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## ABSTRACTS

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# Abstracts of the 15th WFSA World Congress of Anaesthesiologists®

La Rural, Predio Ferial de Buenos Aires, Argentina, 1 March 25–30, 2012

## AMBULATORY ANAESTHESIA

*(The names of the authors presenting each paper are shown in bold type)*

### Paper No: 19.00

#### Assessing the knowledge of medical students about the specialty of anesthesia in Iranian universities

**Farhad Safari**

The field of anesthesia has prominent practical aspects that are unknown for many of medical students to select it as their specialty choice for continuing education. In this study we evaluated the knowledge of a group of medical students about the anesthesia and anesthesiologists in six medical universities of Iran; and compared the students of universities with anesthesia course, with the students of universities without this course.

**Material and methods:** In a cross-sectional study, 350 students from six universities of medical science were investigated. Information about their knowledge and interests about the field of anesthesia were collected by a questionnaire; and compared between two groups of student from universities, with and without course of anesthesia.

**Results:** Among 182 students who answered the questions and included in this study, 99 (54.4%) students were from universities with the educational course of anesthesia (WCA group), and 83 (45.6%) were from universities without the course of anesthesia (NCA group). Comparing the WCA and NCA groups, the knowledge of students about the duration of anesthesia assistant course, the role of anesthesiologists in medical team, the domain of anesthesiologist activity, and the existence of subspecialty courses of anesthesia, in WCA group was more than NCA group (P-value <0.001). The students of WCA group were more interested in choosing anesthesia as their specialty choice (P-value <0.001), as well.

**Conclusion:** The knowledge and interests about anesthesia field, among students of universities with anesthesia course was more than students of universities without this course. Comparing the WCA and NCA groups, the knowledge of medical students about the speciality of Anaesthesiology in wider perspective, the role of anesthesiologists in

medical team, the domain of anesthesiologist activity, and the existence of subspecialty courses of anesthesia, in WCA group was significantly more than NCA group (P-value <0.001). Similarly, the students of WCA group were significantly more interested in choosing anesthesia as their specialty choice (P-value <0.001).

### Paper No: 20.00

#### Studying effect of Intrathecal Midazolam on Acute Pain Score in Comparison with Fentanyl in Lower Limb Fractures (below the Knee)

**Farhad Safari**

shaheed beheshti university. tehran.iran

**Introduction:** Intrathecal injections are one of the available modalities for patient's pain relief. This study assessed the efficacy of analgesic property of a Benzodiazepine (midazolam; with approved analgesic effect when administered intrathecally, IT) against an Opioid (fentanyl; an analgesic drug without any local anesthetic properties when used IT). Based on previous studies, midazolam has less side effects on hemodynamics and respiratory systems in contrast with other drugs used intrathecally for pain relief.

**Materials and Methods:** This survey has been done as a randomized clinical trial in 60 patients with lower limbs fractures (below the knee; within 24 hrs of injury) referred to hospitals of Imam Hossein and Loghman-aldoleh (acute pain). Based on the inclusion criteria, patients were divided randomly into M group (midazolam used IT) or F group (fentanyl used IT). The intrathecal (IT) injection was done after the primary evaluations of patient's vital signs, receiving intravenous fluids and determining the acute pain score in each group based on VAS scores. After 15 minutes of injection, the patient's new pain score were assessed again as previous. All patients underwent the general anesthesia



on a predetermined protocol. All the surgical procedures were done in less than 2 hours.

**Results:** It was shown in this study that injection of midazolam IT is significantly more effective in acute pain relief than fentanyl does as the acute pain score reduction in M group was  $3.06 \pm 1.617$  while in F group was  $1.46 \pm 0.507$  ( $P$ -value  $< 0.001$ ). The painfree time (VAS  $< 4$ ) duration after the surgical procedure in the ward was significantly more for the midazolam group [for midazolam was  $7:15 \pm$  (CI. 95%:  $6.6 \pm 7.8$ ) and for fentanyl group was  $3:30 \pm$  (CI. 95%:  $3.3 \pm 3.7$ )]. Conclusion: Acute pain was relieved more effectively in patients when midazolam used IT (4mg) in comparison with fentanyl (40 $\mu$ g). More studies are needed to assess more analgesic properties of IT midazolam and its therapeutic considerations in the other types of pain (chronic, neuropathic, etc.).

**Keywords:** Midazolam; Intrathecal injection; Acute pain score

## Paper No: 26.00

### Preconditioning effect of Remifentanyl on myocardium during coronary artery bypass graft surgery

Shahrbano Shahbazi

Shiraz university of Medical Sciences. Shiraz-Iran

**Introduction:** Ischemic preconditioning (IPC) is a powerful physiologic process in which previous exposure to transient cardiac ischemia provides protection from lethal ischemia. In this study, we decided to measure troponin-I, ICU and hospital length of stay and inotrope usage for weaning, with remifentanyl preconditioning.

**Material and methods:** In this single blind clinical trial 54 patients undergoing CABG and aged  $< 75$  years old with EF  $> 30\%$  were selected. The patients were randomized to the remifentanyl group ( $n = 27$ ) and control group ( $n = 27$ ).

The patients in remifentanyl group received a remifentanyl bolus of  $1 \mu\text{g/kg}$  followed by an infusion at a rate of  $0.5 \mu\text{g/kg/min}$  for 30 minutes after induction and before sternotomy. Those in the control group received 0.9% saline instead of remifentanyl given at the same infusion rate.

Cardiac troponin I (cTnI) level were measured using elisa technology and cTnI value above  $1.3 \text{ ng/ml}$  was considered as abnormal.

**Results:** The Level of troponin I in all the patients increased in the post bypass period; the overall troponin I level was significantly different between any time from the last time ( $P$ -value  $< 0.001$ ) but this increase in troponin I was not different between the remifentanyl and control groups ( $P$  value =  $0.42$ ). Conclusion: The results of this study show that a short period of high dose remifentanyl before cardiopulmonary bypass dose not reveal preconditioning effect on the heart, so further studies are necessary for confirmation.

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## Paper No: 27.00

### Efficacy of epidural steroid injections for management of symptomatic herniated lumbar disc

Bidur Kumar Baral<sup>1</sup> and Ravi ram shrestha<sup>2</sup>

<sup>1</sup> Nepal orthopaedic hospital, kathmandu, nepal and <sup>2</sup> National Academy of medical science, Kathmandu

**Introduction:** Low-back and radicular pain is a common clinical presentation of herniated lumbar disc. This is the most common presenting complain of the young adults in orthopaedic clinic. The incidence of low back pain is high in our part of the world. The reason may be hilly terrain, difficult working and living environment. The initial treatment of low back pain is conservative. Epidural steroid injection is being slowly established as a reliable mode of minimally invasive treatment modalities in many orthopaedic centres of the world. This is a preliminary report of on-going study of the use of epidural steroid for the management of low back pain cases coming to the Nepal orthopaedic hospital.

**Objective:** To assess the efficacy of epidural steroid injection for symptomatic herniated lumbar disc in Nepalese population.

**Methods:** This is a prospective study, carried out on the patients presenting with the complain of low back and radicular pain due to herniated disc not responding to other modes of conservative treatment. This study was done in the Nepal Orthopaedic Hospital, Kathmandu from January 2009 to July 2010. All the patients of herniated lumbar disc were proven by Magnetic Resonance Imaging (MRI). Injection Methyl prednisolone 80 mg (Depo-Medrol) and 2 ml of 0.5% bupivacaine (Sensorcaine) was diluted in 8 ml of normal saline and injected into the affected lumbar epidural space. The functional status of the patient and the severity of pain were evaluated before injection and after injection during the follow-up period after one week, one month and at six months by using Ostrewy disability index and VAS score.

**Results:** Sixty two patients received the epidural steroid injections, but only fifty patients came for regular follow up till six months. Among the fifty patients, 26 were male and 24 were female. The commonest level of affected herniated lumbar disc was L4-5 (30%) followed by L5-S1 (22%) in single level

but in multi level L4-5, L5-S1 (30%) was commonest level. The functional status and pain response of the patients were improved significantly during all the follow-up periods as compared with the baseline ( $p < 0.001$ ). Four patients, who did not improve back pain even with two dose of ESI, underwent surgery. Most common complaint of patients after injection was pain at the injection site (5%). No major complications were encountered.

**Conclusion:** The epidural steroid injection is a simple, safe, effective and minimally invasive modality for management of symptomatic herniated discs.

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## Paper No: 52.00

### Use of laryngeal mask airway in children with upper respiratory tract infection, compared with face mask: randomized, single blind, clinical trial

**Alireza Shafieipoor Kermany**, Babak Gharaei, Homayoun Aghamohammadi, Alireza Jafari and Mohammadreza Kamranmanesh

Anesthesiology Research Center, Labbafinejad Hospital, Shahid Beheshti University of Medical Sciences

**Introduction:** Anesthesia in children with upper respiratory infection (URI) has been a source of debate for many years. Hyperactivity of the airway following URI increases the risk of perioperative respiratory complications, including cough, laryngospasm, desaturation and bronchospasm. Laryngeal Mask Airway (LMA) which was commercially introduced as a supraglottic device in 1988 apparently induces less laryngeal stimulation. It would be an attractive alternative for airway management in children with URI. The superiority of (LMA) over endotracheal tube (ETT) has been studied in children with URI. Previous studies showed more complications with endotracheal tube in pediatric patients with URI, however the comparison between LMA and FM is lacking. Although the use of a face mask (FM) may be associated with lower risk, it has not been systematically compared to LMA in a randomized study. This study was designed to compare the incidence of postoperative complications in children with uncomplicated URI undergoing anesthesia with either LMA or

FM. We hypothesized that in children with URI fewer complications would arise with LMA than FM.

**Objectives and aims:** This randomized clinical trial was designed to find out the incidence of postoperative cough (primary outcome) and adverse respiratory events (secondary outcomes) in children with uncomplicated upper respiratory tract infection (URI) having laryngeal mask airway (LMA) compared to face mask (FM).

**Method:** One hundred fifty pediatric patients with URI were enrolled. After stratifying the severity of preoperative URI symptoms, subjects were randomized to receive FM or LMA anesthesia. Both groups received inhalational induction and intravenous lidocaine. Respiratory adverse events were evaluated.

**Result:** The two groups did not demonstrate difference with respect to their age, weight, ASA physical status, gender, duration of surgery and severity of URI symptoms. The incidence of cough (19% in LMA vs. 42% in FM;  $p < 0.05$ ), vomiting (4% in LMA vs. 12% in FM;  $p < 0.05$ ) and maneuvers to maintain the patency of airway was more in those with FM (4% in LMA vs 77% in FM;  $p < 0.05$ ). Apnea (7% in LMA and 5% in FM group), desaturation (21% in LMA and 20% in FM), laryngospasm (32% in LMA and 37% in FM), bronchospasm (17% in LMA and 14% in FM), readmission (3% in LMA and 4% in FM) and sore throat (18% in LMA and 20% in FM) were not different between groups.

**Conclusion:** In children with uncomplicated URI who do not require endotracheal intubation, LMA is superior to FM with fewer adverse events.

**Keywords:** Children; Anesthesia; Upper respiratory infection; Laryngeal mask airway; Face mask

## Paper No: 58.00

### Role of LMA in airway management during upper airway laser treatment

**Lida Fadaizadeh**, Arda Kiani, Badiolzaman Radpey and Mohammad Reza Masjedi

Chronic Respiratory Diseases Research lung transplant research center, Shahid beheshti national research institute of tb and lung Telemedicine research center, Shahid beheshti university of medical sciences

**Aim.** Airway management and ventilation is a major concern during Laser ablation of airway lesions. The aim of this study was to define the role of LMA in ventilating patients undergoing such procedures.

**Material and methods:** Patients were randomly allocated to two groups; first using LMA and second using rigid bronchoscopy for ventilation. Complications, vital signs, and patient and physician satisfaction was recorded.

**Results:** Seventy seven patients were enrolled, among which 45 underwent LMA ventilation and 32 underwent rigid



bronchoscopy. Mean age of patients was  $51.3 \pm 16.8$  years and 53 were male. The most common complication was hemorrhage, with no statistically significant difference between two groups. But the most important complication was moderate hypoxemia (minimum about 80%) which was significantly prevalent among the rigid bronchoscopy group ( $P$  value = 0.011). The only inconvenience caused by LMA was sore throat recorded in the 26.8% of LMA group compared to 14.6% of bronchoscopy group. Surgeons did not complain about using LMA and it did not obstruct their vision.

**Conclusion:** Using LMA for airway management during upper airway lesions is not only safe and effective but also lacks flammability and causes less hypoxemia during the procedure. Also there was not objection by the surgeons regarding using this device.

**Keywords:** LMA; laser; rigid bronchoscopy

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## Paper No: 62.00

### Pre-oxygenation with no-cost tse i\$maski reduces severe desaturation in elderly patients under deep propofol sedation during retrobulbar block

James Tse, Dora Zuker, Maria Negron-Gonzalez, Kristen Dauphinee and Sylviana Barsoum

University of Medicine and Dentistry of New Jersey-Robert Wood Johnson Medical School

**Introduction:** Patients undergoing vitrectomy or scleral buckle routinely receive pre-oxygenation with nasal cannula and IV propofol during retrobulbar block. Brief and deep sedation is often required to avoid patient movement during injection of local anesthetics. However, it may cause respiratory depression and/or airway obstruction, especially in elderly patients with severe cardiopulmonary diseases. A simple plastic sheet has been shown to improve oxygenation by transforming nasal cannula to a simple face tent (TSE i\$Maski) in deeply sedated patients during upper GI endoscopy in a prospective study<sup>1</sup>.

**Objectives:** This technique has been used in the Eye Room and the Block Room. We examined its effectiveness in

improving oxygenation and preventing severe desaturation in elderly patients during retrobulbar block.

**Methods:** This retrospective review of elderly patients (>70 years old) who underwent vitrectomy or scleral buckle identified 2 groups. Group 1 (NC,  $n = 41$ ) received only nasal cannula O<sub>2</sub>. Group 2 (TM,  $n = 52$ ) received nasal cannula O<sub>2</sub> and a TSE i\$Maski using a NC plastic bag to cover patient's nose and mouth<sup>1-3</sup>. It was removed prior to sterile preparation to avoid causing possible airway obstruction or suffocation during the case. Patients received nasal cannula O<sub>2</sub> (3–5 l/min or higher as needed) and IV propofol. The bag-mask assisted ventilation was used as a rescue measure to improve oxygenation. Student t-test and Chi Square test were used for analysis. A  $p$  value <0.05 was considered as significant. (Mean±b.S.D.)

**Results:** There were no differences in age (NC: 78±6 years; TM: 79±5), BMI (NC: 25.9±4.0; TM: 28.2±5.5), ASA Physical Status Classification (NC: 2.4±0.6; TM: 2.4±0.6), room air (RA) O<sub>2</sub> Sat (NC: 98±2%; TM: 98±2%), propofol dose (1.04±0.30 mg/kg; TM: 1.15±0.25), ETCO<sub>2</sub> (NC: 31±5 mm Hg; TM: 31±7), inhaled CO<sub>2</sub> (NC: 2±2 mm Hg; TM: 6±5) and bag-mask ventilation (NC: 4/41; TM: 1/52). There were significant differences in the highest O<sub>2</sub> flow rate (NC: 5.5±2.5 l/min; TM: 4.2±0.8 l/min,  $p < 0.0005$ ), FiO<sub>2</sub> (NC: 0.32±0.15; TM: 0.57±0.15,  $p < 0.0001$ ), O<sub>2</sub> Sat after 5 min pre-oxygenation (NC: 98±2%; TM: 100±0%,  $p < 0.001$ ), the lowest O<sub>2</sub> Sat (NC: 92±6%; TM: 98±4%,  $p < 0.0001$ ) and severe desaturation (O<sub>2</sub> Sat <85%) (NC: 7/41; TM: 1/52,  $p < 0.01$ ).

**Discussion.** Data show that pre-oxygenation with a TSE i\$Maski prior to deep propofol sedation for retrobulbar block improves oxygenation and reduces severe desaturation in elderly patients. It increases O<sub>2</sub> delivery without raising O<sub>2</sub> flow.

**Conclusion:** This face tent takes only a few seconds to prepare and may improve patient safety at no additional healthcare cost. It also may reduce procedure interruptions and should be routinely used for pre-oxygenation prior to sedation during retrobulbar block.

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## Paper No: 73.00

### Could preoperative education cause anxiety reduction in patients? A double blinded randomized clinical trial

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**Introduction:** Success of surgery could be influenced by the Psychological characteristics of the patients, so this study was planned to determine the effects of education on elective surgical patient's anxiety, in Lohman Hakim hospital.

**Material and Method:** Patients candidate for elective surgery came to our study from Dec 2008 to Feb 2009. Patients were explained about the purpose of study. The patients were randomly came in to two groups, even and odds. Informations were obtained from the patients, then the patients were asked to fill out APAIS (Amsterdam Preoperative anxiety and information Scale) test and then educational brochure given to patients with even numbers (case group), and were said to read them thoroughly. Other patients received oral information as they needed (control group), and then at the morning of surgery, they filled again APAIS in operating room.

**Results:** 106 patients came to our study, 54 in case group and 52 in control group. In all the measured variables (age, gender, educational level, job, history of past surgery, type of anesthesia in this surgery, insurance, history of smoking or opium addiction, house ownership) there was no significant difference between case and control groups. The result of anxiety level with APAIS on the morning of surgery showed that, there was no significant difference in anxiety level between case and control groups.

**Discussion.** Causes of differences between results of this study and some other studies are differences in type and method and duration of education. In this study believe in GOD's will, confidence to physician and their operation and no fear of death are the most important causes of loss or low level of anxiety and need to information.

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## Paper No: 80.00

### Anesthetic challenges faced during management of dysmorphic children's: our experiences from rural India

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**Introduction:** Dysmorphology is a term coined by Dr. David W. Smith in the 1960's to describe the study of human congenital malformations. Dysmorphology mean, "The study of abnormal form." As anesthetists, we frequently encounter the dysmorphic child. If we have due warning and ample time at our disposal (limitless money) we can thoroughly investigate all of these children preoperatively.

**Objective:** My aim is not to do an exhaustive list of all the syndromes that we may encounter, but rather to summarize my experiences.

**Methods:** Here I am describing the syndromes we experienced and the approach of anesthesiologist to tackle the problems associated with all the syndromes.

S.No Syndrome Problem 1 Shprintzen-Goldberg craniosynostosis Syndrome: Difficult airway due to Mandibular hypoplasia, progressive aortic dilatation, joint laxity, hypothermia, intracranial hypertension associated with craniosynostosis, malignant hyperthermia. 2 Ehlers-Danlos Syndrome: Airway problem, Hyper extensibility of joints, Hypertensive responses to tracheal intubation and extubation. 3 Hurler Syndrome :Mucopolysaccharide storage in tissues and organs,in coronary arteries leads to arrhythmias & cardiac instability.coarse features, growth deficiencies. obstruction of airway, Excessive oral secretions 4 Xeroderma Pigmentosa: PhotoSensitivity, atrophic and pigmentary skin changes, progressive neurologic problems. Atrophic skin of mouth - difficult mouth opening. Ataxia, spasticity, impaired hearing 5 Marfan Syndrome :Arachnodactyly with hyperextensibility, lens subluxation.aortic incompetence 6 Treacher Collins Syndrome :Malar hypoplasia, downslanting palpebral fissures, lower eyelid defect, ear anomalies. Mandibular hypoplasia, cleft palate, cardiac defects 7 Osteogenesis Imperfecta : difficult intubation, problems with positioning and tendency to develop malignant hyperthermia, coagulopathy and cardiovascular abnormalities 8 Metabolic Leukodystrophy: Seizures, risk of aspiration, airway complications and also of copious oral and tracheobronchial secretions.

**Results:** Predicting and diagnosing an anesthetic challenge in preoperative period make the anesthesiologist confident to face the challenges and devise an alternate plan of

action. All the cases were induced by inhalation induction with different volatile agents e.g. Halothane, Sevoflurane. Care has been taken not to use the drugs which release histamine. It is always the titrated dose of drugs which matter other than the drug. Control on airway, temperature, fluid and your skills and premonition will make the difference.

**Discussion.** All these Dysmorphic Child are important to the Anesthetist because they have 1) Occult, serious abnormalities that have not been identified 2) The link with Malignant Hyperthermia 3) The difficult airway 4) Difficult vascular access 5) Psychological problems / mental retardation resulting in extreme anxiety or difficulty with induction Gentle care is always needed to handle these patients to prevent the complications which can occur in the perioperative period like, fracture of bones and teeth, odontaxial dislocation, occurrences of hyperthermia, and excessive bleeding

**Conclusion:** In all these cases a good preoperative assessment will make difference in the anesthetic management plan. Look for abnormalities, find one, and look for another. You can plan your anesthesia accordingly if you can perform an internet search for condition, as in today's electronic world. In our Asian population true malignant hyperthermia is not common. Be prepared for anesthesiologist biggest enemy "Difficult Airway".

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## Paper No: 85.00

### Anaesthesia for paediatric day case tonsillectomy 'a gold standard protocol'

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**Introduction:** ENT surgery accounts for over 30% of operative procedures performed on children, and the majority of this workload is routine elective ambulatory surgery carried out in general hospitals. Post-operative nausea and vomiting (PONV) is the most common symptom delaying day case discharge, reported to occur in up to 30% of children following ENT surgery, resulting in delayed discharge and readmission to hospital. Both early PONV (< six hours post-op) and pain

are independent variables contributing to delayed recovery after day case paediatric ENT surgery. [1]

**Objectives:** To validate the performance and reliability of 'Epsom Protocol' for effective reduction of PONV.

**Methods:** We audited the protocol in a prospective clinical study with a cohort of 100 children admitted electively for planned day-case discharge within six hours, following tonsillectomy with or without adenoidectomy.

**Results:** No PONV was recorded in 95% of children on the day of operation and no discharges were delayed. The nursing record was incomplete in five children and no assessment of PONV status could be made. In our study 100% of the children were discharged home within 6 - 8 hours of surgery, with the predominant variable being absence of PONV using the Epsom Protocol. Parental satisfaction of over 94% was recorded from the parents of these children. [2]

**Conclusions.** Where the routine use of antiemetic has been adopted, but the use of opiate analgesia and nitrous oxide anaesthesia continued, a modest improvement in PONV has been achieved, (from 27% to 11%), but not reached the low level observed in our audit of the Epsom Protocol. [3] We would like to share this audit, including pictures following a paediatric patient from admission, through surgery and discharge to illustrate 'how we do it'.

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## Paper No: 91.00

### BIS or AEP monitoring during TCI Propofol & TCI Remifentanyl anaesthesia in obesity patients

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**Introduction:** BIS and AEP are monitoring devices designed to assess the depth of anesthesia. Meanwhile, a number of studies indicate that with TCI propofol & remifentanyl anesthesia, BIS and AEP have comparable effects on drug consumption and recovery times whereas comparative clinical data for obesity patients are still missing.

**Objectives:** Therefore, we have study to compare the effects of BIS and AEP monitoring during TCI propofol-remifentanyl

anesthesia and versus a standard anesthetic practice protocol in obesity patients.

**Methods:** 600 obesity patients (BMI>40) scheduled for surgery were randomized to receive a TCI propofol-remifentanyl anesthetic controlled either by AEP or by BIS or solely by clinical variables. Anesthesia was induced with 1.0 mcg/kg/min TCI remifentanyl and 10 mcg/ml TCI propofol. After tracheal intubation, TCI remifentanyl was infused at a constant rate of 0.05 mcg/kg/min whereas TCI Propofol 2 – 4 mcg/ml was adjusted according to clinical variables or the following target values: during maintenance of anesthesia to a value of "D(10)" (AEP) or "40" (BIS), 15 min before the end of surgery to "C(20)" (AEP) or "50" (BIS), whereas in the standard protocol group, TCI Propofol was controlled according to clinical variables, e.g. NICO parameters.

**Results:** Recovery times and propofol consumption were recorded by a blinded investigator. The propofol volume was indicated before and after anesthesia and consumption per minute was calculated. Data are mean  $\pm$  SD. The groups were comparable for demographic data, duration of anesthesia, and mean remifentanyl dosages. Compared with standard practice, obesity patients with AEP or BIS monitoring needed significantly less propofol (standard practice 243  $\pm$  51 mg, AEP 154  $\pm$  94 mg, BIS monitoring 220  $\pm$  100 mg TCI propofol [Both:  $P < 0.05$ ]). However, recovery times were not significantly different between the groups, e.g., opening of eyes 4.5  $\pm$  2.0 versus 3.5  $\pm$  2.0 versus 4.0  $\pm$  1.9 min.

**Conclusions.** During TCI propofol-remifentanyl anesthesia, AE and BIS monitoring seem to be equally effective compared with standard anesthetic practice: BIS and AEP allow for reduction of propofol consumption with a better recovery times for obesity patients. Monitoring the electroencephalogram with AEP or BIS during TCI propofol-remifentanyl anesthesia reduces recovery times in obesity patients when compared with a standard practice protocol.

**Paper No: 102.00**

### The effects of different insufflation pressures on liver functions assessed with limon on patients undergoing laparoscopic cholecystectomy

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**Introduction:** Laparoscopic cholecystectomy has been accepted as an alternative to laparotomy but there is still controversy regarding the effects of pneumoperitoneum on splanchnic and hepatic perfusion(1). Objective. We assessed

the effects of different insufflation pressures on liver functions by using indocyanine green elimination tests (ICG-PDR). **Methods.** We analyzed 43 patients who were scheduled for laparoscopic cholecystectomy. The patients were randomly allocated to two groups, 10 mmHg pressure pneumoperitoneum (Group I) and 14 mmHg pressure pneumoperitoneum (Group II). The ICG-PDR measurements were made after induction (ICG-PDR 1) and after the end of the operation (ICG-PDR 2). Serum aspartate aminotransferase (AST), alanine aminotransferase (ALT) and total bilirubin levels were all recorded preoperatively, 1 hour and 24 hours after surgery.

**Results:** The ICG-PDR 1 values for group I and II were as follows,  $26,78 \pm 4,2\%$  per min vs.  $26,01 \pm 2,4\%$  per min ( $p > 0.05$ ). ICG-PDR 2 values were found  $25,63 \pm 2,1\%$  per min in group I vs.  $19,06 \pm 2,2\%$  per min in group II ( $p < 0.001$ ). There was statistically significant decrease between baseline and postoperative ICG-PDR values in group II compared to Group I ( $p < 0.001$ ). Postoperative 1st hour serum AST and ALT levels increased in group II ( $p > 0.05$ ). No statistically difference were detected on postoperative 24st hour serum AST and ALT levels and serum bilirubin between groups ( $p > 0,05$ ).

**Conclusion:** These results demonstrated that 14 mmHg pressure pneumoperitoneum decreased the liver blood flow end of the operation, increased on postoperative 1st hour serum AST and ALT levels. We think that 10 mmHg pressure pneumoperitoneum is superior to 14 mmHg. pressure pneumoperitoneum in laparoscopic cholecystectomy.

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**Paper No: 125.00**

### Rapid-sequence induction: how should it be done? (State of the Art Section)

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Rapid-Sequence induction (RSI) is a technique designed to achieve rapid tracheal intubation in patients with high aspiration risk. The components of RSI are rapidly executed in sequence to minimize the period during which the airway is unprotected. Wide practice variation and controversy, however, exists regarding the best way the technique should be performed in order to achieve the goals for which it was designed. Among those are: 1- Which IV induction drug should be used and what is the dose? 2- When should the muscle relaxant be administered? 3- What is the best muscle relaxant? 4- What is the best dose of Succinylcholine? Should precurarization be used? 5- What is the best dose of Rocuronium? Should priming be used? 6-



Should manual ventilation be routinely upheld or routinely applied? 7- Should cricoid pressure be used or is it more harm than benefit? 8- What is the best head and neck position to achieve Rapid intubation? head-up, down, or horizontal? State-of-the art practice will be discussed as well as the pros and cons of each controversial component.

## Paper No: 127.00

### The rate of satisfaction during endoscopic management of cerebrospinal fluid rhinorrhea: A comparison between propofol-remifentanyl and isofurane-remifentanyl anesthesia

Valiollah Hassani, Mohammad Farhadi, Mahzad Alimian and Maryam Zafarghandi

**Background.** As the surgeon's satisfaction during endoscopic procedures greatly depends on the amount blood loss and his perfect view of the surgical field, the anesthesiologist's method for induction and maintenance of anesthesia plays a major role to achieve this goal.

**Objectives:** This study was performed to compare the two most known methods of induction and maintenance; inhalational and total intravenous anesthesia.

**Methods:** This study includes endoscopic management of 89 patients with CSF leakage during a period of nine years (1999-2008) for whom subarachnoid injection of fluoresceine was first performed and afterwards they were maintained under general anesthesia with two distinct methods (inhalational or intravenous). Hemodynamic indices, blood loss, the surgeon's satisfaction, and the recovery time were assessed and compared between the two groups. Our patients were divided into two groups. Subarachnoid fluoresceine injection was done for all patients at the beginning. Afterwards the first group (58.5%) received intravenous anesthesia with propofol-remifentanyl and the second group (41.5%) was under isoflurane-remifentanyl anesthesia.

**Results:** Endoscopic management and autografts were successful in repairing anterior skull defects in 90% of cases. Regarding the surgeon's satisfaction, blood loss, and hemodynamic stability no significant difference between the two groups was observed ( $p < 0.01$ ).

**Discussion and Conclusion:** Both isoflurane and propofol in combination with remifentanyl afford optimal surgical condition in regards to hemodynamic parameters and the satisfaction from blood-free surgical field. Consequently the two methods can be safely administered for endoscopic procedures in otolaryngology and neurosurgery entities.

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## Paper No: 128.00

### Post operation visual loss prevalence and amount of visual acuity before and after spinal surgery

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**Introduction:** Postoperative visual acuity impairment after posterior spinal fusion (PSF) is a rare complication. Regarding the visual loss effects in person's life, the study of its prevalence and required cautions to prevention is important.

**Objectives:** The aim of this study was to determine the prevalence and amount of visual acuity loss in patients underwent PSF under general anesthesia in prone position in tree Tehran Medical University hospitals.

**Methods:** Number of 100 patients was selected among PSF candidates in Rasule-Akram, Shafa-Yahyaieian and Firoozgar hospitals in Tehran. Subjects had visual acuity more than 0.7 before PSF and no history of visual impairments, hypertension, diabetes mellitus, CAD or other cardiovascular disease. The visual acuity was measured before and 6 hour following recovery after PSF surgery using snellen chart.

**Results:** Right eye visual acuity loss was seen in 2 of 100 studied patients after PSF surgery, that is comparable to 1% reported in previous studies. Median of visual acuities of Left eye before PSF were 9 (0.8-0.9) and 9 after operation (0.8-0.9), and in right eyes were 9 (0.7-0.9) before PSF and 9 after operation (0.10.9); Over all, there were not significant differences in median of visual acuity before and after surgery in both eyes ( $P < 0.05$ ).

**Discussion and Conclusion:** It seems that the prevalence of postoperative visual acuity loss is about the reported 0.1 to 1 percent; however consideration should be taking about the sample number of our study when interpreting the prevalence of in this study (2 percent).

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## Paper No: 140.00

### Efficacy and security of BIS-guided target controlled infusion (TCI) of propofol for dental treatment in disabled patients

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**Background and Goal of study.** People with special needs require additional support beyond local anesthesia in order to receive dental treatment because of their disability or medical condition. The aim of this study is to evaluate the efficacy and safety of TCI propofol intravenous sedation, and compare the utility of bispectral index (BIS) with clinical sedation scales in spontaneously breathing patients with special needs.

**Material and methods:** Consecutive special needs patients scheduled for dental treatment in office-based setting, from September 2010, were enrolled. To describe patients condition, a rating of 16 selected codes (scored 0-4) from the International Classification of Functioning, Disability and Health (ICF)(1) was used. After IM premedication with midazolam and ketamina, a continuous TCI propofol infusion was set up to obtain within two minutes a Plasmatic Concentration target (Cpt) of 3 µg/ml. A supplemental oxygen via nasal cannula with CO2 recorded was systematically delivered. The target of Compartment Effect (Ce) concentration of propofol was titrated to achieve a 60-75 level BIS during all procedure. Clinical level of sedation by means of sedation scale (0-5) (Ramsay modified) and reactivity score (0-4), based on a behavioral scale (2) was measured. To avoid airway complications and protect aspiration or ingestion of water and foreign objects a plastic rubber dam was used in all patients. Capnography, SaO2, respiratory rate, EKG, HR, MAP, and values of Ce, BIS, sedation and reactivity scales were measured at the same point. Duration of dental treatment, required dose of propofol, wake-up time, the incidence of complications, including Apnea Occurrence (defined as RR<8/min or SaO2<90%), were recorded. Data as mean (SD)[range]. Anova statistical analysis was used with

significance level  $p < 0.05$ . Multiple lineal regression analysis and regression equation were obtained.

**Results:** 86 patients 33/53 (M/F); Age 18 (13) [3-45] years; Weight 62 (23)[13-123] kg; ICF modif score : 29 (11)[5-54]; Duration dental treatment: 178 (58)[58-321] min; Propofol total dose: 560 (121) [103-1980] mg; Wake-up time: 3.8 (1.2) [0.9-6.1] min; Apnea occurrence per patient: 11(5) [0-22] n°/patient; Nausea (2); vomiting (3); Laryngeal Mask insertion (2). Correlation BIS vs Ce ( $r^2 = 58.9$ )  $p < 0.01$ . Regresion equation adjusted model:  $Bis = 76.4 - (6.4 * Ce \text{ propofol}) + (0.026 * \text{time})$ . Graphic 1.

**Conclusions.** The BIS values can serve as a useful objective tool to guide the sedation state, airway and hemodynamic management in the safe and effective titration of TCI propofol in a deep sedation for special patients in outpatient setting.

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## Paper No: 172.00

### Contribution of bispectral index (bis) monitoring to determination of sedation depth in patients undergoing cardioversion

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**Introduction:** Atrial fibrillation (AF) is the most common arrhythmia in the elderly. DC cardioversion (CV) is recommended in order to provide sinus rhythm. The procedure should be conducted under deep sedation or general anesthesia. Sedation in electrical cardioversion has some characteristics due to its short and painful procedure. These patients are prone to hemodynamic instability because of their present cardiac problems and respiratory depression due to pulmonary problems.

**Objectives:** The aim of this study was to determine the effectiveness of BIS (Bispectral index) and to investigate its effect on the amount of used anesthetic substance and the quality of anesthesia in patients with persistent AF who would undergo CV.

**Methods:** Sedation was performed on a total of 50 patients using midazolam and fentanyl. Patients were randomized to group 1 and 2. In Group 1 (25 patient), cardioversion was performed when the BIS value was seen to have



**Table 1** Hemodynamic and BIS data

HR beat/min				
Group-1	88 ± 23	89 ± 22	74 ± 12*	73 ± 13*
Group-2	91 ± 17	93 ± 16	75 ± 12*	72 ± 13*
SBP mmHg				
Group-1	133 ± 20	123 ± 21*	140 ± 21	116 ± 14*
Group-2	143 ± 26	128 ± 23*	150 ± 22	124 ± 17*
MBP mmHg				
Group-1	105 ± 16	93 ± 17*	108 ± 18	87 ± 13*
Group-2	114 ± 19	104 ± 19*	120 ± 21	96 ± 12*
DBP mmHg				
Group-1	89 ± 14	80 ± 14*	91 ± 14	74 ± 13*
Group-2	94 ± 17	86 ± 13*	97 ± 15	78 ± 12*
SpO2 %				
Group-1	98,9 ± 0,9	98,9 ± 1,2	99,3 ± 1,4	98,6 ± 1,4
Group-2	98,1 ± 1,4	99,0 ± 1,8	99,5 ± 1,1	99,0 ± 1,1
BYS				
Group-1	97,6 ± 0,5	78,9 ± 4,5*	81,9 ± 6,1*	96,8 ± 1,4
Group-2	97,6 ± 0,6	74,1 ± 8,8*	80,9 ± 7,5*	96,8 ± 1,6
In-group comparisons * means statistically significant (p < 0.05)				

decreased to <80 and the Ramsay sedation score was 5-6. In Group 2 (25 patient), BIS monitor was blinded to investigator, cardioversion was performed when Ramsay sedation score was 5-6. In both groups, the values of blood pressure, heart rate, SpO2 and BIS were recorded. Also, we assessed the total anesthetic amount, awareness and pain.

**Results:** No statistically significant difference was detected between the groups in terms of induction time, anesthetic need, respiratory depression, and systolic, diastolic and mean blood pressures and BIS values ( $p > 0.05$ ). In the in-group comparison, systolic, diastolic and the mean blood pressures rose with cardioversion in both groups and increased to pre-sedation values (Table). In both groups, two patients perceived pain and two patients perceived the procedure. Table . Hemodynamic and BIS Data

**Conclusion:** BIS monitoring did not have an additional contribution to the determination of drug administration and depth of anesthesia in the presence of an experienced anesthesiologist in converting atrial fibrillation to sinus rhythm with cardioversion.

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**Paper No: 196.00**

## Safety protocol for administering propofol hypnosedation in ambulatory practice

**Andrey Lopatin, Mariya Muravyeva, Mariya Germanovich, Irina Khapiy and Andrey Chudaev**

**Introduction:** Hypnosedation is widely used in general clinical practice. However, hypnotics used and anesthetics can also cause serious side effects that limit the usefulness of hypnosedation in ambulatory practice. Propofol is short-acting intravenous sedative-hypnotic agent with some unwanted side effects such as respiratory depression and decrease of blood pressure which limit its usefulness in ambulatory practice.

**Objectives:** The aim of this study was to determine the optimal protocol for propofol hypnosedation in ambulatory practice.

**Methods:** A total of 88 healthy patients (47 males and 41 females, ages 20-62 years) were enrolled in the study of Diprivan hypnosedation. We performed 172 sessions of hypnosedation; 1-12 sessions/patient. 1% solution of propofol was diluted 1:4 with 0.9% sodium chloride (2.5 mg/ml), and all patients received a test IV dose of 2.5-5 mg. The infusion rate at the beginning was  $80 \pm 15 \mu\text{g/kg/hr}$  until the desired level of sedation was achieved in 3-15 min (Ramsay scale of 3). The maintenance dose was  $50 \pm 15 \mu\text{g/kg/hr}$ , and the average duration of sedation was  $45 \pm 15 \text{ min}$ . Respiratory rate and the depth of breathing, blood pressure measurement, pulse rate, oxyhemoglobin saturation and pulse oximetry curve were monitored continuously and the infusion rates were adjusted according. Infusion was stopped  $3 \pm 1.5 \text{ min}$  prior to the end of the session.

**Results:** Target-controlled infusion rate of low dose propofol achieved a desired level of sedation without adverse cardiac and respiratory effects. A decrease in heart rate of  $10 \pm 5\%$  ( $p < 0.05$ ) was observed during the first session of hypnosedation in 28 patients (16.3%). During the following sessions the decrease of heart rate was  $5 \pm 2\%$  ( $p > 0.05$ ). Respiratory rate decreased by  $3 \pm 1.5$  ( $p > 0.05$ ) breath per minute in 8.7% of cases. However, the level of hemoglobin saturation did not fall below 96% (mean  $99 \pm 1.5\%$ ,  $p > 0.05$ ). Blood pressure was  $10 \pm 3.5 \text{ mmHg}$  ( $p > 0.05$ ) below the baseline level at the end of sedation in 60% of cases. Complete return to consciousness occurred after 1-3 min after stopping propofol infusion in 100% of cases. **Conclusions.** Designed protocol for propofol administration using low dose drug concentration and target controlled infusion rate with monitoring of respiratory rate, heart rate, and pulse oximetry allows adequate level of sedation to be achieved and maintained during the entire procedure with minimal risk of complications. This protocol allows complete return to the baseline level of consciousness 1-3 min after infusion of propofol is stopped. This protocol for propofol administration by continuous infusion meets safety requirements for using it in the ambulatory practice.

**Paper No: 210.00****Oxygen supplementation for propofol-based deep sedation for colonoscopy: a comparison between nasal cannula and face mask****Somchai Amornytin**, Wiyada Chalayonnawin and Siriporn Kongphlay

Department of Anesthesiology and Siriraj GI Endoscopy Center, Faculty of Medicine Siriraj Hospital, Mahidol University

**Introduction and Objective:** During deep sedation, oxygen supplementation is an essential role to prevent arterial desaturation. Many types of oxygen devices are available. The objective of the study was to evaluate and compare the complication rate of propofol-based deep sedation (PBDS) for colonoscopic procedure in patients with oxygen supplement with nasal cannula and face mask during the procedure in a tertiary care hospital in Thailand.

**Methods:** A total of 202 patients underwent colonoscopic procedures by using PBDS in Siriraj Hospital from September 2008 to August 2009. The primary outcome variable of the study was the serious complication rate during and immediately after procedure. The secondary outcome variables were minor complications during and immediately after procedure, and mortality rate.

**Results:** After matching age, weight, body mass index, ASA physical status and the indications of procedure, there were 98 colonoscopic procedures in nasal cannula group (N) and 104 procedures in face mask group (M). In group N, there were 38 male and 60 female and mean age was 51.1 (9.1) years old. In group M, there were 35 male and 69 female and mean age was 51.7 (9.1) years old. All sedation was given by residents or anesthetic nurses directly supervised by staff anesthesiologist in the endoscopy room. There were no significant differences in patients' characteristics, sedation time, indication, complications, anesthetic personnel and mortality rate between the two groups. The most common complication in both groups was hypotension (25.5% and 22.1% in group N and M,  $p = 0.571$ ). Procedure related complication was none.

**Conclusions.** The complication rate during oxygen supplementation with nasal cannula and face mask for PBDS for colonoscopic procedure was comparable. Although, the complication rate in both groups was relatively high, all complications were easily treated, with no adverse sequelae.

**Paper No: 212.00****Adverse events of unsedated esophagogastroduodenoscopy in sick patients: the impact of topical pharyngeal anesthesia****Somchai Amornytin**, Udom Kachintorn, Wiyada Chalayonnawin and Siriporn Kongphlay

Department of Medicine and Siriraj GI Endoscopy Department of Anesthesiology and Siriraj GI Endoscopy Center, Faculty of Medicine Siriraj Hospital, Mahidol University

**Introduction and Objective:** Pharyngeal anesthesia by using topical lidocaine is generally used as pretreatment for unsedated esophagogastroduodenoscopy (UEGD). The effectiveness of lidocaine viscous compared with lidocaine spray has not been reported in the medical literature. The aim of this study was to compare and evaluate the minor adverse events of topical lidocaine for pharyngeal anesthesia when the topical lidocaine is used as a single agent for unsedated esophagogastroduodenoscopy (UEGD) between sick and non-sick patients.

**Methods:** Retrospectively analyzed the patients on whom UEGD procedure had been performed during the period of December, 2007 to April, 2009 in Siriraj Hospital. Patients were categorized into two groups. Group A was the patients who had ASA physical status I, II. Group B was the patients who had ASA physical status III, IV. The primary outcome variable was the adverse event rate. The secondary outcome variables were anesthesia and procedure related complications, and mortality rate.

**Results:** There were 1,398 patients who underwent UEGD during the study period. After matching gender, duration of procedure and indications of endoscopy, there were 422 patients in group A and 418 patients in group B. All anesthesia was given by residents or anesthetic nurses directly supervised by staff anesthesiologist in the endoscopy room. There were no significant differences in gender, weight, height, duration of procedure, indications of procedure, and overall adverse rate as well as anesthesia and procedure related complications between the two groups. Mean age in group B was significantly higher than in group A. All complications were comparable, easily treated, with no adverse sequelae.

