disorder.

IL26

OPTIMISATION OF HAEMOSTASIS AS BLOOD SPARING METHOD?

W. Schobersberger, D. Fries and P. Innerhofer

Division for General & Surgical Intensive Care Medicine, Clinic for Anaesthesia and Intensive Care Medicine, University Hospital Innsbruck, Austria

To reduce the application of allogeneic blood products perioperatively and in the ICU several methods have been introduced, e.g. cell saver, preoperative blood donation with iron supplementation and use of recombinant erythropoietin, intraoperative haemodilution. However, the effectiveness of most methods is still discussed controversially. Moreover, these supportive measures focuse mainly on red cell replacement; primary haemostasis and coagulation were not included in blood salving concepts until now. Since the degree of perioperative blood loss is dependent on the functionality of the haemostatic system one could suggest that an

optimisation of haemostasis is a blood salvaging measure. In the last decade new diagnostic and therapeutic strategies have been developed which aim to improve coagulation disturbances. The manufacture of new technologies, e.g. thrombelastography (roTEG®) and PFA-100® support the differentiated analysis of disturbances within distinct parts of coagulation and primary haemostasis. Moreover, time plays a crucial role. Since these equipment's can be set up as 'bedside tests' a more rapid diagnosis can lead to a more rapid coagulation therapy. In addition, the use of these equipments aid in the postoperative phase as well as in the ICU in order to differentiate bleeding as consequence of severe coagulopathy or bleeding as surgical problem. In case of coagulopathy roTEG® and PFA-100® analyses support further coagulation therapy. By differentiating which parts of the haemostatic system need to be improved (coagulation, platelet function) a specific therapy is possible. The introduction of a 'balanced coagulation therapy' by the balanced application of coagulation factors (e.g. fibrinogen, prothrombin complex concentrates) and inhibitors (e.g. antithrombin III) as well as improving platelet function by desmopressin may help to correct haemostasis quickly, thereby acting to reduce allogeneic blood products.

IL27

NEWER NEUROMUSCULAR BLOCKING AGENTS: A COMPARISON WITH ESTABLISHED AGENTS

H.J. Sparr

Department of Anaesthesia and Critical Care Medicine, University of Innsbruck, Austria

Rapacuronium (Org 9487) is a non-depolarising muscle relaxant (NMBA) with a low potency (its ED_{90} is about 1 mg kg^{-1}), which to some extent is responsible for its rapid onset of action. After rapacuronium 1.5 mg kg^{-1} clinically acceptable intubation conditions are achieved within 60-90 s. The clinical duration following single bolus doses up to 2 mg kg^{-1} in adults is short (i.e. <20 min). Therefore rapacuronium has been considered a suitable alternative to mivacurium and succinylcholine for short procedures. Rapacuronium forms a pharmacologically active 3-desacetyl metabolite, Org 9488, which contributes to a delay in spontaneous recovery after repeat bolus doses or infusions. The most prominent side effects of rapacuronium (tachycardia, hypotension and bronchospasm) are dose-related. Due to reports of several serious bronchospasm events rapacuronium was voluntarily withdrawn from the US market in March 2001. Rocuronium is an intermediate-acting NMBA of relatively low potency. Its main advantage is the rapid onset of neuromuscular block. Rocuronium has mild vagolytic effects and does not release histamine, even when administered in large doses. In contrast to rapacuronium, rocuronium is not associated with dose-dependent respiratory side effects. From all currently available non-depolarising muscle relaxants, rocuronium in doses $\geq$1 mg kg^{-1} is the most suitable alternative to succinylcholine in a classical rapid-sequence setting, i.e. under a relatively light plane of anaesthesia. However, it is still a matter of controversy whether, in the case of an unanticipated difficult intubation, the long duration of rocuronium administered in such large doses outweighs the many side effects of succinylcholine.