**Conclusions.** Topical lidocaine for pharyngeal anesthesia in sick and non-sick patients provided effective and safe for UEGD procedure. All adverse events in both groups were comparable, mild degree and easily treat. No serious adverse events were observed.

**Paper No: 238.00****Sublingual Fentanyl as a rescue analgesic after ambulatory surgery for Hallux Valgus. Preliminary data****Iván Ramírez Ogalla**, Antonio Bustos Rivera, Inmaculada Morgado Muñoz and Fernando Rodríguez Huertas

Jerez Hospital, Jerez de la Frontera, Spain

**Introduction:** In these last 4 decades, ambulatory surgery has increased to include 10% to over 70% of surgical

interventions (1). One of the main objectives is to reduce the need for hospitalization after surgery. The main limitations of ambulatory surgery, are bleeding and poorly controlled postoperative pain, which affects 35% of the cases, particularly in orthopedic surgery where pain is moderate to severe, with frequent unexpected hospital admissions and readmissions. In our hospital, surgical correction of hallux valgus is often done by ambulatory surgery, using Akin and Chevron osteotomy (6). For acute postoperative pain control, we use subcutaneous analgesics while doing a superficial peroneal nerve block.

**Objectives.** To study the affectivity of low-dose sublingual fentanyl in cases of uncontrolled postoperative pain after for hallux valgus correction by ambulatory surgery.

**Patients and methods.** This is a preliminary clinical study, with a randomized and a prospective design. Patients included were ASA I and II, between 30 and 65 años, men and women, who underwent Chevron and Akin osteotomy. Basal postoperative analgesia was the same for all patients: Subcutaneous pump prepared for 5 days, releasing 300 mg of tramadol, 180 mg of ketorolac and 12 mg of ondasetron. As rescue analgesic we used sublingual fentanyl tablets at a dosis of 100 micrograms (Abstral®). 4 tablets were provided to each patient explaining the dosage, ie, no more than one tablet every 30 minutes in case of severe pain and no more than 4 tablets in 24 hours, and the possible adverse effects, enclosing written information about it at the time of discharge. The items assessed were postoperative pain and the potential occurrence of any adverse effects associated with opioids. Pain was measured by verbal numerical scale at the time of admission and after 6 hours in the ambulatory surgery recovery unit, and by telephone within the first 24 hours. Regarding adverse effects, we evaluated the occurrence of vomiting and respiratory depression.

**Results:** To date 40 patients have been studied, 9 of which have required rescue analgesia with sublingual fentanyl sublingual due to severe pain. Of these, 2 patients have required a single tablet, 2 patients have taken two tablets, 3 patients required three tablets and 2 patients four tablets. Regarding adverse effects, there was a case of vomiting after drug administration and a case of excessive sedation without loss of consciousness.

**Discussion and Conclusions.** The use of sublingual fentanyl in cases of uncontrolled acute postoperative pain (VAS > 8) after ambulatory surgery for hallux valgus, has proven to be useful for pain control without adverse effects, although the number of patients enrolled to date is insufficient to reach firm conclusions. After rescue analgesia with sublingual fentanyl, a VAS <7 was achieved in all cases, which can be considered acceptable after this type of surgery.

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## Paper No: 243.00

### Comparison of low volume ventilation, no ventilation and continuous positive airway pressure during cardiopulmonary bypass on immediate postoperative outcome

Sandeep Kumar Kar, Chaitali Sen, Kakali Ghosh and Anupam G Oswami

**Background.** Pulmonary function is subnormal in almost all valvular and congenital heart diseases preoperatively. Total CPB shunts majority of blood flow away from the pulmonary arterial tree. So, during weaning from CPB, reperfusion injury occurs to lungs causing delayed extubation time and prolonged ICU and hospital stay. Aim of our study was to investigate the impact of low volume ventilation, no ventilation and continuous positive airway pressure during cardiopulmonary bypass (CPB) on oxygenation in patients during cardiac surgery and post operative respiratory function after open heart surgery.

**Method:** It was a prospective, randomized clinical trial. Forty five (n = 15) patients aged 18 years to 65 years, undergoing elective valve replacement were randomly selected for our study. Patients were randomized to receive either no ventilation (group I) or only low volume normal frequency ventilation (Group II) or continuous positive airway pressure of 5 mmHg (group III) during cardiopulmonary bypass. The group II patients were ventilated with a tidal volume of 2 ml / kg body weight and same respiratory rate as before going on CPB. These patients were ventilated with 100% oxygen during CPB.

**Results:** There were no significant differences in PaO<sub>2</sub> and PCO<sub>2</sub> values among the 3 groups after intubation, after going on CPB, on CPB, after cross clamp, after removal of aortic cross clamp, after coming off CPB, after shifting the patient to recovery. These patients who received low volume ventilation during CPB significantly better inspiratory capacity than group I or III during immediate post extubation period. Duration of ventilation, ICU stay and hospital stay were also significantly lower in group receiving low volume ventilation than the other two groups.

**Conclusion:** Low volume normal frequency ventilation during CPB did not affect immediate oxygenation but decreases duration of ventilation.

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3. Stephen C. Clark, FRCS(C/Th)a\*, Jagan N. Rao, FRCSa, Paul A. Flecknell, MRCVSb, John H. Dark, FRCSa.

**Paper No: 257.00**

## Videolaryngoscopy in paediatric difficult airway management in South Africa

Lara Nienaber

**Summary.** Video laryngoscopes found in South Africa as well as interesting paediatric cases where video laryngoscopy was utilised in Steve Biko Academic Hospital, Pretoria are highlighted.

**Objective:** To show that the visualisation of the vocal cords is far superior with videolaryngoscopy in very small babies and therefore should enhance visualisation in difficult paediatric airways

**Introduction:** Video laryngoscopy results in a better view than obtained through direct laryngoscopy and the quality is of high resolution. This results in the overall increasing appeal of video laryngoscopy and illustrates why it has positioned itself part of difficult paediatric airway management. A better, more anterior view of the larynx may reduce neck movement during intubation of children with c-spine injuries and be of more value in this area.

**Methods:** Video laryngoscopes discussed include: a) Airtraq b) two types of glidescopes (GVL with reusable blades, AVL with disposable stats), c) Storz Telepack and C-mac with Miller and Macintosh blades.

Indications, limitations and advantages of each apparatus are highlighted as well as interesting case subjects including intubations in very small (1,1kg) babies and anatomical malformations affecting the airway management such as cleft palate.

All patients were induced with a sevoflurane inhalation induction, an intravenous line was placed, an opioid and propofol bolus was given after which intubation commenced.

**Results:** Videos /pictures with corresponding glottic view:

- a. Airtraq 1,8kg 5days duodenal atresia
- b. AVL glidescope 1,9kg 6days feeding gastrostomy
- c. AVL 1,1kg 1week jejunal atresia
- d. GVL glidescope 3yr 20kg
- e. GVL 14 months 15kg facial burns
- f. 3,5kg holoprocencephaly Glidescope reusable blade no2 and C-MAC Macintosh 2 blade

- g. GVL 2 blade 3 week 2.5kg epiglottic uploading
- h. C-MAC Macintosh 2 blade 3,5kg cleft palate
- i. C-MAC Miller 1 blade 18month cleft palate

Although these new VLs may appear to require increased time to achieve intubation, the increased time does not appear to be clinically significant.

Video / Picture: Shikani optical stylet 3 year haemangioma

At Steve Biko Hospital more than 130 children and infants were intubated with the reusable GlideScope with one failure (1/130) in a 2 day old 3,6 kg infant with cystic hygroma of approximately 1 kg; who was only intubated successfully with a straight Miller laryngoscope blade (Macintosh laryngoscope blade also failed).

**Conclusions.** The presentation is a practical illustration of difficult paediatric airway management in South Africa. By providing a superior shared view of the glottis video laryngoscopy and other airway tools illustrated have a definite place in paediatric difficult airway management.

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**Paper No: 270.00**

## Anesthetic depth setting the use of a different doses remifentanil anesthetic technique for the pediatric patient

Alonzo Eugenio and Marisa Paola

**Introduction:** Carrying out an induction safe, effective and whether adverse effects is the purpose of any anesthesiologist even more in children, where small changes in their hemodynamic stability can lead to serious consequences increasing the morbidity and mortality.

**Main objective.** "To establish the depth of anesthesia with the use of remifentanil at different doses in pediatric anesthesia technique.

**Methods:** We conducted a pilot study, comparative, prospective, randomized, open in pediatric patients 2 to 10 years, both sexes, scheduled for elective surgery in December 2008 - February 2009. For this trial the sample was 60 patients evenly randomized into three groups where they were given a dose of remifentanil. Group A: 1.25 mcg / kg, group B: 1.75 mcg / kg and group C: 2 mcg / kg. Afterwards, the infusion of remifentanil to 0.1mcg/kg/min. Hemodynamic



variables were measured, and BIS values at 9 times defined CES. General data were expressed as mean descriptive statistics, mode, median and standard deviation (SD). Qualitative variables are presented as percentages of frequency. The variability analysis of the treated groups (quantitative variables) and defined times were evaluated and compared with the statistical method ANOVA and Fisher test. P values <0.05 were considered statistically significant.

**Results:** All children had a moderate state of hypnosis (BIS = 40 - 60) with the administration of remifentanyl at different doses, however, group C presented greater decreases BIS dose related ( $p < 0.05$ ). Remifentanyl as an adjunct to general anesthesia provided comfort, analgesia and hemodynamic stability during laryngoscopy, intubation and surgical incision, while significantly reduced sevoflurane requirements analyzed tidal sevoflurane concentration (CES)  $p < 0.05$ . Patients in group B and C had a higher occurrence of adverse effects (hypotension and bradycardia) during induction of anesthesia without hemodynamic compromise.

**Conclusion:** Remifentanyl bolus dose of 1.25 to mcg / kg is a drug highly effective, powerful and relatively safe for induction of anesthesia in the pediatric patient. The BIS is a useful tool in estimating the depth of anesthesia in the pediatric patient

**Keywords:** remifentanyl; bispectral index; Pediatric Anesthesia; anesthetic depth

**Paper No: 320.00**

### Contribution of bispectral index (bis) monitoring to determination of sedation depth in patients undergoing cardioversion

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**Introduction:** Atrial fibrillation (AF) is the most common arrhythmia in the elderly. DC cardioversion (CV) is recommended in order to provide sinus rhythm. The procedure should be conducted under deep sedation or general anesthesia. Sedation in electrical cardioversion has some characteristics due to its short and painful procedure. These patients are prone to hemodynamic instability because of their present cardiac problems and respiratory depression due to pulmonary problems.

**Objectives:** The aim of this study was to determine the effectiveness of BIS (Bispectral index) and to investigate its effect on the amount of used anesthetic substance and the quality of anesthesia in patients with persistent AF who would undergo CV.

**Table** Before After After recovery induction induction cardioversion

HR beat/min				
Group-1	88 ± 23	89 ± 22	74 ± 12*	73 ± 13*
Group-2	91 ± 17	93 ± 16	75 ± 12*	72 ± 13*
SBP mmHg				
Group-1	133 ± 20	123 ± 21*	140 ± 21	116 ± 14*
Group-2	143 ± 26	128 ± 23*	150 ± 22	124 ± 17*
MBP mmHg				
Group-1	105 ± 16	93 ± 17*	108 ± 18	87 ± 13*
Group-2	114 ± 19	104 ± 19*	120 ± 21	96 ± 12*
DBP mmHg				
Group-1	89 ± 14	80 ± 14*	91 ± 14	74 ± 13*
Group-2	94 ± 17	86 ± 13*	97 ± 15	78 ± 12*
SpO2%				
Group-1	98,9 ± 0,9	98,9 ± 1,2	99,3 ± 1,4	98,6 ± 1,4
Group-2	98,1 ± 1,4	99,0 ± 1,8	99,5 ± 1,1	99,0 ± 1,1
BS				
Group-1	97,6 ± 0,5	78,9 ± 4,5*	81,9 ± 6,1*	96,8 ± 1,4
Group-2	97,6 ± 0,6	74,1 ± 8,8*	80,9 ± 7,5*	96,8 ± 1,6

In-group comparisons \* means statistically significant ( $p < 0.05$ )

**Methods:** Sedation was performed on a total of 50 patients using midazolam and fentanyl. Patients were randomized to group 1 and 2. In Group 1 (25 patient), cardioversion was performed when the BIS value was seen to have decreased to <80 and the Ramsay sedation score was 5-6. In Group 2 (25 patient), BIS monitor was blinded to investigator, cardioversion was performed when Ramsay sedation score was 5-6. In both groups, the values of blood pressure, heart rate, SpO2 and BIS were recorded. Also, we assessed the total anesthetic amount, awareness and pain.

**Results:** No statistically significant difference was detected between the groups in terms of induction time, anesthetic need, respiratory depression, and systolic, diastolic and mean blood pressures and BIS values ( $p > 0.05$ ). In the in-group comparison, systolic, diastolic and the mean blood pressures rose with cardioversion in both groups and increased to pre-sedation values (Table). In both groups, two patients perceived pain and two patients perceived the procedure. Table . Hemodynamic and BIS Data

**Conclusion:** BIS monitoring did not have an additional contribution to the determination of drug administration and depth of anesthesia in the presence of an experienced anesthesiologist in converting atrial fibrillation to sinus rhythm with cardioversion.

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**Paper No: 365.00****Study of haemodynamic and endocrine stress responses following carbondioxide pneumoperitonium during laparoscopic cholecystectomy in patients premedicated with Clonidine, Gabapentin or Placebo****Babu Raja Shrestha**, Binod Gautam, Sanjay Shrestha and Shyam Krishna Maharjan

Kathmandu medical college, Anaesthesiology and ICU

**Introduction:** Pneumoperitonium (PP) is associated with haemodynamic alteration associated with release of stress hormones upon peritoneal gas insufflation. Objectives : The aim of the study is to investigate effect of oral gabapentin or clonidine versus placebo premedication on haemodynamic and cortisol responses after creation of PP in patients of American society of anesthesiology (ASA) physical status I and II undergoing laparoscopic cholecystectomy. Methodology: This was a randomized prospective double-blinded comparative study of 75 ASA I and II patients with three groups : clonidine, gabapentin and control group having 25 patients in each . They were randomly allocated to receive 600 mg oral gabapentin or clonidine 150 mcg one hour prior to induction of anesthesia and a control group . Hemodynamic parameters were recorded before PP and every 5 minutes till 35 minutes of post PP . Blood samples for serum glucose and cortisol were collected before PP and 10 mins after PP.

**Result:** With similar Demographic profiles and baseline haemodynamics in three groups ( $p > 0.05$ ) significant rise in haemodynamic parameters were observed in control group at different time points before and following PP where as those parameters remained consistently stable in gabapentin and clonidine group ( $p < 0.05$ ) . The serum cortisol measured at 10th minute after PP was significantly higher in control group than that in clonidine or gabapentin group,  $p < 0.05$  . The blood glucose level failed to demonstrate its statistical significance as a stress marker pre and post PP in three study groups,  $p > 0.05$ .

**Discussion.** This study shows that carbon dioxide PP with intraabdominal pressure of 12 mm of Hg causes significant haemodynamic alteration and rise in serum cortisol in patients when no stress attenuating anaesthetic adjuncts is administered . On the other hand gabapentin appeared to check the release of cortisol when compared to clonidine group,  $p < 0.05$ . Gabapentin has been used perioperatively for reducing stress responses in different clinical scenario. Similar haemodynamic outcomes have been documented by different authors when they used clonidine as a premedicant with the similar dose . We speculate that as gabapentin inhibits membrane voltage gated calcium channels, it is possible that it may have an action similar to that of calcium channel blockers.

**Conclusion:** Oral premedication with 600 mg of gabapentin or clonidine 150 mcg an hour prior to routine laparoscopic cholecystectomy offers stable haemodynamics which parallels to the attenuation of cortisol release.

**Keywords:** Clonidine; Cortisol; Gabapentin; Haemodynamics; Pneumoperitonium

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**Paper No: 366.00****The Effects of Intrapartum Opioids on breastfeeding****Fardin Yousefshahi**<sup>1</sup>, Fatemeh Davari-tanha<sup>2</sup>, Khosro Barkhordari<sup>3</sup>, Mahbod Kaveh<sup>4</sup> and Patricia Khashayar<sup>5</sup><sup>1</sup> Assistant Professor of Anesthesiology, Women Hospital & Tehran Heart Center, Tehran University of Medical Sciences, Tehran, Iran,<sup>2</sup> Assistant Professor of Obstetrics & Gynecology, Women Hospital & Tehran Heart Center, Tehran, <sup>3</sup> Assistant Professor of Anesthesiology, Tehran Heart Center, <sup>4</sup> Assistant Professor of Pediatrics, NICU Department, University of Medical Sciences, Tehran, Iran <sup>5</sup> General Practitioner, Endocrinology and Metabolism, Women Hospital & Tehran Heart Center, Tehran University of Medical Sciences, Tehran, Iran

**Introduction.** Breastfeeding difficulties in the early postpartum period. Many factors, including sore nipples, engorgement, milk insufficiency, poor newborn weight gain, difficulty of the newborn in latching onto the breast or sucking, and a crying, discontented baby as well as the type of labour and birth, may influence the establishment of breastfeeding (1-4). In addition, the literature has identified the use of pain medication by the mother during labor as a potential barrier to breastfeeding success. There are controversial reports regarding the effects of pain relief medication on neonatal breastfeeding duration (5-7). Initial studies in this regard, however, mainly focus on the impact of epidural analgesia on the newborn's growth rate and neurobehavior; the



substance is also considered as an effective factor in reducing the breastfeeding rate (8-11).

**Objective:** This study assessed the association between intrapartum opioid use (intrathecal or systemic) and breastfeeding following c-section. **Methods:** The prospective double-blinded study was conducted on term pregnant women, who had not received opioids within a month before the procedure, undergoing elective or emergency C-section under spinal anesthesia. They were divided into three groups. In the first group, intrathecal Fentanyl or morphine was used to achieve analgesia during or after the operation. The remainder were divided into two subgroups, those who did not receive any opium and mothers who needed analgesics following labor.

**Results:** There was no difference between the demographic data of the mother's and newborn's APGAR score and weight at the time of birth. There was no significant difference between the opioid analgesics administration route (spinal opioids, systemic opioids or none) and the rate of breastfeeding in the mothers (p-value = 0.773). The infants' weight at the 2nd month was not also significantly different. **Conclusion:** The present study was the first to reveal that spinal opioids does not have any impact on breastfeeding.

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## Paper No: 367.00

### The effect of ephedrine on fetal outcome in treatment of maternal hypotension caused by spinal anesthesia during cesarean section

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**Introduction:** Ephedrine is one of the vasopressor drugs that reduce maternal hypotension. However, it can increase fetal acidosis (1). Some studies show that it is related to ephedrine dosage and were showed 5-10 mg ephedrine is choice (2,3). Ephedrine has indirect alpha and beta agonist effect. It can increase HR and cardiac output with restore systolic BP, but the risk of fetal acidosis can increase (1,3,4). Other studies do not support higher umbilical acidosis in patients who received ephedrine (6,7). Hypotension is a side effect of spinal anesthesia. Some risk factors of it are: peak sensory block height at or above T5, age more than 40 years old, systolic blood pressure base line less than 120 mmHg (4). However, this complication is severe and more common in pregnancy Because of IVC compression with pregnant uterine and higher sensory block level, cause of high intra abdominal pressure (5).

**Objectives:** In this study, we compared patients who were hypotensive and received ephedrine with normal BP patients and effects on fetal acid-base status.

**Methods:** 80 women with singleton pregnancies scheduled for elective cesarean section under spinal anesthesia and divided to two groups. The control group was from whom with normal BP, and women with hypotension and received ephedrine were another. Two groups compared for these variables: maternal BP and HR, nausea and vomiting, neonate apgar and fetal cord blood gases.

**Results:** As the comparison between hypotension and normotensive groups these results achieve :no difference exit between two groups for variables of age, BMI, weight, height, mean BP, mean HR, serum volume, fetal apgar in 1 and 5 min and fetal cord fetal blood gases; But, there is difference between increase oxytocin dosage (p value = 0,003). **Conclusions** Transient hypotension that treats with ephedrine does not have any effect on acid base situation and treatment of hypotension with ephedrine in pregnant women.

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## Paper No: 393.00

### A simple technique to prevent severe desaturation and reduce the risk of fire hazard in propofol-sedated patients during short surgical procedures

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**Introduction:** Desaturation is common in deeply sedated patients receiving nasal cannula (NC) O<sub>2</sub>. Raising O<sub>2</sub> flow to improve oxygenation increases O<sub>2</sub> under surgical drapes and risk of fire hazard(1). A plastic sheet was shown to improve oxygenation in sedated patients by transforming NC to face tent (FT) during lengthy upper endoscopy(2).

**Objectives:** We reviewed its effectiveness in improving oxygenation and assessed O<sub>2</sub> under surgical drapes during short procedures.

**Methods:** Retrospective review of patients who underwent various surgical procedures (breast biopsy, AV fistula, hernia repair etc) identified 2 groups. Group 1 (NC) received NC O<sub>2</sub>. Group 2 (FT) received NC O<sub>2</sub> and a fluid-shield surgical mask(3-4). Patients received NC O<sub>2</sub> (3-5 l/min or higher) and IV propofol. Data collected included O<sub>2</sub> Sat, FiO<sub>2</sub> and O<sub>2</sub> under surgical drapes. Student's t-test and Chi Square

test were used. A p value < 0.05 was considered as significant. (Mean ± S.D.)

**Results:** Among patients who underwent short procedures (<30 min), there were no differences in age (NC: 49 ± 21 yrs; FT: 50 ± 19), BMI (NC: 26.0 ± 4.1; FT: 28.2 ± 6.4), ASA Physical Status (ASA) (NC: 2.1 ± 0.7; FT: 2.1 ± 0.8), baseline O<sub>2</sub> Sat (NC: 99 ± 1%; FT: 98 ± 2%), duration (NC: 22 ± 6 min; FT: 21 ± 7) and propofol dosage (NC: 165 ± 93 mcg/kg/min; FT: 203 ± 96). There were significant differences in O<sub>2</sub> flow (NC: 5.4 ± 2.1 l/min; FT: 4.5 ± 1.0), lowest O<sub>2</sub> Sat (NC: 93 ± 10%; FT: 98 ± 3%) and severe desaturation (O<sub>2</sub> Sat < 85%) (NC: 5/17; FT: 1/37), bag-mask ventilation (NC: 2/17; FT: 0/37), FiO<sub>2</sub> (NC: 0.32 ± 0.08; FT: 0.61 ± 0.22) and O<sub>2</sub> under surgical drapes (NC: 0.42 ± 0.14; FT: 0.21 ± 0.01). Among patients who underwent lengthy procedures (>30 min), there were no differences in age (NC: 54 ± 12 yrs; FT: 54 ± 15), ASA (NC: 2.2 ± 0.9; FT: 2.1 ± 0.7), BMI (NC: 27.1 ± 6.7; FT: 28.7 ± 6.6), baseline O<sub>2</sub> Sat, duration (NC: 66 ± 27 min; FT: 58 ± 26), propofol dosage (NC: 134 ± 48 mcg/kg/min; FT: 152 ± 68) and bag-mask ventilation (NC: 0/17; FT: 0/69). There were significant differences in O<sub>2</sub> flow (NC: 6.2 ± 1.6 l/min; FT: 4.5 ± 1.0), lowest O<sub>2</sub> Sat (NC: 90 ± 9%; FT: 97 ± 3%), severe desaturation (O<sub>2</sub> Sat < 85%) (NC: 3/17; FT: 0/69), FiO<sub>2</sub> (NC: 0.32 ± 0.10; FT: 0.59 ± 0.16) and O<sub>2</sub> under surgical drapes (NC: 0.41 ± 0.13; FT: 0.22 ± 0.01). Discussion: Data show that this technique prevents severe desaturation and reduces assisted ventilation in propofol-sedated patient during short procedures. It increases O<sub>2</sub> delivery without raising O<sub>2</sub> flow and pooling O<sub>2</sub> under surgical drapes. Conclusions: This simple face tent may improve patient safety and reduce risk of fire hazard. It should be routinely used even during short surgical procedures.

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## Paper No: 401.00

### Preoperative low dose aspirin therapy and postoperative blood loss after CABG

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**Introduction:** Low-dose aspirin therapy, administered within the first 6 hours after coronary artery bypass grafting (CABG), was proven beneficial in terms of early and late graft patency, thus ensuring a better long term outcome in these patients. On the other hand, aspirin therapy brings

along a risk of postoperative bleeding, increasing a needs for postoperative transfusion and chest re-opening. There are no firm guidelines regarding preoperative aspirin administration, neither in respect to administration timing, nor in respect to dosing regime.

**Objectives:** To evaluate the effect of preoperative low-dose aspirin therapy (50-100mg) administered within 24 hours of planned coronary bypass grafting surgery on postoperative blood loss, transfusion requirements and reoperation for bleeding in a selected population, undergoing the first time CABG surgery.

**Methods:** A prospective randomized four-month study in 131 consecutive patients who underwent elective coronary artery bypass grafting surgery in condition of extracorporeal circulation. Patients who met the criteria of the study were randomized into two groups: the aspirin group, which received within 24 hours before surgery a low dose of aspirin (50-100 mg), and the nonaspirin control group. Groups were comparable with respect to all preoperative and intraoperative variables. Age, sex, body mass index, duration of bypass ischemic time, number of venous grafts, surgeon involved and preoperative treatment were equally distributed in both groups. Total postoperative mediastinal blood drainage, transfusion of blood and blood products usage and reopening were recorded.

**Results:** The groups were comparable with respect to all preoperative and intraoperative risk factors for bleeding. No significant statistical differences were seen between the patients who did and did not receive aspirin in any of the observed postoperative results: postoperative blood loss ( $p = 0.871$ ); the need for reexploration for hemorrhage ( $p = 0.922$ ); blood transfusion ( $p = 0.736$ ); plasma transfusion ( $p = 0.909$ ); thrombocytes transfusion ( $p = 0.301$ ) or cryoprecipitates ( $p = 0.193$ ). Conclusions. In patients undergoing a first CABG and with no known factors affecting their coagulation, preoperative use of single low-dose of aspirin therapy 24 hours before operation did not appear to increase blood loss, blood products usage requirements and reopening during the hospital stay.

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## Paper No: 402.00

### Analysis of risk factors for difficult endotracheal intubation in prehospital emergency settings – retrospective survey of single emergency medical center in Japan

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**Introduction:** Endotracheal intubation is an important procedure. However, it is more difficult to perform in prehospital emergency settings than a hospital trial. Although a number of analyses of endotracheal intubation in prehospital settings by emergency medical technicians have been reported, such analyses of physicians are few. We surveyed endotracheal intubation procedures performed in prehospital settings by emergency physicians working at an emergency medical center in Japan.

**Objectives:** We analyzed cases of difficult or impossible endotracheal intubation in prehospital settings to determine related risk factors.

**Method:** We retrospectively surveyed the records of prehospital medical procedures performed by emergency physicians at Hyogo Medical Emergency Center from April 2004 to March 2011.

**Results:** Of 3719 surveyed cases, 810 included endotracheal intubation attempts in prehospital settings. The rate of incidence of difficult or impossible endotracheal intubation was 3.82% (31/810). In those 31 cases, the procedures used were surgical airway (tracheostomy, cricothyroidotomy) in 11, blind endotracheal or nasotracheal intubation performed due to difficulties in 8, video-assisted airway device in 5, and esophageal intubation in 4, while intubation failed and only bag valve ventilation was performed in 3. Our analysis indicated 5 risk factors for difficult/impossible endotracheal intubation in prehospital settings; trauma, cardiopulmonary arrest, face/neck injury, intraoral hemorrhage/foreign body, and anesthetic agent used for endotracheal intubation. Logistic regression analysis revealed that face or neck injury (odds ratio 4.92, 95%CI 1.99-12.17), and intraoral hemorrhage or intraoral foreign body (odds ratio 3.17, 95%CI 1.37-7.34) were independent risk factors for difficult/impossible endotracheal intubation in prehospital settings performed by an emergency physician. Conclusion: The incidence of difficult/impossible endotracheal intubation in prehospital settings was 3.82%, with face/neck injury and intraoral hemorrhage/foreign body shown to be independent risk factors.

**Paper No: 436.00****Can Joint Schools support the orthopaedic enhanced recovery program? Experiences from a UK district general hospital****Renee Ford, Sonia Rushby and Phillip Dodd**

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**Introduction:** Enhanced Recovery Programmes (ERP), designed to improve patient outcomes after surgery, are well documented<sup>1,2,3</sup>. Discussion has centred on analgesic and anaesthetic choices, and surgical techniques to improve the recovery process. Little emphasis has been placed on the role of patient education, empowerment and expectation despite this being fundamental to ERP success, as outlined by the U.K. Department of Health<sup>4</sup>.

We sought to address this through the introduction of "Joint School" – a multidisciplinary hospital visit to educate and inform patient expectations with regards to pain management, rehabilitation and discharge planning.

**Objectives:** To assess if patient outcomes and satisfaction are improved in our primary total hip replacement (THR) & total knee replacement (TKR) patients when they become engaged and active participants in their own recovery process.

**Methods:** Length of stay, pain satisfaction and mobilisation data was collected from patients pre-joint school (1st April – 31st Dec 2011) and compared to post-joint school (1st Jan 2011 – 30th June 2011). During the data collection, anaesthetic, analgesic and surgical techniques were standardised.

**Results:** Pre- joint school THRn = 167 TKRn = 183 Post-joint school n = 85 n = 109

Length of Stay – Contractual (PCT) targets: <5days(>45%); <7 days (>75%); >10 days (<10%)

Satisfaction with pain - Score 1 (very dissatisfied) to 5 (very satisfied)

1st Mobilization

**Conclusions:** Our results reinforce the fact that education and engagement of patients is an integral part of the ERP and contributes to its success both in terms of health economics and patient satisfaction.

	Pre Joint School (%)		Post Joint School (%)	
Number of days	THR	TKR	THR	TKR
<5	45	38	64.5	56
<7	72	74	84.5	84
>10	11.4	8.7	8.2	1.8
Re-admission	4.1	3.8	0	6.4

	Pre Joint School (%)		Post Joint School (%)	
Satisfaction score	THR	TKR	THR	TKR
1	10		0	0.5
2	10.5		1	2
3	45.5		7	5.5
4	1616		12	20
5	6656		74	69
Not stated	1222		6	3

	Pre Joint School (%)		Post Joint School (%)		
Number of days	THR	TKR	THR	TKR	
Day	0	9.3	1.1	21.2	17.4
Day	1	83.2	91.8	76.4	78.8
>Day	1	6.5	7.1	2.35	3.6

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**Paper No: 448.00****Blood is a gift - why use two when one will do****Ian Olan and Kerry Gunn**

**Introduction:** "Why use two when one will do is" a clinically led project to promote single unit transfusion of blood components (Red Blood Cells) and a better utilization of Fresh Frozen Plasma as the standard, patients were being routinely transfused two units of blood at a time rather than one, International research shows this can have an adverse effect on patients as the risk increases with every transfusion.

**Objective:** To improve patient safety and reduce unnecessary transfusion by changing from liberal transfusion practices to a restricted transfusion strategy, focusing on promotion of single unit transfusion as a gold standard to reduce medical practices that compromise in any way our patients safety



**Methods:** Audit We carried out a retrospective data audit to analyse how many units of blood were transfused to each patient. We found that one third of all transfusions used two or more units by default. To verify this was still current practice we carried out a 2 week snapshot prospective audit in June 2010. This measured all units ordered to each different specialties of the hospital. We used DMAIC process aligned to Clinical method of Planning, trial, analysis and correction, a project plan and guiding coalition or Clinical champions were selected and invited to participate, social marketing concepts put into place to understand what were the drivers or tag line strong enough to engage Clinicians. Footprint plan and roadshow was planned and executed Expected benefits calculated based on historical and projected information from 18 months of retrospective data Peer analysis We looked at areas of excellence in practice so we liaise with world class organisations such as: Cleveland clinic – USA, Mayo Clinic – USA, New South Wales Clinical Excellence Commission Education and Awareness Developed an education and awareness campaign championed by Clinical Champions from ADHB, CMDHB, WDHB, Waikato DHB and NZBS, this included: Posters, Intranet site, Grand Rounds and other clinical meetings; RMO Clinical Handbook 2010 Creation of new protocols and medical algorithms for supporting medical practice and transfusion prescription decision based on new standard and medical evidence, The way of measuring success is through a volume analysis using statistical process control such as: Control P-Chart, Box plots, trend chart, data used is external volumes provided from NZBS which are the same volumes used for the monthly Invoice received by ADHB the methodology was presented to the Blood Transfusion Committee and the Finance Managers for their validation.

**Results:** Since the programme was introduced in October 2010 to July 2011 we have: saved 2,080 units of Red Blood Cells saved 1,121 units of Fresh Frozen Plasma saved 12,804 hours of Patients time released 2,401 hours of Nursing time financial benefits of \$1,653,968 thus far Ratio of Red blood cells used per screened patient reduced from: 0.5121 to 0.4564 Ratio of Fresh Frozen plasma used per screened patient reduced from: 0.1204 to 0.0902

**Conclusions.** A measurement system designed by and for clinicians is needed to provide a trustworthy source of information to change medical practice, early involvement with all parties and specialties is needed for success as well as using a scientific approach and rigor for finding solutions e.g. Lean - Six sigma as a change and project management approach and expertise to demonstrate improvement using statistical process control rather just change on practice.

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## Paper No: 462.00

### The impact of the routine use of sugammadex in ent surgery

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Microlaryngoscopy and panendoscopy are day-case procedures on patients presenting with multiple co-morbidities. The procedure duration is unpredictable, ranging from 6 to 40 minutes in our centre. This may lead to a situation of completed surgery with profound neuromuscular block, resulting in theatre delay. Sugammadex is a modified  $\gamma$ -cyclodextrin that forms a complex with rocuronium and vecuronium, leading to potentially predictable rapid termination of neuromuscular blockade (NMB) (1).

**Objective:** The aim of this audit is to assess the time interval from end of surgery to theatre exit for microlaryngoscopy and panendoscopy surgery, where sugammadex has been used.

**Methods:** Theatre (OR) times are recorded on the operating room management information system (ORMIS). We retrieved OR times from ORMIS for microlaryngoscopy and panendoscopy procedures over a 1 month period (Audit 1). To reduce the influence of different anaesthetic techniques we audited the OR times for a single consultant using his standard technique (Audit 2). OR times were recorded prospectively for thirty patients. The times were measured again (Audit 3) following the introduction of Sugammadex in our hospital. OR times were recorded prospectively for thirty patients.

**Results:** In Audit 1, data retrieved from the ORMIS revealed time intervals from end of surgery to theatre exit between 2 and 17 minutes. In Audit 2, the time intervals from end of surgery to theatre exit ranged from 5 minutes 20 seconds to 16 minutes 13 seconds (mean = 8 minutes 9 seconds). In Audit 3, time intervals ranged from 3 minutes 23 seconds to 5 minutes 20 seconds (mean = 4 minutes 8 seconds).

Figure 1. Time intervals for Atracurium-Neostigmine/Glycopyrrolate and Rocuronium-Sugammadex Discussion Compared to neostigmine/glycopyrrolate, sugammadex reduces the mean time to recovery of a train of four (2). In the UK the suggested staff cost per minute in theatre is £4.44 (3). Our audit demonstrated a 50% reduction in the mean time interval from end of surgery to theatre exit with a saving of 4 minutes. For a single case, routine use of sugammadex does not appear cost effective. The predictability of reversal of NMB with sugammadex is advantageous in theatre sessions with multiple short endoscopic procedures. The accumulated time saving is significant. The potential economic and productivity consequence is that one additional case could be added to each theatre session. The long-term cumulative financial impact of this could be significant.

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**Paper No: 465.00**

## Prospective analysis of the incidence of postoperative nausea and vomiting (PONV) in an ambulatory surgical facility

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**Introduction:** Postoperative nausea and vomiting (PONV) is a common complication following ambulatory surgical procedures and can result in unanticipated hospital admissions.[1] There are patient, surgical and anesthetic risk factors for the development of PONV.[2-4] Evidence suggests that in patients at risk for PONV, combination antiemetic prophylaxis should be used.[4]

**Hypothesis:** Our hypothesis was that in our ambulatory surgical population, patients who received combination prophylaxis would have a decreased incidence of PONV.

**Objectives:** The objective of this study was to prospectively examine the incidence of PONV in an ambulatory surgical facility.

**Methods:** All anesthesiologists at the centre were aware of the guidelines for prevention of PONV. No formal education session was held prior to study onset. After Research Ethics Board approval, trained observers collected data on the day of surgery specifically noting the type of surgical procedure, the use of postoperative opioids in either the Post Anesthetic Care Unit or the Surgical Day Care from where patients were discharged home. They also collected data on the use of intraoperative prophylactic antiemetics and the incidence of PONV as defined by the need for postoperative antiemetic medication. The number of admissions to hospital and the reason for admission were also noted.

**Results:** Data was collected on a convenience sample of 973 patients. The overall incidence of PONV was 25.05% and the overall admission rate was 3.14%. The incidence of PONV in female patients undergoing emetogenic procedures who received postoperative opioids was 32.35%. In this population of 238 patients, 98% received general anesthesia. The incidence of PONV in patients who received combination

prophylactic therapy (dexamethasone and ondansetron) was 30% and in those patients who received single or no prophylaxis, 40%. This result was not statistically significant,  $p = 0.13$ . The admission rate for this group was 5.73%. Four of these patients had surgical complications, one was admitted for pain control, one for medical reasons and in the remaining 6 patients, no record of the reason for admission was noted.

**Discussion:** Our findings demonstrated a trend towards the efficacy of combination antiemetic prophylaxis in female patients undergoing emetogenic procedures who received postoperative opioids. Although some data were missing, there were no admissions to hospital because of PONV.

**Conclusion:** Females undergoing emetogenic procedures may be a cohort most likely to benefit from combination prophylaxis for PONV.

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**Paper No: 486.00**

## Effects of surgical procedure on cognitive state of elderly patients

**Alexander Cruz and María Sotomayor**

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**Background:** Cognitive impairment in the elderly is a world health problem nowadays.

**Objectives:** To determine if the surgical procedure affects the cognitive state of elderly patients.

**Methods:** We designed an observational, prospective and longitudinal study including 40 elderly patients, greater than 65 years of age, hospitalized for an elective surgical intervention, and 40 controls similar in age and gender. Cognitive function was evaluated with Minimental Caban test the day before and seven days after surgery in both groups. We considered cognitive dysfunction as a score of 14 or less.

**Results And Discussion:** The average age of patients was 72,6 years (SD = 7,06) while in the control group was 77,4 years (SD = 8,06). We found preoperative cognitive dysfunction in 17 (42,5%) of patients and at the seventh day in 16 (40%) of patients (CI = 95% P = 0,22). The control group had a similar percentage of cognitive dysfunction at baseline, 17(42,5%) of patients, while at the seventh day there were



only 4 (10%) of patients with cognitive dysfunction (CI = 95% P < 0,05). There was no association between surgical procedure characteristics: ASA scale, type of anesthesia, hypoxemia or arterial hypotension, with postoperative cognitive dysfunction.

**Conclusion:** We didn't find any influence of surgical procedure over postoperative cognitive state in the elderly patients.

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## Paper No: 493.00

### Effect of subacute administration of mitragyna speciosa korth standardized methanol extract or morphine on the development of antinociceptive tolerance to thermal noxious stimuli in mice

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**Introduction:** There are 25 alkaloids contained in *Mitragyna speciosa* Korth standardized methanol extract (*M. speciosa*) with mitragynine as the main constituent. *M. speciosa* is an indigenous plant in South East Asian region and has been used traditionally for pain relief and treatment of opioid addiction. It acts on mu, delta and kappa opioid receptors as an agonist, but structurally different to morphine, and produce analgesia in response to both thermal and mechanical noxious stimuli. However, prolonged opioids exposure inevitably leads to the development of tolerance and undesirable side effects.

**Objective:** To study the effect of subacute administration *M. speciosa* Korth on development of analgesic tolerance, and compare it to morphine.

**Methodology.** 39 Male Swiss albino mice were divided into 3 groups, each was subjected to daily doses of *M. speciosa*, morphine or placebo, given subcutaneously for 6 days. The mice were then subjected to daily hot plate noxious stimuli 30 minutes after administration, until the sign of pain exhibited (hind-paw licking, jumping). This time to respond was termed as latency. Cut off point of 45 second was employed to prevent tissue injury. On day 7, the *M. speciosa* administered mice were given a single challenge dose of *M. speciosa* while the morphine and placebo treated mice were given morphine and subjected to hot plate test for 120 minutes, at 30 minutes interval. Antinociceptive response was quantified as percentage of maximal possible effect, %MPE, whereby; MPE (%) =  $\frac{\text{Post-Drug Latency} - \text{Pre-Drug Latency}}{\text{Pre-Drug Latency}} \times 100$

Cut off time – Pre-Drug Latency The changes in baseline latencies between pre and post administration in all group were also quantified.

**Results:** *M. speciosa* standardized methanol extract administered mice showed increase antinociceptive response by day 6 when compared to placebo ( $p < 0.01$ ), while morphine treated mice showed minimal tolerance by day 6, however not statistically different ( $p > 0.05$ ). The baseline latencies were significantly increased for both *M. speciosa* and morphine group post administration when compared to pre administration ( $p < 0.01$ ), however, the difference between the two groups were not significant ( $p > 0.05$ ).

**Conclusion:** There was no development of tolerance but an increase in analgesic effect observed in mice administered with *M. speciosa* Korth in subacute duration. In comparison, morphine treated mice showed minimal tolerance, however this was not statistically significant.

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## Paper No: 516.00

### The Effects of Hydroxyethyl 130/0.4 (Voluven) on Renal Function in Laparoscopic Nephrectomy

Diana Vernetta, Ana Alvarez, Irene Churruca and Daniel Hernando

Fundació Puigvert

**Introduction:** The anesthesia and the increase of intracavitary pressure secondary to pneumoperitoneum (PP) has haemodynamic effects that could produce a relative hypovolemic state with decrease of renal blood flow and consequently a potential risk of organ ischemia. That could have negative effects to recover the renal function after laparoscopic nephrectomy. Acute normovolemic haemodilution is a good conservation strategy in order to increase the renal blood flow. So intravascular volume replacement therapy is an important issue in the perioperative management of laparoscopic surgery but the optimal fluidotherapy isn't established.

**Objectives:** This study investigated whether intraoperative fluid management can abolish the negative effects of pneumoperitoneum on hemodynamics and if the infusion of hydroxyethyl 130/0.4 (Voluven) before installation of pneumoperitoneum is more effective to counteract the collapsed system.

**Methods:** 99 patients undergoing laparoscopic nephrectomy were randomized into three groups: group 1, served as control and received 10ml/ideal body weight (IBW)/hour of crystalloids; group 2, received 10ml/IBW/hour of crystalloids plus 6ml/IBW of HES 130/0.4 (Voluven) just before PP; group 3 received 10ml/IBW/hour of crystalloids plus 6ml/IBW of HES 130/0.4 (Voluven) just before PP followed by 3ml/IBW/hour of HES 130/0.4 (Voluven). Renal function was assessed: before surgery, immediate postoperative period and at last follow-up (greater than 6 months) using the estimated glomerular filtration rate (GFR) calculated by the 4-variable Modification of Diet in Renal Disease (MDRD).

**Results:** In group 1, GFR decreased from 83.06ml/min to 58.78ml/min at hospital discharge and 58.82ml/min 6 months after surgery. In group 2, GFR decreased from 83.75ml/min to 61.87ml/min at hospital discharge and 62.94ml/min 6 months after surgery. In group 3, GFR decreased from 84.21ml/min to 64.90ml/min at hospital discharge and 67.15ml/min 6 months after surgery. Conclusion: This study showed that during laparoscopic nephrectomy an intraoperative hydration with HES 130/0.4 (Voluven) before installation of pneumoperitoneum resulted in better GFR compared to fluid regimen with only crystalloids.

**Paper No: 535.00**

## Paediatric Anaesthesia in rural areas Anaesthesia for (PDA) at Bugando Medical Centre

**Ernestina Kimaro**

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**Introduction:** The goal set by the world federation of societies of Anaesthesiologists is to make available highest standards of anaesthesia to all people of the world. In order to advance towards this goal, continuous Action Research and

education was implanted which revealed the major obstacles for safe anaesthesia in rural areas of North's West Tanzania were lack of essential equipments, trained personnel and oxygen. Since then we have been trying to improve the situation at Bugando Medical Centre. The hospital employed a cardiothoracic surgeon who is willing to perform complex procedures like PDA. Equipments and materials required have been immobilized and staff training for few theatre and ICU staffs done which upgraded our hospital to the extent of performing our first PDA closure on 19.01.07 successfully. Since then up to May 2011, 50 consecutive patients with patent ductus arteriosus underwent surgical closure under general anaesthesia.

**Objectives:** To assess the quality improvement in paediatric anaesthesia at Bugando Medical Centre in the North West part of Tanzania. To identify and quantify the cost of the PDA patients care in board compared with abroad.

**Methods:** – Retrograde study of the cases for five years was done. All patients came in the hospital through Paediatric ward. Diagnosis was made from natural history and clinical manifestation. Echocardiogram was done to confirm the diagnosis, the planned for surgery.

Pre anaesthesia evaluation was done to every patient. All patients were done under general anaesthesia.

**Management Of General Anaesthesia:** Qualified anaesthesia personnel is continuously present to monitor the patient and to provide anaesthesia care. Pre induction check list is done, pulse oxymetry and 3-lead electrocardiographic monitoring is started. BP cuff for NIBP is started. Anaesthesia is induced by halothane+oxygen face mask, pancuronium 0.1 mg/kg followed by intubation after 2 min. Maintenance of anaesthesia is by T-piece with isoflurane 1% in oxygen 100% in children less than 15kg or by circle system for children above 15 kg. During anaesthesia the patients oxygenation, heart rate, ventilation circulation and temperature are monitored. Arterial Blood Pressure is not routinely monitored. Before the surgical incision morphine 0.15mg/kg is given and pancuronium 0.1 mg/kg. At the end of operation intercostal nerve block is done using marcain 0.25% for post operative analgesia. All patients were reversed at the end of operation. Extubation was done in the recovery room and then taken to ICU.

**Results:** Total patient anaesthetized included in this study were 50. Age range from 8 months to 12 years. 8 months to 1 year were 5 patients = 10%. 1 year to 5 years were 34 patients = 68%. 6 years to 12 years were 11 patients = 22%.

Cost of one operation was about 4,000\$.

**Conclusion:** From the outcome it is clear that when there is enough essential equipment to provide care and medically qualified personnel, quality improvement can be achieved and it is cost effective.

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**Paper No: 554.00****Are nonophthalmic-rated ultrasound devices safe for ophthalmic regional anesthesia?****Steven Gayer**, Howard Palte, Jean-Marie Parel, Esdras Arrieta-Quintero and Izuru Nose

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**Introduction:** Needle-based ophthalmic anesthesia is generally safe. However, it can be associated with the rare catastrophic complication of globe perforation. Ultrasound-guided regional anesthesia allows real-time needle visualization so its adoption in ophthalmic anesthesia may lessen risk of ocular injury. Use of ultrasound remains uncharted because ultrasonic energy is potentially injurious to vulnerable eye tissue. We investigated the ocular safety of a non-orbital rated ultrasound transducer commonly used for regional anesthesia.

**Objectives:** The aim of this study was to compare thermal and mechanical changes produced by an ophthalmic rated ultrasound machine versus a non-rated device commonly used by anesthesiologists for peripheral nerve blocks in OR suites.

**Methods:** The study protocol was approved by the University of Miami Institutional Animal Care and Use Review Board Committee and conforms to the ARVO Statement for Use of Animals in Ophthalmic and Vision Research. This is a dual phase comparative rabbit-model investigation. In Phase 1, thermocouples were surgically implanted in the anterior chamber, lens, vitreous, and peri-orbital skin. Thermal changes were recorded during 10 minute ultrasound exposure to FDA orbital and non-orbital rated devices. Ophthalmic pathologists determined anatomic impact using light microscopy and histopathology. In an analogous manner, Phase 2 eyes were exposed to 10 minutes ultrasound using either device and examined for 3 days via light microscopy and then histology. A control group was exposed to a 10 minute application from a dormant transducer of each machine, and assessed similarly.

**Results:** A greater rate of temperature appreciation and higher final temperature occurred in all eyes with use of the non-orbital rated device. In both groups intraocular temperatures approached the subcutaneous value. Minor tissue injury was detected only in eyes which had undergone surgical thermocouple implantation. Histopathology did not identify structural or thermal cellular injury in eyes from either group.

**Conclusions.** Under conditions of prolonged exposure we compared a FDA-approved ophthalmic ultrasound transducer with a non-rated ultrasonic probe for ocular damage. Both phases of the study did not show evidence of ultrasound-induced macro-or microscopic thermal or structural injury. These outcomes suggest that certain non-rated devices commonly found in operating room suites may be

safe for ophthalmic regional anesthesia. The tangible benefits of anesthesiologists using available OR equipment for ocular anesthesia may include faster turnover times, reduced block-related complications and enhanced patient safety.

**Paper No: 574.00****Choice of optimal airway for general anesthesia during planned outpatient ophthalmic surgery****Igor Idov**, Pavel Rylov, Sergey Bersenyov, Vladimir Komlev and Sergey Kostarev

S. Fyodorov Eye Microsurgery Federal State Institution, Ekaterinburg Branch

**Introduction:** Wide variety of artificial airways for non-invasive artificial pulmonary ventilation (APV) suggests search and choice of optimal device for APV in complex anesthesiological aid during ophthalmic surgery. Laryngeal ducts have found their place in ophthalmic anesthesiology within the last decade. Objectives A comparative estimation of supraglottic airways efficacy has been performed in ophthalmic patients during following operations: subtotal vitrectomy, scleral buckling, reconstructive operations on the anterior segment of the eye, squint surgery, evisceration, enucleation. Seven types of disposable and reusable airways have been studied: I – GEL (Intersurgical), LMA-CLASSIC, LMA – Flexible, LMA – SUPREME, C – TRACH, LMA – FASTRACH, LMA – PROSEAL. Seven groups of patients, 20 persons in each have been formed. There were 54% of females and 46% of males, aged from 1 to 75 years.

**Methods:** Anesthesia protocol was identical in all the patients and included endotracheal anesthesia with Sevoflurane, using standard induction. APV during surgery was performed through a closed contour in MiniLow – Flow mode with Aliseo Datex – Ohmeda and Blease Frontline respirators. Myoplegia was applied. Hemodynamics and gas exchange were estimated by continuous monitoring of standard parameters with Datex Cardiocap II and Datex Ultima devices, depth of anesthesia was controlled by AEP-monitor.

**Results:** The performed medical and economic analysis of selected airways types use for general anesthesia during planned ophthalmic surgery has disclosed obvious advantages of three airways types: I– GEL for single use; LMA-CLASSIC and LMA– Flexible for multiple use. No complications associated with airway introduction or insufficient airtightness of respiratory tract during APV was seen in any of 7 groups.

**Conclusion:**

1. All supraglottic airways provide sufficient respiratory tract airtightness necessary for effective artificial pulmonary

ventilation and are therefore optimal for ophthalmic anesthesia.

2. According to medical and economic analysis, the following devices are optimal for planned ophthalmic anesthesia: I – GEL (Intersurgical), LMA-CLASSIC, and LMA – Flexible while C – TRACH, LMA – FASTRACH, LMA – PROSEAL could not be recommended.

## Paper No: 578.00

### Anaesthesiological perioperative management influences in-hospital mortality in patients receiving negative-pressure wound therapy

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**Introduction:** Negative-pressure wound therapy (NPWT) is increasingly used for treatment of chronic persistent wounds and acute complicated wounds. In 2009 we observed several fatalities in patients with NPWT and recurrent operative interventions. Therefore we implemented a rigorous standard for perioperative anesthesiologic management on January 1st, 2010. We report outcomes of one-year cohorts of patients receiving NPWT in time periods of January 1st – December 31st 2009 and January 1st – December 31st 2010.

**Objectives:** The objective of the current study was to investigate whether a perioperative management which prevents low serum potassium levels and dehydration preoperatively decreases in-hospital mortality significantly in patients with NPWT.

**Methods:** Retrospective analysis of one year patient cohorts before and after installment of new perioperative management guidelines. New management guidelines included placement of a central venous line to facilitate blood sampling and necessary substitutions of potassium with a target concentration of  $>4.5$  mmol/L and infusion of 1000 ml of crystalloid fluid preoperatively over 4 hours before induction of anesthesia.

Patient records were retrieved automatically by computerized search with keywords diagnosis related groups (DRG) encoding NPWT in 2009 and 2010. All patient records were then hand searched. 205 of 544 patients records were excluded because of diagnosis mismatch. All patient's laboratory and clinical data were recorded and analyzed. Values were determined as medians and 1st and 3rd quartils. All data were analyzed non parametrically using Fisher's exact test and Wilcoxon-Mann-Whitney-U-test were appropriate. Significance was assumed when P value was less than 0.05.

**Results:** All patients in 2009 and 2010 were from the departments of visceral surgery, traumatology, orthopaedic- or vascular surgery. There was no difference in distribution to the surgical department according to groups. Age, gender, ASA classification, duration of hospital stay and case mix index (CMI) and patient clinical complexity level (PCCL) as measures of severity of illness were comparable in both groups ( $p > 0.05$ ). In 2009  $n = 33$  of 166 patients with NPWT died during their hospital stay, whereas mortality was decreased significantly to  $n = 16$  of 173 in 2010 (Fisher's exact test,  $p < 0.05$ ). Thus mortality was reduced by 53,8 %. In 2009 medians of serum potassium values were 4,20 mmol/L compared to 4,30 mmol/L in 2010 (Wilcoxon-Mann-Whitney-U-test,  $p < 0.05$ ).

**Conclusion:** Retrospective analysis of our data indicates that an intensive preoperative management regime in patients with NPWT can significantly reduce hospital mortality.

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## Paper No: 580.00

### Anaesthetic technique has not been associated with prostate cancer recurrence

**Irene Churrua**, Sergi Sabaté, Juan Francisco Mayoral, Joan Carles Ortiz and Pilar Sierra

Fundació Puigvert

**Introduction.** In recent years there has been talk about anesthetic technique effects in the recurrence of prostate cancer. Objective: To evaluate the recurrence of prostate cancer in patients who received either general anaesthesia with subarachnoid analgesia or general anaesthesia with postoperative opioid analgesia.

**Materials and Methods:** Retrospective study. Patients with invasive prostate carcinoma who underwent open or laparoscopic radical prostatectomy between January 1997 and December 2007 were analyzed. A dependent variable was the increase in postoperative prostate-specific antigen (PSA). Independent variables were: prostate weight, Gleason score, preoperative PSA, margin of tumour, age and surgical approach. A multivariable Cox regression model was developed.

**Results:** 2173 radical prostatectomies were studied. We adjusted the variables according to prostate weight,



Gleason score, preoperative PSA, margin of tumour, patient age, surgical approach (open or laparoscopic). We didn't find differences in recurrence between general-subarachnoid anaesthesia compared to general anaesthesia in a multivariable Cox regression model. The Gleason score and margin were independent predictors of recurrence (HR: 1.5 [1.3-1.9] and 3.6 [2.5-5.3] respectively). We matched patients based on the propensity of receiving subarachnoid blockade vs. general anaesthesia. Independent variables associated with developing recurrence were the same variable with HR 1.4 [1.1-1.9] and 4.2 [2.2-7.9] respectively.

**Conclusion:** In this retrospective study we only found that the margin of tumour and Gleason score are predictive for prostate cancer recurrence. Anaesthetic technique was not related to cancer recurrence. It is necessary to do extensive prospective studies to confirm our results.

## Paper No: 582.00

### Thoracic epidural anesthesia in major vascular surgery and antiplatelet drugs

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**Introduction:** Thoracic epidural anesthesia/analgesia (TEA) is known as most effective technique for postoperative pain management (1)(2) improving surgical outcomes especially in fast track surgery (3)(4). Nevertheless this technique used for patients with antiplatelet drugs scheduled to systemic intraoperative heparin, as aortic surgery, may leave some perplexity. Anyway antiplatelet drug suspension increases cardiac and embolic risks (5) so much that guidelines counsel risks/benefit balance for every clinical case (6).

**Objectives:** The objective is the analysis of adverse events, morbidity, mortality and outcome in patients scheduled to major vascular surgery, employing following pathway: single antiplatelet drug (acetylsalicylic acid or thienopyridines) maintenance, TEA, intraoperative heparin one hour after epidural catheter positioning, early postoperative fast-track ambulation avoiding postoperative thrombo-embolic prophylaxis with heparin.

**Methods:** From 2000 to 2011 Vascular Team treated 888 patients affected by obstructive and aneurismatic aortic pathologies. Emergency/urgency conditions were excluded. Antiplatelet therapy wasn't stopped, unless preoperative anamnesis and exams emphasized haemostatic problems. Patients with double antiplatelet drugs were evaluated by surgeons, anesthesiologists and cardiologists together about risk/benefit balance. After TEA positioning and

epidural administration of local anesthetic patients underwent light general anesthesia. At the end of surgery patients were awakened and transferred to the ward, maintaining continuous epidural infusion. Intraoperative heparin was neutralized by protamine. Throughout postoperative period patients followed early oral feeding, resuming usual therapy (antiplatelet drug included) and early in bed mobilization, getting up with assistance three hours after end of surgery. Low molecular weight heparin was avoided. Epidural catheter was removed 48 hours after end of surgery. Parameters analyzed were: kind of antiplatelet drugs assumed; major hemorrhagic complications; neurological complications; outcome morbidity and mortality till 30th postoperative day.

**Results:** 622 patients treated for aortic pathologies assumed respectively: 506 acetylsalicylic acid; 91 thienopyridines; 7 dipyridamolo; 18 acetylsalicylic acid plus thienopyridines, 5 of which stopped one drug on Team opinion. During postoperative period only one neurological event was recorded, but it didn't correlate with epidural technique.

**Discussion.** In aortic surgery TEA showed decrease of perioperative cardiac ischemic, respiratory, gastrointestinal and renal accidents, specially if associated to fast track surgery. Even though the risk of spinal haematoma is very low last guidelines suggest to maintain acetylsalicylic acid, while show perplexity about thienopyridines and intraoperative heparin. However several authors report high level of safety about TEA in major surgery, considering its advantages.

**Conclusion:** The review of our data confirm the safety of TEA in vascular major surgery. We suppose that the advantages of TEA and maintenance of antiplatelet drugs can decrease adverse events, least of all ischemic one, leading, by low risks, to a better outcome and morbidity.

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**Paper No: 608.00****Learning curves cusum in anesthesia procedures****Oscar Aguirre, Angela Rios, Mauricio Calderon and Luz Maria Gomez**

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**Introduction:** Psychomotor learning process in health is a complex multidimensional function and it has a great social impact, therefore its objective assessment should be individualized. The model CUSUM (Cumulative Sum method) has proven to be a great tool in the assessment of psychomotor education in anesthesia since it allows a specific analysis according to the individual and to the skill.

**Objective:** Our Objective was to construct learning curves for basic anesthetic procedures using the CUSUM method.

**Materials and methods.** Every procedure performed by anesthesiology first year students at orotracheal intubation, spinal anesthesia, epidural anesthesia, central venous catheterization and radial arterial catheterization was evaluated sequentially, estimating 1 as a success or zero as a failure, and operating these values according to the CUSUM model. With this information the learning curves of each student were made.

**Results:** For orotracheal Intubation: 75% of students achieved 95% of success with 65+-24 cases. For spinal Anesthesia: 50% of students achieved 85% of success with 35 cases. Epidural Anesthesia: 100% of students achieved 80% of success with 13+-5 cases. Subclavian venous catheterization: 100% of students achieved 80% of success with 21 +- 6 cases. Arterial catheterization: 75% of students achieved 80% of success with 42+- 5 cases.

**Discussion.** Konrad showed that in orotracheal intubation 90% of success is achieved with 57 attempts whereas Bouchacort with 41 attempts. Olivera showed that 80% success is achieved with 9 to 88 attempts. In our work, these values varied but remained within the range. In conductive anesthesia we found similar values to Olivera. In subclavian venous catheterization a reference value of 21+-6 cases to achieve 80% success was found. Our radial arterial catheterization results differ from previous issues. The main limitation of this study was the reduced amount of students tested and the case record.

**Conclusions.** CUSUM charts are the best tool currently available for the psychomotor learning assessment in Anesthesiology. They provide immediate information that change over time and they compare this information with quality standards early in the learning process.

**Paper No: 615.00****Experiences of anaesthesiologist as a member of surgical team in libya during upraisal****Pekka Mononen**

**Introduction:** Before heavy fighting of Tripoli ICRC sended 2 RDUs ( rapid deployment unit) into Libya to help hospitals to treat war wounded . As delegate of Finnish Red Cross I was a member of first finnish surgical team in Libya.

**Methods:** Our task was to visit Libyan hospitals recovering after the leave of Gaddafi troops, assess the performance and the skill to treat war injuries of visited hospitals, collecting data of patients, anaesthesiological metods and surgical care of patients. With cooperation of Libyan colleagues guidelines for treatment ( surgical and anaesthesiological ) war injuries were settled in meetings. RESULTS Data during Mission 27.8 – 20.9.2011 are presented :Assesment results in table 1.

**Discussion.** Injuries were GSW (84%) in lower extremities of patients we operated, and 16% traffic accidents caused by war activities. Performance of hospitals ( table 1) was 5-9, because of restarting hospitals. Main deficiency was external fixation sets and skilled personnel. Daily shortage of electricity and water decreased performance. Anaesthetics, medicines, iv-fluids, monitors and anaesthesia machines were up to date providing excellent care of patients any kind. In First aid post too small supply of iv-fluids and ketamine could be a problem.

**Conclusion:** Hospitals in Libya are well equipped and restarting after liberation, and with supply of external fixation sets, some instruments, iv-fluids and some anaesthetics mainly ketamine the performance of hospitals will be grade 9 – 10. Teaching guidelines for treating war injuries with special reference to first aid and emergency care are presented in medical meetings for doctors and personnel by ICRC.

**Paper No: 648.00****Prevention of venous thromboembolism with Fraxiparine® in patients undergoing colorectal surgery****Mirjana Shosholcheva and Igor Kostov**

University Clinic of Surgery

**Introduction:** Adequate, evidence-based prophylaxis of venous thromboembolism (VTE) is still not routine in clinical practice in patients who undergo colorectal surgery (1). Although it is difficult to predict when pulmonary embolism might occur, it is well known that the incidence of VTE in these patients is highest between days 25 and 31, while the period of prophylaxis is usually performed during the period of hospitalization (approximately 11 days) (2). Even 15% of all patients with cancer present VTE, 50% of them on autopsy (3). Major bleeding associated with anticoagulants is additional challenge (4) for those who assess contraindications for anticoagulants. The aim of this study was to examine and to prove the efficacy and safety prophylaxis

of VTE with Fraxiparine® following recommendations of the ACCP (Chest 2008 (5) and to support longer duration of prophylaxis.

**Method:** 42 patients who underwent colorectal surgery (score = 2 and 3) according to the different level of risk for VTE (6) were included in an observation, prospective study. Group specific prophylaxis with Fraxiparine® was performed routinely with different preventive strategies in respect of dose and time of administration. The analysis of the applicable recommendations was used with the clinical signs according to Wells criteria (7) and determination of the platelets count and D-dimers (8) at the 1st, 7th and 30th day postoperatively. Colour doppler sonography of v. femoralis communis, v. femoralis and v. popliteae as method of choice in the early diagnosis of deep venous thrombosis was performed at the 1st and 7th day according to the recommendation of the American College of Radiologists. Compressive stocks and Fraxiparine® (0.4 ml or 3800 anti Xa IU/ml, sc, once or twice daily; grade 1A) were administered 12-24 h preoperatively. Duration of the treatment was 28-30 days continuously (9,10).

**Results:** There was no evidence of major bleeding in the whole group, as so as there was no statistical significant difference between the platelets count during the follow up period ( $p > 0.05$ ). Only at 2 patients the decrease of the platelets count was more than 20%. D-dimers were elevated in 5 patients without diagnostic significance. Colour doppler sonography showed lumen of the veins free of echogenic formation and spontaneous flow with respiratory phase in all patients.

**Conclusion:** There is a "gap" between the presence of recommendations and their implementation in clinical practice. Long-term prophylaxis with Fraxiparine® is safe and efficacy and VTE might be prevented following these recommendations.

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## Paper No: 723.00

### Continuous intravenous analgesia for postoperative pain control in ambulatory surgery

Jerzy Pablo Pacheco, Magdalena Serra, Juan Blazquez, Jose Planell and Francisca Gordo

**Objectives:** The control of postoperative pain as well as nausea and vomiting remains a major challenge in Ambulatory Surgery (1). We are investigating the efficacy, feasibility and safety of the use of continuous intravenous analgesia devices for pain control in ambulatory surgery postoperatively.

**Material and methods:** ASA I, II and III. Patients were included. Analgesic regimens available: Prescription 1 tramadol 400mgr+dexketoprofen 250 mg Prescription 2 tramadol 400mg+12 g metamizol Prescription 3 tramadol 200mgr+dexketoprofen 150 mg Prescription 4 dexketoprofen 250mg. Prescription 5 tramadol 400mgr+dexketoprofen 250 mg+haloperidol 2.5 mg. All with a fixed prescription of paracetamol 1g c / 6 h, gastric protector, metoclopramide if nausea and / or vomiting and rescue tramadol 50 mg orally (2), (3). We used an elastomeric continuous infusion device for 48 hours, during this period the patients were controlled by the home care team of our hospital.

Postoperative pain was assessed by verbal numeric scale (VNS), from the immediate postoperative period at 24, 48 and even 72 hours after removing the elastomeric device. We evaluated side effects, satisfaction and medication use rescue.

**Results:** We included 400 patients from January 2010 to August 2011, 60.4% were women. 83.2% underwent orthopaedic surgery: Hallux valgus, osteotomies of the foot (43.2%) arthroplasties, rhizarthrosis, osteotomy, osteosynthesis (30%), and knee ligamentoplasty (10%). 12.3% of abdominal wall surgery: Inguinal hernia repair. 4.5% other procedures: Varicose veins, septoplasty, TVT colpoplastia. 61.7% had peripheral blocks performed. The most commonly used was prescription 1 and 5 with 83.9%. We noticed that the analgesia was effective in 94.1% of patients who had VNS between 0 and 4 at 24 hrs, 95% at 48 hrs and 91.5% at 72 hrs. The presence of nausea or vomiting was 8% at 24 hrs. And 10% at 48hrs, we noticed a significant decrease in 24 Hrs. with the prescription that included haloperidol. 8% need rescue medication with tramadol VO, and satisfaction was good in 99.5% of cases.

**Conclusions.** Intravenous continuous analgesia at home with elastomeric devices fits any type of surgery, for their efficiency, safety, easy handling and low cost in the Ambulatory Surgery Units in our hospital.

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## Paper No: 729.00

### Prediction of postoperative vomiting in laparoscopic gynecological surgery

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**Introduction:** Postoperative vomiting (POV) is the second the most common postoperative patient complaint. Patients undergoing laparoscopic gynecological surgery have a higher incidence of POV. Assessment of POV risk factors helps clinicians to use appropriate POV prophylaxis. The most used predictive models for POV in clinical practice are Apfel's and Koivuranta's simplified risk scores.<sup>(1,2)</sup>

**Objectives:** We analyzed multiple predictive factors for POV in laparoscopic gynecological surgery and proposed a new predictive model for POV. Additionally we compared Apfel's and Koivuranta's risk score with our new score model in this clinical setting.

**Methods:** After obtaining IRB approval and informed consent, 421 women (ASA PS I-II) undergoing laparoscopic gynecological surgery were enrolled in a prospective study. Of these women, 47 were excluded and 374 completed the study. No POV prophylaxis was given. Thiopental was used for induction and isoflurane or sevoflurane for maintenance of general anesthesia. POV and pain scores were measured at 2 and 24 hours postoperatively. Diclofenac and meperidine were used for postoperative pain and metoclopramide for POV. We analyzed 21 patient, 11 anesthesia, and 2 surgery related factors. Multivariate logistic regression was used for predictive modeling. Initially all predictors with  $p > 0.2$  significance and then iterative predictors with  $p > 0.05$  were excluded. All excluded predictors were then individually tested for possible interaction with the final model looking for influence of the predictors' significance on the model for more than 20% of the initial significance.<sup>(3)</sup>

**Results:** Incidence of POV was 32.3%. Predictive modeling showed 4 predictive factors in the final model: type of surgery (OR = 3.54), history of POV (OR = 1.92), non-smoking (OR = 1.77) and early postoperative pain (OR = 1.033). Our model showed better absolute and relative predictive accuracy (70.86% and 68.97%, respectively) compared with Apfel's (62.03% and 61.16%) and Koivuranta's (66.84% and 54.15%). Also, our model had higher sensitivity and specificity (0.743 and 0.636, respectively) compared with Apfel's

(0.636 and 0.586). Koivuranta's model had higher sensitivity (0.901) but poor specificity (0.181).

**Conclusions.** A new predictive model for POV with four predictors (history of PONV, nonsmoking status, early postoperative pain, and type of surgery) compared with two commonly used models was a better predictor for POV in patients undergoing laparoscopic gynecologic surgery. Further validation of our model on a new data set is needed.

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## Paper No: 735.00

### Lateral lumbar plexus block in children: a novel ultrasound-guided approach through the acoustic window of abdominal wall

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**Introduction:** The psoas compartment block (PCB) has been used for many years for postoperative analgesia in surgeries that involve lower extremities in children. Recently, several articles have provided anatomical findings in order to determine the best way to achieve the block in children <sup>(1,2)</sup>. Traditionally, posterior approach to PCB has been identified as a complicated and potentially dangerous block. However, studies in children have shown a small number of adverse events without major complications <sup>(3,4)</sup>. Nowadays, US-guidance has emerged as an attractive tool in many regional blocks including PCB <sup>(5)</sup>.

**Objectives:** We present a novel US-guided approach to the PCB, placing the US probe on the abdomen avoiding some of the disadvantages of the previous approaches with the same successful results <sup>(5,6)</sup>.

**Methods:** The study was divided in two parts. (1) Fifty patients (1-15 years old; ASA I-II) were scanned on their abdominal surfaces (M-turbo with a curved array transducer C60x (5-2 MHz; Sonosite ®. Bothell, WA, USA)) in order to establish the anatomical relations and, to decide the best way for locating the probe for performing an eventual puncture. (2) In the clinical study, we locate the probe transversally over the abdomen at level of vertebral body L4 visualizing the picture of the transverse process and psoas, erector spinae and quadratus lumborum muscles. In supine position, the puncture was performed laterally in the flank at level of the posterior axillary line in direction to psoas muscle under real time US-guidance. Eighty-five children (1-15 years old; ASA I-II), scheduled for surgeries suitable for PCB were recruited. All patients were followed and assessed for analgesic requirements and adverse effects.

**Results:** In the first part we identified the level of the vertebral body L4 as the best level to do the block. This point coincides with the aortic bifurcation and psoas, quadratus lumborum and erector spinae muscles. No images of kidneys were present at this level at any age. Lumbar plexus was evident in 78% of patients. In the clinical study, the block was possible in all patients (95% first attempt). Postoperative analgesia was excellent in all patients during a period of 24 hr. Nausea and vomiting was present in 10%, and urinary retention and epidural spread with bilateral transient effect in 5%.

**Conclusions.** We present novel US-guided approach to PCB in children. This technique permits a clear and easy-to-understand view of the structures, which allows a successful block with few side effects.

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## Paper No: 739.00

### Supraspinal neuroapoptosis following chronic administration of morphine in rats

Dusica Bajic, G. Kathryn Commons and Sulpicio G. Soriano

**Introduction:** The newborn brain is fundamentally different from the adult brain. It is uniquely susceptible to opioid stimuli playing a role in regulating cell proliferation, activity dependent synaptogenesis and cortical development. Prolonged neonatal opioid exposure has been associated with faster onset of opioid analgesic tolerance [1], and a long-term neurodevelopmental delay, cognitive and motor impairment [2]. We hypothesized that neurotoxicity in the form of apoptotic cell death would be increased in association with development of antinociceptive tolerance to morphine in developing rat.

**Methods:** Two groups of rats were analyzed: (1) control group injected with normal saline (n = 4), and (2) chronic morphine (tolerant) group treated with 10 mg/kg morphine (n = 3). Rats were injected twice daily for 6.5 days starting on the postnatal day 1 (PD1). An immunohistochemical double-

labeling technique was done with markers for apoptotic cells (caspase-3), and one of the following: neuronal nitric oxide synthase (nNOS), a microglial (Iba-1), or an astrocytic marker, glial fibrillary acidic protein (GFAP). We analyzed: somatosensory cortex, hippocampus, hypothalamus, as well as periaqueductal gray (PAG).

**Results:** Chronic morphine administration was associated with (1) analgesic tolerance (as demonstrated by Hot Plate Test), and (2) trend of increased number of Caspase-3 immunoreactive cells in all anatomical regions analyzed. Caspase-3 immunoreactive cells exhibited morphology analogue to different types of neurons, but only a few were nNOS-immunoreactive. Also, a few microglial cells underwent apoptosis. Clusters of Caspase-3 cells that were losing morphological features were noted in chronic morphine group in the region of cortex and hippocampus only and were noted to be double-labeled with nNOS and GFAP. Astrocytic activation was selective for clusters of Caspase-3 immunoreactive cells and was not widespread in any of the regions analyzed.

**Discussion.** Although several reports have demonstrated neuroapoptosis following opioid administration in vitro [3] and in vivo at the spinal cord level in adult rats [4], our study shows increased trend of supraspinal apoptosis in developing brain that includes mostly neurons, very few of which are nNOS. Although oxidative stress is associated with antinociceptive tolerance to morphine in adult rats [5], the role of nNOS in developing brain remains to be investigated. Lack of widespread glial apoptosis and robust glial activation provides evidence that glia is not involved in mediating chronic effects of morphine in PD7 rat.

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## Paper No: 740.00

### South American contribution to regional anesthesia

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I – Paracervical Block. In 1910, the Peruvian doctor Enrique Febres Odriozola (1-2) presented the first description, in the world, of the paracervical block. Medicament: Cocaine hydrochloride 1% with caffeine; analgesia after 10-12 minutes. Without complications. His work was published in: "Bulletin de la Société d'Obstétrique de Paris", December 15, 1910, 13: 432-34.

II – Epidural Block: the "Hanging Drop" Sign of Gutiérrez Professor Dr. Alberto Gutiérrez (1892-1945), distinguished Argentine physician, Chief of surgery of the "Spanish. Hospital" in Buenos Aires, founded the magazine "Revista Argentina de Anestesia y Analgesia" in 1939. In 1933, while performing an epidural needle insertion using the "loss of resistance" method (sign of Dogliotti), he found considerable resistance when reaching the yellow ligament. On detaching the syringe he noted a drop of anesthetic solution (1% procaine) hanging from the needle hub. He decided not to reattach the syringe but slowly advanced the needle. Moments later, the drop was absorbed into the needle, and he decided to inject 5ml of procaine, repeating four boluses sparingly, and thus achieved successful analgesia. That year, Gutiérrez announced the finding in the Buenos Aires publications "El Día Médico"(3) and "Revista de Cirugía"(4). Thanks to these publications, Gutiérrez' technique has had widespread international acceptance. He is currently the only Argentine that is cited in the chapters of historic relevant texts in the world of anesthesiology (5).

III – Caudal analgesia in pediatric surgery. Dr. Armando Fortuna et al.(6)Sao Paulo, Brazil, 1967. A series of 170 infants and children were operated upon under caudal analgesia. Lignocaine was used in concentrations from 0.5 to 2%. The average dose employed was 10 mg/kg body weight. Analgesia was satisfactory in 91,7% of cases. Complete failure occurred in 5,2% of patients. No serious accidents or complications were seen due to the anaesthetic method.

IV - Headaches due to dura mater puncture. In 1963, Dr. Edgar Martínez Aguirre (7) of Caracas, Venezuela, reported headache relief after a dura mater puncture, by placing a "blood patch" in the epidural space. In 1967, Dr. José Usubiaga et al (8) of Buenos Aires, Argentina, addressed the same complication, by administering intermittent saline solution (10-20 ml) injections lumbar epidural catheter. 1989: Dr. J. Barrios Alarcón et al (9) of Sao Paulo, Brazil. Epidural injection of 20-30 ml dextran 40.

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## Paper No: 744.00

### Remifentanyl compared with alfentanil for ambulatory surgery during monitored anesthesia care

Slavica Stojanova, Rade Filipovski, Mirjana Sosolceva and Tanja Trojic

**Introduction:** Universal goals during one day surgery are rapid recovery from anesthesia, rapid return of cognitive functions. Many patients find the operating room environment and awakeness during surgery provoked anxiety. These are the reasons for using local anesthetic tehncis in combination with intravenous drugs to provide anxiolysis, sedation and analgesia.

**Objectives:** Comparison of analgesic effects of remifentanyl versus alfentanil in combination with midazolam during one day surgery under monitoring anesthesia care. The goal of the study was to evaluate witch combination of the drugs facilitated shorter recovery time and decreased charges.

**Methods:** After improved of hospital ethic committee, retrospective review of 38 outpatient charts with ASA I-III patients were randomly assigned to one of two groups. Each patient was premedicated with 2mg. midazolam, and 5min. before the local anesthesia was administered in the I-group patients begun to receive 0,05 &#956;g/kg. remifentanyl. In the II-group patient 5min. before the infiltration of local anesthetic received 0,5 &#956;mg. alfentanil. Inadequate analgesia ( $VAS \geq$ ) was treated in I-group with enlargement of ratio to 0,1 &#956;g/kg and larger, and in the II-group with bolus of alfentanil of 0,50μg. no more than three times. For the evaluation of the pain we used VAS during the infiltration of local anesthetic, and every 5 minutes during the surgery. Patients were verbally asked to rate their sedation on a numerical scale from 0 -10 preoperatively, and every 10 min. during the surgery, and 30, 60, 90 min. after the end of surgery. Monitoring include the usual cardiovascular and respiratory monitoring: ECG, NIBP, pulse oximeter, respiratory rate.

**Results:** There were no significant differences between groups in the rate of sedation, before, during and after

surgery, but the remifentanyl group had less sedation all the time postoperatively compared with alfentanil group. One patient in the remifentanyl group experienced muscle rigidity during the first enlargement of the dose, and infusion of remifentanyl was interrupted and the surgery was prolonged only with local anesthesia. Also, one patient in alfentanil group had respiratory depression during the first repeated dose of alfentanil with very short acting of 4,5min. The time for first analgesic use was shorter in remifentanyl group (20min for remifentanyl, 35 min for alfentanil group). : Patients in remifentanyl group were able for discharge earlier than alfentanil patients

**Conclusion:** Remifentanyl: provided effective analgesia and mentioned adequate respiration during MAC, well suited for ambulatory care due to rapid onset, even after large doses or prolonged administration.

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## Paper No: 748.00

### Correlation between Spectral Edge Frequency (SEF) and implicit memory during general anesthesia

Oded Steiner

**Introduction:** There are two kinds of memories that might happen after surgery:

1. Explicit memory- recall of events during surgery. Incidence: 0.2-1.2%
2. Implicit memory- behavioral changes towards words /events occurring during surgery. Incidence: ?

It is very important to prevent Awareness under General Anesthesia (AGA), because it may have adverse psychological effects, including Post-Traumatic Stress Disorder-PTSD.

Spectral Edge Frequency (SEF) is a reliable parameter for measuring brain-activity. Its "Optimal range" is between 8-12 Hz. SEF<8 Hz – deep anesthesia. SEF>12 Hz – superficial anesthesia.

Past studies (1) show that the use of SEF is important during general anesthesia. It helps to prevent AGA.

Reaction Time (RT) is the time that take the patient in response to words heard during anesthesia and read to patient post-operatively.

The purposes of the study:

1. To confirm the relation between SEF during general anesthesia and implicit memory (as measured by RT).
2. To check if there are any differences between reaction-time to neutral words and to emotional words, heard during anesthesia.

#### Patients and Methodology:

Including criteria: &#61656; Hebrew speaking &#61656; ASA 1 and 2, aged 18-65 ys. &#61656; BMI< 35 &#61656; Elective surgery: Laparoscopic cholecystectomy Excluding criteria : &#61656; Chronic sedative treatment &#61656; Psychiatric/Neurologic disorders

&#61656; Non-cooperative patient

Implicit memory test:

- Two lists of word-pairs (cue and target).
- First list: Surgical (experimental) - heard during surgical Procedure.
- Second list: Control- not heard during surgical procedure.
- Each list include: ? negatively-emotional valence pairs (e.g. anger-rage ) ? neutral pairs (e.g. hill-mountain ).
- Four hours post-operatively: patients were provided only with the Cue words (e.g. anger or hill) from both lists: ? surgical ? control (heard for the first time).
- Differences in Reaction-Time (RT) in naming correct target- words Provided to cues from control and surgical lists, were measured.

#### Results:

Demographic data: &#61656; Nr. of patients: 30 &#61656; Mean age (ys): 43.9 &#61656; M/F: 7/23

SEF score and End-Tidal Isoflurane: &#61656; General SEF levels were significantly negatively correlated with end-tidal isoflurane level ( $p < 0.001$ ). &#61656; When the Isoflurane levels were low, the SEF levels were high.

SEF score & Reaction -Time: &#61656; SEF level was significantly negatively correlated with RT of correct negatively emotional words in the experimental list ( $p < 0.05$ ). &#61656; Patients took less time to provide correct associates (target words) to emotionally negative cues from the experimental list, than to those from the control list.

The findings were correlated with SEF: When the SEF levels were high, the RT was short.

**Conclusions:**

1. SEF is a sensitive measure of implicit learning and awareness during general anesthesia.
2. Implicit memory can be detected by Reaction Time (RT).
3. There is an inverse relation between a measure of cortical electrical activity (SEF) and implicit memory (as measured by RT to name target words to cue words presented during surgery).
4. Implicit learning during general anesthesia may be stronger for emotionally negative information and is detected by SEF.

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**Paper No: 750.00**

### Comparison between intravenous parecoxib and ketorolac for post-operative pain relief following ambulatory laparoscopic sterilization under general anaesthesia

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**Introduction:** Laparoscopic sterilizations are commonly done as a short daycare procedure. However, it is now known that the pain incurred is often underestimated in terms of intensity and duration. Effective postoperative pain relief for such a procedure requires a rapid onset and a longer lasting effect of analgesics, without their adverse side-effects.

**Objectives:** This prospective, randomised and double-blind study was done to compare the effectiveness between a single intra-operative dose of intravenous (IV) parecoxib and ketorolac for post-operative pain relief following laparoscopic sterilization as an ambulatory procedure.

**Methods:** Seventy ASA I or II patients were randomised into two groups. The Parecoxib Group received 40 mg IV parecoxib sodium and the Ketorolac Group received 30 mg IV ketorolac tromethamine following a standardised induction of anaesthesia. Post-operative pain was assessed using Verbal Rating Score (VRS) after surgery in the recovery room, at 4 hours post-operatively prior to discharge home, and at 12 hours and 24 hours later through telephone calls.

**Results:** There was no difference in VRS between both groups immediately and at 4 hours after surgery. VRS at rest and on deep inspiration were significantly lower in the Parecoxib Group at 12 and 24 hours post-operation. Although significantly fewer patients from the Parecoxib Group needed rescue medication at home, their median time to rescue medication at home was comparable to the Ketorolac Group.

**Conclusions:** In patients undergoing ambulatory laparoscopic sterilization under general anaesthesia, intra-operative IV parecoxib 40 mg provided comparable pain relief to IV ketorolac 30 mg in the immediate post-operative period. However, IV parecoxib provided a longer and better pain relief at 12 to 24 hours after surgery in these patients.

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**Paper No: 765.00**

### Effects of sedation with propofol on the quality of mri studies of the brain

Linda Chi, Ammmar Al-Ibraheemi and David Ferson

**Introduction:** Many patients undergoing brain MRI studies require sedation. Indications for sedation usually include: 1. claustrophobia, 2. morbid obesity, and 3. chronic pain.

**Objectives:** We hypothesized that the use of propofol for sedation can cause relaxation of airway structures and can result in snoring. Snoring, which reflects partial airway obstruction, can cause significant MRI motion artifacts and interfere with proper analysis of MRI studies. The use of a supraglottic airway can mitigate motion artifacts and improve diagnostic quality of MRI studies.

**Methods:** We reviewed the data of all patients, who underwent brain MRI studies with sedation in a one year period. We stratified the patients into two groups: patients in whom supraglottic airway was used and the second group of patients without supraglottic airway. Brain MRI studies were reviewed by a board certified neuroradiologist, blinded to the stratification scheme. The studies were rated on the severity of motion artifact and diagnostic value of the study.

**Results:** Patients, who received sedation with intravenous propofol had significantly higher incidence of motion artifacts on brain MRI than patients who did not receive sedation.

**Conclusions.** Sedation with propofol during brain MRI can cause partial airway obstruction. This results in significant motion artifacts on MRI images and decreases significantly the diagnostic value of the study. Use of supraglottic airways during MRI studies under sedation with propofol reduces motion artifacts and improves the quality of MRI images.

**Paper No: 778.00**

## Perception about the role of anaesthesia and anaesthesiologist among the paramedics from a medical college in nepal

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**Introduction:** Anaesthesiologists and anaesthesia specialty has always been considered as behind the scene specialty. The image and the status of anaesthesiologists in the eyes of medical and lay communities has always been a problem<sup>1</sup>. One study has shown even healthcare personnel and academic staffs don't know the depth of anaesthetic practice and teaching potential of anaesthesiologist<sup>2</sup>. This study was designed to assess the knowledge about Role of anaesthesiologist among paramedics at Kathmandu University Hospital.

**Materials and Methods:** This prospective questionnaire based study was conducted at Kathmandu University Hospital from 2nd January 2011 to 30th Jan 2011 among the paramedics working in different departments of the hospital. **Results:** Out of 150 questionnaires distributed, only 120 Paramedics responded. Mean age of respondents was 23.33. Majority had educational qualification equivalent to intermediate level and were females. Only 49.20% said anaesthesia to be a different specialty, and 72.5% said we work differently in the theatre whereas 70% knew we also did something in post operative period.

**Discussion:** Better awareness of anaesthesia activities and proper expectation by the patient would create interest of health administrators and help in recruiting more anaesthesia related health facilities<sup>3</sup>. Lack of recognition and decreased appreciation of the role of the anaesthesiologist contributes to the frustration of the anaesthetic practitioner<sup>4</sup>. In our study the level of education correlated with knowledge about anaesthesia and anaesthesiologists. Poor public image is one the reasons for job dissatisfaction among anaesthesia residents<sup>5</sup>. This is very true in developing countries like ours where there is constant shortage of anaesthesiologists with total number ranging less than 120. As the paramedical staffs stay in the front line of communication, improving the

image of specialty will surely help towards improving its image to the eyes of the public.

**Conclusion:** Anaesthesiologists have duty to visit patient pre-operatively and post operatively. The expanding role of anaesthesiologist inside and outside the theatre like intensive care unit, acute and chronic pain management and emergency and trauma care should be highlighted to all the staffs &#8195.