Cisatracurium, an isomer of atracurium, is approximately four times as potent as atracurium. The onset time of cisatracurium is significantly slower than after equipotent doses of atracurium. The recommended intubating dose is 0.15-0.2 mg kg^{-1} (3 to 4 times the ED_{95}). Unlike atracurium, cisatracurium does not trigger histamine release, even when administered in large doses, and it has only minimal cardiovascular side effects. The elimination of cisatracurium from the body is mainly independent of organ function, which makes the pharmacodynamics of cisatracurium predictable in patients with impaired renal and hepatic function such as geriatric patients and critically ill patients.

IL28

RACZ-CATHETER: PROS AND CONS

A. Spacek

Dept. of Anestehesiology and Intensive Care B, University of Vienna

The so-called Racz-catheter is a special, stainless steel fluoropolymer-coated spiral-tipped epidural katheter, which has been developed by Dr. Racz for the nonsurgical management of epidural adhesions (so-called epidural neuroplasty, lysis of adhesions, epidural neurolysis) for treatment of a variety of painful conditions. This procedure is indicated in chronic, therapy resistant low back pain and radiculopathy due to epidural adhesions after surgical interventions, infections or herniated discs.

During this invasive procedure, which should be performed under fluoroscopy, the Racz-catheter has to be placed (via hiatus sacralis) within the epidural adhesions. According to the procedure protocol local anaesthetic (10 ml 0.25% bupivacaine), steroid (80 mg triamcinolone) and 10 ml 10% saline should be injected via catheter. It is also possible to inject additionally 1500 IE hyaluronidase at the first day of the treatment to enhance the spread of local anesthetic. The application of local anesthetic and hypertonic saline should be repeated twice within 48 hours. The catheter should be removed afterwards and the patient can be discharged.

The potential side effects and complications of treatment via Racz-catheter include unintended intrathecal injection of local anesthetic or hypertonic saline which can lead to cardiac arrhythmias, paraparesis or paraplegia, bowel and/or bladder dysfunction, sexual dysfunction, and infection. To prevent infections the patients should receive during the hospitalisation intravenously and after the discharge for 5 days orally antibiotic therapy.

This interventional pain management technique leads to pain relief of more than 40% in approx. 70% of the treated patients for up to 6 months.

IL29

PERIOPERATIVE USE OF α_2-ADRENERGIC AGONISTS

C.K. Spiss

Department of Anesthesiology and General Intensive Care, University of Vienna, Austria

In the perioperative period, α_2-adrenergic agonists (clonidin, dexmedetomidine) are clinically used for premedication, for the suppression of undesired sympathetic responses, the prolongation of the action of local anesthetics during regional anesthesia, for sedation, for the treatment of postoperative shivering, and for the treatment of various withdrawal syndromes.

The mechanism of action is based on their binding to α_2-adrenergic receptors of which three subtypes (α_{2A}, α_{2B}, α_{2C}) exist. α_2-adrenergic receptors are located in the central nervous system (locus coeruleus), in the spinal cord (posterior horn), in peripheral sympathetic nerves, and in smooth muscle cells of the peripheral vasculature. The inhibitory effects of α_2-adrenergic agonists on sympathetic responses are primarily attributable to their binding to the G-protein which is directly coupled to further effector mechanisms (e.g., Ca^{++} channels).

Premedication: In patients scheduled for coronary artery bypass grafting clonidine (200-300 µg po) has successfully been used as premedication drug for intraoperative hemodynamic stabilization and reduction of anesthetics. Intraoperative use: α_2-adrenergic agonists have been shown to reduce the minimal alveolar concentration of volatile anesthetics in patients by up to 50-90%. The sympathetic reactions to laryngoscopy or other painful stimuli (e.g., sternotomy) could effectively be suppressed by α_2-adrenergic agonists. Regional anesthesia: Extremely small doses of intrathecal clonidine (30 µg) provided adequate analgesia in parturients. Doses of 150 µg added to bupivacaine prolonged sensory and motor block up to 31%. Similar effects are observed in epidural use. Shivering: Clonidine 150 µg iv eliminated postoperative shivering in almost 100% of

patients after general anesthesia and was therefore as effective as meperidine. Sedation and drug withdrawal syndromes: α_2-adrenergic agonists provide adequate sedation, anxiolysis, and analgesia without respiratory depressive effects under desired hemodynamic function (tachycardia and hypertension are inhibited). Further, opioid withdrawal symptoms are successfully treated with α_2-adrenergic agonists.