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**Paper No: 789.00**

## Effect of a single shot sciatic nerve block combined with a continuous femoral block on pain scores after knee arthroplasty. a randomized controlled trial

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**Introduction:** Postoperative pain after total knee replacement /arthroplasty (TKA) is a major concern. It is severe pain in 60% of patients and moderate in 30%. Continuous femoral nerve blocks (CFNB) are considered an excellent choice for regional anaesthesia for major knee repair but there are some controversies about the need of supplemental obturator or sciatic nerve blocks for achieving better postoperative analgesia. A recent meta-analysis states there is no sufficient evidence to recommend or discharge these associations.

**Objectives:** We aim to assess the efficacy of the association of a sciatic nerve block (SNB) and a CFNB for reducing post-operative pain in patients submitted to TKA.

**Methods:** A randomized controlled study on 50 patients submitted to TKA. Control group receives a femoral nerve block with a catheter before general anaesthesia is induced and the intervention group gets a similar block plus a single shot SNB before general anaesthesia. Both groups start a continuous local anaesthetic infusion through femoral catheter after the end of surgery and supplemental oral diclofenac and paracetamol. Pain scores are measured in three occasions until 24h postoperatively, side effects and patient satisfaction are monitored.



**Results:** We hypothesize that the addition of a sciatic block to a femoral nerve block can give a clinical significant reduction in post-operative TKA pain scores (on the Visual Analogue Scale (VAS) of 1.5 or greater between the intervention and control groups). We hope to start statistical analysis soon and finish by December 2011. With the results of this study we hope to give a valuable contribution for the ongoing debate of post-operative analgesia after TKA.

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## Paper No: 837.00

### Different clinical applications of cpap in icu; modes of administration

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## Introduction:

CPAP is the application of positive pressure the airway throughout the spontaneous breathing cycle. It is usually used as a mode of spontaneous breathing trial (SBT) in ICU for weaning patients from mechanical ventilation. CPAP may also be a mode of non-invasive respiratory therapy in acute clinical conditions like: severe respiratory distress with history suggestive of congestive heart failure or acute pulmonary edema, near drowning, high altitude sickness with features of pulmonary edema, severe respiratory distress unresponsive to bronchodilators, acute exacerbation of COPD with intrinsic PEEP, atelectasis, sleep apnea, & ARDS.

CPAP may increase lung compliance, decrease the work of breathing in spontaneously breathing patients with COPD & also decreases LV preload, LV afterload and LV transmural pressure, thus improving cardiac and systolic index in patients with APE.

CPAP without use of ventilator:

CPAP can also be administered to spontaneously breathing patients via T-piece circuit (which is modified by attaching an AMBU PEEP valve to the expiratory limb and a large reservoir bag to the inspiratory limb). This modified T-piece CPAP device can be effectively applied to intubated patients, patient with tracheostomy tube-in-situ or to non-intubated patients (by tightly fitting face mask or nasal mask with use of straps or harnesses). In ICU settings where ventilators may be available in limited numbers, this easy to assemble CPAP device can be very handy.

Another alternative is to use Boussignac CPAP device (BCPAP) which is a very lightweight simple plastic self-contained disposable device that relies on oxygen flow through a special valve to generate positive pressure. It can be used with a face mask attached with straps in patients who are not intubated or it can be directly connected to an ET tube or Tracheostomy tube. The key component is the valve, which attaches to the oxygen or air source and creates a virtual valve. The design utilizes Bernoulli's principle, similar to a turbine jet, to create positive pressure, even though the system is open.

**Case reports.** We report (along with photographs) several cases of use of CPAP with these modified T-piece system and with Boussignac CPAP system to our patients in ICU for the purpose of weaning from ventilator and also its use with facemask for treatment of Acute Pulmonary Edema and acute exacerbation of COPD, thus avoiding endotracheal intubation and mechanical ventilation.

## Paper No: 858.00

### Anesthetic challenges faced during management of dysmorphic children's: our experiences from rural India

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**Introduction:** Dysmorphology is a term coined by Dr. David W. Smith in the 1960's to describe the study of human congenital malformations (birth defects), particularly those affecting the morphology of the individual. Dysmorphology literally mean, "The study of abnormal form." As anesthesiologists, we frequently encounter the dysmorphic child.

**Objective:** My aim today is not to do an exhaustive list of all the syndromes that we may encounter, but rather to summarize my experiences.

**Methods:** Here I am describing the syndromes we experienced and the approach of anesthesiologist to tackle the problems associated with all the syndromes.

S.No Syndrome Problem 1 Shprintzen-Goldberg craniosynostosis Syndrome Difficult airway due to Mandibular hypoplasia, progressive aortic dilatation, joint laxity, hypothermia, intracranial hypertension associated with craniosynostosis, malignant hyperthermia. 2 Ehlers-Danlos Syndrome Airway problem, Hyper extensibility of joints, Hypertensive responses to tracheal intubation and extubation. 3 Hurler Syndrome Mucopolysaccharide storage in tissues and organs, coarse features, growth deficiencies. Narrowing of nasopharynx, obstruction of airway, deposition of mucopoly-saccharides in coronary arteries leads to arrhythmias & cardiac instability. Excessive oral secretions 4 Xeroderma Pigmentosa Sensitivity to sunlight, atrophic and pigmentary skin changes, progressive neurologic problems. Atrophic skin of mouth – difficult mouth opening. Ataxia, spasticity, impaired hearing 5 Marfan Syndrome Arachnodactyly with hyperextensibility, lens subluxation. Hypertensive response to intubation, aortic incompetence 6 Treacher Collins Syndrome Malar hypoplasia, downslanting palpebral fissures, lower eyelid defect, ear anomalies & deafness. Mandibular hypoplasia, cleft palate, cardiac defects 7 Osteogenesis Imperfecta difficult intubation, problems with positioning and a tendency to develop malignant hyperthermia, coagulopathy and cardiovascular abnormalities 8 Metabolic Leukodystrophy Seizures, risk of aspiration, airway complications and also of copious oral and tracheobronchial secretions

**Results:** Predicting and diagnosing an anesthetic challenge in preoperative period make the anesthesiologist confident to face the challenges and devise an alternate plan of action to tackle all the challenges. In all these cases we have faced the challenges and make our plan of action according to situation.

All the cases were induced by inhalation induction with different volatile agents e.g. Halothane, Sevoflurane. Care has been taken not to use the drugs which release histamine. It is always the titrated dose of drugs which matter other than the drug. Control on airway, temperature, fluid and your skills and premonition will make the difference. Discussion: All these Dysmorphic Child are important to the Anesthetist because they have 1) Occult, serious abnormalities that have not been identified 2) The link with Malignant

Hyperthermia 3) The difficult airway 4) Difficult vascular access 5) Psychological problems / mental retardation resulting in extreme anxiety or difficulty with induction Gentle care is always needed to handle these patients to prevent the complications.

**Conclusion:** Look for abnormalities, find one, and look for another. You can plan your anesthesia accordingly if you can perform an internet search for condition, as in today's electronic world. In our Asian population true malignant hyperthermia is not common. Be prepared for anesthesiologist biggest enemy "Difficult Airway".

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**Paper No: 894.00**

## Intrathecal morphine vs. epidural in caesarean section

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**Introduction:** Several studies have examined different post-operative analgesia protocols in caesarean sections (CS) (1,2,3). In Argentina, the most common method used is the continuous intravenous analgesia with weak opioids associated with non-opioid analgesics. The morphine used in the neural axis has proved to be an effective and safe way as a postoperative analgesic method in CS (1,3) without producing major adverse effects (4).

**Objetives.** We aimed at comparing the analgesic equivalence of 100 mcg of intrathecal morphine with 1 mg of peridural morphine for postoperative analgesia after CS in the first 24 hours and also to assess the adverse effects.

**Methods:** We conducted a double blind randomized and controlled clinical trial on 200 patients who underwent a CS. The subjects were randomized into two groups: IT (intrathecal, hyperbaric bupivacaine 0,5 % 10 mg, fentanyl 20 mcg, morphine 100 mcg) and EP (Epidural, Lidocaine 2% with epinephrine 17 ml, fentanyl 100 mcg, morphine 1 mg). They all received 400 mg of ibuprofen every 6 hours and 10 mg of

metoclopramide every 8 hours, after the surgery. If the pain was moderate ( $> 4$  and  $< 7$  in 10 according to EVN [Verbal Numeric Scale]), 25 mg of tramadol EV were administered, if the pain was severe ( $> 7$ ) the dose increased to 50 mg. The total number of rescues was measured in the first 24 hours, as well as the time until the first rescue and the pain intensity according to EVN. The analgesic satisfaction was assessed after 24 hours according to a scale from 0 to 100. The adverse effects were registered according to a scale from 0 to 10: pruritus, sedation, respiratory depression and nausea. The chi-square test was applied for proportions comparison, considering significant a  $p < 0.05$ . Results: From the 200 patients, the 6.3% showed moderate pain and the 2.8% experienced severe pain at some point of the day. 6.8% had moderate nausea, 1.4% severe, 16.7% moderate pruritus and 2.8% severe. There were no significant differences with respect to pain, nausea or pruritus. There was no profound sedation or respiratory depression. The analgesic satisfaction was higher than 90 in 95% of the patients in both groups.

**Conclusions.** Both intrathecal and epidural morphine proved to be safe and effective alternatives for postoperative pain in CS without showing any significant differences in regard to analgesic quality and adverse effects. Eventhough, based on our clinical experience during the surgery, we prefer the intrathecal morphine.

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**Paper No: 913.00**

## Ambulatory thoracic surgery: 3 years experience and outcome

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**Introduction:** King's College Hospital started ambulatory thoracic procedures in 2007. Our aim is to look into the outcome as well as classify the reasons for cancellations.

**Methods:** The data were collected from the case records, electronic patient record and the thoracic surgery data base. **Results:** This is a consultant led service, which screens and select patients to avoid complications and cancellations. We have 111 cases in our data base currently. Case mix included mediastinocopy (20%), mediastinocopy (5%), VATS (35%), Chest wall procedures (35%) and miscellaneous (5%). All patients attended a nurse led pre- assessment clinic and those who are at risk were filtered out. They were seen subsequently by an anaesthetist and underwent more investigations which included arterial blood gas analysis, pulmonary function test and other imaging studies. Demographic data included Age (52.6(16-83))\* and sex (M: F 69:42). \*Mean (range). The immediate complication rate was 4.5%. They included pneumothorax, low oxygen saturations and inadequate pain relief. Double lumen endo-tracheal intubation was not possible in 2 patients. 6 patients developed delayed complication such as infections. Unanticipated hospital admission happened in 3 patients, of which 2 were immediate (1.8%) and one late (0.9%). First patient developed pneumothorax and supra ventricular tachycardia following a rigid bronchoscopy and biopsy procedure. Second patient was admitted for treatment of unexplained low oxygen saturation. One patient went home, but re-presented to emergency department later with low oxygen saturations and pneumothorax. 7 patients (6.3%) were cancelled on the day of the operation. We grouped the cancellations according to the NHS Institute of Innovation and Improvement classification. Hospital clinical reasons were accountable for 2 cancellations in which the one patient required more investigations and the other was not fasted. Hospital non- clinical reasons were responsible for 3 cancellations. They included over running lists and no accompanying person with the patient. Patient reasons included declining the surgery and do not arrive on the day, which accounted for 2 cancellations.

**Discussion.** Ambulatory thoracic surgical service requires good peri-operative back up plan for survival. More than 50% of the cancellations happened are mainly due to hospital non clinical reasons which are avoidable. Guidance is provided by the NHS Institute of Innovation and Improvement to avoid cancellations. Another important aspect of this service is the cost effectiveness.

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**Paper No: 970.00**

## Management of severe mitral stenosis during pregnancy by a multidisciplinary care team

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**Introduction:** Familiarity with the treatment of cardiac diseases during pregnancy is becoming increasingly important for cardiologists as they join the team of obstetricians and anesthesiologists in the care of these complicated patients (1-3). Severe mitral stenosis is a high-risk lesion in pregnancy that can have serious implications (4,5). We present a 37-year-old pregnant patient who came to our cardiology department with severe rheumatic mitral stenosis (valve area 0.7cm<sup>2</sup>, mean gradient 22mmHg) and chronic atrial fibrillation.

**Objectives:** We demonstrate a multidisciplinary approach to managing a complex cardiac patient during pregnancy.

**Methods:** Our hospital is a tertiary care center that cares for complex obstetrical patients and gets referrals from the entire region. Our team consisted of cardiac and obstetric anesthesia, adult cardiology, interventional cardiology, hematology, and obstetrical staff. We had regular team meetings at each stage of the pregnancy with a full plan for all stages of labor, delivery and post-partum care. All specialists were equally involved in the care of the patient.

**Results:** Initially the patient presented to cardiology with atrial fibrillation and mild symptoms of mitral stenosis despite being placed on bed rest. As her pregnancy advanced, her symptoms became progressively worse. She had multiple echocardiograms throughout the pregnancy to track the progression of her disease. At 29 weeks gestational age, she required intervention with percutaneous balloon valvotomy. The entire team was present for the valvotomy in case of any complications requiring emergent delivery of the baby. This required coordination between two hospital sites. Both she and the baby were fully monitored during the procedure. The valvotomy was successful in improving her valve area and decreasing her mean gradient from >20 to 10mm Hg. This procedure allowed her to tolerate her third trimester. At 36 weeks she had premature rupture of membranes and went into active labor requiring an emergent operative delivery with a general anesthetic. Since all the details for her care were well documented, there was a clear plan for the on call team to follow and she delivered a healthy baby girl. Post delivery she was transferred to the coronary care unit and both she and baby went home after a few days.

**Conclusions.** It is vital to have a multidisciplinary care team involved in the care of complex patients during pregnancy. This team needs to have regular meetings and discussion with the patient to ensure that there is a well-documented care plan in case of emergency.

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## Paper No: 971.00

### Impact of general anesthesia on in vitro fertilization outcome

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**Introduction:** The use of general anesthesia during, In Vitro Fertilization (IVF), remains controversial since it could interfere with human oocyte fertilization and embryo development and

**Table 1.** Comparative Results

	Group A	Group B	
# of embryo transfers		333	105
Age	35.5 ± 4.1	35.2 ± 3.9	p > 0.05
Total oocytes retrieved	11.8 ± 6.6	11.3 ± 6.8	p > 0.05
Mature oocytes retrieved	8.5 ± 3.7	8.1 ± 3.8	p > 0.05
Fertilization rate	2301/2830 (81%)	723/851 (85%)	p < 0.05
Abnormal fertilization	65/2830 (2%)	34/851 (4%)	p > 0.05
Cleavage rate	2255/2301 (98%)	706/723 (98%)	p > 0.05
Day 5 embryo development	1025/2301 (45%)	354/723 (49%)	p < 0.05
Day 5 embryos stage Morulae	113/1025 (11%)	31/354 (9%)	p > 0.05
Early blastocyst	92/1025 (9%)	17/354 (5%)	p > 0.05
Expanding blastocyst	399/1025 (39%)	128/354 (36%)	p > 0.05
Expanded blastocyst	391/1025 (38%)	168/354 (47%)	p < 0.003
Hatching blastocyst	30/1025 (3%)	10/354 (3%)	p > 0.05
Embryos transferred	2.1 ± 0.6	2.1 ± 0.7	p > 0.05
Clinical pregnancy rate	166/333 (50%)	51/105 (49%)	p > 0.05
Implantation rate	199/701 (28%)	62/221 (28%)	p > 0.05
Miscarriage rate	17/166 (10%)	4/51 (8%)	p > 0.05
Ectopic pregnancy	2/166 (1%)	1/51 (2%)	p > 0.05
Delivery rate	148/333 (44%)	46/105 (44%)	p > 0.05



implantation. Day 5 embryo transfer (ET), provides an excellent model to evaluate its possible negative effect.

**Objective:** Compare the impact of general anesthesia vs. conscious sedation on IVF outcome with day 5 ET.

**Material and methods:** Four hundred and thirty eight consecutive oocyte retrievals followed by day 5 ET were included. Patients were divided according to the anesthetic technique, in 2 groups. Group A: (333 cases) conscious sedation with midazolam, dextropropoxyphen, and dipyrone or ibuprofen, and Group B: (105 cases) general anesthesia with midazolam and propofol. Both groups were comparable regarding age, ovarian response and number of transferred embryos. Unpaired t test or Chi2 were used for statistical analysis as appropriate.

**Results:** A higher fertilization rate and percentage of embryos reaching day 5 transferable stage and expanded blastocyst stage were observed in Group B [Table1].

**Discussion.** The optimal anesthetic technique for IVF oocyte retrievals is still controversial. General anesthesia may be a better option regarding patients comfort and operators ease to complete the procedure in a shorter time without patient movements or complaints.

**Conclusion:** General anesthesia does not seem to have a negative effect on the embryo developmental potential nor on IVF cycle success. The present findings should be confirmed with a prospective randomized trial.

## Paper No: 993.00

### Hand-assisted Laparoscopic Hepatectomy for transplant with living donor. Anesthetic Management Report. Initial Experience in Argentina

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**Introduction:** Numerous technical-surgical advances of anesthesia and reanimation are allowing the extension of the laparoscopic hepatic surgery indications (3). We describe our initial experience in the anesthetic management of the hand-assisted laparoscopic hepatectomy with living donor as an alternative in the liver transplantation.

**Objectives:** Analyze the anesthetic management during the laparoscopic hepatectomy for living donor in our transplant program.

**Methods:** A retrospective analysis of two related living donors who underwent a hand-assisted laparoscopic hepatectomy in the period of 2010 was performed.

**Results:** The laparoscopic resection was successfully performed in the two analyzed donors. The middle age and weight of the donor was 29.5 years old and 59.75 Kg respectively. In both cases, the mother was the donor. The surgical time was of 590 minutes (640-540 min). Hemodynamic instability was not registered during the surgery. The lowest

registered intraoperative temperature during the surgery reached 36°C; the axillary temperature average was 36.8° C in the Intensive Care Unit. All patients were extubated in operating room. One of the donors required a transfusion of 2 blood units since the Hb decreased from a preoperative value of 14.3 g / dl to 7.1 g / dl during the surgery. Hourly diuresis was an average of 100 ml during the surgery. The time of hospital stay was of 1 day in Intensive Care Unit and 2 days in general room. One of the patients showed temporary elevation of the intraoperative lactate; in both patients, the serum bilirubin, TGO and TGP increased until the first post-operative day, and also a light increase in the INR was registered. Related laparoscopic complications were not observed.

**Discussion.** The anesthetic management in the donor patient who underwent a partial laparoscopic hepatectomy for living donor is aimed at preventing mortality, minimizing the donor's morbidity and optimizing the resected hepatic segment state. Evidence of other centers shows that this type of procedure is carried out with minimally invasive anesthetic techniques(1). In our short experience, this type of surgery cannot be performed without invasive monitoring due to the extension of our surgical times.

**Conclusion:** The left lateral laparoscopic hepatectomy is a safe technique in transplant centers that have previous experience in laparoscopy, surgery and hepatic anesthesia (3),(2). Besides providing anesthetic safety to the donor, the anesthesiologists role is to contribute to the optimization of the donated graft(1).

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## Paper No: 1007.0

### Retrobulbar versus peribulbarblock : incidence of apnic episodes

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**Introduction:** The challenges of anesthesia on ophthalmic surgery are somewhat less serious but it still requires from the anesthesiologist point of view not only good technical expertise, such as a thorough knowledge of the anatomy and physiology of the eye, as well as specialty ophthalmic surgical procedures. In the 80's, retrobulbar anesthesia was the only alternative to general anesthesia on ophthalmic procedures but there were complications well known, such as the simple eye pain, retrobulbar hemorrhage, globe perforation, optical nerve atrophy, seizures, reflecting oculocardiac, trigeminal

nerve block and even respiratory arrest. In 1986, peribulbar anesthesia was introduced as a safe and effective alternative, especially, to the trobulbar option. However, this procedure is also now been questioned.

**Objective:** This study aims to call attention to the possibility of sleep apnea during the application of peribulbar procedure.

**Methodology.** The methodology applied was that of a qualitative approach, based on current literature and case reports already published.

**Results and discussions.** During a multicenter study, Davis and Mandel 2 compared and analyzed 16,224 peribulbar procedures, establishing types of complications, such as, hemorrhage expulsive (0.013%), orbital hemorrhage (0.74%), perforation of the globe (0.006%) and convulsion (0.006%). Also, a rare, very serious and underreported complication during the peribulbar procedure was the anesthesia of the brainstem, with consequent respiratory failure. Freitas and Espirandellia 1, and Ribeiro 3 reported two cases of apnea after peribulbar procedure. Both happened on women on their fifties, during a retinopexy surgery with scleral implant and extra capsular cataract extraction and lens implants, respectively. It is true that the needles size, as well as the technique used, may have contributed to anesthetic injection to the optic nerve sheath and hence into the epidural space. In the cases reported all precautions were taken and yet the complications occurred. Yet, another issue that would interfere in the results it would be the anatomical variation and the change of position of the optic nerve. However in the cases studied, CT scan of the orbits showed no abnormality.

**Conclusion:** The peribulbar anesthesia although advantageous in relation to the retrobulbar, is not free of serious complications, such as apnea. Therefore, it is of vital importance that all ophthalmic surgeries take place at clinic units where there are resuscitation equipment and the constant presence of an anesthesiologist during all the procedure so that appropriate management takes place if there is any complication.

**Keywords:** Peribulbar block; Complications; Apnea

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**Paper No: 1015.0**

## Ultrasound Usage In Thrombotic Central Venous Catheterization: A Case Report

**Huseyin Sen, Gokhan Inangil, Murat Kuyumcu, Hakan Cansiz and Guner Dagli**

**Introduction:** Central venous catheterization has been routinely used for administration of drugs and blood products, fluid resuscitation and central venous pressure monitoring in patients undergoing cardiac surgery. However, the insertion of catheter sometimes causes complications which are difficult to treat. Thus additional attempts such as ultrasound usage are needed during this procedure.<sup>1</sup> In addition to its role for the selection of the vein used for catheterization ultrasonography can also minimize the complications related to venous catheterization procedure.<sup>2</sup>

**Case Presentation.** A 72 year-old (89 kg) male was scheduled for coronary artery bypass surgery. After five-lead, two-channel ECG, SpO2 and invasive blood pressure monitoring via radial artery cannulation, and induction of anesthesia; central catheterization via right internal jugular vein was planned. The patient was placed in the trendelenburg position and needle was advanced. Although the location of the vein was confirmed by the aspiration of venous blood, a J-tip guidewire had not been able to be advanced more than 14 cm. Then guidewire was removed and blood was aspirated for control purpose. Free blood flow was seen and the wire had been re-advanced. However, resistance to the guidewire again had been encountered at 14th cm of the right internal jugular vein. After that we planned to use of catheter insertion by means of a ultrasonography guidance. During the ultrasonography visualization we had noticed a large thrombus occupied the right internal jugular vein. Finally, right internal jugular vein catheterization had to be abandoned and left internal jugular vein was used successfully for central venous catheterization via a 7 Fr 2-lumen catheter under ultrasonography visualization.

**Discussion.** Various precautions have been reported for prevention of complications in central venous catheterization. Physician's experience and use of ultrasound visualization are important factors. Ultrasound reduces the mechanical complications of central venous catheterization with real time visualization of the stenosis and variations of the veins.<sup>3</sup> Developing technology makes ultrasound more portable and smaller so that they can be more practically used in medical processes and we believe that invasive procedures can be achieved more easily and appropriately with the guidance of real time ultrasound imaging.

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**Paper No: 1021.0****Massive Intraoperative Venous Air Embolism: A Case Report**

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**Introduction:** Intraoperative venous air embolism is a serious and fatal complication and can be seen more frequently during posterior fossa craniotomies performed in sitting position, cervical spinal surgeries and the insertion or withdrawal of central venous catheters.<sup>1,2</sup> Herein we describe anesthetic management of a patient with intraoperative massive venous air embolism patient.

**Case Presentation.** A 51 years old (ASA-II) female with posterior fossa hematoma scheduled for craniotomy. The patient was taken to operation room and monitored with five cables ECG, SpO<sub>2</sub> and NIBP. Following the induction of anesthesia, invasive monitoring was achieved via internal jugular venous catheterization with radial artery cannulation. Then sitting position was given to the patient and surgery was initiated. Suddenly the patient's SpO<sub>2</sub>, EtCO<sub>2</sub>, invasive arterial pressure and heart rate decreased from 100% to 80%, 33 to 18, 120/68 mmHg to 70/30 mmHg, 80 beats to 46 respectively at the 105th minute of the ongoing surgery. We suspected from venous air embolism surgeons were informed and possible venous air is tried to be aspirated by central venous catheter. A total amount of 200 cc blood and 70 cc air is aspirated. The surgeons closed transverse sinus with saline soaked cloth indicating the possible surgical focus site for air embolism. The patient was given left-side-head-down position and ventilated with 100% O<sub>2</sub>. Fluid resuscitation is accelerated, 10 mg ephedrine is used. About 2 minutes later, the patient's hemodynamic parameters SpO<sub>2</sub>, EtCO<sub>2</sub>, improved to 99% and 34 respectively. Operation was underwent without any other complications and the patient is taken to ICU without any other problems.

**Discussion.** Venous air embolism can be seen with neurosurgical operations in sitting and half-sitting positions. In addition to routine monitoring, central venous and arterial catheterizations for invasive measurements are necessary for early diagnosis and treatment. In our case, early intervention prevented our patient from probable more serious complications. A sudden drop both in end-tidal CO<sub>2</sub> concentration and invasive blood pressure are significant findings for the early diagnosis of air embolism. Such hemodynamic disturbances should be a warning to anesthesiologists.

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**Paper No: 1036.0****Spinal versus general anaesthesia for laparoscopic cholecystectomy: a comparison of complications, patient satisfaction and cost of anaesthesia**

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**Introduction:** General anaesthesia (GA) with intermittent positive pressure ventilation is considered the standard anaesthetic technique for conducting laparoscopic cholecystectomy (LC). Applications of neuraxial techniques for laparoscopic surgeries are not new, especially in higher risk patients. Nevertheless, there are sparse studies on comparison of spinal anaesthesia (SA) and GA while performing LC.

**Objectives:** This study aimed at comparing complications, patient satisfaction and overall anaesthetic cost of LC when performed under either SA or GA.

**Methods:** Two hundred ASA physical status I and II patients undergoing LC were randomized into two groups. SA group (n = 100) received 3 ml of 0.5% heavy bupivacaine admixed with fentanyl (25 mcg) and pethidine (25 mg) intrathecally to obtain a sensory blockade up to T5. GA group (n = 100) underwent standard endotracheal general anaesthesia with intermittent positive pressure ventilation. Preanaesthetic preparations and all other surgical or anaesthetic managements were standardized. Surgery was performed with a low-pressure pneumoperitoneum (10 mm Hg) and a minimal operating table tilting. Before surgical dissection 30 ml of 0.25 % bupivacaine was instilled into the right sub-diaphragmatic space and over the gall bladder. Intraoperative events, complications, postoperative pain (visual analog scale scores at 2, 4, 8, 12 and 24 hours), 24 hours parenteral opioid consumption, patients' satisfaction towards anaesthetic technique (on a 10 points scale) and an overall anaesthetic cost were studied.

**Results:** There were no differences between the groups regarding complications, intraoperative need for vasoactive medications, duration of hospital stay and degree of patient satisfaction. Pain scores at 2, 4, 8, 12, and 24 hours and consumption of parenteral opioids over 24 hours were significantly lesser in the SA group (p < .05). The overall cost of anaesthesia in the SA group was significantly lower (p < .05).

**Discussion.** Our study has confirmed the feasibility of performing elective laparoscopic cholecystectomy with low pressure CO<sub>2</sub> pneumoperitoneum and minimal operating table tilt under sole spinal anaesthesia. Additionally, spinal anaesthesia provides minimal intraoperative haemodynamic perturbations and is valuable in postoperative pain control, patient satisfaction and lowering the cost of anaesthesia. However, this approach requires a co-operative patient, an experienced laparoscopist, and gentle surgical technique and an enthusiastic anaesthesiologist ever prepared to supplement it with intravenous adjuncts.

**Conclusions.** Spinal anaesthesia is tolerable and safe for performing elective laparoscopic cholecystectomy in otherwise healthy patients. Compared to GA, spinal anaesthesia provides better control of postoperative pain, lesser postoperative opioid consumption and a lower overall cost of anaesthesia.

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## Paper No: 1056.0

### Complications during pediatric cardiac catheterization

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**Background.** Interventional catheterization has replaced or improved in the last years some surgical procedures and the conditions of patients before surgery. Due to the increase of technological advances, these procedures inside the catheterization laboratory in pediatric patients with congenital heart disease, have led to an increase in the demand for anesthesiologists. The anesthesiologist must provide safe patient care and choose an appropriate anesthetic technique for each case. Objectives: To determine the complication rates during pediatric cardiac catheterization in our institution and their respective risk factors.

**Methods:** Retrospective analysis was made of the medical records of patients who required sedation or general anesthesia for diagnostic and interventional cardiac procedures, from January 2008 to December 2009.

**Results:** The data was obtained from 625 pediatric patients with median ages of  $5.89 \pm 4.66$  years, and median weight was of  $21.08 \pm 14.43$  kgs, for males 49% and 51% for females. 116 diagnostic procedures, 386 interventional

procedures and 123 transesophageal echocardiographies (TEE), with sedation or general anesthesia, were revised. The main diagnosis were: ventricular septal defect (VSD) ( $n = 184$ ; 29.44%), atrial septal defect (ASD) ( $n = 120$ ; 19.2%), patent ductus arteriosus (PDA) ( $n = 105$ ; 16.8%), valvular pulmonary stenosis (VPS) ( $n = 39$ ; 6.24%) and other diagnosis represented a 28.32%. The complication rate was 6.08% ( $n = 38$ ), the average age was 5.22 years, without correlation considering age and sex. The most frequent ones were bronchospasm ( $n = 6$ ; 15.78%), atrioventricular block ( $n = 4$ ; 10.52%), ventricular tachycardia ( $n = 4$ ; 10.52%) and bleeding ( $n = 3$ ; 7.89%). These events were mostly occurring on patients with VSD, although only represent 8.24% from total for this diagnostic. Complications were observed in 20 patients undergoing interventional procedures, with a significant correlation for complications. The mortality rate was 1.92% ( $n = 12$ ), and the average age was 6.75 years. The deaths occurred more often during interventional procedures.

**Conclusions.** Complications in pediatric cardiac catheterization are diverse. The anesthetic complications are related to ventilatory disorders, and they are benign. Although, the intrinsic complications related to the procedures are frequent and they have the highest mortality cardiac rates. The risk factors include the type of heart defect and the type of intervention.

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## Paper No: 1069.0

### Conscious sedation for implantation of implantable cardioverter defibrillator

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**Introduction:** Implantation of implantable cardioverter defibrillators (ICD) under conscious sedation is widely practiced, however, some centers still use general anesthesia. General anesthesia is not without risk in patients with poor ventricular function, and has considerable comorbidities for ICD implantation.

**Objectives:** We assessed sedative/analgesic dose and cardio-respiratory effect/complication of implantation of ICD using monitored anesthetic care.

**Methods:** During ICD implantation, patients were closely monitored and their vital signs were recorded at 5 minute intervals.



Conscious sedation was achieved with a combination of midazolam and fentanyl at the start of each case. Additional dose of both agents were titrated during the procedure to ensure patient comfort and adequate sedation. To induce deep sedation for defibrillator function testing, a bolus dose of etomidate (80 to 120 mcg/kg) or propofol (400 to 500 mcg/kg) was administered, and if needed, another dose was given. The aim of deep sedation was to produce a brief loss of responsiveness to glabellar tap and loud auditory stimulation (Ramsay sedation score 5 or 6). Procedure time, sedative dosages (midazolam, propofol/etomidate), analgesic doses (fentanyl), the need for emergency anesthetic support/intubation, and incidence of perioperative complication were recorded.

**Result:** A total of 137 consecutive patients (35 female) from October 2005 to March 2011 were examined. The underlying pathology of the patients were ischemic heart disease (n = 34), dilated cardiomyopathy (n = 23), idiopathic ventricular fibrillation/tachycardia (n = 21), hypertrophic cardiomyopathy (n = 19), brugada syndrome (n = 17), arrhythmogenic right ventricular dysplasia (n = 8), long QT syndrome (n = 6), etc. Total procedure time was  $119.7 \pm 59.2$  min, and total administered dose of fentanyl and midazolam were  $55.4 \pm 21.5$  mcg and  $4.1 \pm 2.0$  mg, respectively. According to their LVEF and NYHA classification, 69 received propofol ( $260.5 \pm 221.4$  mg), 68 received etomidate ( $46.2 \pm 65.2$  mg). During deep sedation, blood pressure, heart rate and oxygen saturation were significantly decreased. There were five cases of respiratory compromise, which required brief manual ventilation, two cases of hypotension which required inotropics, and one case of VF which required DC shock.

**Conclusion:** Implantation of ICD may be performed successfully under monitored anesthetic care and sedation. However, as significant hemodynamic change and respiratory compromise would occur, close monitoring and meticulous titration of drug is warranted.

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## Paper No: 1075.0

### Fluid therapy for ambulatory surgery under spinal anaesthesia

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**Introduction:** A large percentage of Ambulatory Surgery procedures can be performed with spinal anesthesia techniques. Little data exist on optimal dosing of peri-operative fluid

therapy recommended to perform these procedures with minimal complications.

**Objectives:** To determine which combination of anesthetic and fluid achieve a better result based on sufficient duration of the blockade and a lower complication rate.

**Methods:** Cohort study of ASA 1 and 2 patients between 18 and 85 undergoing outpatient surgery of different surgical specialties with estimated surgical time of 90 minutes or less that included 75 patients with female predominance (57.3% n = 43) and an age average of 51.3 years. Exclusion criteria included ASA 3 or 4, severe uncompensated heart or respiratory disease, and patient refusal. In the pre-anesthesia room each patient was assigned by simple randomization to one of six possible combinations of fluid and anesthetic: Saline (S) Polyionic Crystalloid (Plasmalyte®) (P), Polyionic Colloid (Volulyte®) (C) in a dose of 500 ml. in each case (250 ml pre-induction and intraoperative 250 ml) combined with mepivacaine 50 mg. (M) (3.0 ml) or 50 mg prilocaine (P) (3.0 ml). NIAP and HR were measured in the induction room, at 5 and 15 minutes post spinal anesthesia, at the end of the operation, at admission and discharge from the PACU. The complications during a period between the onset of anesthesia and discharge along with the duration of motor block were registered. 23 patients received Saline, 26 patients received Polyionic Crystalloid, and 26 patients received Polyionic Colloid. Sub Groups: SP 11 patients, SM 12 patients, PP 13 patients, PM 13 patients, CP 12 patients and CM 14 patients. The variables were measured with Student's t-distribution using SPSS statistical analysis package Ver. 19 (IBM®).

**Results:** The overall complication rate was 42.7%. The complications were more frequent in the group receiving saline (65.2%, p = 0.36) than the Polyionic Crystalloid (30.8%, P = 0.36) or colloid (34.6%, P = 0.36). The most common type of complication was hypotension. The mean recovery time of motor blockade for mepivacaine was 124.1 minutes and for prilocaine was 97.22 minutes.

**Conclusion:** The combination of 500cc of polyionic crystalloid with 50 mg mepivacaine resulted in the lower complication rate (23.1%, P = 0.03) with acceptable recovery times (132 minutes, p = 0.117).

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## Paper No: 1076.0

### Noncardiogenic pulmonary edema from massive irrigation fluid absorption during hysteroscopic myomectomy: a case report

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**Background.** Gynecological hysteroscopy is a relatively safe procedure, used for diagnosis and treatment of intrauterine pathologies; with a low percentage of complications.

**Case Presentation.** An otherwise healthy 44-year-old woman presented for hysteroscopic myomectomy. She underwent spinal anesthesia uneventfully. For surgical hysteroscopy a roller pump and a hysteroresectoscope were used along with normal saline as the distending solution with a perfusion pressure of 100 mmHg. Within 35 min, she complained of chest discomfort and was sedated. Later she presented tachypnea, tachycardia, hypertension and low saturation unresponsive to bag and mask ventilation with 100% oxygen. Massive facial edema developed rapidly. An anaphylactic reaction was suspected and treated with 125 mgr of methylprednisolone and 1 mgr of IV adrenaline with no improvement. Orotracheal intubation was performed and pink frothy fluid came out of the ET. Fluid overload was suspected as the most likely diagnosis, intravenous furosemide was given and the hysteroscopy was discontinued. Laboratory findings revealed severe respiratory acidosis. She was treated with bicarbonate bolus, furosemide infusion, IV mannitol and dopamine infusion. We retrieved 500cc of liquid through the endotracheal tube. A thorax x-ray confirmed the presence of massive pulmonary edema. After a highly negative fluid balance, the respiratory parameters improved very rapidly and she was extubated in the ICU 7 hours later. During the following days there were also signs of dilutional coagulopathy and anemia.

**Discussion.** Fluid overload due to absorption of irrigation fluid is seen in approximately 0,2% of patients. Hypervolemic syndrome and hyperchloremic metabolic acidosis have been reported in NS overload. In the mentioned case, a positive fluid balance of almost 6.5 l of NS was calculated; this was not identified before due to an error in the assembly of the circuit and bypass of the alarms thus leading to noncardiogenic pulmonary edema, anasarca, respiratory acidosis, hypocalcemia, coagulation and hemoglobin dilution, which resolved with forced diuresis and cardiopulmonary support. She was discharged after 7 days of the procedure.

**Conclusion:** General anesthesia and sedation can mask symptoms of irrigation fluid absorption. Anesthesiologists must monitor fluid balance and perfusion pressure, of the irrigation fluid at all times to avoid this event. The use of normal saline is not without life threatening complications.

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## Paper No: 1091.0

### Day surgery at university of Uyo Teaching Hospital, Uyo: are we transferring the burden of care?

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**Introduction:** The practice of day surgery and anaesthesia is increasingly popular. It is safe and nearly 50-70% of surgeries in the UK and the United States of America are now performed on day stay basis.<sup>1-3</sup> It has many potential benefits including reduced disruption in patients' normal lives since day stay present for surgery and anaesthesia and is discharged home on the same day.<sup>2</sup> It is however thought that it leads to a transfer of burden postoperative care to caregivers who are often times the spouse, significant other and a responsible adult in cases of children.<sup>3</sup>

**Objective:** To assess the impact of day procedure on the functional status of patients in the immediate postoperative period as a measure of the burden placed on the caregiver.

**Method:** Patients who had daycare procedures in a general surgery unit in 2008 were assessed on their postoperative visit a week later for any adverse effect of the procedure on their functionality at home. Information on age, sex, type of procedure, pain, bleeding and level of activities (use of toilet, preparation and taking of meals or drinks and walking about in the compound) were entered into a format and analyzed.

**Results:** Nine patients were involved in the study. Seventy six (77%) complained of varying degrees of pain at operation site for which simple oral analgesics were effective. 23(23%) had no complaint whatsoever and there was no report of bleeding from the operation site by any of the patients. Eighty five patients (86%) were independent, 14(14%) partially dependent and none completely dependent.

**Conclusion:** Day surgery would appear not to significantly alter the level of activity of patients in the immediate postoperative period, it does not also appear to involve transfer of care to the community or caregiver though this may depend largely on the type of surgeries performed. A more extensive study employing standardized instrument of assessing quality is required to verify this conclusion.

**Keywords:** Day Surgery; Level of Activity; Burden of Care

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### Paper No: 1093.0

#### Levobupivacaine 0.75% and hyaluronidase for peribulbar blockade in cataract surgery. is there any ideal volume?

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**Introduction:** Since the introduction of hyaluronidase in ophthalmology peribulbar blocks for cataracts extractions, different authors describe the most variable concentrations of hyaluronidase provide adequate anesthesia.

**Objectives:** The goal of this study was to analyze the influence of hyaluronidase, at different concentrations, in the anesthetic volume minimum necessary to provide peribulbar anesthesia with levobupivacaine 0.75% without epinephrine.

**Methods:** After approval by the committee of medical research and ethical, 210 consecutive ocular surgery patients were randomized into seven groups: 7,5UTR/ml, 15UTR/ml, 20UTR/ml, 30UTR/ml, 40UTR/ml, 50UTR/ml e 100UTR/ml. Peribulbar block was performed with injections of levobupivacaine 0.75%. Using parallel up-down sequential allocation from a 4,5 ml starting volume, the volumes in all the groups were changed using a testing interval of 0,5 ml according to the quality of globe akinesia, fifteen minutes after injection the block was deemed unsuccessful or failure. The minor effective local anaesthetic volume was calculated for all groups using the allocation method and Up-Down, Massey and Dixon, and also by the ROC curve.

**Results:** The groups were considered, significantly, similar the parameters sex, age, height, weight, ASA status and eye laterality. The median effective anesthetic volume, by using the Up and Down method, required for clinical efficacy was 3.39ml [standard deviation ( $\sigma$ ),  $\pm 0.18$ ] in group H7,5UTR.ml<sup>-1</sup>, 5.21ml( $\sigma$ ,  $\pm 0.27$ ) in group H15UTR.ml<sup>-1</sup>, 5.90ml( $\sigma$ ,  $\pm 0.32$ ) in group H20UTR.ml<sup>-1</sup>, 4.22ml( $\sigma$ ,  $\pm 0.24$ ) in group H30UTR.ml<sup>-1</sup>, 4.70ml( $\sigma$ ,  $\pm 0.20$ ) in group H40UTR.ml<sup>-1</sup>, 4.29ml( $\sigma$ ,  $\pm 0.20$ ) in group H50.ml<sup>-1</sup> and 3.14ml( $\sigma$ ,  $\pm 0.15$ ) in group H100UTR.ml<sup>-1</sup>. Using the ROC –curve method, the median effective volume for peribulbar block to produce sufficient akinesia of the eye was 2.44ml, 4.67ml, 5.86ml, 3.55ml, 3.99ml, 3.77ml and 2.42ml, respectively as the above groups.

**Conclusions:** Reduced concentrations of hyaluronidase associated with local anesthetic solution improves the diffusion of local anesthetics resulting in an adequate peribulbar block,

as well as and that increasing the high concentration of hyaluronidase.

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### Paper No: 1120.0

#### A novel approach to intraoperative peroneal nerve function monitoring during tibial osteotomy

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**Introduction:** Tibial osteotomy is commonly used for the treatment of varus deformity and osteoarthritis of the medial compartment of the knee (1-3). Peroneal nerve palsy resulting in weakness or paralysis of the extensor hallucis longus muscle (weakness on dorsiflexion) is a common complication of this procedure (4-6). Injury is thought to occur as a result of traction on the peroneal nerve either by intraoperative retraction, or by anatomic displacement of the osteotomy fragments (5).

**Objectives:** Various strategies have been described to access motor function intraoperatively including EMG (7,8) and direct nerve stimulation (9). These techniques enable quantification of the neural function throughout the entire operation (7), monitor the effect of ischemia on peripheral nerve function (7) and predict postoperative neurologic deficit (10). We describe the use of ropivacaine (Naropin™) for selective sensory blockade under combined spinal and epidural anesthesia to assess motor function of the peroneal nerve intraoperatively.

**Methods:** Twenty one patients presenting for tibial osteotomy received a combined spinal-epidural anesthetic using 12.5 mg of intrathecal ropivacaine and an epidural infusion of 7.5cc/hr of 0.5% ropivacaine. Prior to surgery, a sensory level was checked and surgery proceeded. In all cases, ropivacaine provided adequate sensory blockade of the lower extremities while maintaining a moderate degree of motor function. During surgery a low dose IV infusion of propofol (50-75 mcg/kg/min) was used to provide sedation. At critical points during the surgery, upon the surgeons' request, the propofol infusion was stopped and the patient was awakened. Motor function of the peroneal nerve was then assessed by having the patient dorsiflex their foot.

**Results:** Tibial osteotomies are commonly performed under neuraxial anesthesia with bupivacaine. Ropivacaine produces

relatively less blockade of motor fibers than bupivacaine but with similar sensory blockade. This is because low pKa and high lipid solubility (bupivacaine) are associated with preferential blockade of A-fibers, whereas high pKa and low lipid solubility (ropivacaine) are associated with preferential blockade of C-fibers (11). When used for prolonged femoral nerve blocks in minipigs, there was more tissue damage and muscle apoptosis with bupivacaine than ropivacaine (12). And with interscalene catheters, when ropivacaine 0.2% was compared to bupivacaine 0.15% there was better preservation of strength in the hand and less paresthesia in the fingers (13).

**Conclusion:** The selective sensory block provided by ropivacaine may be beneficial in monitoring intraoperative motor function and may provide early detection of nerve injury. Further studies are warranted.

## Paper No: 1139.0

### Module based anesthesia training program in mongolia

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**Introduction:** The main aim of the World Federation of Societies of Anesthesiologists (WFSA) is "to make available the highest standards of anesthesia, pain treatment and resuscitation to all peoples of the world"<sup>1</sup>. In spite of major advances in technology and training, the majority of the world's population, still does not have access to acceptable standards of anesthesia and analgesia. Between the years 1960-2003, 350 trainees graduated as anesthesiologists. The training curriculum has been based on didactically outdated and fragmentary Russian education program. Currently 185 doctors are practicing as anesthesiologists in Mongolia<sup>2</sup>. Many hospitals, especially in district hospitals have a shortage of specialists in anesthesia, emergency medicine and intensive care doctors. There is a high turnover of anesthesia professionals in this country. One reason for this has been an inadequate curriculum in anesthesia training and postgraduate education. Due to inadequate training it will graduate low competent doctors with higher turnover, frequent shift into other specialty results heavy workload for rest of anesthesiologist appropriately less time to self learning and training the others. This is vicious circle needed to interrupted in Mongolia anesthesia education<sup>3</sup>.

**Objectives:** The main objective of the training program Mongolian Society of Anesthesiologists (MSA) is to achieve desirable standards of training for anesthesiologists in international standards.

**Methods:** To achieve the objectives of MSA sent their key trainers to Bangkok Anaesthesia Regional Training Centre (BARTC) of the World Federation of Societies of Anesthesiologists (WFSA). In the past 16 years, BARTC has provided a one year training for 60 doctor anesthesiologists from 6 Asian

countries. 19 doctors from Mongolia graduated from the program. All of them went back home and have been important driving force in improving teaching, training and anesthesia practice at home. Other source for improvements in training progress in Mongolia is the education link with Australian Society of Anesthesiologists (ASA). With financial support from the ASA, has established a new training center in Ulaanbaatar and employed an training officer. The trainers of both Societies established a new training program for anesthesia that comprises of 17 different learning modules. This module based new program is helping to eradicate the previous deficits in education in Mongolia and to address some important obstacles to anesthesia education in Mongolia<sup>4</sup>. Since 2008, this program launched and graduated 36 residents so far. As main textbook for our residents training is "Developing Anesthesia Textbook" written by Dr. David Pescod and "Module based textbook" written appropriately low and middle income countries<sup>5</sup>.

**Results:** To measure the effectiveness the module based training, evaluated based on questionnaire filled by residents graduates the program: "The adequacy of training policy and its objectives are corresponding appropriately to their needs were 95.5% " "The effectiveness of this training program is reported positive in 98.2% " "The efficiency the training program financial were assessed as 100% by participants. " "The difficult points were pointed out: language barriers of residents, textbook translation into Mongolian language quality found as not satisfactory, trainers didactic competencies were low. " "The residents final examination test question marks increased compared 2005 with 2010 by 22.5% (74.2% v 96.3%), practical skill marks increased by 15.8% (80.3% v 95.5%).

**Conclusions.** The Anesthesia training program progress made as the result of training the key trainers at the WFSA- BARTC and mutual cooperation in anesthesia education with ASA members.

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## Paper No: 1159.0

### Half-day Surgery - A Four Hour Patients Journey

**Carmen Ingrassia De Cruzado and Ian Mc Lean**

**Introduction:** Day surgery is the admission of selected patients to hospital for a planned surgical procedure, returning home on the same day. In a well controlled day care



centre, without beds, we have been testing the hypothesis of half-day surgery i.e. admission to discharge within a 4-hour window.

Half-day surgery is particularly suited to providing patient focused treatment as it is safe, efficient and effective, and provides the least possible disruption to patient's lives. This concept can increase capacity and help to meet waiting time targets in a cost effective way.

**Method:** Patient selection and optimisation is the key to success. Once a patient referral is received a decision is made as to accept or reject a patient for half-day surgery. Rejections are kept to a minimum as the referring physicians are familiar with our admissions criteria (ASA I, II, BMI <40). Once accepted, the patient is called to a pre-assessment clinic where they receive a one-stop protocol specific service and leave with an operation date. Anaesthetic pre-assessment is also carried out at this stage, if indicated.

Procedures carried out include Major 3 for surgery (e.g. Hernia repair, Arthroscopy) and Major 4 Anaesthetics(4)

The day before their procedure, all patients are called to remind them of fasting, medications, etc. and make sure they are fit to proceed. On the day of their procedure the patient is requested to arrive 30 minutes prior to their scheduled theatre slot, the 4-hour journey starts. Following normal theatre checks and consent, the patient walks to the operations room where induction takes place on the table employing a comprehensive patient specific anaesthetic technique to improve safety and reduce time. On completion the patient is transferred to First Stage recovery where they wake and are observed and monitored routinely for 20 minutes. They are then escorted to the Second Stage recovery sitting area to have a hot drink and biscuits prior to discharge. The entire episode takes no more than 4 hours as this is one of the unit's key performance indicators (KPI's).

**Results:** We present results from a 12 month period of half-day surgery covering 409 GAs undergoing surgical procedures from Inter 2 to Major 3 (Inter 4 to Major 5 Anaesthetics) for Orthopaedic, Ophthalmic and General Surgery. Complications, PONV and re-admissions were under 0.5 % and patient satisfaction consistently >95%.

**Conclusion:** The model of Half-day surgery has been tested within laboratory type conditions i.e. well managed surgical environment with a stable clinical team employing proven surgical techniques with the majority of the variables controlled. It has proved achievable and consistently safe as well as cost effective.

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## Paper No: 1172.0

### Quality of surgical field during endoscopic sinus surgery-a comparison of propofol and desflurane

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**Introduction:** Excessive bleeding that occurs due to the rich vascularity of the nose not only makes surgical procedure difficult and lengthy but also increases the incidence of complications such as orbital perforation or dural puncture. In order to avoid these problems, hypotensive anaesthesia is usually employed during endoscopic sinus surgery (ESS). Each hypotensive technique is associated with specific disadvantages. Propofol and desflurane are well known hypotensive agents. Aim To assess the quality of surgical field for ESS during general anaesthesia using controlled hypotension induced either with propofol or desflurane.

**Materials & Method:** This prospective randomized single blind study included 40 ASA I-II patients of either sex, in the age group of 18 - 60 years. Induction & intubation was done with morphine 0.1 mg/kg, propofol 2-2.5 mg/kg & vecuronium 0.1 mg/kg. Maintenance of anaesthesia was achieved with either desflurane or propofol in oxygen-nitrous oxide mixture. Administration of anaesthetic agent was adjusted to achieve mean arterial pressure (MAP) between 65-75 mm of Hg. If target MAP was not achieved even with maximum allowed anaesthetic concentration, other hypotensive agents were used. Subjective assessment of blood loss in the operative field was done by a single surgeon in all cases at every 15 minutes according to Fromme category scale.

**Results:** In propofol group the mean category scale value was  $2.665 \pm 0.243$  and in desflurane group mean category scale value was  $2.200 \pm 0.410$  ( $p = 0.000$ ). In desflurane group four patients required NTG or metoprolol as rescue drug ( 20.0 %) and in propofol group nine patients required NTG or metoprolol (45.0 %) with p value of 0.091 which was not significant. Time period of emergence was statistically significant in the both groups with  $14.60 \pm 2.06$  min in propofol and  $9.35 \pm 1.27$  min in desflurane group. Discussion

In our study we aimed at moderate controlled hypotension with MAP in range of 65-75 mm of Hg. This is in keeping with Chan et al who demonstrated improvement of the surgical field following a moderate reduction in MAP. Our results indicate that moderate controlled hypotension does improve surgical conditions though this is in contrast to a study by Boezaart et al who concluded that only profound controlled hypotension (MAP = 50 mm Hg) can provide good surgical conditions for endoscopic sinus

surgery. Conclusion Although desflurane provides better surgical field & rapid emergence both propofol and desflurane can be used safely to produce controlled hypotension and satisfactory surgical field.

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## Paper No: 1193.0

### Regional cerebral oximetry for neurosurgery patient: opportunity to monitor brain oxygenation

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**Introduction:** Regional cerebral oximetry provides a window to the brain allowing direct, continuous, noninvasive measurement of changes in oxygen saturation of cerebral blood. Near-infrared spectroscopy (NIRS) is one of the methods for such monitoring and might be applied to the scalp (frontal parts) of patient. Despite of this one of the most important limitations in neurosurgery – it's application difficulties. Due to this reason feasibility studies can show the cerebral oximetry availability for different neurosurgery patient groups. Objective: Estimate the feasibility to monitor cerebral oximetry for neurosurgery patients in operating room and in neurosurgery intensive care unit and possible basic disturbances for study.

**Material and methods:** Prospective trial took place in Neuroanaesthesiology Unit of Lithuanian University of Health Sciences Hospital. The monitoring was performed with INVOS® Cerebral/Somatic Oximeter, which is based on near-infrared spectroscopy (NIRS). The monitoring places were operating room, neurosurgery intensive care unit and regular neurosurgery ward. 27 patients were included to the study.

**Results:** 16 were withdrawn from the study due to registration limitations. Records of 11 patients were analysed (18.2% women and 81.8% men). Age of the patients ranged from 19 to 76 years (average  $50.3 \pm 18.3$ ). Performed operations with successful monitoring were: 3 craniotomies and subdural haematoma evacuations after traumatic brain injuries, 1 transfenoidal adenomectomy, 2

eliminations of neoplasma, 2 endarterectomies, 2 extra-intra cranial anastomosis operations, 1 clippation of aneurysma. Nine patients were monitored in operating room. Two patients were also monitored in neurosurgery intensive care unit and in traumatic brain injury department. The values of cerebral oxygenation in operating room were 62–82% before intubation and 72–93% in a period of operation. The biggest difference of cerebral oxygenation between brain hemispheres were registered for patient with traumatic brain injury: 42 and 68% before intubation,  $60 \pm 8.8$  and  $76 \pm 4.0\%$  during operation,  $64 \pm 4.9$  and  $80 \pm 5.3\%$  in the intensive care unit. The longest period for monitoring lasted 72 hour and the shortest – 2 hour ( $16.8 \pm 27.3$  hour).

**Conclusions.** Monitoring of regional cerebral oximetry for neurosurgery patient can be performed despite of that it has limitations, which includes surgery of frontal head's region; application of Mayfield holder in the frontal region of the head; patients transferring from one department to another; intraoperative transcranial Doppler monitoring.

## Paper No: 1210.0

### Effective implementation of who surgical safety checklist

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**Introduction:** Surgery plays a cardinal role in global health care, with an estimated 234 million operations performed yearly [1]. At least half a million deaths per year would be preventable with effective implementation of the WHO Surgical Safety Checklist worldwide. The risk of complications is poorly characterized in many parts of the world, but studies in developed countries have shown a perioperative mortality from inpatient surgery of 0.4 to 0.8% and a major complications risk of 3 to 17% [2,3,4].

**Objectives:** The study was done to evaluate and improve the compliance in the use of the Checklist in two surgical centres of a district hospital in Slough, United Kingdom (Wexham Park and Heatherwood NHS Trust).

**Methods:** Recovery staff were given a single tick box format form to document the completion of the Surgical Safety Checklist in consecutive cases over a 1 month period. Considering the poor results of the first survey, a targeted education and theatre policy change campaign were implemented prior to another survey done 5 months later.

**Results:** The first survey done in February 2011 had enrolled 177 consecutive cases (127 Wexham Park and 50 Heatherwood) showed a poor compliance in Sign Out section of the Checklist with only 31% being filled and only 17% complete. After implementing education and new theatre policies a second survey was done in July 2011 (193 total, 139 Wexham Park and 54 Heatherwood). Overall improvement

was seen in each part of the Checklist : Sign In 8.1 %; Time Out 15.2%; Sign Out 20.2% and complete forms improved by 20.8%. The audit identified clearly which specialties, theatres, grades of surgeons and anaesthetists were associated with the compliance of each case.

**Discussion.** The main pitfall in the completion of the surgical checklist seemed to be in the compliance of the surgical team in completing the sign out section of the checklist.

**Conclusion:** The WHO Surgical Safety Checklist is a useful tool in preventing perioperative mortality if used correctly. The adequate implementation can be monitored and improved by a simple survey process with profound improvement in patient safety as shown by this study. This survey showed that this compliance can be significantly improved in a short period of time by targeted education and theatre management policies. Overall improvement was seen in each part of the Checklist : Sign In 8.1 %; Time Out 15.2%; Sign Out 20.2% and complete forms improved by 20.8%.

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## Paper No: 1220.0

### Sedation/Analgesia in outpatient autistic children with Ketamine S(+)

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**Introduction:** Performing painful outpatient procedures in children and adolescents is a challenge for all; the patient, parents and health professionals. The communication and psychosocial interaction difficulty, as found in children with autism spectrum disorder, makes the procedure an even greater challenge, being that the anesthesiologist make it feasible in a safe manner.

**Objectives:** We evaluated the safety and efficacy of ketamine S(+) and midazolam as a protocol for sedation/analgesia during lumbar puncture in children with autism.

**Method:** As part of the diagnostic investigation for the clinical trial CAST (Corticosteroids for Autism — A Scientific Trial), 20 male autistic children between 3-7 years of age were

evaluated who underwent lumbar puncture to collect 10 ml of cerebrospinal fluid (CSF). The protocol consisted of oral midazolam, 1mg/kg (maximum 20mg) as premedication 30 minutes before admission to the procedure room, and ketamine S(+) intramuscular or intravenous 3-5mg/Kg and 1-3mg/Kg respectively, and for sedation and analgesia. All subjects also received atropine 0.01mg/kg and ondansetron, 0.15mg/kg. They were monitored with NIBP, ECG and continuous peripheral O2 saturation from the beginning of the procedure until complete recovery. The incidence of side effects/complications and variability of vital signs were compared between the two groups.

**Results:** Ten patients received Ketamine S(+)-IM (group 1), while ten others received Ketamine S(+)-IV (group 2). The comparison between the two groups showed that neither age nor body weight have a statistically significant difference ( $p = 0.35$  and  $0.53$ ). The average Ketamine S(+) dose was 3.37 mg/kg for group 1 and 1.61 mg/kg for group 2. The lumbar puncture was successful in all patients, and the sedation administration time to discharge did not differ significantly between the two groups. Common side effects were salivation (3IM and 2IV) and vomiting (2IM and 3IV). As for complications there was one case of laryngospasm in group 1, and symptoms of low CSF pressure after the procedure in three patients. These results are preliminary.

**Conclusions.** Ketamine S(+)-IV or IM (after premedication with midazolam) was shown to be safe and effective as a protocol for sedation/analgesia for lumbar puncture in autistic children. Side effects and complications were rare and easily managed. Promotion and conflicts of interest: Laboratório Cristália provided the medication used in the research. Approved by the CEP: CMM/HUAP No. 294/2010

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## Paper No: 1258.0

### Hypnotic depth and duration measured by bispectral index with propofol versus propofol during the curettage in abortions

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**Introduction:** The use of hypnotics dates back many years, have used a countless number of agents to achieve hypnosis, however currently there is no ideal drug that meets all the anesthesiologist pharmacological characteristics required. The propofol this it was introduced to the clinic by Hiltmann in the year of 1963-1975; its use was suspended due to severe hemodynamic effects caused by cremophor el is

used as a solvent and not by the same propanidid, which showed the large release of histamine that was causing anaphylactic reactions occurred in hypersensitive patients. Recently cryopharma laboratories of guadalajara mexico changed their preparation for a solution with a new vehicle, called solutol hs15, which are kept with the same beneficial properties of propanidid without adverse effects and no proven and histamine release which was caused by cremophor el and responsible for the severe hemodynamic changes.

**Objectives:** Compare the depth, time of action and recovery induced hypnosis propanidid 7 mg / kg and propofol 2 mg / kg, using bispectral index during curettage for abortions under 14 weeks gestation.

**Material and methods:** 62 Female patients 18 to 40. asa i with a diagnosis of abortion in all its forms, and pregnancy under 14 weeks gestation, undergoing suction curettage, divided into 2 groups, propofol group a (n = 31) and propanidid group b (n = 30 ). spss version 10.0 statistical analysis, using student's t test and mann-whitney test.

**Results:** Demographic data were statistically similar in both groups, as well as the time of curettage. surgical bis values with a value of  $p < 0.002$ . maximum bispectral index value of  $p < 0.0001$ . emersion bispectral index value of  $p < 0.0001$ . With regard to surgical time value of  $p < 0.0005$ ; emersion time a p-value  $< 0.01$ , and time to awaken a  $p < 0.0002$ .

**Discussion:** When hypnosis is induced propanidid the first value is recorded as surgical deeper and you get faster than that induced with propofol (bisqx, tqx), the maximum hypnotic effect (bismax) is also higher and significant, it is interesting to note the time required both drugs to exert their maximum effect is not significant. The degree of satisfaction of patients receiving propanidid was better to have no pain during the administration of the drug, shorter and emergence in the state of consciousness without further drowsiness. Interestingly, there is activation of the respiratory center resulting in increased ventilatory rate at therapeutic doses, also the positive chronotropic effect observed, it must be further explored in future studies.

**Conclusions:** Propanidid 7 mg / kg has greater hypnotic depth, get it in less time and its elimination is higher compared to 2 mg / kg propofol.

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## Paper No: 1311.0

### Application of propofol for ambulatory anesthesiology in gynecology patients

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In this effort are shown propofol application for ambulatory anesthesiology in gynecology patients. Propofol is a short, effective immediately, anesthetic that is widely used in ambulatory anesthesiology, with its properties for a quick introduction and awakening from intravenous anesthesia.

**Method:** In this study will be comparatively analyzed in two groups, 100 patients the age of 55-80 years, in a period of one year, in which the often (constantly) cause to implement the ambulatory anesthesiology is metroragija prolongata.

**Results:** The second group, which was numerous, were analyzed patients with bronchitis chronika; astma bronhiale and patients with allergic disease with the ASA classification II. In patients with lung disease after prior premedication with Amp.Amynophilin 125-250mg. In infusion solution of 250ml 0,9%NaCl and Amp.Ranital and Reglan with initial TA140/90mmHg approached towards the introduction of intravenous anesthesia with 2mg. Dormikum,0,1mg.Fentanyl and Propofol 100mg. During and after intervention patients for all the time hemodynamically stable with TA from 110/70 to 130/90mmHg puls65-70/min and SaO2 od 99%. From laboratoty values without major drawing of the hemoglobin of 10% compared with initial values. At the allergic patients in the premedication prior with Amp.Synopen i.m. and Urbason 60-80mg.i.v. with initial TA 130/80mmHg, puls80/min.i SaO2 100%, approached towards the introduction of intravenous anesthesia with 1mg. Dormikum; 0,1mg. Fentanyl and 120-140 mg. Propofol. During and after intervention patients with stable vital signs TA110/70mmHg;puls 70/min. and Sao2 100%. Another group of patients judged to have (estimated with a) ASA III were cardiac patients and they have been directed to make an additional investigation: ECG, ECHO at the heart and laboratory analysis. From the results in more of them had been ascertained



Myocardiophatia chronika so  $EF < 55\%$  and the same have been treated with adequate therapy prescribed by a cardiologist. From laboratory analysis in 10% of them was found Trombocitoza  $Tr > 500$  and the same were on therapy with Sintrom prescribed by a transfusiologist. Since it was taken cardiac therapy that was on the stage of premedication with initial TA 160/100mmhg, puls 70/min. and  $Sao_2$  od 96% access to an introduction to the intravenous anesthesia with 3mg.Dormikum; 0,1mg.Fentanyl and 40-70mg.Propofol. During and after intervention patients cardiocirculatory stable with TA 140/90mmhg, puls 60/min. and  $Sao_2$  from 97%.

**Conclusion:** From above we can conclude that in both groups of patients balanced with the provision of propofol, intervention has passed without major drawing of in hemodynamics, both during and after the intervention. With this one can be note benefit from the use of propofol in ambulatory anesthesiology in gynecological patients.

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## ANAESTHETIC ACTION AND BIOCHEMISTRY

(The names of the authors presenting each paper are shown in bold type)

### Paper No: 33.00

#### Effect of rocuronium on expressions of cyclooxygenase-2 and nitric oxide synthase in vascular endothelial cells

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**Introduction:** Endothelial cells play an important role in a number of physiological and pathological processes, such as inflammation through the response to and release of various endogenous vasoactive compounds to modulate vascular relaxation and constriction. Pain is the first response to injury or infection in the vascular endothelial cells. Injury and infection activates the immune system to produce inflammatory responses. Rocuronium administration is frequently associated severe burning pain. It has been suggested that the pain induced by rocuronium may be due to the activation of nociceptors by the osmolality or pH of the solution, or by the release of endogenous mediators such as histamine, kinin, and other substances mediating inflammation. But, the exact mechanism of rocuronium-induced localized pain has not been established. In the present study, it was investigated whether rocuronium bromide-induced localized pain involves the induction of inflammation in bovine endothelial cells.

**Method:** Calf pulmonary artery endothelial (CPAE) cells were treated with rocuronium bromide at concentrations of 1,000  $\mu$ g/ml, 100  $\mu$ g/ml and 10  $\mu$ g/ml for 24 hours. The cells in the control group were left untreated. And then Western blot were performed to analyze cyclooxygenase (COX)-1, COX-2, 5-lipoxygenase (LOX), inducible NO synthase (iNOS) and endothelial NOS (eNOS). Prostaglandin (PG) E2 immunoassay, nitric oxide (NO) detection, and immunocytofluorescence were also conducted. The data were analyzed by one-way ANOVA followed by Duncan's post-hoc test. The differences were considered statistically significant at  $P < 0.05$ .

**Result:** The present results show that rocuronium bromide exerted no significant effect on COX-1 protein expression in CPAE cells. But, COX-2, 5-LOX and iNOS protein expressions were increased as a dose-dependent manner. And PGE2 synthesis was also increased as a dose-dependent manner. On the other hand, rocuronium inhibited eNOS protein

expression in a dose-dependent manner, and then NO production is suppressed as a dose-dependent manner in the CPAE cells.

**Conclusion:** These findings show that rocuronium can cause inflammation in vascular endothelial cells that likely occur via increasing COX-2, 5-LOX and iNOS protein expressions. And vasospasm also can be caused by inhibited eNOS protein expression and NO production.

### Paper No: 198.00

#### Phaxand<sup>®</sup>, a captisol<sup>®</sup>-enabled water soluble preparation of alphaxalone for intravenous anesthesia and sedation: comparison of anesthetic properties with propofol and althesin<sup>®</sup>

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**Introduction:** Alphaxalone is a neuroactive steroid that causes anesthesia by positive modulation at GABAA receptors. It was the main ingredient of Althesin<sup>®</sup>, used widely for intravenous anesthesia from 1971 until 1984 when it was withdrawn from clinical practice because of hypersensitivity to the emulsifying agent (Cremophor EL) used in the formulation (1). Captisol<sup>®</sup> is sulfobutylether  $\beta$ -cyclodextrin; a molecule with a lipophilic cavity that enables water insoluble drug dissolution in water for human use.

#### Objectives:

- (1) dissolve alphaxalone in water using Captisol<sup>®</sup>
- (2) assess anesthesia and recovery using this preparation and
- (3) compare these properties with propofol and Althesin<sup>®</sup>.

**Methods:** Alphaxalone (10mg/ml) was prepared using 13% Captisol<sup>®</sup> and saline (PhaxanCD<sup>®</sup> - PHAX). An "Althesin<sup>®</sup>-like" solution of alphaxalone was prepared in 20% CremophorEL as described in the literature (ALTH) (2). Jugular intravenous catheters were implanted in male Wistar rats

(150-200g). Separate groups of ten rats each were given intravenous injections of PHAX or ALTH (1.25, 2.5, 5, 10, & 15 mg/kg), or propofol lipid emulsion [10mg/ml; PROP (1.25, 2.5, 3.75, 5, 10, 15, & 20mg/kg). Onset and recovery from anesthesia was assessed by righting reflex, tail pinch response and rotarod performance. AD50 and AD95 values for righting reflex and tail pinch responses were calculated from probit analysis.

**Results:** Alphaxalone (10mg/ml) dissolved readily in 13% Captisol®-saline to form a clear colourless solution. Intravenous PHAX caused immediate dose-related sedation and anesthesia accompanied by no abnormal movements. The course of anesthesia was smooth with rapid awakening equal with equivalent doses of ALTH and PROP. The doses that caused all 10 rats to lose righting reflex was: ALTH 5; PHAX 5; & PROP 10 mg/kg respectively. Those doses caused loss of righting reflex for (minutes; mean (SD)): ALTH 3.6(2.18); PHAX 1.9(0.84); PROP 2.5(1.15). The AD50 (AD95) doses for loss of righting reflex for ALTH, PHAX, and PROP (mg/kg) were 2.95(4.39), 2.79(4.26) & 4.63(8.40) respectively. The AD50 (AD95) doses for loss of tail pinch response were 6.46(14.09), 6.56(8.56) & 8.4(14.46) mg/kg for ALTH, PHAX, and PROP respectively.

**Conclusions:** PhaxanCD causes anesthesia with fast onset, and offset timing equal with propofol and Althesin®. PhaxanCD is twice as potent as propofol. PhaxanCD® may be reintroduced into human anesthesia because the clear water-soluble preparation avoids the CremophorEL hypersensitivity. Furthermore, it is filterable with none of the infection and other issues associated with propofol lipid formulations.

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## Paper No: 261.00

### In-vitro inhibition of a hepatic microsomal enzyme activity and changes Cyt P450 isozyme by opioids

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**Introduction:** In chronic alcohol consumption, the induction of cytochrome P450 occurs and this may lead to a change in the action of opioids.

**Objectives:** To determine the relationship between chronic alcohol consumption and opioid metabolism in liver of mongrel dogs.

**Methods:** The experiments was carried out on mongrel dogs of both sexes and different ages. The animals were divided into two groups. One had free access to food and water. The other group had free access to food and 12% ethanol, instead of water, for 90 days. After that period each group of animals were anaesthetized with Alfentanyl. After 3 hours, liver samples were taken. After the biopsy, the liver was quickly removed, homogenized and used for determination of cytochrome P450, glutathione (GSH), and protein, as well as the activity of glutathione peroxidase (GSH-Px) and lipid peroxidation (LP) by spectrophotometric methods.

**Results:** There was a slight increase in AST activity and a slight decrease in ALT in the serum of all dogs that received Alfentanyl. However, none of these changes were statistically significant. No changes were seen in the serum parameters following opioid treatment. The 90 day treatment with ethanol yielded a two-fold increase in cytochrome P450 content. However, exposure to the anaesthetics for 3 hours did not affect its content. On the other hand, the hepatic GSH content was significantly decreased following treatment with opioids. At the same time, treatment with opioid drugs, produced a significant increase in the activity of GSH-Px. Also lipid peroxidation was somewhat increased. Discussion The observation of tested Alfentanyl caused a decrease in GSH level, an increase in GSH-Px activity and intensified lipid peroxidation was probably due to a hepatotoxic effect of this opioids. Conclusion It can be concluded that treatment with the opioid in those 3 hours did not cause any significant change in liver parameters. This does not imply that an identical effect would be observed if the animals had been exposed to the action of opioids for a longer time. It can be concluded that ethanol exhibited a strong effect, causing an increase in almost all the investigated liver parameters.

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## Paper No: 284.00

### Anesthesia management of patients undergoing surgery for hydatid cyst removal

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**Introduction:** Hydatid disease or echinococcosis is an infection of humans caused by the larval stage of *Echinococcus granulosus*, *E.multilocularis*, or *E.vogeli*. It is prevalent in areas where livestock is raised in association with dogs (1). It is endemic in cattle-and sheep-raising regions of the world, including the Middle East . The liver and lungs are the most common sites of these cysts. Slowly enlarging echinococcal cysts generally remain asymptomatic until their expanding size produces a mass effect on the involved organ giving rise to clinical symptoms. Intraoperative anaesthetic management depends on the anatomical site of the cyst and the risk of cyst rupture during surgery which may lead to anaphylaxis (2). This is a report of our experience dealing with a series of 16 patients scheduled for elective resection of hydatid disease at our institution.

**Materials and Methods:** The medical charts of patients undergoing surgery for hydatid cyst at Al Ahli Hospital in Hebron over a 30-month period (January 2008-June 2011) were included in this retrospective study. The following data were collected: age and gender of the patients, weight, size, and site of the hydatid cysts, preoperative complications and length of hospital stay.

**Result:** 16 cases were collected during this period. Eight (57%) were female and six (43%) were male. Their ages range from 13 to 80 years and their body weights from 24kg to 83kg (mean 61.66kg). The size of the cysts ranged from 5.5 x 3.7cm to 30 x30cm, with most located in the right hepatic lobes (fig 1) . The median hospital stay was 3 days). The duration of procedure ranged from 50 minutes to 160minutes (mean 90.7 minutes).

All patients received general anesthesia. For prevention of anaphylactic shock 12 patients (86%) received an average intravenous dose of 200 mg of hydrocortisone. Two( 14%) cases of anaphylactic shock occurred during surgery, the 1st was 10years old female who received adrenaline

0.25mg, while the second one was 23years old required 8mg of adrenaline and 25mg of promethazine followed by additional large doses of vasopressors and mechanical ventilation for 2 days. No patient died during or after the surgery.

Comments Hydatid cyst surgery represents a major challenge for both the anesthetist and the surgeon. Life-threatening complications such as massive hemorrhage and anaphylactic shock can occur at any time during the procedure but especially in relation to rupture of the cyst. For all cases of hydatid cyst removal it is recommended to insert 2 wide bore venous cannula for rapid infusion of intravenous fluids and blood products, and an arterial cannula to monitor arterial blood pressure. Prophylactic hydrocortisone (200 mg) should be given following induction of anesthesia, and in case of anaphylactic shock, adrenaline should be administered I.V without delay.

## Paper No: 400.00

### Does type of anesthesia influence cytokine output during major surgery?

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**Introduction:** There is some evidence to suggest that the type of anesthesia influences the post surgery recurrence rate of various solid tumors<sup>1</sup>. This is possibly due to changes to host defense mechanisms during anesthesia and surgery.

**Objectives:** Observe for any immunological response to surgery and anesthesia by noting changes to various cytokines during major surgery as well as in the postoperative period.

**Methods:** Blood samples were collected at multiple time intervals. This observational study was part of a larger pharmacological study on intravenous acetaminophen. We estimated cytokines at different time intervals. The data here shows the cytokines at 0 hr (soon after the induction of anesthesia), at 6 hours (end of surgery) and at 48-72 hours (postoperative period). The plasma was stored and later batch analyzed for 27 different cytokines.

**Results:** There were a total of 20 non-randomized patients in this observational study and the demographic details given in Table 1. One group received only general anesthesia and the 2nd group received spinal or spinal and epidural anesthesia along with a general anesthesia for the surgery. All patients underwent major abdominal surgery. The data were not normally distributed and we used Mann-Whitney U test to compare the 2 groups (Table 2). The results



showed some minor changes to the cytokine levels in the postoperative period in those receiving spinal or epidural anesthesia. There were no significant differences between the 2 groups in their clinical observations or outcomes.

**Conclusions:** This pilot study shows that there is no evidence that inclusion of spinal/ epidural anesthesia reduces the output of cytokines compared to general anesthesia alone to account for the suggestion that cytochemical changes during surgery could account for recurrence of solid malignant tumors.

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## Paper No: 507.00

### Ulinastatin suppresses lipopolysaccharide-induced cyclooxygenase-2 and inducible nitric oxide synthase through the nuclear factor- $\kappa$ B inactivation in mouse BV2 microglial cells

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**Introduction:** Ulinastatin is an intrinsic serine-protease urinary trypsin inhibitor that can be extracted and purified from human urine. Urinary trypsin inhibitors are widely used to treat patients with acute inflammatory disorders such as shock and pancreatitis. And it can be used to reduce blood loss during operation. However, although the anti-inflammatory activities of urinary trypsin inhibitors have been studied, their underlying mechanisms are not yet fully understood.

**Methods:** In the present study, we evaluated the effect of ulinastatin on lipopolysaccharide (LPS)-induced inflammation using mouse BV2 microglial cells. To accomplish this, we performed a 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) assay, reverse transcription-polymerase chain reaction (RT-PCR), Western blot, an electrophoretic mobility gel shift assay (EMSA), nitric oxide (NO) detection, and a prostaglandin E2 (PGE2) immunoassay in mouse BV2 microglial cells.

**Results:** The results of the present study revealed that ulinastatin suppressed PGE2 synthesis and NO production by inhibiting the LPS-induced expression of cyclooxygenase-2 (COX-2) and inducible nitric oxide synthase (iNOS) mRNA and protein in mouse BV2 microglial cells. Furthermore,

ulinastatin suppressed the activation of nuclear factor- $\kappa$ B (NF- $\kappa$ B) levels in the nucleus.

**Conclusions:** These findings demonstrate that ulinastatin has analgesic and anti-inflammatory effects that likely occur via suppression of the expression of COX-2 and iNOS through down-regulation of NF- $\kappa$ B activity.

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## Paper No: 528.00

### Preemptive analgesic effect of systemically administered midazolam: experimental study in rats

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**Introduction:** Preemptive analgesia suggests that the application of analgesic in prior to proceeding of noxious stimuli prevent the sensibility of the central nervous system which provokes the pain. The aim of this study was to investigate preemptive analgesic effects of intraperitoneally administered midazolam in different doses and midazolam with morphine and diclofenac, in rat model.

**Methods:** After Institutional Ethics Committee approval, 240 male, Sprague Dawley rats, weighing 250–300 gr, were included in the study. The rats are divided in five groups. In group I, midazolam group, midazolam is applied in 0.1, 1, 5 and 10 mg/kg ip; group II diclofenac in doses 10 mg/kg ip; group III, morphine 10 mg/kg ip, and in group IV and V, morphine and diclofenac was added to midazolam. Saline was used as control. The hot plate test, model of acute pain and formalin test, model of inflammatory pain were performed 10 minute after the drug administration. Paw withdrawal in response to thermal stimulation and or paw flinching and shaking in response to sc hind paw formalin injection were measured. Behaviour side effects and motor disturbances were also examined.

**Results:** In hot plate test and formalin test, midazolam produced significant preemptive analgesic effects with the 50% effective dose (ED50) of 2.82 mg/kg (CI95% = -1.85-5.1 mg) and 1.6 mg/kg (CI95% = -0.81-4.04 mg) in phase I and

1.1 mg/kg (CI95% = 0.67-5.03 mg) in phase II. Antinociceptive effects of midazolam enhanced with morphine, in hot plate test and formalin test. ED50 of midazolam with morphine was 0.91 mg/kg (CI95% = -0.51-3.7 mg) in hot plate test and 0.8 mg/kg (CI95% = -0.66-3.07 mg) in phase I and 0.5 mg/kg (CI95% = 0.13-4.53 mg) in phase II, in formalin test. Midazolam with diclofenac also expressed increased antinociceptive effects, in both tests, The ED50 of midazolam (with diclofenac) 1.0 mg/kg (CI95% = -1.37-5.01 mg) in hot plate test and 0.9 mg/kg (CI95% = -0.87-4.09 mg) in phase I and 0.7 mg/kg (CI95% = 0.48-6.63 mg) in phase II, in formalin test.

**Conclusion:** Systemically administered midazolam had preemptive analgesic effects on acute thermal, and acute inflammatory induced nociception in rats. The antinociceptive potency of midazolam enhanced with morphine and diclofenac.

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**Paper No: 835.00**

## Comparision of epidural 0.5%bupivacaine with 0.75%ropivacaine on latency and duration for lower limb and lower abdominal surgery

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**Introduction:** The present study is carried out to compare the latency and duration of action of Bupivacaine and recently introduced Ropivacaine

**Objectives:** Bupicaine is established regional anaesthetic. But it has got toxic effects on CVS resulting in conduction disturbances, myocrdial depression and CNS effects. Ropivacaine is new regional anaesthetic recently introduced. It has got less toxic effects on CNS and CVS. In the present study, 0.5 % epidural bupivacaine 20 ml is compared with 0.75 % epidural

ropivacaine 20 ml to bring out the facts regarding the latency, duration and safety aspects.

**Methods:** Hospital ethical committee approval and informed consent was taken from all patients. Both males and females were included in the study. ASA grade 1 and grade 2 patients were selected. Age ranged from 20 to 80 years. Patients undergoing elective lower abdominal and lower limb surgeries were selected. Routine investigations and BT, CT were within normal limits. There was no contraindication to epidural anaesthesia. They were divided into 2 groups of 102 patients each; group 1 is bupivacaine epidural, group 2 is ropivacaine epidural. Patient was shifted to operation table. Monitors, pulse oxymeter, NIBP, ECG, ET CO<sub>2</sub> were connected. Patient was turned laterally or in seated position. Back was cleaned and draped. Epidural space was identified by loss of resistance technique with 18 G epidural needle and catheter was passed and fixed to back of patient, and patient changed to supine position. After taking necessary precautions, 20 ml local anaesthetic was injected randomly and latency time was noted to loss of pain sensation to pin prick and duration of effect was noted till the loss of regression of 2 segments.

**Results:** Epidural effects of bupivacaine and ropivacaine were studied. Average age is similar in both groups. Sex ratio is similar. Average weight is similar. Latency is similar. Duration of analgesia is prolonged in Ropivacaine group with p value < 0.0001 (statistically significant). Male: female ratio is similar in both groups (55:47 vs 55:47) average age is similar (47.49 ± 15.37 years vs 44.23 ± 17.17 yrs) average weight is similar (64.96 ± 5.50 vs 64.14 ± 7.42) latency is similar (12.30 ± 2.96 minutes vs 12.37 ± 3.31 mins) duration of action is significantly different (176.02 ± 22.05 mins vs 252 ± 45.26 mins) p value < 0.0001

**Discussion:** In the present study, epidural effects of bupivacaine and ropivacaine were studied. Average age is similar in both groups. Sex ratio is similar. Average weight is similar. Latency is similar. Duration of analgesia is prolonged in Ropivacaine group with p value < 0.0001 (statistically significant). Bupivacaine produces cardiac dysrhythmias and myocardial depression. In this study no such effects were noted, as dose was kept within therapeutic range. Prolonged effect of ropivacaine is more useful.

**Conclusion:** The prolonged duration of ropivacaine is statistically significant. There were no toxic effects of Ropivacaine on CNS and CVS.

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**Paper No: 1023.0****Isoflurane sensitivity in complex-i deficient mice****S Roelofs**

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**Introduction:** Children with mitochondrial disorders are frequently anesthetized for diagnostic muscle biopsy, but also for a wide range of other operations. These disorders may interfere with vital functions and with response to surgery and anesthesia.

**Objectives:** Mutations in the NDUFS4 gene cause isolated complex-I dysfunction. NDUFS4 knockout (KO) mice show clinical signs and symptoms resembling those of patients with mitochondrial complex-I disease (1). We examined isoflurane sensitivity in the NDUFS4-KO mouse model, which exhibit an isolated mitochondrial complex-I deficiency.

**Methods:** We investigated seven NDUFS4-KO mice, five NDUFS4 heterozygous (HZ) mice and five wild type (WT) mice. Animals were placed inside an airtight box, breathing spontaneously while isoflurane was administered. The concentration of anesthetic was measured intermittently at the venting port of the chamber. After equilibration the response to electrical stimulation to the hind paw was recorded. When a response was noticed the anesthetic concentration was increased stepwise, until there was no response. At this point the anesthetic concentration was decreased until there was a return of response. The minimum alveolar concentration (MAC) was determined as the average concentration of isoflurane at loss and return of response to pedal electrical stimulation. Statistical analysis was done using the Students-t-test for unpaired data,  $p < 0.05$  was significant.

**Results:** MAC for isoflurane was significantly lower ( $p < 0.001$ ) in NDUFS4 KO mice compared to WT and HZ mice: 0.8 (SD 0.29) vs 1.55 (SD 0.29) and 1.55 (SD 0.11) respectively. There was no difference in isoflurane sensitivity between wild type and heterozygous mice. The KO mice showed severe respiratory depression at low isoflurane concentrations. Mean respiratory frequency was 102 (SD 17.0), 104 (SD 11.7) and 79 (SD 10.2) in respectively WT, HZ and KO mice, with significant difference between KO and non-KO mice ( $p < 0.001$ ).

**Conclusions:** Complex I was the most sensitive of any step in oxidative phosphorylation to inhibition by volatile anesthetics in vitro (2). In a simple animal model, *C. elegans*, a clear correlation existed between mitochondrial complex I oxidative phosphorylation capacity and volatile anesthetic sensitivity (3). Morgan et al. found profound hypersensitivity to volatile anesthetics in a subset of children with defects in complex I function, requiring very low sevoflurane concentrations to reach a Bispectral Index (BIS) value of 60 (4). In accordance

with these previous findings, our study showed an increased sensitivity to isoflurane in complex-I deficient mice.

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**Paper No: 1043.0****Stress hormones response in cardiac surgery**

**Angeles Silva, Carlos Culebras, Carlos Lopez, Maria Iurita and Juncal Iurita**

Stress Hormones In Cardiac Surgery, Vicente

Stress response to surgery is modulated by different factors such as the magnitude of the injury, the type of procedure and anesthesia. Stressful experiences induce important hormonal changes in the cardiovascular system and hypothalamic-pituitary-adrenal axis, reflecting a close and bidirectional relationship.

**Aim:** To study hormonal changes induced by cardiac surgery. Steroid hormones glucocorticoids (ACTH – cortisol), mineralocorticoids (aldosterone), androgens (dehydroepiandrosterone or DHEA) and renine were determined in cardiac surgery patients.

**Method:** A set of hormones were determined in 50 patients, free of endocrine diseases undergoing programmed cardiac surgery. Hormone tests included steroid glucocorticoids (ACTH–cortisol), mineralocorticoids (aldosterone), androgens (dehydroepiandrosterone or DHEA), renine and growth factor insulin type I (IGF-I. Blood samples were extracted at baseline (48h prior), first 24 hours and by the 5th day following cardiac surgery.

**Results:** Our patients were middle aged, overweight males (70% males, mean age 59.6 y-o, BMI 26,2) and preserved ejection fraction (56 +16). Total surgery duration was 240 minutes of anesthesia, 66 minutes of cardiopulmonary bypass, and 111 minutes of myocardial ischaemia on average. The mean time to extubation was 14 hours, with 3.4 +1.2 days of ICU stay; only 4% required intra aortic balloon. As shown in table 1, most hormones increased significantly with surgery, approaching baseline values by the 5th day. IGF-I remained unchanged, Significant and early changes in cortisol, aldosterone and renine levels were found attributable to surgical stress, volume depletion and hydroelectrolyte imbalance.

**Conclusion:** our data show an early and swift activation of the hypothalamic-pituitary-adrenal axis responding to stress and volume or hydroelectrolyte imbalance.