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IL30

IMMUNE-MONITORING IN SEPSIS – CLINICAL RELEVANCE ?

A. Spittler

Surgical Research Laboratories, AKH, University of Vienna, Waehringer Guertel 18-20, 1090 Vienna, Austria

Septic shock is the most common cause of death in intensive care units; approximately 40%-50% of patients admitted with septic shock die of refractory hypotension or progressive multiorgan failure. During the last decade a biphasic immuneresponse in the course of sepsis which partly overlaps has been characterized. A hyperactivated immunesystem excessively releases proinflammatory cytokines such as tumor necrosis factor-α (TNF-α), interleukin-6 (IL-6) and IL-8 which are known to be the key mediators in the early phase of septic. The hyper-inflammatory phase is than counterregulated by anti-inflammatory substances such as IL-10 and transforming growth factor-β (TGF-β) which can lead to immunosuppression and immunoparalysis. In this phase the immunesystem is characterizd by anergy to repeated bacterial challenge. This is indicated by a diminished HLA-DR expression on monocyte cell surface and a dramatically reduced TNF-α activity which can be measured in an ex vivo LPS inducible TNF-α production into whole blood. In the later phase of sepsis persistent high IL-6 levels are well established to indicate a poor prognosis. Additionally to differentiate between infection, inflammation and tissue damage lipopolysaccharid binding protein (LBP) and procalcitonin (PCT) should be determined.

Since both, the hyperinflammatory as well as the immunosuppressive phase requires distinct therapeutic strategies and the transition period between immunephases passes very rapidly, a fast analytical system is necessary. Within 1.5 hours after blood sampling both, soluble factors by chemoluminescence (IMMULITE, DPC Biermann) as well as monocyte HLA-DR expression by flow cytometry can be quantified. Test results regarding the LPS inducible TNF-α secretion are available already after 5.5 hours.

In conclusion the rapid determination of various soluble substances produced in vivo combined with the ex vivo LPS induced TNF-α secretion and monocyte HLA-DR expression allows a discrimination between different phases of sepsis. On the basis of these test systems an effective bedside immunemonitoring can be performed which subsequently may allow a very specific treatment of sepsis patients in different immunological phases.

IL31

MONITORING THE ''DEPTH OF ANESTHESIA''

M. Struys

Department of Anesthesia, Ghent University Hospital, de pintelaan 185, 9000 Gent, BELGIUM

Monitoring techniques of the cerebral function during anesthesia have become clinically more applicable thanks to the commercialization of specific equipment. Various investigators have studied the ability of different techniques for measuring the different 'components of anesthesia'. The bispectral index, a processed EEG parameter using discriminant analysis on a set of EEG features including the EEG bispectrum and power spectrum analysis, was already proved having a high correlation with clinical signs of anesthesia and concentration of most of the hypnotics (1).

Another processed EEG parameter, approximate entropy, was proposed as measure of anesthetic depth. Approximate entropy is a new statistical parameter derived from the Kolmogorov-Sinai entropy formula which quantifies the amount of regularity in data. The approximate entropy quantifies the predictability of subsequent amplitude values of the EEG based on the knowledge of the previous amplitude values (2)

Auditory evoked responses (AEP) are also used for measuring hypnotic drug effects. Different authors compared the auditory evoked potential and EEG for monitoring depth of anesthesia and found similar accuracy using both monitors. For AEP, both raw as processed signals are studied in the past using moving time avarage (MTA) techniques (1). Recently, an on-line analysis of middle latency auditory evoked potentials for monitoring depth of anesthesia was developed by Jensen et al. applying an Auto Regressive Model with Exogenous Input (ARX-model) from which a Depth of Anesthesia Index (AAI) was calculated. This technique was provenly faster than the MTA (3).