Baseline	First	24 h	5th day
Cortisol $\mu\text{g/dl}$	19.23	53.5 ( $p<0.005$ )	37.6 ( $p<0.005$ )
ACTH $\text{pg/ml}$	13.93	16.14	11.65
DHEA $\mu\text{g/dl}$	948.66	1270	1367 ( $p<0.005$ )
Aldosterone $\text{ng/dl}$	97.34	163.98 ( $p<0.005$ )	140.87
Renine $\text{ng/dl}$	12.48	19.68 ( $p<0.005$ )	14.10

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## Paper No: 1048.0

### Transient functional hypothyroidism induced by cardiac surgery

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Functional Hypothyroidism in Cardiac Surgery, Vicente

It is well known that thyroid and growth factor hormone levels change in response to stress, fear or emotions. But little is known of the magnitude and duration of this response.

**Aim:** To evaluate the changes in the thyroid axis, growth hormone and growth factor insulin type I (IGF-I) following cardiac surgery, their timing and the possible causes, we studied 50 patients, without thyroid disease. All patient underwent programmed cardiac surgery (PCS), half were coronary artery bypass graft surgery and half valvular. Hormones were determined in the previous 48h, in the first 24 hours following the procedure and by the 5th day.

**Method:** Up to 70% of our cases were males, with a mean age of 59.6 years old, the body mass index was 26.2 and ejection fraction 56±16 on average. The total surgery duration was divided in subsets: anesthesia 240 minutes, cardiopulmonary bypass 66 minutes, myocardial ischaemia 111 minutes on average. The mean time to extubation was 14 hours and the ICU stay was 3.4±1.2 days. Intra aortic balloon was used in 4%.

**Results:** GH increased significantly in the first 24 hours, decreasing to baseline values by the 5th day. On the other hand IGF-I remained unchanged. Conclusions: A temporary hormonal downfall of thyroid hormones occurs following

cardiac surgery; functional hypothyroidism could be related to protection mechanisms responding to surgical injury. Growth hormone responds to cardiac surgery as a stress hormone, whereas IGF-I remains unchanged even though it's expression is mediated by GH.

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## Paper No: 1109.0

### Central and peripheral opioid receptor blockade prevent propofol-induced hypotension in rats

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**Introduction:** Propofol is an anesthetic agent that is largely used in general anesthesia and intensive care and that occasionally exerts a prominent hypotensive effect via myocardial and vascular mechanisms.

**Objective:** The objective of the present study was to evaluate the role of opioid receptors in the hypotensive effect of propofol.

**Methods:** In this experimental pharmacological study, pentobarbital-anesthetized rats were submitted to one of the following two protocols: Protocol 1, systemic (intravenous) or central (intracisternal) infusion of propofol with

Baseline	First	24 h	5th f-u day
TSH ( $\mu\text{mI}$ )	2.24	1.12 ( $p<0.05$ )	2.56
T3 ( $\text{ng/dl}$ )	0.85	0.45 ( $p<0.05$ )	0.70
Free T3 ( $\text{ng/dl}$ )	4.88	3.95 ( $p<0.05$ )	4.44 ( $p<0.05$ )
Inverse T3 ( $\text{ng/dl}$ )	30.51	55.29 ( $p<0.05$ )	37.18 ( $p<0.05$ )
T4 ( $\mu\text{dI}$ )	83.60	63.12 ( $p<0.05$ )	79.09
Free T4 ( $\text{ng/dl}$ )	1.34	1.13 ( $p<0.05$ )	1.33
GH ( $\text{ng/ml}$ )	1.64	7.8 ( $p<0.05$ )	2.5
IGF1 ( $\text{ng/ml}$ )	189.87	180.60	167.0



simultaneous analysis of the dose-response curve of the mean arterial pressure (MAP) and mesenteric intravital microscopy; and Protocol 2, systemic or central pretreatment with naloxone followed by intravenous or central administration of propofol.

**Results:** Protocol 1: Intravenous administration of propofol induced a significant dose-dependent reduction in the MAP (6%, 31% and 36% reductions with the 2.5, 7.5 and 25-mg/kg dose, respectively;  $P < 0.05$  for the 7.5 and 25 mg/kg doses). Intracisternal propofol induced a significant dose-dependent reduction in the MAP (9%, 5%, 20%, and 31% reduction with the 0.1, 1.0, 10, and 100- $\mu$ g dose, respectively;  $P < 0.05$  for the 10 and 100- $\mu$ g doses). Neither intravenous nor intracisternal propofol induced alterations in the mesenteric microcirculation ( $P > 0.05$ ). Protocol 2: Intravenous (7.5 mg/kg) or intracisternal propofol (10  $\mu$ g) induced significant hypotensive effects of 45% and 35% reductions in the MAP, respectively ( $P < 0.05$ ).

**Discussion:** Neither the systemic nor the central pretreatment with naloxone (5 mg/kg and 100  $\mu$ g, respectively) induced any significant alterations in the MAP in any group. However, both systemic and central pretreatment with naloxone prevented the hypotensive effect of the systemic or central injection of propofol.

**Conclusion:** This experimental pharmacological study demonstrated that the blockage of central and peripheral opioid receptors prevents propofol-induced hypotension, suggesting that these receptors may be involved in the cardiovascular alterations elicited by propofol administration in anesthetized rats.

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## Paper No: 1218.0

### Upregulation of HMBG1 and TLR -4 cardiac right atrium mRNA expression during CABG surgery – the effects of sevoflurane conditioning and postconditioning

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**Introduction:** Immune system activation and the inflammatory response are important components of ischemia/reperfusion injury (I/R) during cardiac surgery with the cardiopulmonary bypass (CPB). High-mobility group box-1 (HMGB1) protein released by activated immune cells is a crucial mediator of inflammation. Toll-like receptors (TLR2, TLR4) are key mediators in myocardial injury and inflammation in the settings of I/R, and they participate in the HMGB1 signalling pathways. Sevoflurane exhibits protective, anti-inflammatory effect on the myocardium in response to I/R injury, both in pre and postconditioning fashion.

**Objectives:** We evaluated the sevoflurane conditioning and postconditioning effect on the mRNA expression of HMGB1, TLR2 and TLR4 in the cardiac right atrium, and HMGB1 serum kinetics, together with the pro-inflammatory biomarkers release (IL-6, TNF- $\alpha$ ) in patients scheduled for first-time elective CABG-CPB surgery.

**Methods:** Based on the anesthetic technique used, patients were divided into 3 groups: those who received sevoflurane conditioning (n=20), sevoflurane postconditioning (n=20), and those who received TCI propofol (n=20) anesthesia. Blood samples for HMGB1, IL-6, TNF- $\alpha$ , and Troponin I were collected before the induction of anesthesia, and at 6 and 24 hours after the surgery. Serum changes in HMGB1 level were determined with ELISA method. Total RNA was isolated twice (pre-CPB and post-CPB) from the right atrial appendage tissue samples using the AllPrep<sup>®</sup> DNA/RNA/Protein Kit. The relative amount of HBOX1, TLR2, and TLR4 mRNA was determined by quantitative real time PCR with 7900HT Fast Real-Time PCR System.

**Results:** Serum HMGB1 protein concentrations increased significantly from  $1.6 \pm 1.0$  ng/mL at baseline to  $2.8 \pm 1.7$  ng/mL at 6 hours after the surgery ( $p=0.006$ ), and remained high 24 hours after surgery ( $2.6 \pm 1.2$  ng/mL,  $p=0.03$ ). The level of IL-6, TNF- $\alpha$ , and Troponin I was significantly higher 6 and 24 hours after the surgery in all patients, compared to the baseline values. The mRNA expression for HMGB1 was elevated during the surgery ( $RQ 1.41 \pm 0.66$ ) and correlated with higher protein concentration of HMGB1 measured in serum at 6 h after the surgery ( $R=0.53$ ,  $p=0.04$ ). The mRNA expression for TLR4 increased in all study groups during the surgery ( $RQ 1.49 \pm 0.61$ ); there was no change in mRNA expression for TLR2 ( $RQ 2.0 \pm 4.33$ ).

**Conclusion:** CABG-CPB surgery stimulated a significant inflammatory response, but the method of anaesthesia did not have any major influence on the intensity of this response. Cardiac right atrium HMGB1 and TLR4 mRNA expression was upregulated in the early post bypass period but it was not modulated by sevoflurane anesthesia.

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## CHRONIC AND CANCER PAIN

(The names of the authors presenting each paper are shown in bold type)

### Paper No: 3.00

#### **Evaluation of the effects of extract from the Stem Bark of *Croton macrostachyus* in inflammatory and neuropathic models of nociception in mice**

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*Croton macrostachyus* (Euphorbiaceae) is a plant used in Cameroonian traditional medicine in the treatment of many pathologies including pain. The present study was undertaken with the aim of evaluating the analgesic property of the extracts from the stem bark of *Croton macrostachyus* and to bring out the possible mechanisms of action of these plant extracts. The analgesic effects were evaluated on three models of acute pain induced by LPS, PGE2 and capsaicin, one model of chronic inflammatory pain induced by CFA and two models of neuropathic pain induced after avulsion of the brachial nerve and sciatic nerve ligature. Oral administration of the extract inhibited significantly and in a dose-dependent manner the different models of pain used. The extract significantly inhibited the acute pains induced by the capsaicin and the prostaglandin E2, the inflammatory pain induced by CFA and the neuropathic pains induced by brachial nerve avulsion and binding of the sciatic nerve. Whereas, the extract did not have a significant effect on the LPS induced pain. Glibenclamide inhibits the activity of the dypirone, without affecting the antinociceptive activity of the extract on the PGE2 induced pain, in the same way rimonabant (SR 141716A) inhibits completely the win 55212-2 activity without affecting the activity of the *C. macrostachyus* extract. These results show that the stem barks of *C. macrostachyus* possess analgesic properties. This activity of the methylene chloride/methanol extract of *C. macrostachyus* would be due to a blocking of vanilloid

(TRPV1) receptors of capsaicin, thus reducing the entry of sodium and calcium ions, leading to a reduction and/or inhibition of the release of certain neurotransmitters. In conclusion, *Croton macrostachyus* have therapeutic virtues, which justify its use in traditional medicine. The results of this study show that this plant is equipped with pharmacological analgesics properties and probably anti-inflammatory.

### Paper No: 84.00

#### **Linkage between pain culture: an anthropological perspective**

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**Introduction:** Anthropology is essentially the study of mankind in its wider social context. It is only in the last two decades that anthropologists have taken a keen interest in the field of pain. This entails looking at illness, disease and their treatments in a cultural context (1).

**Objectives:** The main aim of this analysis is to present the interplay between pain and culture.

**Methods:** An analytical account of the anthropological view of pain and culture following an in-depth literature review is hereby presented.

**Discussion:** Pain perception is probably the most controversial topic today. Going beyond the initial physiological response to pain we find that behavioural reactions, perception of pain and how people deal with it, are highly culturally elaborated (1). Culture determines the perception and expression of pain, as well as its clinical implications. Anthropologists argue that cultural factors relate to the whole experience of pain. It's a truism to say that all pain is a private experience, but cultural factors determine whether that pain is elaborated, discussed and what people do about it. Pain is expressed both verbally and non-verbally. Even from the non-verbal component it seems that some cultural groups, particularly Japanese

and Chinese and some South-Asians, are far more stoical in their expression of pain compared with Western cultures.

**Conclusions:** From this paper, it is clear that there is a lot we could learn from the anthropology of pain. It is imperative for pain practitioners and other health care professionals to have an understanding of culture and how it impacts on patients and how they perceive and experience their pain.

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## Paper No: 103.00

### Effective management of pain using Over The Counter (OTC) medicines in resource-poor communities

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**Introduction:** We all know what pain is. Sometimes we hardly notice it. However, other times it is so severe that we ask a doctor or pharmacist for help. Sometimes we take a painkiller (analgesic) to lessen the pain until it goes away (1).

**Objectives:** The main objective of this paper is to consider the effects of OTC medicines in the management and control of pain syndromes in resource-restricted communities.

**Methods:** The author undertook an in-depth literature review and now presents an analytical account of the situation.

**Discussion:** Recently the Proprietary Association of Great Britain (PAGB) which represents the manufacturers of OTC medicines and food supplements in the UK and the British Pain Society produced a document on managing pain effectively with OTC medicines. It highlights results of an inquiry into the misuse of OTC and prescribed medicines (2). All medicines can cause unwanted side effects. Used in the short term, these are not generally troublesome but if painkillers are used long-term, then the extent and severity of side effects can increase. If you have any concerns, you should seek advice from your doctor, pharmacist or other health care professionals (1).

**Conclusion:** Short term pain can be treated by pain killers that can be bought OTC either from a pharmacy or other shops. Long term pain sometimes called chronic or persistent pain, is present everyday or comes and goes. Some people with long term illnesses need to take painkillers everyday to manage this (1).

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## Paper No: 255.00

### Spinal cord stimulation for the intractable postthoracotomy syndrome

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**Introduction:** Spinal cord stimulation has been used for the patients with intractable neuropathic pain. Although is regarded as a relatively safe and effective procedure, several complications after implantation of a electrode occur. We report a case of a fractured electrode 2 years later following implantation.

**Patient Profile:** Age/Sex: 62/Male.

**Patient Medical History:** The patient had been suffering from postthoracotomy syndrome for more than 10 years. Spinal cord stimulation electrode was implanted at T3 spinal level after meticulous probing the appropriate site for the pain. The electrode was fixed at the interspinous ligament. The battery was placed at the left lower quadrant of abdomen. The patient reported that the pain was reduced by 50 % and he was very satisfied with the result. The patient found 2 years later that the interruption of stimulation occurred due to the position change. Shortly after that the stimulation had completely gone. Chest X-ray taken at the follow-up showed the fracture of the electrode near the anchoring site.

**Discussion:** The frequent complications following the spinal cord stimulation are electrode migration and fracture. The damage of the electrode near the anchoring site seems to be caused by the repetitive foldings and unfoldings of the electrode due to the position change. Henderson suggested recommendations to reduce the complication. 1) A needle should be introduced at a fairly low angle using the paramedian technique to minimize the bending angle 2) The entry point of a needle should be high thoracic vertebra (T1-4) for cervical target and lumbar (L1-4) for thoracolumbar target because those spinal segments show the least movement ranges.

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## Paper No: 302.00

### Treatment of acute neurological deficits following spinal surgery, anesthesia, diagnostic punctures and obstetrical procedures

**J. Antonio Aldrete<sup>1</sup>, Nora Godinez<sup>2</sup>, Alfredo Ramirez Bermejo<sup>3</sup>, Ramsis F. Ghaly<sup>4</sup> and Carlos Salgueiro<sup>5</sup>**

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**Introduction:** Neurological deficits continue to follow various procedures that intervene within the vertebral canal. Most of them leave a permanent residual neurological deficit (ND)<sup>1</sup>.

**Objectives:** To determine the success of a modified treatment protocol that would be instituted, as soon as possible, once the neurological deficit that occurred after an invasion of the vertebral canal has been confirmed (by MRI) and its extent has been defined (neurological exam).

**Methods:** 486 adult patients were included in the study. The treatment group contacted one or more of the authors who identified the circumstances of the injury and defined the resultant deficit along with the participating physicians. The latter were advised as to what procedure to follow and maintained contact for consultation. The treatment consisted in the IV infusion of methylprednisolone, lidocaine, diphenhydramine, MgSO<sub>4</sub> and ketamine, in 3 hrs, for 5 days.

**Results:** Considerable improvement was noted in most of the patients. However, those treated before 90 days after the date of the causative event obtained the greatest ND recovery. Of late, to our surprise, even those treated after 24 moths of injury, had some improvement of their ND.

**Conclusions:** The appearance of neurological deficits after interventions into the vertebral canal may be reversed if therapeutic action is instituted. It appears that the sooner the treatment is administered, the greater will be the improvement obtained.

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## Paper No: 303.00

### Cerebrospinal fluid pressure is found to be elevated in patients with arachnoiditis

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**Introduction:** Patients with lumbosacral Arachnoiditis (ARC) complain frequently of severe low back pain, sensory changes in the lower extremities, sympathetic system variances and sphincter dysfunction<sup>1</sup>.

**Objectives:** Since measurement of the CSF pressure in this group of patients has not been reported, it was determined

to measure it in patients with clinically and radiographically (by MRI) diagnosed Arachnoiditis.

**Methods:** In sixteen adult patients, with the clinical and radiological diagnosis of ARC, in whom informed consent was obtained, the CSF pressure was measured in the lateral decubitus position with a water manometer. Midline punctures were made usually in a space where no surgical scars were present. As comparison, CSF pressure was also determined in 16 patients, to undergo surgery, without history of low back pain.

**Results:** The opening pressure in the patients with ARC averaged 37.4 cm of H<sub>2</sub>O with a median variance of 7.2 cm (+/-). In the control group, the average value was 11.4cm with a median variance of 2.8 cm (+/-).

**Conclusions:** The elevated value of CSF pressure noted in patients with ARC may be due to impediment of the CSF return to the brain caused by intradural adhesions and scarring present in patients with ARC. The feasibility that the reabsorption of CSF in this group of patients is decreased by any other mechanism, will need to be determined. This finding may also explain some of the symptoms experienced by patients with ARC.

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## Paper No: 316.00

### The Effect of Stellate Ganglion Block in Patients with Postmastectomy Lymphedema

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**Introduction:** Breast cancer related lymphedema (BCRL) affects approximately 19-41% of the patients with postmastectomy. The onset of BCRL has been known different in patients. About 75% of the patients with postmastectomy occur BCRL within 2 years and about 90% of the patients occur within 3 years. BCRL is thought to be the result from excess fluid accumulation in the interstitial space because the lymphatic drainage system injuries during a mastectomy.

**Objectives:** The aim of this study was to assess effectiveness of stellate ganglion block (SGB) in patients of BCRL. We hypothesized that SGB would decrease in edema of the upper arm and improve the qualities of life.

**Methods:** 27 patients diagnosed with BCRL were included. A diagnostic criteria was that arm circumferences had 2cm or more differences than one place between the affected



arm and the non-affected arm. The arm circumferences measured in an axilla, an upper arm (15cm proximal to the lateral epicondyle), an elbow, a forearm (10cm distal to the lateral epicondyle), a wrist. SGB was performed five times as three days intervals. The results were evaluated in terms of pain intensity as assessed by the visual analog scale (VAS), lymphedema and breast cancer questionnaire (LEBCQ). The arm circumferences were recorded by comparison with before SGB. The statistical analysis was performed with the Wilcoxon signed rank test for analysis inside the groups. Also, we produced ROC curve for analysis cut-off value of SGB.

**Results:** The arm circumferences after stellate ganglion block decreased in all areas (five measured areas,  $P < 0.05$ ). The VAS ( $P = 0.001$ ) and LEBCQ ( $P = 0.002$ ) also decreased significantly. A cut-off value of SGB was 10.8 months.

**Conclusion:** SGB was effective for decreasing of pain and edema in BCRL patients and was improved the qualities of life.

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## Paper No: 322.00

### Spinal epidural abscess after long-term epidural catheterization

Maria Del Carmen Martán Lorenzo and  
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**Introduction:** Potentially fatal complication after epidural catheter insertion is a spinal epidural abscess. It is estimated an incidence of 0.2 to 2.0 of 10.000 admissions. Case report We presented a 45-yr-old woman. Medical history included lumbosciatic and recurrent pain due a L4-L5 lumbar discopathy. She was operated one year ago and was treated with opiod and corticoide without resolution. Later the patient was treated with an epidural catheter. She was readmitted in 4 days with fever, increasing severe back pain and right lower limb with signs of radiculitis. There it was evidence of inflammation, purulent discharge and erythema at the insertion site. The MRI showed an intraspinal hypointense triangular shaped fluid collection with peripheral rim enhancement in previous epidural location, typical of epidural abscess. The intervertebral disc and abscess intraoperative were cultured and negative. The grown of a sample of catheter tip was positive for *S. epidermidis*. It was started empirical antibiotic treatment with ceftriaxone and metronidazole. Antibiotic therapy was changed according to the antibiogram results. It was treated with ceftazidime and vancomycin for

4 weeks. Next day the patient developed a sensory deficit in the left lower limb. It was performed on that day posterior surgical decompression and drainage of a pustular abscess.

**Discussion:** The incidence of spinal epidural abscess formation after epidural catheter placement depends on the presence of predisposing factors. The risk of epidural abscess is increased by prolonged catheterization ( $>3$  days), immunocompromise and multiple attempts at insertion. Back pain is the main complaint during the development of a spinal epidural abscess and it is reported in up to 90% of cases. In this case it was difficult to distinguish epidural abscess from other causes of medullar compression due to the recurrent chronic back pain secondary at discopathy hernia. *S. aureus* is isolated from epidural abscesses in more than 50% of patients who presented. Aerobic and anaerobic streptococci are isolated for approximately 15% of the cases. Gram negative are found in 15% and anaerobes in 2%. In our case the organism isolated was *S. epidermidis*. Due to the good evolution the patient was discharged from hospital on the fourth week of income to continue ambulatory monitoring.

**Conclusions:** Basic aseptic measures are critical for preventing infection through epidural needles. Spinal epidural abscess is a rare and devastating pathology. If it is early recognized and treated it has a favorable prognosis. The delay in diagnosis or inadequate treatment can mean permanent disabilities for patient.

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## Paper No: 337.00

### Incidence and characteristics of pain in children with solid malignant tumors

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**Introduction:** The multidimensionality of the pain experience poses numerous methodological challenges for study of the

incidence of pain. Epidemiological research of malignant pain in children is scarce with often contradictory results.

**Objective:** to investigate the incidence of pain, pain types (somatic, visceral, neuropathic, mixed somatic and neuropathic), pain duration and intensity at the time of diagnosis of SMT.

**Methods:** Retrospective study of 386 children with solid malignant tumors treated in Children's Hospital Zagreb Oncology department during the period 1999.-2008. SMT were divided to three groups : abdominal, musculo-skeletal and tumors of CNS. Intensity of pain was measured by FLACC or VAS at the diagnosis, pain characteristics and duration of pain in days before the diagnosis have been noted. Statistical analysis was made by STATA/IC ver. 11.02 program, normality of variables has been tested by Kolmogorov-Smirnov test, for difference between groups parametric or nonparametric tests were used. Incidences were shown with CI, statistical significance was  $p = 0.05$ .

**Results:** In 386 children there were 230 boys (59.6%) and 156 girls (40.4%). Median age was 7.0 (min 0.1, max 18). There were 147 children (38.1%) with abdominal tumors, 127 (32.9%) with musculo-skeletal tumors, and 112 (29%) with tumors of CNS. Types of pain were somatic in 182 (65.4%), visceral 47 (17%), neuropathic 20 (7.2%), mixed somatic and neuropathic in 17 children (6.2%) and somatic and visceral in 10 (3.6%). Pain intensity at diagnosis was median 6.0 (min 3, max 10) and for all three groups of tumors, there was no statistically significant difference in pain intensity (Kruskal Wallis  $p = 0.65$ ). Duration of pain before the diagnosis was median 30 days (min 2, max 500). The shortest duration of pain was in children with abdominal tumors - median 25.5 days (min 2, max 365), with tumors of CNS median 42.5 days (min 7, max 365), and the longest with musculo-skeletal tumors median 60 days (min 5, max 500), statistically significant difference was found (Kruskal Wallis test  $P < 0.001$ ) Pain incidence was 71.5 % (95% CI 66,7-76); for abdominal tumors was 64.6% (95% CI 56,3-72,3), for musculo-skeletal tumors 83.5% (95% CI 75,8-89,5) and for tumors of CNS 67% (95% CI 57,4-75,6). There was statistically significant difference between incidences of pain in different groups of tumors (X2 test  $p < 0.001$ ).

**Conclusions:** Comparing types, duration and intensity of pain between three groups of solid malignant tumors no difference was found in the intensity of pain, but incidence, duration and types of pain were significantly different in the three groups of tumors.

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## Paper No: 378.00

### Changes in the Life of Chronic Pain Patients Receiving Intrathecal Infusions

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**Introduction:** We assessed how patients suffering from chronic pain experience the changes in life brought by the implantation of an intrathecal drug delivery system (IDDS).

**Objectives:** Intrathecal infusion of opiates is an effective option in the therapy of patients suffering from chronic pain<sup>1</sup>. Because chronic pain leads to severe psychosocial changes, the reduction of pain is not the only criterion of a successful pain therapy. Material and Methods We're treating 32 patients suffering from nonmalignant chronic pain with IDDS (average time of therapy 56 months). These patients have been evaluated with a questionnaire of 20 items, including 18 items of the Glasgow Benefit Inventory (GBI)<sup>2</sup>. The GBI is a generic questionnaire developed especially for otorhinolaryngological interventions, but can also be used - of course with a certain loss of specificity - for other interventions.

**Results:** 80% of the questionnaires were returned. The patients showed in the two subscales "general attitude to life" and "improvement in physical health" a high positive value what means improvement in these categories. In the subscale "relationships with friends and family" the value is still positive but much less distinctive. 27/28 are describing an improvement of the variables "things you do" and "overall life". 24/28 patients assess the pain level better or much better. 18/28 described an improvement of self-confidence. 100% would decide again for an implantation of IDDS. Only eleven patients have shown an improvement of the parameter "social withdrawal", even 25% are reporting an increased withdrawal. Not one patient could return to work.

**Discussion and Conclusions:** IDDS was shown as very effective in reducing the pain level in our patients. Also psychosocial parameters like self-confidence or "life in general" were improved in the majority of our patients. The general satisfaction with IDDS must be very high, if 100% of the

patients would undergo this treatment again. Despite of this nobody of our patient could return to work and 25% of our patients are describing a continued social withdrawal since the implantation of IDDS. So it seems that especially the social changes in life brought by a long history of suffering from pain cannot be neutralized by taking away the pain. Both, the increase of social withdrawal in 25% of our patients and the continued unemployment show the significance of a psychosocial support even after the implantation of IDDS and even after achieving a major pain relief.

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## Paper No: 464.00

### Fluoroscopically-guided lumbar epidural steroid injection versus a blinded technique using the inter-laminar approach for the treatment of chronic axial and radicular low back pain

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**Introduction:** lumbar epidural steroid injections are frequently performed for chronic axial and radicular low back pain. Most practitioners agree to perform the procedure fluoroscopically guided to increase its efficacy and safety; however, in rare clinical situations, X ray exposure is not an option, so a traditional epidural injection technique has to be used, being a blind technique; however, some clinicians dispute the clinical relevance of those advantages with regard to patients improvement.

**Objective:** to compare pain, complications and functional outcomes after blind and fluoroscopically guided lumbar epidural steroids injections. Material and methods: 140 patients with low back and radicular pain were randomly assigned to get a lumbar epidural steroid injection fluoroscopically-guided or through a standard loss of resistance to injection technique. The primary outcome measure was the 5 point difference in the functional scale determined between day 0 and day 90. Secondary outcome measures were the intensity of pain, a variation of 30% with respect to the starting value in the scale (0 to 10) of pain was considered meaningful. Roland Morris disability questionnaire, visual analogue scores for pain and patients' satisfaction with treatments received were obtained prior to commencement of the

study and at 15 and 90 days after procedure. Patients and evaluator were blinded to the technique used. The data analysis was designed with a multiple regression model to which variables determined the results in the fluoroscopy group after 15 and 90 days.

**Results:** After 3 months the improvement in the functional assessment was not found to depend significantly on the intervention group ( $p = 0,232$ ). No significant differences were found in the pain assessment at rest between the two groups of intervention at 15 days ( $p = 0,44$ ) and 90 days ( $p = 0,6117$ ) and no significant differences in response to pain assessment on movement at 15 days ( $p = 0,656$ ) and 90 days ( $p = 0,792$ ). Analgesic requirements were not found to significantly depend on the intervention group ( $p = 0,691$ ). Satisfaction measured after 15 and 90 days was not found to depend significantly on the intervention group.

**Keywords:** back pain; fluoroscopy; steroid; functional recovery; blind technique

## Paper No: 583.00

### Basic Pain Education

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Kenyatta National Hospital

The IASP Developing Countries Education grant for pain education has previously come to Kenya twice. This grant is the 3rd one, and attempts are made to determine the magnitude of change this pain education has achieved. From the results we give suggestions on how to sustain basic pain education with minimum resources.

We carry out two trainings in basic pain education. We invite participants to come for a one day basic pain education based on lectures and discussions. There is a pre and a post training questionnaire to assess the current status and immediate impact of this education. Participants are then asked to commit to be team leaders in their institutions, continuing on pain education and to form pain teams after this course. A follow up questionnaire is done at one, two, three, six and twelve months. Initial follow up finds that only 32% are educating their members in Pain at one month. This is expected to decrease with time. The reasons for this low uptake are identified, discussed and possible solutions suggested making future pain education more effective, in the developing world. The most important is having the health sector, medical professional bodies and teaching institutions make pain education a basic requirement in training and adopting pain as the 5th vital sign. Acknowledgements: IASP for awarding the funds three times to Kenya for the betterment of pain education. The Kenyatta National Hospital, Nairobi for its leading role during the pain education initiative. The Kenya Palliative Care Association, for providing resource persons and direction. The Kenyan Chapter of IAP

for the support. The Kenya Society of Anaesthesiologists for proving the leadership during this initiative and making pain one of its major Continuing Medical Education topics for the next five years. ETHICS, LAW, ECONOMICS and EDUCATION

**Keywords:** Basic; Pain; Education; Uptake; Services

## Paper No: 602.00

### Comparing Midline vs. Lateral Parasagittal Approach during Fluoroscopically-Guided Interlaminar Lumbar Epidural Steroid Injection

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**Introduction:** Midline interlaminar (MIL) and transforaminal (TF) lumbar epidural steroid injections (LESI) are two accepted treatments in the conservative care of low back pain with radiculopathy secondary to lumbar disk disease. Objectives: The purpose of this study is to compare these two approaches (midline and parasagittal) during interlaminar lumbar epidural steroid injection (LESI).

**Methods:** After IRB approval we included 44 patients with history of unilateral lumbosacral radiculopathic pain, undergoing LESI. We included patients with lumbar disk disease including disk herniations, bulging discs, and degenerated discs (confirmed by MRI). The patients who had discogenic pain without radiculopathic pain, history of previous spinal surgery and LESI (s) in the past year, allergy to methylprednisolone, or lidocaine, or iodine-based contrast, concurrent use of systemic steroid medications or opioid habituation were excluded from the study. Every patient received the same medication (120 mg (2mL) of methylprednisolone acetate along with 1mL of normal saline solution and 1mL of lidocaine 1%), but they were randomly assigned to one of two groups, based on the approach: group I (22 patients) – got LESI using midline (MIL) approach, and Group II (22 patients) – got LESI using parasagittal interlaminar (PIL) approach. The pain scores (on the 11-point numeric rating scale [NRS] were recording at rest and during movement 20 minute before procedure, and on days 1, 7 and 28 after the injection. Statistical analysis was performed using SPSS software (SPSS 15.0, Chicago, IL).

**Results:** There was no difference between these two groups with respect to age, gender, height, weight or duration of symptoms. The average pain score on the 11-point Numeric Rating Scale (NRS) before injection was  $5.4 \pm 2.1$  at rest and  $7.1 \pm 2.6$  during movement in the MIL group, and  $5.1 \pm 2.8$  at rest and  $7.6 \pm 2.4$  during movement in the PIL group. LESI (both approaches MIL and PIL) clinically

and statistically significantly reduced unilateral lumbosacral radiculopathic pain at rest and during movement. However, the improvement over the time was better in the PIL group. Statistical significance for NRS at rest was 0.026 in the PIL group, and 0.044 in the MIL group. Statistical significance for NRS during movement was 0.005 in the PIL group ( $p < 0.001$  highly statistically significant), and 0.019 in the MIL group.

**Conclusions:** Even though both groups of patients had significant improvement, the parasagittal approach was slightly more effective than the midline approach in targeting low back pain with radiculopathy secondary to lumbar disk disease.

## Paper No: 603.00

### The Role of Concordant Pressure Paresthesia in Determining Outcome during Fluoroscopically-Guided Lumbar Epidural Steroid Injection

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**Background:** Lumbar epidural injection of corticosteroids (LESI) is one of the most commonly performed interventional pain management procedures in the United States.<sup>1-4</sup> Objectives: Our hypothesis was that a pressure paresthesia occurring during the LESI in the same distribution of the radicular pain will give prognostic information. The use of lidocaine in the injected solution may also be an indicator of proper achievement of medication target, thus increasing the likelihood of an improved outcome toward pain resolution.

**Methods:** Forty four consenting adult patients undergoing LESI for radicular low back pain were prospectively assigned randomly, in single-blind fashion, to one of two groups: Group I (22 patients) – got LESI using midline (MIL) approach, and Group II (22 patients) – got LESI using parasagittal interlaminar (PIL) approach. The patients were asked to need to confirm whether pressure paresthesia was in distribution of “usual and customary pain” or it was distinct from “usual and customary pain”. They were also asked to grade a pressure paresthesia on the scale from 0 to 3 (0 = no paresthesia, 1 = mild, 2 = moderate and 3 = severe paresthesia) ipsilaterally and contralaterally. Statistical analysis was performed using SPSS software (SPSS 15.0, Chicago, IL).

**Results:** There was no statistically significant difference between these two groups with respect to age, gender, height, weight or duration of symptoms ( $p > 0.05$ ). Most of the patients with PIL approach had pressure paresthesia in the distribution of usual and customary pain (82%), and



only 32% of patients from MIL group ( $p = 0.002$ ). Most of the patients from PIL group felt moderate to severe paresthesia ipsilaterally (18 out of 22), and only one patient had no paresthesia. However, in the MIL group most of the patients had either no paresthesia or mild paresthesia (19 out of 22), and only three of them had moderate or severe paresthesia. The difference between these two groups was highly statistically significant ( $p < 0.0001$ ). There was no statistical significant difference in contralateral paresthesia between these two groups ( $p = 0.068$ ).

**Conclusion:** We are also expecting that a pressure paresthesia occurring during the LESI in the same distribution of the radicular pain and could be used as an indicator of proper achievement of medication target, thus increasing the likelihood of an improved outcome toward pain resolution.

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## Paper No: 604.00

### The Effect of Lumbar Epidural Steroid Injections on Quality of Life and Everyday Functionality

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**Background:** Even though evidence for efficacy of lumbar epidural steroid injections (LESI) is limited, especially, for long-term improvement in pain and functionality, this is one of the most commonly performed interventional pain management procedures in the United States.<sup>1-3</sup>

**Objectives:** Since there is no much data regarding the everyday functionality improvement after LESI, the purpose of this study is to evaluate the effect of interlaminar lumbar epidural steroid injections (LESI) on quality of life and everyday functionality and to compare midline and parasagittal approach during LESI.

**Methods:** After Advocate Healthcare IRB approval of the protocol, written informed consent was obtained from 44 adult patients scheduled to undergo LESI for radicular low back pain. All patients received 120 mg (2mL) of methylprednisolone acetate along with 1mL of normal saline solution and 1mL of lidocaine 1%. This was a single-blinded randomized study. The patients were randomly assigned to one of two groups, based on the approach: group I (22 patients) – got LESI using midline (MIL) approach, and Group II (22 patients) – got LESI using parasagittal interlaminar (PIL) approach. All patients completed the Oswestry Low Back Pain

questionnaire before injection and on days 1, 7 and 28 after injections. This questionnaire has been designed to give the information how the patients' back pain has affected their ability to manage in everyday life. The sections concern impairments like pain, and abilities like personal care, lifting, walking, sitting, standing, sleeping, social life, sex life and traveling. Statistical analysis was performed using SPSS software (SPSS 15.0, Chicago, IL).

**Results:** Our results showed that there was no difference in the basal Oswestry Low Back Pain (OLBP) score between the PIL and MIL group ( $21.25 \pm 7.60$  vs.  $19.50 \pm 5.13$ ). Both groups showed improvement in their everyday activities and quality of life. However, the differences between OLBP scores between baseline and days 1, 7 and 28, was statistically significant only in the PIL group ( $p = 0.037$ ). There was no statistically significant difference between OLBP scores between different time points in the MIL group ( $p = 0.145$ ). **Conclusion:** Even though both groups of patients had improvement in their quality of life and everyday functionality, our results have showed that parasagittal approach was more effective than the midline approach in patients with unilateral lumbosacral radiculopathic pain.

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## Paper No: 643.00

### The usefulness of CT guided percutaneous cordotomy in comparison with fluoroscopic guided cordotomy

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**Introduction:** Percutaneous cordotomy (PCC), the interruption of nociceptive pathways in the anterolateral column of spinal cord, is used for the treatment of refractory cancer pain. It is crucial to insert an electrode precisely into the anterolateral column to get pain relief and prevent complications. Two methods, fluoroscopy and CT guided PCC (F-PCC and CT-PCC) have been adopted to guide an electrode.

**Objectives:** We compared the effect and complications between F-PCC and CT-PCC

**Methods:** Fifteen cases of F-PCC were performed in 14 patients (cervico-thoracic region 3, thoracic region 2, lumbosacral region 10). Fifteen cases of CT-PCC were performed in 10 patients (cervico-thoracic region 1, thoracic region 2, lumbosacral region 7). F-PCC was performed with the method described by Rosomoff et al, and CT-PCC by Kanpolat et al.

In F-PCC, the target point of the electrode insertion into the spinal cord is just at the same level, or slightly ventral (within 1-2mm), of dentate ligament, visualized with the injection of contrast medium in lateral view of fluoroscopy. In CT-PCC, an electrode is inserted in the anterolateral column of the spinal cord, visualized following the injection of contrast medium in the subarachnoid space. Confirmation of the position of the electrode with electrical stimulation and the coagulation of the spinal cord were performed with same method. The change of nociception corresponding to the painful region and the grasping power of hand ipsilateral to PCC were noted in each group.

**Results:** With CT-PCC, analgesia of the targeted painful region was obtained in all cases (15/15), and decrease of the grasping power (more than 25% decrease of preoperative value) occurred in no cases (0/15). On the other side, analgesia of the targeted painful region was obtained in 9 cases (9/15), and decrease of the grasping power occurred in 3 cases with F-PCC (3/15).

**Discussion:** This study showed that an electrode can be located in the targeted point more precisely with CT-PCC than F-PCC. Experience with CT-PCC shows that spinal cord is not always located in the middle of spinal canal: its position changes with neck position, rotated and pushed with an electrode. These results show that information from fluoroscopy is not sufficient to insert an electrode in the targeted point.

**Conclusion:** This study shows that CT-PCC method is superior to F-PCC method in respect of the precise location of an electrode.

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## Paper No: 650.00

### Chemical rhizotomy to relieve perineal pain of neoplastic origin

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**Introduction and Objectives:** We report the successful treatment of severe perineal pain in a patient with unresectable carcinoma of the rectum by intrathecal neurolysis using phenol-glycerol. The aim of this paper is to evaluate the effectiveness of chemical rhizotomy to relieve pain and reduce the requirement of systemic opioids.

**Case report:** On June 2011 a 64 - year - old man with rectum adenocarcinoma was admitted to the Pain Clinic for refractory pain. He has a story of advanced rectal adenocarcinoma that requires a colostomy to manage bowel obstruction. On admission to our hospital he complained of constant,

severe perineal pain with difficulty to maintain a sitting position in addition to rectal tenesmus. Despite being on oral morphine 160 mg/day with adjuvant drugs the analgesia is not achieved. An increase in the opioid dose is not considered due to confusion and severe nausea episodes. After discussing the risks and benefits of intrathecal neurolytic block with the patient it is performed as analgesic treatment. A subarachnoid saddle block with 2.5 mg of hyperbaric bupivacaine is held 48 hours prior to neurolytic block achieving total pain relief. On day 3 of admission subarachnoid puncture was performed placing the patient in a sitting position and focusing on the L5 S1 intervertebral space with a 20 G needle through a median approach. 0.5 ml of 6% phenol in glycerol was slowly injected having the patient lean in a 45 - degree inclination immediately thereafter to make sure that hyperbaric phenol is deposited only in the posterior sensorial roots. Satisfactory analgesia is achieved ranging from a pre-procedure pain intensity of 8/10 to 3/10 within 24 hours. The morphine dose was reduced to 40 mg/day and on day 4 the patient was discharged remaining comfortable at home so far.

**Discussion:** 10 to 20% patients with advanced cancer have refractory pain and can benefit from invasive procedures such as neurolytic blocks. 6% phenol - glycerol is a non selective neurolytic which causes protein denaturation and subsequent necrosis because of perineurial blood vessel injury. It plays an important role in the management of painful syndromes with oncologic origin that affect the perineal region. Indications for intrathecal neurolysis should include patients with short life expectancy (one year or less) since adverse effects may be present.

**Conclusions:** Chemical rhizotomy may be an effective therapy for achieving rapid pain control, reduce systemic opioids and improve quality of life.

## Paper No: 672.00

### Interaction between intrathecal tianeptine and cyclooxygenase-2 inhibitor in a rat model of inflammatory pain

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**Introduction:** Tianeptine exhibited antinociception in the tail-flick, hot-plate test, and the formalin test of rats. Selective inhibitors of cyclooxygenase (COX)-2 are one of the most widely used analgesics. For the development of a multi-targeted drug strategy which may decrease the side effect profile, the characteristics of interaction between the agents should be demonstrated. Objectives: We evaluated the interaction between the tianeptine and DUP-697, a COX-2 inhibitor, in the formalin test. Methods: Male Sprague-Dawley rats were prepared for intrathecal catheterization.

Pain was evoked by injection of formalin solution (5%, 50  $\mu$ L) into the hindpaw. After examination of the effects of intrathecally administered tianeptine and DUP-697, the resulting interaction was investigated with isobolographic and fractional analyses.

**Results:** Intrathecal tianeptine produced a dose-dependent reduction of the flinching response during phase 1 and phase 2 in the formalin test. Intrathecal DUP-697 also suppressed the flinching response during both phases, but the extent of change was not statistically different over the range of administered dosage in phase 1, and the dose dependency was apparent in only phase 2. The ED<sub>50</sub> values (95% confidence intervals) of tianeptine were 68.5 mg (24.3–192.9) and 171.3 mg (110.7–265.2) for phase 1 and 2, respectively, and that of DUP 697 for phase 2 was 79.4 mg (22–286.3). Isobolographic analysis revealed an additive interaction between the tianeptine and DUP-697.

**Conclusion (s):** Tianeptine and DUP-697 effectively relieved inflammatory pain in rats. The combination of tianeptine and COX-2 inhibitor may provide additional benefits for the management of inflammatory pain.

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## Paper No: 673.00

### Analgesic mechanism of intrathecal tianeptine in a rat model of inflammatory pain

**Woong Mo Kim, Hyung Gon Lee, Seong Heon Lee, Cheol Won Jeong and Jeong Il Choi**

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**Introduction:** Tianeptine exhibits a neurochemical properties distinct from classic antidepressant. However the analgesic activity of tianeptine has not been studied at the spinal level.

**Objectives:** We evaluated the antinociception of tianeptine and the mechanism of its action regarding the serotonergic, adrenergic, and glutamatergic transmission, at the spinal level.

**Methods:** We examined the effect of intrathecal administration of dihydroergocristine, prazosin, yohimbine, and t-PDC, the serotonergic,  $\alpha$ -1,  $\alpha$ -2 adrenergic antagonists, and glutamate transporter inhibitor, respectively, on the effects of tianeptine in the formalin test.

**Results:** Intrathecal tianeptine reduced the flinching in the formalin test during phase 1 and 2 in a dose-dependent manner. Prazosin and yohimbine attenuated the antinociceptive effect of intrathecal tianeptine during both phases, whereas dihydroergocristine reversed the antinociception of tianeptine only in phase 2. Meanwhile, t-PDC did not affect the analgesic effect of tianeptine in both phases.

**Conclusions:** Intrathecally administered tianeptine effectively relieved inflammatory pain in rats. The adrenergic transmissions are involved in the activity of tianeptine on the facilitated state as well as acute pain at the spinal level, whereas serotonergic system is related only to the facilitated pain. Glutamatergic transmissions may not contribute to the analgesic activity of tianeptine in the spinal cord.

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## Paper No: 696.00

### Antinociceptive effect of NMDA receptor antagonist and opioid receptor agonist on vincristine-induced peripheral neuropathy in rats

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**Background:** Vincristine-induced peripheral neuropathy is a major dose limiting side effect. The mechanisms underlying this dose-limiting side effect are currently unknown and there are no validated drugs for its control. The aim was to study the involvement of opioid and NMDA receptor on vincristine-induced peripheral neuropathy model in rats. Methods: Male Sprague-Dawley rats weighing 220–240g were used in all experiments. Rats subsequently received daily intraperitoneal (i.p.) injections of either vincristine sulfate (0.1 ml/kg/day i.p.) or saline (0.1 ml/kg/day i.p.) over 12 days, immediately following behavioral testing. For assessment of mechanical allodynia, mechanical stimuli using von Frey filament was applied to the paw and measured a withdrawal threshold. The effects of N-methyl-D-aspartate (NMDA) receptors antagonist (memantine; 2.5, 5, 10 mg/kg i.p.), opioid agonist (morphine; 2.5, 5, 10 mg/kg i.p.) and vehicle (saline) were evaluated.

**Results:** Mechanical allodynia developed over the course of ten daily injections of vincristine relative to groups receiving saline at the same times. Intrapertoneal morphine reduced significantly the paw withdrawal threshold compared to vehicle and produced dose-responsiveness. This effect was blocked by naloxone. Only highest dose of memantine (10 mg/kg) was able to increase the mechanical threshold and returned to basal values. Subanalgesic doses of morphine (2.5 mg/kg) and memantine (2.5 mg/kg) produced an additive effect on mechanical allodynia reaching an antinociceptive effect.

**Conclusions:** Our results confirm that: the activation of opioids receptor produced analgesia; the blockade of NMDA receptors produce antinociception at high doses and low doses of memantine enhancing the effect of opioids.

**Paper No: 738.00****Supraspinal glial ontogenic rat differences following chronic morphine administration**

**Dusica Bajic Charles, B. Berde Kathryn and G. Commons**

The midbrain ventrolateral periaqueductal gray (vLPAG) is a prominent site of systemic morphine's analgesic actions, and neuroplasticity in the vLPAG appears critical for the development of tolerance [1,2]. Also, glial activation was implicated in antinociceptive tolerance to morphine in adult rat [3-5], but its role in developing brain is unknown. The main objective of the present study was to identify glial adaptations in the vLPAG following chronic administration of morphine with age. We hypothesized enhancement of morphine-induced glial gene expression and immunohistochemical labeling in adult but not developing brain at the postnatal day (PD)7 age.

Two ages (newborn and adult) and two groups were analyzed: (1) control, injected with normal saline, and (2) chronic morphine (tolerant) group. Animals received either morphine (10 mg/kg) or equal volume of normal saline subcutaneously twice daily for 6  $\frac{1}{2}$  days. On the PD7 (newborn) or estimated PD65 (adult), vLPAG was dissected one hour following the last injection. Tissue blocks of vLPAG from different animals comprising the same group (n = 5/group for adult rats, and n = 5-8/group for PD7 rats) were processed together for total RNA isolation prior to processing Rat Toll-Like Receptor Signaling Pathway PCR Array (SABiosciences, MD; n = 3 arrays/group). Second set of animals was processed for immunohistochemical identification of glia using astrocytic (GFAP) or microglial (Iba-1) markers (n = 5-6/group).

In the adult rat vLPAG, tolerance is associated with >100% upregulation of Hspa1a, Ifnb1, and Il10 gene expression, >50% upregulation of Tlr4, as well as statistically significant upregulation of Il6 and downregulation of Lta and Tnf genes expression. These genes encode for Heat shock 70kD protein 1A, Interferon beta 1, Interleukin 10 Toll-like receptor 4, Interleukin 6, and Tumor necrotic factor member 1 and 2, respectively. In the PD7 rat, Ifnb1 and Lta were upregulated, while Tlr5 was downregulated >100%. Anatomical analysis revealed astrocytic but not microglial hypertrophy as demonstrated by increased % area and % intensity of GFAP-labeling in vLPAG (n = 6/group). No anatomical changes were found in PD7 rat between treatment groups.

At the vLPAG, opioid tolerance is associated with differential glial gene and immunohistochemical expression changes between adult and PD7 rat. Anatomical analysis implicates astrocytes, but not microglia to be activated in the vLPAG following chronic administration of morphine in the adult rat. Findings are highly suggestive of differential supraspinal glial mechanisms of opioid tolerance between adult and PD7 rat. Presented data might have implications for differential pain treatment with age.

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**Paper No: 775.00****Spinal Cord Stimulation for post-operative chronic pain patients in the cervical area**

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**Introduction:** Spinal cord stimulation is usually performed by the placement of the electrode in the posterior epidural space. But in the case of post-operative chronic pain patients in the cervical area, electrode placement is difficult by the strong adhesion in the posterior epidural space. We studied the pain relief effects of ventral nerve roots stimulation by the placement of the electrode in the anterior epidural space.

**Objectives:** After obtaining institutional ethical committee permission, 5 cervical post-operative chronic pain patients were selected and informed consent was obtained. **Methods:** Electrode of spinal cord stimulation was inserted into anterior epidural space and pain relief effects were evaluated after electric stimulation.

**Results:** All patients experienced satisfactory pain relief after electric stimulation.

**Conclusions:** Electric stimulation of ventral nerve roots showed satisfactory pain relief in the post operative cervical pain patients even in the strong adhesion in the posterior region.

**Paper No: 780.00****Contributing factors of postoperative chronic pain**

**Lilit Museyan Magda, Yeghiazaryan Marina and Mardiyan Mane Jilavyan**

**Introduction:** Contributing factors of postoperative chronic pain (PCP), surgical interventions potentially causing PCP and factors closely related to the latest are subject of great



debate in modern medicine (D. Roubotem - Lester, 2007). Aim. To evaluate contributing factors of PCP after abdominal surgery.

**Materials and methods:** This two year study considers 267 patients (17.6% females, 82.4% males), who underwent abdominal surgery. 15.4% of patients developed PCP. Patients were divided into three groups according to the type of surgery. I group consisted of patients who underwent cholecystectomy (n = 84), II group - hernioplasty (n = 108), and III group - appendectomy (n = 75). The following factors of PCP were evaluated: peritonitis, coexisting diseases, postoperative complications, type of anesthesia, location of incision, character of pain and duration of the surgery. Part of mentioned data was collected partially from patients' charts and information about PCP was obtained through phone consults. Collected data was processed, and analyzed using  $\chi^2$ -test in order to find any correlation between all these factors.

**Results:**  $15.5\% \pm 3.9$  (n = 13),  $18.5\% \pm 3.7$  (n = 20) and  $10.7\% \pm 3.6$  (n = 8) of patients in I, II and III groups respectively suffered from PCP. The type of incision and the character of pain affected the occurrence of PCP in I group ( $\chi^2 = 15.8$ ; P = 0.003 and  $\chi^2 = 31.26$ ; P = 0.0001 respectively), as well as in II ( $\chi^2 = 5.9$ ; P = 0.04 and  $\chi^2 = 6.4$ ; P = 0.04 respectively) and III groups ( $\chi^2 = 10.2$ ; P = 0.04 and  $\chi^2 = 10.5$ ; P = 0.02 respectively). Adversely, coexisting diseases didn't affect the occurrence of PCP in all three groups (I group -  $\chi^2 = 0.92$ ; P = 0.3, II group -  $\chi^2 = 0.09$ ; P = 0.9, III group  $\chi^2 = 0.9$ ; P = 0.3): The presence of peritonitis ( $\chi^2 = 19.5$ ; P = 0.0001) and the duration of surgery ( $\chi^2 = 13.7$ ; P = 0.04) influenced on the occurrence of PCP in the I group, while the type of anesthesia ( $\chi^2 = 0.23$ ; P = 0.5) and the presence of postoperative complications did not ( $\chi^2 = 0.3$ ; P = 0.5): The type of anesthesia ( $\chi^2 = 1.7$ ; P = 0.4 and  $\chi^2 = 1.6$ ; P = 0.2 respectively), peritonitis ( $\chi^2 = 0.6$ ; P = 0.5 and  $\chi^2 = 0.5$ ; P = 0.5 respectively), presence of postoperative complications ( $\chi^2 = 0.09$ ; P = 0.7 and  $\chi^2 = 0.3$ ; P = 0.5 respectively), and the duration of surgery ( $\chi^2 = 0.1$ ; P = 1.0 and  $\chi^2 = 3.1$ ; P = 0.2 respectively) did not affect the incidence of PCP in II and III groups.

**Conclusions:** The factors affecting the incidence of PCP after abdominal surgery were the type of incision and the character of pain. Adversely, type of anesthesia, postoperative complications, duration of surgery and the presence of coexisting diseases didn't have influence on PCP. Presence of peritonitis and duration of surgery influenced the incidence of PCP only after cholecystectomy. Thus, investigation of predisposing factors of PCP can play an important prophylactic and economically beneficial role in abdominal surgery.

**Paper No: 787.00**

### Prevention of postoperative chronic pain Is it possible, or not?

Lilit Museyan Magda, Yeghiazaryan Marina and  
Mardiyan Mane Jilavyan

**Introduction:** Anticonvulsants are widely used for treatment of chronic pain, however there is a lack information about their preventive effects.

**Aim:** The aim of the study is to evaluate the effectiveness of Tebapentine for prevention of postoperative chronic pain (PCP).

**Materials and methods:** A double blind randomized case-control observational study was conducted which was carried out in two stages. The first stage included data collected from November 2010 to April 2011. Incidence of PCP, its contributing factors and severity was evaluated among 400 patients who underwent abdominal, lower limb, breast and rectal surgeries. The possible risk factors included peritonitis, coexisting diseases, location of surgical incision, type of anesthesia, type of surgery, its duration and postoperative analgesia. The second stage of the study included patients who, according to the first stage, were more prone to develop PCP during the first 24 hours after surgery. The patients were randomly selected and given 300 mg Tebapentine 2 hours before extubation, and then two more doses q 8 hours. In two months after beginning of second stage there were 19 and 17 patients in control group and placebo group respectively. We plan to collect information about existence, intensiveness, character and duration of PCP as well as effectiveness of analgetics in 1, 3 and 6 months by phone. Statistical analysis will be conducted using  $f\hat{O}2$ -test, while contributive factors will be evaluated by ANOVA.

**Results:** According to the data of the first stage location of the surgical incision and diagnosis may have positive impact on PCP after herniotomy ( $f\hat{O}2 = 5.9$ ; P = 0.004 and  $f\hat{O}2 = 4.07$ ; P = 0.03 respectively) and cholecystotomy ( $f\hat{O}2 = 15.8$ ; P = 0.003 and  $f\hat{O}2 = 7.54$ ; P = 0.02), while after appendectomy only the location of incision ( $f\hat{O}2 = 10.2$ ; P = 0.04), and the duration of tube placement ( $f\hat{O}2 = 8.8$ ; P = 0.05). Coexisting diseases and type of anesthesia have no impact on PCP after herniotomy ( $f\hat{O}2 = 0.09$ , P = 0.9 and  $f\hat{O}2 = 1.66$ , P = 0.4 respectively) cholecystectomy ( $f\hat{O}2 = 0.9$ , P = 0.3 and  $f\hat{O}2 = 0.23$ , P = 0.5) and appendectomy ( $f\hat{O}2 = 0.9$ , P = 0.3 and  $f\hat{O}2 = 1.6$ , P = 0.2). The duration of the surgery has no impact on PCP after herniotomy ( $f\hat{O}2 = 0.11$ , P = 1.0) and appendectomy ( $f\hat{O}2 = 3.06$ , P = 0.2) except for cholecystectomy ( $f\hat{O}2 = 13.7$ , P = 0.004). Peritonitis is a possible impact only after cholecystectomy ( $f\hat{O}2 = 19.5$ , P = 0.0001). No PCP was revealed after hemorrhoidectomy (n = 60). Recruitment of patients for the second stage is not completed yet, therefore the data is not presented.

**Conclusion:** In case of positive effect of Tebapentine it will be possible to prevent PCP, thus decreasing its extension and impact of contributing factors, which has important medical, socioeconomic and humanitarian value.

**Paper No: 981.00**

### Chronic pain syndrome after knee arthroscopy in patients with PTSD

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**Introduction:** Development of Chronic Pain Syndrome (CPS) leads to disability. Posttraumatic Stress Disorder (PTSD) has been reported to be associated with CPS. An acute perception of pain in patients with PTSD is poorly understood. (1. 2 ) We hypothesize that Army Veterans with PTSD are at risk of developing CPS after elective surgery.

**Objectives:** To identify factors, contributing to the development of CPS in Veterans after elective surgery.

**Methods:** After IRB approval, the medical records of Veterans (18-50 years old), who underwent elective ambulatory Knee Arthroscopy at a single Veteran's hospital in 2006 – 2010 have been reviewed. The gathered data included: demographics, ASA class, comorbidities, preoperative chronic use of opioids and analgetics, type and length of surgery, type of anesthesia, anesthesia medications, perioperative doses of opioids before discharge; and an opioid consumption at 3 months after the surgery, what was considered as a post-operative CPS. Two-sample Student's t-test was used to analyze the data. All p values are two-sided. An alpha level of 0.05 was considered statistically significant. Data reported as mean  $\pm$  standard deviation (SD) or n (%).

**Results:** Total of 147 patients (age  $39 \pm 8$  yo, males = 87%, whites = 76%, blacks = 15%) were identified, with 32% incidence of PTSD, which was strongly associated with female gender ( $p = .03$ ), chronic use of opioids preoperatively ( $p = .0006$ ), higher requirement of opioids in the recovery room ( $p = .001$ ), and higher CPS postoperatively ( $p = .0004$ ), compared to non-PTSD. Development of the postoperative CPS was associated with female gender ( $p = .04$ ), higher ASA class ( $p = .006$ ), PTSD ( $p = .0004$ ), psychiatric disease ( $p < .0001$ ), preoperative CPS ( $p < .0001$ ), use of illicit drugs ( $p = .005$ ), and chronic preoperative use of opioids ( $p = .0001$ ).

**Discussion:** This retrospective study suggests that Army Veterans with psychiatric disorders, PTSD, illicit drugs use, and chronic opioid use have a higher risk of developing post-operative CPS.

**Conclusions:** Further prospective studies are required to elucidate the incidence and mechanisms of developing of post-operative CPS in patients with PTSD.

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## Paper No: 1000.0

### Spontaneous vertebral reduction during the procedure of kyphoplasty in a patient with Kummell's disease

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**Introduction:** Kummell's disease is a spinal disorder characterized by delayed post-traumatic collapse of vertebral body with avascular necrosis. Although definitive treatment for this disease has not been established, it has been reported that percutaneous vertebroplasty or kyphoplasty showed good results. However, these procedures were not recommended in cases of severely collapsed vertebral bodies because of the risk of cement leakage or the technical difficulties. We report a rare case of spontaneous reduction of vertebral height during the insertion of working cannula into the collapsed vertebral body with Kummell's disease.

**Objectives:** In this report, authors planned to show the effectiveness and safety of kyphoplasty for the severe vertebral compression fracture in Kummell's disease.

**Methods:** Authors performed kyphoplasty for the very severe vertebral compression fracture in Kummell's disease.

**Results:** Spontaneous reduction of the height of vertebral body happened while inserting the working cannula into the fractured vertebral body.

**Conclusions:** We report a rare case of spontaneous reduction of vertebral height during the insertion of working cannula into the vertebral body with Kummell's disease.

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## Paper No: 1001.0

### Epidural injection method for the treatment of symptomatic sacral perineural (Tarlov) cysts

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**Introduction:** Sacral perineural (Tarlov) cysts are usually asymptomatic and detected incidentally on CT or MRI scans for other medical conditions. But sometimes they provoke pain or neurologic symptoms by compressing nearby nerve roots or sacral bones. To treat these problems, Surgery or aspiration methods have been performed but they are often ineffective and may cause severe complications. Also there are no treatment guidelines and randomized controlled trials for the treatment of symptomatic perineural cysts.

**Objectives:** This case report shows that epidural injections of steroid and a high volume of local anesthetic agent reduced symptoms caused by perineural cysts.

**Methods:** Case 1; A 44-year-old woman complained perineal and peri-anal burning pain. It started 5 years ago with no apparent reason and it aggravated after 2 years. The pain got worse during defecation and was irrelevant to positional change. And it caused her awake on her bed at night. Case 2; A 33-year-old male programmer presented at our pain clinic for severe pain in perineal and scrotal area with clamping pain and tingling sense in both buttocks. Those symptoms started after 3 days of strenuous work. His VAS was 9 and he could not get back to work because his pain got aggravated when he sit on a chair for more than 30 minutes and alleviated with standing. After examinations and diagnostic blocks, Authors thought that sacral perineural cysts caused their problems. Procedures; Under the fluoroscopic guidance, we inserted 25 gauge spinal needles into the sacral foramina in both sides. Confirming the epidural space as the dye dispersed in this area, we injected 8 ml of 0.19% ropivacaine and a mixture of 2 ml of 0.19% ropivacaine and 10 mg of triamcinolone in each side. After a week of this procedure, problems got lessened, so we repeated this 3 more times in every 2 weeks.

**Results:** Patients got much pain relieved (from 8~9 of visual analogue scale to 1~2) and discomfort (a patient could get back to work) after 4 times of epidural injections.

**Conclusions & Discussions:** We report 2-cases of problematic sacral perineural cysts that are effectively treated with repeated epidural injections with a high volume of local anesthetic and steroids. This epidural injection method can be one of the non-invasive modalities for the treatment of symptomatic sacral perineural cysts.

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## Paper No: 1037.0

### Organized treatment of chronic pain in the first multidisciplinary pain center in Macedonia

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**Introduction:** Chronic pain patients are physiologically, psychologically and socially destroyed, stigmatized and intoxicated by different medications and treatments.

**Objectives:** The main objective of our multidisciplinary pain center, consisted of highly specialized doctors, was to show

the positive results in the diagnostics and treatment of chronic pain syndromes.

**Methods:** During our 1 year of existence, 98 patients were eligible for this study, 41% male and 59% female, with mean age of 38 years and range of years 18-86. All patients were diagnosed by 64 multisliced computer tomography and/or nuclear magnetic resonance. Most frequently treated syndromes were: degenerative diseases of musculoskeletal system, spine and joints (34 pts.); osteoporosis (13pts.); malignant diseases (11pts.); metabolic, toxic, vascular and endocrine polyneuropathies (22pts.); cervical, lumbal spondylosis and discus hernia (18pts) (Table 1). Patients were treated according to the guidelines provided by the European task force for pain treatment (1), the medications (2,3) used were: NSAID, corticosteroids, polyvitamins, tranquilizers, serotonin selective reuptake inhibitors, opioid and nonopoid anesthetics, loco-regional anesthesia, TENS, bisphosphonates, intraarticular drug applications. To assess the grade of pain a pain score scale was used (numerical scale 1-10). The pain was defined as mild (1-3 score), moderate (4-6 score) and severe (7-10 score). Results: According to the "pain score scale" our treatments reduced 60% of the pain in a period of approximately five days and accomplished to put the pain under control. Most resistant on drug treatment were cancer patients, older patients, patients with osteoporosis, and patients whose illness lasted for years. Best results in reducing pain showed patients with degenerative diseases of musculoskeletal system, spine and joints; and patients with metabolic, toxic, vascular and endocrine polyneuropathies (Table 2).

**Conclusion:** A multidisciplinary approach in the treatment of chronic pain seems very reasonable and successful. The cost benefit of our professional pain treatment has big social, health and financial success for the patients and as well as for the community.

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## Paper No: 1072.0

### The lower extremity sympathetic blocks visualized and controlled by light

**Aleksejs Miscuks, Mikhail Aron, Iveta Golubovska and Uldis Rubins**

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**Introduction:** The non-contact optical photoplethysmography imaging (PPGI) technique is used for assessment of blood perfusion in human skin. We believe that the amplitude of PPGI will increase after injection of local anesthetic due to increasing of blood perfusion in patient skin blood vessels after performing of adequate sympathetic block for treatment of chronic pain. The sympathetic blocks before neirolysis should be confirmed not only by correct needle position with a 2 contrast x-ray imaging, but additionally, by any objective methods.

**Objective:** The main aim of our research was to develop simple, non-invasive, contactless optical method for monitoring the quality of sympathetic block for invasive treatment of neuropathic pain. The primary objective of our research was to measure the changes of amplitude of PPG with contactless PPGI method. Methods: 10 patients with chronic low back pain syndrome and radiculopathy were assigned for sympathetic neurolysis. The sympathetic block at L3 level under X-ray control in AP and side view with a contrast was performed. The local anesthetic Lidocaine 100 mg/8 ml

was injected. The PPGI uses green spectral band of backscattered radiation for detection of amplitude of blood volume pulsations in skin upper layers. The data of modification amplitude of blood volume pulsations was analyzed "online". After increasing of PPGI signal more than 2 times we consider the sympathetic block is successful. Results. The sympathetic block absence was detected when the PPG amplitude increased and was outside of a region of  $\pm$  standard deviation of PPG evaluated in 1 minute interval. In an experimental manner we find that the "online" PPGI might be used in a patient foot area.

**Conclusions:** The imaging photoplethysmography is new simple, noninvasive, contactless method which may be useful for sympathetic blocks confirmation.

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## CLINICAL CIRCULATION

(The names of the authors presenting each paper are shown in bold type)

### Paper No: 66.00

#### Intraoperative blood loss evaluation in major Orthopaedic Surgery

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**Introduction:** Orthopaedic surgery affects significant blood loss. Blood conservative technique is limited, and the need for blood therapy in trauma victim couple with lack of willing donors makes blood a scarce commodity in our bank. Intraoperative blood loss is often perceived to be in excess of preoperative provision for replacement at surgery. This has been a problem as it causes delay in start and sometimes postponement because anaesthetist would not proceed with cases until sufficient blood is available for replacement of loss. It became necessary to have measured value in major procedure which could serve as guide for pre-operative order of blood.

**Objective:** To use available methods of blood loss evaluation and demonstrate flaws of the commonly used visual estimation, thereby encourage practitioners to engage more reliable method.

**Method:** Intraoperative blood loss was measured in 200 randomly taken major elective procedures with anticipated significant blood loss in the hip, limbs and spine, using – swab weighting technique, collection in suction bottle and estimate in drapes and gown. Surgeons and anaesthetist visual estimates in each procedure was enquired in all the 200 procedures and were compared with measured values.

**Result:** Wide range of blood loss was observed in all groups of procedures. The range was relatively wider with groups of procedures involving applications of tourniquet. Large blood loss 1500– 5000mls occurred in shoulders, hip, thigh and spine in increasing order in volume. Worse offenders in blood loss being chronic malunion, nonunion implant removal, repeat surgery of femoral fracture and spine procedures. Surgeons underestimated blood loss in 57% of cases by volume > 500mls, anaesthetist by 35%. These were seen mostly in large blood loss as was encountered in spine, chronic femoral and hip procedures. Under transfusion with blood was 45% while over transfusion was 8.5%. Blood loss range minimum – maximum measured volume in each

groups of procedures are as indicated below-Hemiathroplasty 400–1800mls Humerus 200–1500mls Hip-replacement 400– 2000mls Femoral fracture 700–3500mls Knee 300–1500mls Laminectomy 3000–5000ml

**Conclusion:** Surgeons and anaesthetist were reasonably accurate with visual estimation in small blood loss. However, as loss increases the visual estimate become unreliable.

### Paper No: 109.00

#### Effect of Colloid Versus Crystalloid Administration in Cardiopulmonary Bypass Prime Solution on Tissue and Organ Perfusion

**Shahrbano Shahbazi and Davood Zeighami**

Shiraz University of Medical Sciences

**Background.** We evaluated the effects of tissue and organ perfusion during and after coronary artery bypass grafting surgery with either colloid (Voluven) or crystalloid (Lactated ringer's) as prime solution.

**Materials and Methods:** In this prospective randomized-controlled trial study, 70 patients undergoing on-pump coronary artery bypass grafting surgery were randomly assigned to receive either colloid (Voluven) or crystalloid (Lactated ringer's) as prime solution, during cardiopulmonary bypass. Tissue and organ perfusion markers including lactate, troponin I, liver and renal function tests and electrolytes were measured sequentially, before induction of anesthesia and the day after surgery.

**Results:** there was no significant differences between two groups regarding those parameters.

**Conclusion:** Both voluven and Lactate Ringer had same effects on organ perfusion as assessed by parameters of tissue perfusion.

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## Paper No: 123.00

### Preconditioning effect of Remifentanil on myocardium in patients undergoing on-pump coronary artery bypass grafting surgery

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**Background.** It is now well known that several pharmacologic agents can induce ischemic preconditioning and a number of these drugs are used in anesthesia. In this study, we decided to measure Troponin-I as a marker of tissue ischemia, with remifentanil preconditioning in coronary artery bypass grafting (CABG) surgeries. In addition we compared length of ICU and hospital stay between two groups.

**Methods:** In this study 54 patients undergoing CABG and aged < 75 years old with EF > 30% were randomized to the remifentanil group (n = 27) and control group (n = 27). The patients in remifentanil group received a remifentanil bolus of 1 µg/kg followed by an infusion at a rate of 0.5 µg/kg/min for 30 minutes after induction and before sternotomy. Those in the control group received 0.9% saline instead of remifentanil given at the same infusion rate. Cardiac Troponin I (cTnI) level were measured using Elisa technology and cTnI value above 1.3 ng/ml was considered as abnormal.

**Results:** The Level of Troponin I in all patients increased in the post bypass period. There was an increased trend of Troponin I over time in both groups (P < 0.001) although no significant difference was seen between two groups. (p value = 0.42). There was no significant difference between two groups regarding length of ICU and hospital stay.

**Conclusion:** The results of this study show that a short period of high dose remifentanil before cardiopulmonary bypass did not reveal any preconditioning effect on the heart. Further studies are necessary for confirmation.

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## Paper No: 219.00

### Prothrombin complex concentrate (Octaplex®) in an unusual Stauffer's syndrome

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**Introduction:** Renal cell carcinoma (RCC) is associated in up to a 20% to the emergence of paraneoplastic syndromes, being sometimes the first clinical outcome. Hepatic dysfunction in non metastatic RCC patients was first described by Stauffer in 1961, and can be categorized as a non-specific hepatitis with coagulation times extension, increased cholestasis enzymes and even hyperbilirubinemia (1). In most cases, analytical alterations are normalized after the surgery attributing the syndrome to cytokines synthesized by the own tumor (2).

**Objectives:** Because of its uniqueness and its impact on the hemostasis we describe the case of a patient subjected to laparoscopic nephrectomy due to a RCC and Stauffer syndrome, in which the use of prothrombin complex concentrate (PCC) achieved an effective hemostasis.

**Methods:** 70 years and 80 Kg weight woman submitted for laparoscopic left nephrectomy due to a RCC. Her personal background includes hypertension, treated with Enalapril and NIDDM in antidiabetic oral therapy. Preoperative laboratory tests reveal 10.3 total bilirubin (nv 0, 20-1, 20) at the expense of DBR 9.2 (nv 0, 00-0, 30), AST 672 (nv 5-31), ALT 397 (nv 5-31); GGT 507 (nv 7-32); ALP 222 (nv 35-104); PT 30% (nv 75-100 per cent); INR 2.04 (nv 0, 8-1, 2). Prior to the surgery 2 fresh frozen plasma (FFP) and iv vitamin K were administered, and the patient didn't require blood transfusion. Once in the recovery room, within 3 hours from arrival, bleeding through the surgical drainage and trocar incisions was objected, without hemodynamic instability.

**Results:** Given the underlying liver dysfunction, 25 IU/Kg of PCC (Octaplex®, Octapharma S.A., Madrid) were administered, ceding the bleeding. The patient left the anesthesia intensive care unit with PT 44%, INR 1.6 and platelet counting of 137,000.

**Discussion:** Octaplex is a new PCC that is indicated for treatment or perioperative prophylaxis of bleeding in patients with prothrombin complex coagulation factors deficiency, when rapid correction of bleeding is required. Although numerous studies emphasize the value of PCC in reversing the effects of oral anticoagulant therapy in bleeding patients undergoing cardiac surgery and other surgery's, as well as in the liver transplantation, not much has been published to date about its use in controlling postsurgical bleeding in patients with hepatic dysfunction undergoing non-cardiac surgery (3-4).

**Conclusions:** We can therefore say Octaplex® use increases, in this case, the efficacy and safety in post-operative bleeding management, and deserves a special attention for its rarity and implications in hemostasis.

\*\* BRD: Direct bilirubin, AST: Aspartate transaminase, ALT: Alanine transaminase, GGT: Gamma glutamyl transpeptidase, ALP: Alkaline phosphatase, PT: prothrombin time, INR: international normalized ratio, APTT: Activated partial thromboplastin time.

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**Paper No: 231.00**

## The correlation analysis of hemoviscoelastography and traditional tests of blood coagulation

**Oleg Tarabrin<sup>1</sup>, Ivan Tyutrin<sup>2</sup>, Ruslan Tkachenko<sup>3</sup>, Sergii Shcherbakov<sup>1</sup> and Dmytro Gavrychenko<sup>1</sup>**

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**Introduction:** It's known that deep vein thrombosis of lower extremities and pulmonary embolism occupies an important place in the structure of postoperative morbidity and mortality.

**Methods:** After Ethics approval and informed consent, was studied the functional state of hemostasis in a group of 40

**Table 1.** Correlation analysis of indexes of LPVH with platelet aggregation test, standard coagulation tests, thromboelastogram.

PAT ICC spontaneous aggregation	0,76
t1 spontaneous aggregation	0,59
ICC epinephrine 2,5 mcg/ml	0,66
SCT t3 (BCT) CT	0,86
ICD APTT	0,56
ÎÀ fibrinogen	0,67
IRCL fibrinolytic activity	0,83
TEG CTA Ê	0,93
BCT R	0,76
ICD R	0,64
ÎÀ Îi	0,86
IRCL FA	0,74

healthy volunteers, who were not receiving drugs affecting coagulation and 37 patients with postphlebotic syndrome (PPTS). In patients PPTS conducted baseline studies coagulation state and daily monitoring of dynamic changes in the functional state of hemostasis, a comparative evaluation of performance low-frequency piezoelectric vibration hemoviscoelastography (LPVH) and platelet aggregation test (PAT), standard coagulation tests (SCT), thromboelastogram (TEG).

**Results:** It was found that the LPVH correlated with SCT, PAT and TEG (Table 1). However, our proposed method is more voluminous: indexes ICC (the intensity of the contact phase of coagulation), t1 (the time the contact phase of coagulation), and A0 (initial rate of aggregation of blood) consistent PAT indexes, indexes ICD (the intensity of coagulation drive), CTA (a constant thrombin activity) and CIP (the clot intensity of the polymerization) - SCT and TEG. In addition, the advantage of this method is to determine the intensity of fibrinolysis - with indicator IRLS (the intensity of the retraction and clot lysis).

**Conclusion:** LPVH allows make the total assessment of all parts hemostasis: from initial viscosity and platelet aggregation to coagulation and lysis of clot, as well as their interaction. His figures are objective and informative, as evidenced by close correlation with the performance of traditional coagulation methods.

**Paper No: 232.00**

## Can the combination of low molecular weight heparin and epidural anesthesia reduce the level of postoperative thrombotic complications at the patients after total hysterectomy?

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**Introduction:** Each year in the world the cancer of reproductive system is diagnosed in more than 600,000 women. In 8-35% of patients with cancer of reproductive system pulmonary embolism was the cause of death, and at 43% - the background for other fatal complications.

**Objectives and methods.** The results of surgical treatment of 79 patients after hysterectomy under prolonged epidural anesthesia during the period from 2008 to 2010 entered the study. Condition of hemostasis was monitored by 12 standard biochemical tests, as well as the new instrumental method haemoviscoelastography preoperatively, intraoperatively and every day during 10 days after surgery. Prevention of thrombotic in group 1 (37 patients), conducted by bempiparin 3500: the first injection 12 hours before surgery, then at 6 hours after the operation in the future once a day for 10 days, group 2 (42 patients) received heparin 5000 units: the first injection 6 hours before surgery, then 6 hours after the operation, then 4 times per day for 10 days.

**Results:** All included in the study patients before the surgery has detected hypercoagulation and inhibition of fibrinolysis: increasing of MA (maximum density of the clot, fibrin-platelet constant of the blood) to 20.7% ( $p < 0.001$ ), ICD (the intensity of coagulation drive (the intensity of clot formation)) to 15.6%; reduction of IRCL - the intensity of the retraction and clot lysis to 13.6% ( $p < 0.05$ ) in both groups compared to normal rates. At 1st day after surgery in patients treated by bempiparin (group 1) declines MA, ICD - the intensity of coagulation drive to 12.7 ( $p < 0.05$ ) and 9.6% ( $p < 0.001$ ) respectively, and IRCL increase by 4.6% ( $p < 0.05$ ) compared with preoperative. In group 2, there was a similar picture: the reduction of MA and ICD to 10.3 ( $p < 0.001$ ) and 6.6% ( $p < 0.05$ ) respectively, and IRCL increase by 4.4% ( $p < 0.001$ ). At 5th day condition of hemostasis in both groups came almost to the same value - a moderate hypocoagulation, normal activity of fibrinolysis. At 7th days of postoperative period, thrombotic complications developed in 1 patient of 1st group (2.70%). In the 2nd group, complications developed in 4 (9.52%) patients: in 3 cases - deep venous thrombosis and in 1 case - coagulopathic bleeding.

**Conclusions:** Using combination of bempiparin and epidural anaesthesia reduces the level of postoperative thrombotic complications, such as deep venous thrombosis, massive bleedings at the patients after total hysterectomy.

**Paper No: 404.00**

## Tissue Doppler of the right ventricle: Prognostic value after a non cardiac surgery

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**Introduction:** It is well demonstrated that the right ventricular disfunction has bad prognosis. Intraoperative assessment of the right ventricular (RV) function with echocardiography is difficult, because of its complex anatomy. Tissue Doppler imaging (TDI) is a new ultrasound tool that measures regional myocardial velocities in systole and diastole. TDI focuses on the high-intensity, low-velocity echoes of the myocardium and could be a valuable tool for the assessment of the systolic right ventricular function (RV).

**Objectives:** To evaluate the correlation of intraoperative systolic RV TDI velocities ( $s'$ ) with length of the intensive care unit, hospital stay and early postoperative cardiovascular complications after a non-cardiac surgery.

**Methods:** TEE examinations performed in patients with cardiac disease undergoing non-cardiac surgery were included. Patients with tricuspid valve disease and patients in non sinus rhythm were excluded. Echocardiographic examination for evaluating systolic function ( $s'$ ) was obtained from the mid-esophageal four-chamber view with the pulsed-wave TDI sampling of 3 mm placed in the lateral tricuspid annular site. The clinical outcomes studied were length of stay in the intensive postoperative care units and the duration of the hospitalization. Postoperative cardiac events defined as hypotension, hypertension, myocardial ischemia, pulmonary edema, arrhythmias and death, were also studied. To calculate the necessary sample size, it was considered that a 20% decrease in hospital stay between patients having normal and abnormal tricuspid systolic velocity ( $s'$ ) would be important. For the results to be of statistically significant with an  $\alpha=0.05$  and a potency of 80%, it was necessary to recruit 20 patients in each group. Statistical analysis was conducted using STATA 10.0. Continuous data were expressed as mean  $\pm$  SD or median with an interquartile range, depending on the distribution of the variable. Parametric data of the groups were analyzed using the unpaired t-test or the Mann-Whitney U test. Categorical variables among groups were compared using the Fisher's exact test. Independent predictors of cardiac events were calculated by logistic regression. Significance was set at  $p < 0.05$ .

**Results:** 67 patients (ASA II 36%, ASA III 52% and ASA IV 12%), 52% male,  $65 \pm 11$  years were studied. RV  $s'$  velocity was measured easily in all patients. RV  $s'$  lower than  $12.8 \pm 2.5$  cm/seg was considered abnormal and it correlated with a longer time of hospitalization ( $p < 0.05$ ) and higher incidence of cardiovascular complications ( $p < 0.05$ ).

**Discussion:** This prospective study shows that RV  $s'$  velocity was a good predictor of length in ICU stay, length of hospitalization and postoperative cardiovascular complications. Hypotension was the most frequent complication found. Having a clinical predictor of systolic RV function ( $s'$ ), that is easily obtainable, non-invasive and readily available can be useful, and the non-invasive assessment of RV function can be an important clinical tool as it could be used to identify potential risky patients.



**Conclusion:** TDI is clinically relevant in the perioperative setting for evaluating the RV function and also for predicting early morbid events after a non-cardiac surgery.

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## Paper No: 429.00

### Systolic heart function remains depressed for at least one month after on-pump cardiac surgery

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**Introduction:** Cardiac surgery remains a source of considerable morbidity and mortality. Impaired postoperative heart function is thought to be a main cause of this. Ischemia and reperfusion injury facilitated by cardioplegia and extracorporeal circulation contributes to postoperative cardiac depression.

**Objective:** The objective of this study was to quantify the duration of systolic and diastolic cardiac dysfunction after on-pump cardiac surgery.

**Methods:** The study was prospective, descriptive and approved by the regional ethical committee. 59 patients scheduled for on-pump coronary bypass grafting, aortic valve replacement or combination procedures thereof were included. Echocardiography was performed at 1) the day before operation, 2) the 1st postoperative day, 3) the 4th postoperative day, 4) one month postoperatively and 5) 6 months postoperatively. All measurements were performed by a single experienced echocardiographic technician minimizing inter-individual variation. Radial systolic function was quantified by ejection fraction (EF) whereas longitudinal contraction was measured as global strain (GS) and by tissue tracking score (TT). Diastolic function was evaluated as E/E' and E'/A'. Data was analyzed with a univariate ANOVA for repeated measurements and a paired t-test was used for comparison between two time points.  $P < 0.05$  was considered significant.

**Results:** All measures of systolic function changed over time (all  $P$ -values  $< 0.025$ ). As compared with baseline data, values for EF, GS and TT were depressed the 1st postoperative day ( $P$ -values  $< 0.047$ ) and remained depressed at the 4th postoperative day ( $P$ -values  $< 0.004$ ). 1 month after surgery, EF and TT were still decreased ( $P$ -values  $< 0.038$ ),

and GS was insignificantly decreased ( $P = 0.094$ ). 6 months after surgery, all measures of systolic function had returned to baseline values ( $P$ -values  $> 0.148$ ). Both echocardiographic indices for diastolic function did not change significantly over time ( $P$ -values  $> 0.081$ ).

**Discussion:** This study showed that patients undergoing on-pump cardiac surgery had impaired systolic function for at least one month postoperatively as evaluated by echocardiographic methods. This was found despite revascularization and/or afterload reduction achieved by surgery. This finding may be explained by the ischemia and reperfusion injury induced by intraoperative cardioplegia and extracorporeal circulation. To our knowledge, this study is the first to quantify the duration of depressed systolic function after on-pump cardiac surgery.

**Conclusion:** Measures of systolic function remained depressed for at least 1 month after on-pump cardiac surgery, but had returned to preoperative values 6 months after surgery. Indices of diastolic function did not change significantly in the perioperative period.

## Paper No: 482.00

### The ability of pleth variability index in predicting fluid responsiveness with different tidal volume during general anesthesia

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**Introduction:** Respiratory variations in the pulse oximeter plethysmographic waveform amplitude ( $i \div POP$ ) are sensitive to changes in preload and can predict fluid responsiveness in mechanically ventilated patients. However,  $i \div POP$  cannot be easily calculated from a bedside monitor. Pleth Variability Index (PVI) is a new algorithm that automatically calculates  $i \div POP$ .

**Objective:** The aim of our study was to evaluate the ability of PVI in predicting fluid responsiveness in patients ventilated with different tidal volume under general anesthesia.

**Methods:** Fifty ASA class II patients aged 18-75 yr undergoing elective gastrointestinal surgery were randomly allocated into 2 groups: group A ( $VT = 8 \text{ ml/kg}$ ,  $n = 25$ ) and group B ( $VT = 10 \text{ ml/kg}$ ,  $n = 25$ ). Study was performed after anesthesia induction. Haemodynamic data, mean arterial blood pressure, heart rate, central venous pressure, cardiac index (CI), stroke volume index (SVI) and PVI were recorded at baseline and after volume expansion by infusion of 6% Hetastar 130/0.4 ( $7 \text{ ml/kg}$ ) at  $0.4 \text{ ml/kg/min}$ . The CI and SVI were measured with the FloTrac/Vigileo system (Edwards Lifesciences, Irvine, CA). Fluid responsiveness was defined as

a percentage increase in CI ( $\dot{V}CI$ )  $\dot{V}15\%$ . To assess the ability of a variable to identify responders and nonresponders, receiver operator characteristic (ROC) curves were generated, and the optimal threshold value (the value that maximizes the sum of both sensitivity and specificity) was determined. Areas under the ROC curves (AUCs) were calculated and compared.

**Results:** The baseline values of PVI in responders with VT of 8 ml/kg and 10ml/kg were  $17.4 \pm 5.1$  and  $22.1 \pm 5.7$  respectively, which were significantly higher than those of nonresponders ( $10.2 \pm 2.3$  and  $13.1 \pm 3.1$ ) ( $P < 0.01$ ). There was a significant relationship between PVI before volume expansion and change in CI after volume expansion in both groups ( $r=0.566$  in group I,  $r=0.683$  in group II, respectively) ( $P < 0.01$ ). In group I, a PVI threshold value of 13.5% before volume expansion was able to discriminate between responders and non-responders with a sensitivity of 81.3% and a specificity of 88.2%. In group II, a PVI threshold value of 15.0% predicted fluid responsiveness with a sensitivity of 88.9% and a specificity of 87.5%.

**Conclusions:** PVI can serve as valid indicators of fluid responsiveness automatically and non-invasively in mechanically ventilated patients with a tidal volume of 8ml/kg and 10ml/kg under general anesthesia. The best threshold values for PVI to predict fluid responsiveness are 15.0% at VT of 10 ml/kg and 13.5% at VT of 8 ml/kg.

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## Paper No: 551.00

### Chart for Haemodynamic-Oxygen delivery diagnostic

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**Introduction:** B.Shramek' Haemodynamics' diagnostic chart is widely used in cardiovascular monitoring for diagnostic and therapy management purposes. But as the main function of circulation is to deliver oxygen to tissues and cells, in absence of oxygen delivery analyses this chart doesn't clearly answer the question whether the patient's haemodynamic changes are physiological or pathological ones. Our objectives were to combine B.Shramek's Haemodynamics diagnostic chart with system oxygen transport parameters.

**Methods:** Oxygen delivery index (DO<sub>2</sub>I) is commonly used for evaluation of system oxygen transport and calculated as:  $DO_2I = CaO_2 \cdot CI$ . B.Shramek's Haemodynamics diagnostic chart already has horizontal axis which represents current  $\dot{V}I$  values. It is very easy to add the second vertical axis to the right side of the chart for representing current  $CaO_2$  values. In order to reduce lines on the chart we scaled the  $CaO_2$  axis in such a way that graphical borders of its

normal values match the lines of Mean blood pressure normal values. Now, each time a point on the chart with coordinates corresponding to CI and  $CaO_2$  current values shows the oxygen delivery state. So this advanced Hemodynamics-Oxygen delivery chart carries two points: first one – the original Shramek's haemodynamics point and the second – newly introduced Oxygen Delivery (OD) point.