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IL32

ACUTE NECROTISING PANCREATITIS IN THE LIGHT OF EVIDENCE BASED MEDICINE

S. Trenkler

Dept. of Anaesthesiology and Intensive Medicine, Reimann Hospital, Presov

Acute necrotising pancreatitis with its mortality of 45 % continues to present intensivists with many challenges. An improved understanding of the pathophysiology of the disease has stimulated investigation of new medical treatments but only a few therapies stand up to evidence-based evaluation. A critical analysis of the available studies leads to the following conclusions: The main determinant of outcome is the extent of pancreatic necrosis and the risk for the development of infected necrosis. Patients with severe form of pancreatitis, as assessed by combination of scoring systems and dynamic contrast-enhanced CT, should be treated in ICU, preferably in dedicated referral centres. Despite numerous suggested specific therapies there is still no Grade A evidence that any confers significant mortality benefit. Studies have been repeatedly negative for nasogastric suction, histamine H_2-receptor blockers, atropine, glucagon and fluorouracil. There is insufficient evidence at present to support the use of octreotide, somatostatin or protease inhibitors like aprotinin and gabexate mesilate. The basic principles of therapy are universal - replacement of substantial fluid losses, correction of electrolyte and glucose abnormalities, cardiovascular, respiratory and renal supportive therapy. Bacterial infection of necrotic pancreatic tissue occurs in 40-70 % of patients and infection is the major cause of morbidity and mortality. Patients with sterile necrosis should receive a broad-spectrum antibiotic that adequately penetrates pancreatic tissue like imipenen, quinolone or cefuroxim, but we still need definitive proof of the benefit of this treatment. Acute necrotising pancreatitis may represent one of the subsets where selective decontamination of the gut may improve outcome. The role of nutritional support is difficult to establish but enteral nutrition is no more harmful than parenteral nutrition and maybe advantageous. Enteral nutrition to the jejunum should be established as soon as possible. Following the initial CT scan, additional scanning is indicated only if the patients' clinical condition deteriorates. Surgeons should be involved in patients with infected pancreatic necrosis or deterioration of organ systems. Decisions are often difficult and surgical options include debridement with drainage, lesser sac lavage or scheduled re-exploration.

IL33

POSTOPERATIVE CARDIAC ARREST IN A PATIENT UNDERGOING UROLOGIC SURGERY

M.N. Vicenzi

University Department of Anaesthesiologie and Intensive Care Medicine, LKH - Universitätsklinikum Graz, Austria

Background. PTCA reduces the risk of perioperative adverse cardiac outcome by 50% despite having twice the risk of such when compared to otherwise healthy patients (1). Stenting further increases the success of PTCA and is nowadays associated with an early occlusion rate < 1%. However, the risk to benefit ratio for reduction of perioperative risk is highly under doubt given the scarce but scaring reports available (2).

Case. Thirty-three days before scheduled nephrectomy, a patient suffered from an acute coronary syndrome due to a ruptured plaque of the LAD. Immediate PTCA with stenting, followed by abciximab, aspirin and ticlopidine comprised the antiischemic treatment. Five days preoperatively, antiplatelet therapy was replaced by 40 mg enoxaparin (sc once daily). Anesthesia and surgery were uneventful. Two hours later, a transmural, anterolateral myocardial infarction with ventricular fibrillation developed. CPR and epinephrine restored the circulation. Angiography detected a complete occlusion of the LAD-stent, a PTCA restored vessel lumen and blood flow. Heparin and ticlopidine were initiated, but the patient now suffered from severe intestinal bleeding which required tranfusion and cessation of above drug treatment.

Discussion. Thrombogenic stents initially require aggressive antiplatelet therapy and major surgery induces coagulatory imbalances. Forty cases of preoperative stenting (2) and the present one had catastrophic outcome, including both stent thromboses and bleeding. Only a single case report with successful management of a stented patient is available (3).

Conclusion. Lack of controlled, prospective studies and poor outcome of available reports let PTCA with stenting appear as an uncontrollable risk for preoperative patients.

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IL34

THE ROLE OF PERFLUOROCARBON AS AN OXYGEN CARRIER

M. Zink

Department of Anesthesiology and Intensive Care Medicine, University of Graz, Auenbruggerplatz 29, 8036 Graz, Austria

Substantial blood loss is a side effect of major surgical procedures. Routinely, blood loss is corrected with stored allogeneic blood. Shortage of allogeneic blood and transfusion complications are well known. Therefore the development of red blood substitutes was intensified and has made rapid progress in recent years. All artificial oxygen carriers to date are based on acellular materials, either perfluorocarbon (PFC) emulsions or haemoglobin derivates.

PFC must be emulsified before it can be administered intravenously, because it is insoluble in water. The intravascular half-life time is determined by the uptake of the PFC droplets into the reticuloendothelial system and is about 10 hours (1.8gPFC/kg). After the uptake the phospholipid surfactant is broken down. The PFC molecules dissolve back into the blood and are excreted via the expired air. PFC molecules do not undergo in vivo metabolism.

They are chemically inert and capable to dissolve large volumes of nonpolar gases like oxygen, carbon dioxide or nitrogen. In contrast to the oxygen binding properties of haemoglobin, the oxygen content of PFC is linearly proportional to the oxygen partial pressure. Therefore elevated levels of oxygen partial pressure are necessary. However, oxygen is extracted very effectively from PFCs. Extraction typically reaches 90%.

Out of the newer PFCs, Perflubron is being developed commercially. It can be produced in large scale quantities and carries no risk of infection transmission. The preparation is a 60% w/v Perflubron-based emulsion (Oxygent™, Alliance Pharmaceuticals, San Diego, USA). Perflubron has been studied extensively during the past decade in several Phase II and III clinical trials. In orthopedic surgery perflubron emulsion was more effective than autologous blood or colloid infusion in reversing physiologic transfusion triggers and delaying the need for allogeneic blood transfusion. Additional indications for PFCs treatment may include clinical situations with compromised tissue oxygenation, such as cerebral or myocardial ischemia and air embolism. Moreover a great advantage would be the possibility of PFC application in cases where no allogenic blood is available, i.e. emergency cases or trauma surgery.

IL35

LIFESAVING REGIONAL CITRATE ANTICOAGULATION TO BRIDGE INADEQUATE DANAPAROID THERAPY DURING HAEMOFILTRATION

M. Dworschak, M. Hiesmayr, A. Lassnigg

Department of Cardiothoracic Anaesthesia and Intensive Care

We present a case where regional citrate anticoagulation became lifesaving in the early postoperative setting after orthotopic heart transplantation in a patient who developed acute renal failure and heparin-induced thrombocytopenia necessitating anticoagulation with danaparoid. Frequent clotting of haemofilters caused serious derangements of serum electrolytes and hypervolaemia. The addition of trisodium citrate at a concentration of 18 mmol/l in 105 mmol/l sodium chloride to the predilution at a rate of 1 l/h prevented extracorporeal blood clotting. Blood flow was adjusted to 100-150 ml/min and ultrafiltration maintained between 1-1.5 l/h depending on the fluid balance that had to be achieved. Calcium chloride had to be substituted on the venous side of the haemofilter. During regional citrate anticoagulation it is crucial to regularly control blood gases, serum sodium, and calcium levels. We would also like to stress that the recommended plasma anti-factor Xa levels for haemodialysis (0.5-0.8 IU/ml) may be inadequate and values similar to those in use during cardiopulmonary bypass (1.5-2 IU/ml) are necessary (1,2). In addition, clinicians have to be aware of the fact that plasma anti Xa levels can vary extensively depending on the assays that are used (3).

References.

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IL36

THE ANESTHETIST'S OBLIGATION TO THE LIVING ORGAN DONOR

H. Gerlach

Klinik für Anaesthesiologie und operative Intensivmedizin Charité, Campus Virchow-Klinikum, Augustenburger Platz 1, D-13353 Berlin, Germany

Background. The number of patients needing transplantation exceeds the number of cadaveric donors available. Up to 25% of paediatric patients listed by the United Network for Organ Sharing will die within 1 year while waiting for an organ. Living-related organ transplantation (LROT) is one partial solution to this shortage. LROT, however, exposes the donor to the risks of (partial) organ explantation and general anesthesia. Although reviews of the surgical techniques and complications associated with