**Results:** Normal value range of DO<sub>2</sub>I lies within 480-800 ml/min/m<sup>2</sup>. So we have to draw two parabolas corresponding to these values on the chart. These lines divide the chart into three zones: left – hypoxia, central – normal oxygen delivery and right – hyperoxia. The location of the OD point on the chart will demonstrate the system oxygen delivery state.

**Conclusions:** This combined chart may be successfully used in a real time monitoring mode for diagnostic and therapeutic management of haemodynamics and system oxygen delivery disturbances.

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## Paper No: 678.00

### Relationship between intraoperative hyperglycemia and following outcomes in off-pump coronary bypass surgery

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**Introduction:** Intraoperative hyperglycemia is one of the major modifiable risk factors affecting the outcome of cardiac surgical patients. As hyperglycemic episodes are common during cardiopulmonary bypass (CPB), higher glucose concentration ( $>200$  mg/dL) than that from investigations in critically ill patients has been shown to be associated with adverse outcome. Of interest, intraoperative glucose concentrations closest to normoglycemia ( $\dot{V}140$  mg/dL) was also associated with worse outcome even in the absence of hypoglycemic episodes. However, intraoperative glucose control during off-pump coronary bypass surgery (OPCAB) should be different as it avoids CPB and cardioplegia.

**Objective:** This study addressed the predictive power of intraoperative glucose concentration  $>140$  mg/dL on post-operative outcome following OPCAB.

**Methods:** The medical records of 647 consecutive patients underwent OPCAB were retrospectively reviewed. Time-weighted average of intraoperative glucose concentrations was calculated and patients were categorized as glucose  $\dot{V}140$  mg/dL or  $>140$  mg/dL. Composite morbidity/mortality

was defined as the presence of one or more of the morbidity endpoints (postoperative myocardial infarction, infection, stroke, renal dysfunction, reoperation, prolonged mechanical ventilation) during hospitalization or mortality within 30 days postoperatively. Multivariate logistic regression analysis was performed to assess the relationship between glucose concentrations and composite morbidity/mortality.

**Results:** Patients with glucose >140 mg/dL showed higher incidence of renal dysfunction (7.9% vs. 2.4%,  $P = 0.002$ ) and composite morbidity/mortality (13% vs. 6%,  $P = 0.006$ ). In multivariate logistic regression analysis, glucose >140 mg/dL (Odds ratio (OR) 2.487, 95% confidence interval (CI) 1.195-5.175,  $P = 0.015$ ), anemia (OR 2.201, 95% CI 1.172-4.133,  $P = 0.014$ ), elevated preoperative serum creatinine over 1.4 mg/dL (OR 6.681, 95% CI 2.970-15.03,  $P < 0.001$ ) were identified as independent risk factors for composite morbidity/mortality.

**Conclusions:** In contrast to the results of cardiac surgeries using CPB, time-weighted average of intraoperative glucose concentration >140 mg/dL was independently associated with adverse outcome after OPCAB.

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## Paper No: 832.00

### Opcab surgery in elderly patients: evidence of benefits?

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**Introduction:** The majority of earlier trials comparing clinical outcomes after off-pump bypass surgery (OPCAB) and conventional bypass surgery (CCAB) were non-randomized comparisons of low-risk patients undergoing single- or double-vessel bypass, with the potential risk of unbalanced

baseline patient characteristics leading to bias in favor of either OPCAB or CCAB. There remains considerable uncertainty as to the role of OPCAB for patients across the full spectrum of risk groups.

**Objectives:** This systematic review and meta-analysis sought to determine whether off-pump bypass surgery (OPCAB) provides significant clinical advantages compared to conventional coronary artery bypass surgery (CCAB) in elderly patients (>60y, >70y, >80y, >90y), and whether the benefits of OPCAB over CCAB are directly related to increasing age.

**Methods:** Comprehensive searches of MEDLINE, Cochrane CENTRAL, EMBASE, abstract databases up to January 2011. Criteria for Included Trials: Randomized or non-randomized controlled studies - Elderly patients (age>60) undergoing OPCAB compared directly with elderly patients (age >60) undergoing CCAB, reporting a least one relevant outcome in any language. Two reviewers independently identified relevant trials and extracted outcomes data.

**Bias.** Publication bias was explored through visual inspection of funnel plots. Meta-Analysis: Odds ratios [OR, 95% CI] were calculated for proportions, and weighted mean differences [WMD, 95% CI] were calculated for continuous data.

**Results:** Eligible studies: 27 studies (26 nRCT and 1 RCT - 10,271 patients) were included in the analysis. Regression did not show publication bias, but significant heterogeneity was found for neurocognitive dysfunction, low cardiac output syndrome, transfusions, ventilation time, and length of stay. Significant clinical benefit of OPCAB over CCAB in elderly patients was summarized in table 1.

**Conclusions:** In elderly patients, OPCAB is superior to CCAB for reducing risk of death, stroke, AF, neurologic complications, low cardiac output syndrome, renal insufficiency, transfusions, ventilation time, and hospital length of stay, without increased risk for reoperation for bleeding, myocardial infarction, angina recurrence, or need for reintervention. However, the magnitude of benefit of OPCAB over CCAB did not rise further with increasing age >70.

## Paper No: 878.00

### Point-of-care ultrasound reveals important heart pathology

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**Introduction:** Very few recommendations exist for preoperative assessment of cardiac function. A typical preoperative assessment consists of a medical history, stethoscopy, ECG and a limited blood screening. With this set of examinations it is unlikely to identify impaired systolic / diastolic function or significant cardiac pathology. A full cardiological examination including echocardiography will provide the information needed for proper safety during surgery and anesthesia, but this is unrealistic due to financial limitations and limited resources. Similar issues in the emergency units

Outcomes	OR	[95%CI]	P
Death, 30d	0.62	[0.46-0.85]	0.0024
Death, 1-3yr	0.59	[0.34-1.03]	0.062
Stroke	0.43	[0.29-0.63]	0.00001
Myocardial Infarction	0.83	[0.51-1.33]	0.42
Atrial Fibrillation	0.79	[0.69-0.90]	0.0005
Renal insufficiency	0.64	[0.44-0.91]	0.013
Neuro complication	0.62	[0.40-0.96]	0.005
Reintervention	0.40	[0.09-2.76]	0.42

and the critical care setting has given rise to different point-of-care ultrasound protocols with focus assessed transthoracic echocardiography (FATE) being one of the first in the field [1]. The FATE protocol consists of four predefined scanning positions in which the examiner will be able to exclude obvious pathology, assess wall thickness, cardiac dimensions and myocardial function. However, little is known about the diagnostic accuracy of FATE examinations in the hands of relatively inexperienced examiners.

**Objectives:** The purpose of this study was to examine whether FATE can correctly diagnose common serious heart pathology.

**Methods:** 25 patients with or without significant cardiac pathology were included. FATE was performed by an inexperienced examiner at the bedside and images were interpreted with dichotomous outcomes in regard to seven entities: 1) pericardial effusion ( $\leq 10$ mm), 2) left ventricular dilatation ( $\leq 62$ mm), 3) right ventricular dilatation ( $\leq 35$ mm), 4) left ventricular hypertrophy ( $\leq 13$ mm), 5) left ventricular failure ( $\leq 40\%$ ), 6) aortic stenosis (Maximum flow velocity  $\leq 3$ m/s), 7) tumors or masses. The examiner was blinded to the patients' medical history and results from previous echocardiographic examinations. Results from the interpretation were compared with ultrasonic diagnosis made by a specialist in cardiology.

**Results:** 175 assessments were made with a total of 5 discrepancies between the FATE examiner and the specialist; two with regard to right ventricular dilatation, two with regard to tumors and masses and one with regard to left ventricular hypertrophy. Overall sensitivity was 97.4% and specificity 97.1%. Positive predictive value was 90.5% and negative predictive value was 99.2%. Kappa statistics showed good agreement between observers ( $k=0.92$ ).

**Conclusions:** These preliminary results show good diagnostic performance of bedside ultrasound performed by an inexperienced examiner and shows potential for screening in the perioperative period. The results call for broad implementation of point-of-care ultrasound among all physicians dealing with any kind of potential cardiovascular disease. A more substantial sample size is needed in order to assess diagnostic performance in the seven different entities.

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## Paper No: 967.00

### When to transfuse in cardiac surgery?

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**Introduction:** A low preoperative haemoglobin (Hb) or substantial blood loss in patients with cardiac disease is associated with high mortality and morbidity [1]; The threshold for

transfusion in the perioperative patient with known coronary artery disease is still unknown. Previous studies have suggested that the risk of transmitting blood related disease or inducing adverse reaction outweighs the benefit of improved tissue oxygenation. Although international data and guidelines [2] support more restrictive transfusion, practice within specialist centers remains variable [3].

**Objective:** To assess transfusion triggers and practices against the standard guidelines in patients undergoing cardiac surgery in a tertiary specialist center.

**Methods:** We carried out a prospective survey of transfusion rates, indications and red packed cell volume given to patients undergoing cardiac surgery over a period of 6 months. The haemoglobin level at time of transfusion and at time of discharge from intensive care unit (ITU) was measured.

**Results:** A total of 100 cardiac surgery patients were transfused corresponding to a transfusion rate of 37%. High risk factors Mean % (range) Age (yr)-66 (40-85) High Risk surgery-40 Previous anti coagulation/platelet therapy -77 Pre-op Hb (g/dL) 12.7 (8.2-16.2) Mean transfusion volume (ml) 1217 (95-5830) Reason for transfusion -Mean (%) Low Hb -41 Not documented 36 Bleeding 18 To raise Hb to 10g/dL 2 Surgeons request 1 Pump dilution 1 Hypotension 1 Twentynine patients received blood at Hb  $> 7$ g/dL. Seventy at  $< 7$ g/dL; Three received blood at Hb  $> 10$  g/dL due to ongoing bleeding. One was unrecorded. Average Hb on Discharge from ITU was 9.67.

**Conclusion:** Our transfusion rates are significantly lower than the 50% suggested by the database of The Society of Thoracic Surgeons. Not all patients undergoing cardiac procedures have equal risk of bleeding or blood transfusion. The clinical need for transfusion must be made on an individual basis and further local and national guideline reinforcement is needed.

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## Paper No: 1006.0

### Peripheral venous pressure measurements to estimate central venous pressure

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**Introduction:** Central venous pressure (CVP) reflects the relationship between blood volume and vascular compliance. CVP variability indicates changes in blood volume. CVP measurement requires catheterization of a central vein. Such procedures are not devoid of risks to patients and increase costs and perioperative time. Significant correlation and agreement between venous pressures measured at vena cava and peripheral veins have been demonstrated 1,2. Estimation of CVP from peripheral venous pressure (PVP) measures would be clinically useful to prevent central venous catheterization.

**Objectives:** The aim of this study was to determine the agreement between CVP and PVP measures and to derive a predictive equation for estimating CVP from PVP.

**Methods:** This prospective observational study was approved by the Institutional Review Board. The study included 13 adult patients undergoing elective surgery requiring CVP monitoring through a catheter inserted centrally via subclavian or internal jugular veins using Seldinger's technique. Additionally, teflon peripheral venous catheters (18 though 14G) were inserted into an upper limb vein. Concurrent measures of CVP and PVP were obtained through electronic pressure transducers. Agreement and biases between measurements were estimated by the Bland and Altman's method. Simple linear regression was applied to data having CVP and PVP as dependent and predictor variables, respectively. The robustness of the model was confirmed by 1000 bootstrap samples, from which 95% confidence interval of coefficients were calculated. Student's paired t tests were used to assess the difference between observed and predicted CVP values. P values less than 0.05 was considered statistically significant.

**Results:** Eighty one paired samples were obtained. CVP and PVP measures differed by  $-1.74 \pm 1.85$  mmHg. The percentage of differences contained into the limits of agreement of 2 standard deviation of the mean inter-measure difference was 92.5%. The correlation coefficient (r) between CVP and PVP measures was 0.90 ( $r^2=0.81$ ). The resulting linear equation was  $PVC=0.052 + 0.839 \times PVP$ . No significant differences between the observed values of PVC ( $9.41 \pm 3.99$  mmHg) and those predicted by the model ( $9.40 \pm 3.60$  mmHg) were found.

**Discussion and Conclusions.** Peripheral venous pressure can be used clinically as a surrogate for CVP in adult patients. In addition, CVP can be reliably estimate by the linear equation derived in this study.

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**Paper No: 1095.0**

## Hemodynamic effects of phenylephrine on hypotension during combined general and epidural anesthesia

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**Introduction:** Hypotension is frequently observed after epidural injection of local anesthetics during combined general and epidural anesthesia. Intravenous volume expansion with a crystalloid solution or injection of a vasoconstrictor such as ephedrine or phenylephrine (PE) is commonly used to treat this hypotension. However, because of its short plasma half-life and pure alpha adrenergic agonist property, PE is considered to be of limited therapeutic value.

**Objectives:** We examined the hemodynamic effects of PE infusion administered during combined epidural and general anesthesia.

**Methods:** The subjects were five patients undergoing elective upper abdominal surgery. A thoracic epidural catheter was inserted before induction of general anesthesia with propofol. Endotracheal intubation was facilitated with rocuronium and anesthesia was maintained with sevoflurane (0.6~0.8 MAC) in oxygen and intermittent fentanyl when required. PE infusion at  $0.2 \mu\text{g/kg/min}$  was started when systolic arterial pressure (SAP) decreased below 90 mmHg after epidural injection of lidocaine. SAP, heart rate (HR), stroke volume index (SVI), and cardiac index (CI) were monitored for 30 min using a FloTrac monitor (Edwards Lifescience). SAP/CI was used to evaluate peripheral vascular resistance.

**Results:** (mean  $\pm$  SD) were subjected to analysis of variance, and post hoc analysis was done using the Dunnett test. **RESULTS:** Patients' characteristics were as follows: age was  $62 \pm 22$  years, height was  $155 \pm 5$  cm, and weight was  $45 \pm 7$  kg. SAP decreased from  $110 \pm 15$  mmHg to  $84 \pm 3$  mmHg after epidural injection of lidocaine. SAP significantly increased by 20 min after PE infusion, without a significant change in HR. SVI, CI, and SAP/CI significantly increased by 30 min after PE infusion. **CONCLUSION:** PE infusion at  $0.2 \mu\text{g/kg/min}$  may increase SAP by elevating both peripheral vascular resistance via arterial vasoconstriction, and cardiac index via venoconstriction during combined general and epidural anesthesia.

**Paper No: 1106.0**

## Cardiac surgery with cardiopulmonary bypass in dialysis-dependent patients

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**Introduction:** The end stage renal disease is an important risk factor for patients undergoing cardiac surgery with cardiopulmonary bypass(CPB). The aim of this study is to determine the impact of preoperative status on morbidity and perioperative mortality of chronic hemodialysis patients proposed for cardiac surgery with CPB

**Methods:** we have conducted a retrospective study of a series of 38 patients, collected in the service of cardiothoracic surgery of the military hospital of Tunis over a period of 10 years from January 2000 to January 2010.

**Results:** The studied population was essentially male (68,4 %), aged on average  $61 \pm 10$  years. EURO score was high at  $8.46 \pm 2.7$ . The indications for surgery were: coronary artery bypass grafting in 30 patients (79%), aortic valve replacement in 3 patients (7.8%), mitral valve replacement in 3 patients (7.8%) and two patients (5, 26%) underwent combined surgery. Blood transfusion was required in 29 patients (76.3%) with an average of  $1.5 \pm 0.75$  packed red cells. The mean duration of CPB was  $95 \pm 23$  minutes and the average duration of aortic clamping was  $58 \pm 12$  minutes. Five patients (13.1%) required prolonged mechanical ventilation for an average of  $10.35 \pm 7.5$  days, the average length of stay in ICU was  $4.35 \pm 3.5$  days, the Mean hospital stay was  $14.85 \pm 5.93$  days. The mortality rate was 15.7%. On multivariate analysis predictors of mortality were : age > 65 years, female gender, obesity, chronic obstructive pulmonary disease, ejection fraction of left ventricle <30%, NYHA class IV, anemia, the urgency of surgery, mitral valve replacement surgery for ischemic mitral regurgitation and the prolonged stay in ICU.

**Conclusion:** We have shown that some risk factors associated with the dialyzed renal failure, increase mortality. Some factors are inaccessible to therapy. Others, however, allow for preventive action. The prevention strategy should be based on the management of avoidable risk factors.

**Keywords:** Chronic renal failure; hemodialysis; cardiac surgery; cardiopulmonary bypass

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## Paper No: 1110.0

### Lateral E' is preload dependent during triggered positive pressure ventilation: a controlled cross-over study

Johan Fridolf Hermansen, Peter Juhl-Olsen, Christian Alcaraz and Fredriksen Erik Sloth

**Introduction:** Point of care ultrasound like the FATE (1) protocol is becoming an increasingly popular tool for hemodynamic evaluation of the critically ill. Doppler modalities can differentiate between systolic and diastolic dysfunction. The

most accurate diagnostic method includes measurement of early transmitral flow, E, and early velocity of the mitral annuli, E' (2). However, E has been shown sensitive to preload variation, whereas studies have yielded conflicting results regarding E'. In addition, little evidence exists as to the effect of positive pressure ventilation (PPV) on diastolic indices.

**Objectives:** The aim of the study was to evaluate the preload dependency of E' and E by changing test subject position. Furthermore, also to assess how different ventilation pressures affect E and E'.

**Methods:** Ten healthy subjects (age 23-32) were studied. All were tilted in the neutral position (0°), reversed-Trendelenburg position (30°) and Trendelenburg position (-30°) to alter preload. Prior to the Trendelenburg position 1000ml of isotonic saline was rapidly infused through a cubital vein. In each position subjects were exposed to PPV with varying pressures (pressure support/positive end-expiratory pressure (cmH2O): 0/0 (baseline), 0/10, 0/20, 10/4, 20/4, 10/10, 20/10). For each individual position and ventilator setting echocardiographic recordings comprising E and E' were recorded. An ANOVA for repeated measurements was used to analyze the influence of positioning and ventilator settings during triggered PPV. At baseline, a similar analysis was performed in evaluation of influence of positioning.

**Results:** During spontaneous respiration, E' was not dependent on position ( $P=0.282$ ). With PPV applied, E' was dependent on position ( $P < 0.001$ ). E was dependent on position during spontaneous respiration ( $P < 0.001$ ) and during triggered PPV ( $P=0.001$ ). At the individual positions, E' was influenced by ventilator settings in horizontal ( $P=0.005$ ) and reverse-Trendelenburg position ( $P < 0.001$ ), but not by Trendelenburg ( $P=0.515$ ). E was not influenced by ventilator settings in the individual positions (all  $P$ -values > 0.156). Overall inter-observer variability was  $-2.0$  (+/-5.9%).

**Discussion:** E' was insensitive to preload with spontaneous ventilation, but surprisingly E' was preload dependent with PPV. E was preload dependent with spontaneous ventilation and with PPV, which is in accordance with previous results. Interestingly, E' was more sensitive to ventilator settings than E, despite being proposed to be less preload dependent.

**Conclusions:** E' should not be considered a reliable tool for diagnosing diastolic function in settings where preload is susceptible to change. E' at the lateral portion proved to be preload dependent during PPV, which also applies to E.

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**Paper No: 1126.0****A Pilot Study: Randomized prospective clinical study on combined volatile-induced pre- and post-conditioning in patients undergoing coronary surgery****Adriaan Van Rensburg, Jacek Karski, Angela Gerath and Marcin Wasowicz**

Department of Anesthesia, Toronto General Hospital, University Health Network, University of Toronto, Toronto, ON, Canada

**Introduction:** It is over 25 years since publication of the first reports describing the concept of ischemic preconditioning. These reports showed that short period(s) of ischemia applied to the myocardium before permanent occlusion of the coronary artery leads to a significant decrease in myocardial injury. These studies were followed by discoveries showing that different inhalation anaesthetic agents confer similar conditioning properties. Over the last 10-15 years, anaesthesiologists witnessed publication of multiple experimental studies suggesting that the use of these agents before an ischemic insult can reduce myocardial damage, termed volatile anaesthetic induced pre- conditioning (APC). Additionally, other studies proposed that the use of volatile agents after ischemia can provide further beneficial effect (post-conditioning).

**Hypothesis:** Volatile-induced pre- and post-conditioning result in better outcomes when compared to intravenous based anaesthesia and post-operative sedation.

**Objective:** To determine if cardiac outcomes in patients undergoing CABG surgery are improved when combined volatile-based anaesthetic pre- and post-conditioning are applied during the perioperative period.

**Methods:** After Ethics Board approval, 139 patients scheduled for elective on-pump CABG surgery were recruited. Patients were randomized to receive either: (1) combined volatile anaesthesia (0.6-2 MAC) and volatile postoperative sedation (0.1-0.3 MAC) or (2) propofol-based anaesthesia (2-6 mg/kg/hr) and postoperative sedation. Volatile sedation was provided with the use of Anaesthetic Conserving Device (AnaConDa, Sedana Medical, Sweden). Depth of anaesthesia was monitored with BIS value targeted between 40-60 from induction until extubation. Anaesthesia and ICU care were done according to study protocol. The following outcomes were analyzed: troponin levels, incidence of arrhythmias (Holter monitoring), hemodynamic parameters, and perioperative inotropic requirements. Statistical analysis of continuous and categorical variables was conducted with Mann-Whitney and Fisher's exact test, respectively.

**Results:** 70 patients were randomized to the volatile group and 69 to the propofol group. Demographic characteristics were similar between the two groups. The mean troponin levels in the volatile and propofol group were similar at 2, 4 and 12h after CABG surgery (3.2 vs 4.1 mcg/ml,  $p = 0.27$ ; 5.0 vs 5.8 mcg/ml,  $p = 0.53$ ; and 5.1 vs 5.5 mcg/ml,

$p = 0.81$ , respectively). There was no difference between groups in the hemodynamic variables, need for inotropic support, or incidence of post-operative atrial fibrillation.

**Conclusions:** Our data showed that combined volatile anaesthesia and post-operative sedation compared to the intravenous regimen does not offer additional cardioprotective properties in patients undergoing elective cardiac surgery. It may suggest that volatile induced pre- and post-conditioning extensively studied in laboratories may not translate into clinical practice.

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**Paper No: 1127.0****The dependence of hemodynamics on the type of the anesthesia and on concomitant cardio vascular diseases****Yuriy Malyshev and Christina Dolmova**

**Introduction:** The anesthesia in patients having concomitant cardiovascular diseases (CVD) is safe if hemodynamics, blood gas and water electrolytic balance maintain acceptable level [1,2].

**Objectives:** The lowering risk of hemodynamic imbalance in patients having concomitant CVD during surgery on the basis of selection optimal type of anesthesia.

**Methods:** 93 patients of age from 30 to 80 years have been operated for gastrointestinal diseases. 53 patients had concomitant ischemic heart disease (IHD), 27 patients had arterial hypertension (AH), 13 patients had the combination of IHD and AH. All patients had ASA class II-III. Dependent on the type of the anesthesia the patients were divided into groups: I group ( $n = 29$ ) is total intravenous anesthesia (TIVA - diazepam, ketamine, fentanyl); II group ( $n = 21$ ) is TIVA in combination with epidural anesthesia (EA-0,5ropivakain); III group ( $n = 26$ ) is anesthesia sevoflurane in combination with fentanyl; IV group ( $n = 17$ ) is anesthesia sevoflurane in combination with EA. Artificial lung ventilation was performed under condition of normoventilation. Duration of the surgery is 5-14 hours. Harvard's standard of monitoring including definition SI, CI, SVR was used.

**Results:** During anesthesia in I group occurred the increase of SI from 31 (27,5-50,0) to 35 (19,7-52,0) ml/m2 ( $p < 0,05$ ), the

tendency to decrease of CI 4-8% more and SVR from 2106 (1079-3318) to 1971 (1416-2557) dynes $\times$ cm<sup>-5</sup> ( $p > 0,05$ ). In II group has been increase of SI 22% more from 33 (24,2-55,0) to 40 (20,6-54,7) ml/m<sup>2</sup> ( $p < 0,05$ ), the tendency to decrease of SVR 11-28% more, CI remained within normal value. In III group occurred the lowering of SVR 36% more from 2171 (782-3153) to 1377 (797-2357) dynes $\times$ cm<sup>-5</sup> ( $p < 0,05$ ) and during completion of the anesthesia occurred the increase of SI 46% more from 27 (19,2-47,7) to 39 (24,6-59,1) ml/m<sup>2</sup> ( $p < 0,05$ ), CI 33% more from 2,1 (1,7-4,2) to 2,8 (1,9-5,8) l/min $\times$ m<sup>2</sup> ( $p < 0,05$ ). In IV group during anesthesia CI lowered 21% more from 3,4 (2,2-5,6) to 2,8 (1,7-4,8) l/min $\times$ m<sup>2</sup> ( $p > 0,05$ ). SI 2% more. SVR either decreased 10% more or increased 16% more but during completion of the anesthesia these were higher than normal value is. Two patients from III and IV groups had heart rhythm disorder and acute cerebrovascular accident.

**Conclusions:** Optimal type of the anesthesia in patients with concomitant CVD is the combination of TIVA and EA as well the anesthesia with sevoflurane and fentanyl that assisted the normalization of compensatory adaptation. TIVA or the combination of the anesthesia with sevoflurane and EA caused the compensatory adaptation tension of cardiovascular system.

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## Paper No: 1143.0

### PEEP-induced pulse pressure changes predict stroke volume variation in anesthetized patients

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**Background.** Application of positive end expiratory pressure (PEEP) is known to induce hemodynamic instability particularly in patients with hypovolemia (1). Under constant elastic wall properties of large arteries, pulse pressure (PP) changes predominantly reflect stroke volume changes. Accordingly, we hypothesized that PEEP-induced percent changes of PP (PiPPP) predict circulatory volume (CV) conditions determined by the stroke volume variation (SVV).

**Methods:** With approval of the IRB, we recruited 42 ASA PS I-II adult patients undergoing major surgeries requiring continuous arterial pressure monitoring with a Vigileo/FloTracTM. Exclusion criteria included 1) BMI > 35, 2) ejection fraction < 40%, 3) SV index < 30 ml/m<sup>2</sup> on zero end-expiratory pressure (ZEEP), 4) systolic blood pressure < 80 mmHg on ZEEP, 5)

arrhythmia and 6) COPD. All patients were mechanically ventilated under general anesthesia and paralysis (tidal volume = 10 ml/kg, respiratory rate = 10 breaths/min, I/E ratio = 1:2). Hemodynamic parameters including SVV and PP were measured during ZEEP and 10 cm H<sub>2</sub>O PEEP application. PiPPP was calculated as (PPPEEP - PPZEEP) / (PPZEEP) %. Correlation analysis between SVV on ZEEP and PiPPP was performed by Spearman rank order test and  $P < 0.05$  was considered significant.

**Results:** We observed variable hemodynamic changes in response to PEEP application and significant dependence of the PiPPP on CV conditions ( $\hat{r} = 0.592$ ;  $\hat{c}P < 0.001$ ). For different CV conditions determined by the SVV values at ZEEP (non-normovolemia: SVV > 10 %, severe hypovolemia: SVV > 13%), we found a high positive predictive value (PPV) for non-normovolemic condition (82%) and a high negative predictive value for severe hypovolemic condition (93%) when PiPPP > 15% is considered positive.

**Discussion:** This is the first study demonstrating dependence of PiPPP on SVV on ZEEP while significant association between PEEP-induced SV changes and SVV on ZEEP was previously reported (2). Although the number of trials was small, our results suggest potential usefulness of pulse pressure measurements before and during 10 cm H<sub>2</sub>O PEEP for determining CV conditions in anesthetized and mechanically ventilated patients. Our PiPPP is a simple non-invasive hemodynamic parameter obtained without arterial pressure-based cardiac output monitoring systems. Clinical usefulness of the PiPPP should be assessed by accuracy of fluid responsiveness prediction in a large sample size in the future.

**Conclusions:** PEEP-induced pulse pressure changes predict stroke volume variation and possibly serve to optimal fluid management.

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## Paper No: 1151.0

### Excision of arteriovenous malformation cerebral Jehovah's Witness patient

Alejandro Cavagna

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**Introduction:** The anesthetic handling of Jehovah's Witness patients undergoing surgery excision of bleeding as a cerebral arteriovenous malformation, is a real challenge for the physician.

**Objective:** Description of anesthetic management to ensure the transport of oxygen during high blood loss surgery without blood transfusion possible.



**Material and methods:** 23 year old patient, 45 kg, ASA1. Diagnosis: Temporal arteriovenous malformation. Jehovah's Witness refusal to consent to the transfusion. Erythropoietin was administered pre-operatively managed to increase cell mass. During the surgery, they looked for: -Reducing the quantity and quality losses using: tramexámico acid (loading and maintenance), and extreme acute normovolemic hemodilution (21 ml/kg), controlled hypotension, blood recovery (cell-saver), patient positioning, exhaustive control of hemostasis field; -Maintain normovolemia using: crystalloids, colloids, inotropic support and blood saved; -Increase the availability of oxygen using high FiO<sub>2</sub>; -Maintain adequate anesthetic plane (TIVA-TCI propofol / remifentanyl); -Monitoring with ECG 5-lead, CVP, invasive blood, urine output, temperature, pulse oximeter, capnography; -Serial laboratory blood count, coagulation, blood gases, blood glucose and lactic acid. Towards the end of the resection the vascular nest presents rupture with massive bleeding, hemodynamic instability and acute reduction of the globular

mass; recovering immediately the recovered sanguineous volume plus the blood of the normovolemic hemodilution. In the post-operative treatment received analgesic, anticonvulsant, and erythropoietin. Discharged on the ninth day with Ht 25%, Hg: 7.8mg%, platelets: 130000. Without sequela.

**Result:** During massive bleeding with hemodynamic compensation had fallen to 9% in Hct, Hb 2.9 and inotropic requirements. Remained normal ST segment, blood glucose, acid-base status and lactic acid throughout the surgery. Therapy with Ht passes. 26% and Hb 8.3. She was extubated at 12 hours.

**Discussion:** Beneficial effects of conservation techniques and blood conservation, versus negative effects of severe anemia, respecting the patient's will.

**Conclusion:** Respecting the will not get blood to Jehovah's Witness patients who underwent surgery at high risk of massive bleeding perioperative strategies currently exist that aim to ensure oxygen transport and tissue utilization, reducing mortality significantly.

## CLINICAL NEUROSCIENCES

(The names of the authors presenting each paper are shown in bold type)

### Paper No: 40.00

#### **Dose-related Reduction of Sevoflurane Requirements to Block Autonomic Hyperreflexia by Remifentanil During Transurethral Litholapaxy in Patients with High Complete Spinal Cord Injury**

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**Introduction:** An inhaled anesthetic concentration required to block autonomic hyperreflexia (AHR) is high enough to cause severe hypotension in patients with high spinal cord injury (SCI).

**Objectives:** We aimed to determine the effects of remifentanil on the sevoflurane requirement to block AHR in SCI.

**Methods:** The study involved 96 patients with chronic, complete SCI scheduled to undergo transurethral litholapaxy during general anesthesia. Anesthesia was induced with thiopental, and sevoflurane concentrations in 50% nitrous oxide were adjusted to maintain a bispectral index of 40 to 50. Whether the patient develops an AHR [an increase of systolic blood pressure (SBP)  $>20$  to 40 mmHg] was first examined by distending the bladder with glycine solution (the first trial). Patients who developed AHR were then allocated to receive no remifentanil infusion (control,  $n=31$ ), a target-controlled plasma concentration of 1 ng/mL ( $n=25$ ), or 3 ng/mL remifentanil ( $n=24$ ). After baseline hemodynamics had recovered, the target sevoflurane and remifentanil concentrations were maintained for at least 20 minutes and the procedure was resumed (the second trial). Each target sevoflurane concentration was determined by the up-and-down method based on changes (15% increase or more) of SBP in response to the bladder distension. SBP, heart rate, and bispectral index were measured before and during the bladder distension during the trials, and plasma concentrations of catecholamines during the first trial.

**Results:** Eighty-two (85.4%) of 96 patients developed AHR during the first trial. During the second trial, the end-tidal concentrations of sevoflurane to prevent AHR were reduced to 2.6% (95% confidence interval 2.5% to 2.8%,  $P<0.01$ ) and 2.2% (2.1% to 2.4%,  $P<0.0001$ ) in the groups receiving 1 and 3 ng/mL remifentanil, respectively, in comparison with 3.1% (2.9% to 3.3%) in the control. When considering minimum anesthetic concentration (MAC) values and the contribution of 50% nitrous oxide (0.48 MAC), the combined MAC values, expressed as multiples of MAC, were 2.27, 1.98, and 1.75 in the control, 1 ng/mL remifentanil, and 3 ng/mL remifentanil groups, respectively.

**Conclusions:** Target-controlled concentrations of 1 and 3 ng/mL remifentanil would reduce the requirement of sevoflurane combined with 50% nitrous oxide to block AHR by 16% and 29%, respectively, in SCI patients undergoing transurethral litholapaxy.

### Paper No: 79.00

#### **DIC and Venous Air Embolism during surgical resection of a Giant Meningioma. A case report**

**Luciana Curia, Emily Fanciullo and Maksim Fedarau**

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**Background and rationale:** Disseminated intravascular coagulation (DIC) is a syndrome that results from unregulated activation of coagulation resulting in simultaneous profuse bleeding from consumption of clotting factors as well as intravascular thrombus formation. It has been described in the literature as a known issue in patients with trauma, obstetric complications, sepsis and certain malignancies. Venous air embolism is another potentially serious complication in the surgical patient, mostly in patients that require a sitting position and so the risk of having a surgical field above the level of the heart. We present a rare case of DIC and

venous air embolism in a supine Giant meningioma resection.

**Clinical Presentation:** This is a 69-year-old previously healthy female who presented to Cayuga Medical Center on January 9, 2011, after syncope with seizure. She was found to have a right frontal lobe meningioma. At the same time she was found to have a non-ST elevation MI and ultimately underwent cardiac catheterization with PTCA to the mid LAD on January 12 2011 at Strong Memorial Hospital in Rochester New York. Patient received a Plavix load at that time. She was readmitted on February 8, 2011, for resection of the tumor. In the OR, patient was hooked up to standard ASA monitors and induced with no complications. Two big bore IVs were placed as well as a left radial arterial line once patient's airway was secured. No central line was placed yet a precordial doppler was chosen as preferred monitor. Intraoperatively, patient had significant blood loss requiring 7 units of PRBC and 5 doses of FFP, rising a high suspicion for DIC. A TEG was not sent but due to the suspicion of DIC a blood panel was sent consistent with thrombocytopenia and DIC. At around the same time, we noticed a change in the precordial doppler sound and with the suspicion of air embolism we immediately notified the surgeons and proceeded to flood surgical field with saline, tamponade field and put OR bed in trendelenburg. Event resolved without complications. Rest of the surgical course was uneventful and patient was transported intubated to the Neuro ICU.

**Conclusion:** DIC and venous air embolism are rare complications in supine brain tumor surgeries. Being prepared, organized and having an excellent communication with the surgical team played a great part in the successful outcome of this female patient. It allowed us to recognize and treat both conditions ahead of the game.

**Paper No: 155.00**

## Anaesthetic implications for intraoperative high field magnetic resonance imaging in neurosurgery: our experience

**Bishnu Panigrahi**

India

In the past few years, intraoperative MRI ( iMRI ) has been successfully integrated into the operation theatre. Presently iMRI is no longer a vision, but an established neurosurgical tool. Maximal lesion resection along with avoidance and preservation of eloquent cortex is the major benefit of this technology. Whereas iMRI provides superior image quality in a variety of applicable sequences, it also presents new challenges for the anaesthesiologist.

**Objective:** To focus on the issues of interest to the anaesthesiologist, eg. set up of the technology, safety concerns, monitors and equipment considerations and the difficulties faced

by us during the anaesthetic management of neurosurgical procedures for iMRI.

**Methods:** We used 1.5 Tesla MRI scanner with a rotating OR table installed in a radiofrequency shielded OR (MRI suite) and MRI compatible anaesthetic and monitoring equipment. A retrospective analysis of 388 cases conducted over a period of 57 months was done. Also we evaluated the number of patients in whom iMRI revealed significant residual tumour. Time from induction to incision, time taken for iMRI and total anaesthesia time (from induction to pin removal) were recorded for all the patients. We also analyzed anaesthetic problems like difficult intubation, hypothermia and delayed emergence.

**Results:** Gliomas and pituitary tumours accounted for 79 % of our cases. Of all the cases, 95 patients ( 24.48 %) underwent further resection following iMRI. Besides, 186 patients (47.9 %) had tumours near eloquent regions, which were removed without producing any new neurological deficit. We encountered difficult intubation in four patients. Mean time from induction to incision was 56 minutes. The mean total anaesthesia time was 306 minutes (210-460 minutes). Delayed extubation was observed in four patients.

**Conclusion:** iMRI feedback aids the surgeon in ensuring near total resection of the tumour without compromising the surrounding healthy tissue. iMRI is safe and has minimal negative influence on perioperative anaesthetic management, even though iMRI may prolong the duration of surgical procedures and henceforth anaesthesia duration.

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**Paper No: 277.00**

## Effect of opiate receptor gene polymorphisms on opioid addiction

**Hulya Turkan<sup>1</sup>, Ali Esat Karakaya<sup>2</sup>, Bensu Karahalil<sup>2</sup>, Ela Kadýođlu<sup>2</sup> and Kenan Eren<sup>3</sup>**

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**Introduction:** Addiction to opiates and illicit use of psychostimulants is a chronic, relapsing brain disease that, if left untreated, can cause major medical, social, and economic problems. In addition to environmental factors, genetic background plays an important role in the susceptibility toward drugs of abuse. Inter-individual differences underlying drug abuse (such as initiation, addiction, and abstinence) would provide information that might lead to novel treatment

and prevention approaches. The opiate receptor mediates the action of morphine and the A118G polymorphism is candidate gene for studies of opiate dependence.

**Objectives:** The aim of our study was to examine whether  $\mu$ -opiate receptor gene (OPRM1) polymorphism was associated with substance dependence in Turkish population.

**Methods:** 103 addicts were included in the study to evaluate the association of variants with addiction. 83 healthy volunteers with similar demographic features were included as a control group. Subjects were conformed to the criteria for opiate dependency as defined by DSM-IV. Demographic questionnaire and drug-taking history questionnaire was employed to collect information. Blood samples were collected and SNP genotyping was done for OPRM1 genetic polymorphisms.

**Results:** The G allele in Addiction Group was 16,1% and 8,4 % in Control Group. The difference between groups is significant.

**Conclusions:** In conclusion, there was a significant association between OPRM1 A118G gene polymorphisms and addiction. However, further studies with combination of several SNPs are required for clinical management of addicted patients. expression in heroin abusers. PNAS 2006; 20: 7883–7888.

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## Paper No: 296.00

### Intrathecal baclofen for spasticity and pain

Dhafir Al Khudhairi

**Introduction:** Spasticity is a disorder of muscular function causing muscular tightness or spasm which occurs when there is an insult to the central nervous system. This insult could be either pathological or traumatic.

**Objective:** The aim of this retrospective study is to assess the significant reduction of spasticity and spasm after the use of intrathecal Baclofen when previous medical treatment has failed, and to assess any complications.

**Method:** Forty-six patients had intrathecal Baclofen pumps implanted for severe spasticity at Sultan Bin Abdulaziz Humanitarian City. There were 14 females and 32 males, ages ranging from 12 to 57 years.

These patients either did not respond to, or tolerate, oral medications and were referred to us for possible Intrathecal baclofen pump implantation.

**Results:** Fifty-one patients were tested for Intrathecal Baclofen injection. The test dose consisted of a single bolus of 50-100  $\mu$ g of Intrathecal Baclofen, depending on the size

of the patient. Of these, 46 were accepted for implantation after passing the diagnostic test when their Ashworth Score had improved (reduced by 2 scales).

All patients showed a definite improvement in their spasms and symptoms following the implantation. Improvement was noted not only in spasticity, but also in general daily living activities, mobility and behavior. Improvement was also noted in pain relief, and there was a lessening of sleep disturbance.

The dose of Intrathecal Baclofen varied significantly and ranged between 50 and 450  $\mu$ g per day.

**Conclusion:** The patients who had implantation of the intrathecal Baclofen pumps showed excellent results; the number of complications was acceptable and were not life-threatening. Infection was the significant complication in two patients and this led to explantation of their pumps. Patient satisfaction was very high and was related to improvement in the quality of life for the patients.

## Paper No: 297.00

### Arixtra (Fondaparinux) as Part of Treatment for Patients with Stroke

Magda Yeghiazaryan, Hayk Hovhannisyan, Lilit Museyan and Levon Matevosyan

**Introduction:** Alteplaza, with its proven efficiency, is currently considered first-line drug for the thrombolytic treatment of the acute ischemic stroke. However, the non-availability of this drug in the Republic of Armenia necessitates searching for alternative treatment of ischemic stroke with a view to reducing the mortality rate of these patients to the extent possible. The aim of the current study was to study the role of Arixtra as an alternative treatment in the prevention of secondary ischemia for patients with stroke. Methods and Materials: The case control study has been planned and conducted since April 2011. During two months after the commencement of the study thirty-five patients with stroke were studied in the Intensive care unit (ICU). Patients' average age was  $63,6 \pm 8,7$ . Among them, 40% had ischemic stroke ( $n=14$ ) and 60% ( $n=21$ ) had hemorrhagic. 53% ( $n=11$ ) of the patients with hemorrhagic stroke underwent surgical manipulations; 82% ( $n=9$ ) of them were opened surgical manipulations, while intravascular coiling constituted 18% ( $n=2$ ). APACHE II was  $17,3 \pm 4,8$ . 77% of patients ( $n=27$ ) had artificial breathing with average duration of  $17,5 \pm 9,1$  days. Mortality was 37% ( $n=13$ ). During the treatment, all the patients received 2.5mg of Arixtra per day subcutaneously. Besides Arixtra, the patients received 0.3ml Fraxiparine subcutaneously, and 40% of all the patients ( $n=14$ ) also received Clopidogrel 75mg/day. All the drug prescriptions were under the control of coagulogram. The patients received proper amount of infusion fluids (colloids and crystalloids)  $2000 \pm 655$  ml/day. The assessment criteria of treatment were computer tomography scan, with



positive or negative results, and secondary complications connected with hypocoagulation. Student method was implemented in the current phase of the statistical data analysis.

**Results:** Initial coagulation test yielded the following results; Fibrinogen  $480 \pm 81$  mg/dl, APTT  $30.6 \pm 10$  sec., INR  $1.2 \pm 0.1$ . At the end of the treatment the results were Fibrinogen  $463 \pm 91$  mg/dl ( $p=0.1$ ), APTT  $34.4 \pm 9$  sec. ( $p=0.01$ ), INR  $1.36 \pm 0.27$  ( $p=0.0005$ ). Secondary hemorrhage was only for 6% ( $n=2$ ), while primary and secondary ischemia for 3% ( $n=1$ ): In the other organ systems, there wasn't any secondary hemorrhage.

**Conclusion:** The initial study data suggest that using Arixtra as a treatment component for patients with stroke can have positive results both in the treatment of ischemic strokes and in the prevention of secondary ischemic complications and treatment efficiency in patients with hemorrhagic stroke.

## Paper No: 340.00

### Cerebral Desaturation Events During Beach Chair Position Shoulder Surgery: Regional Versus General Anesthesia

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**Background:** Beach chair position (BCP) surgery may compromise cerebral blood flow and oxygenation, resulting in acute neurologic injuries. Recent reviews of the risks of sitting position surgery concluded that the choice of anesthetic technique may have "a direct effect on the type of complications that can be expected" and "may influence the potential for cerebral ischemia."<sup>1</sup> Many clinicians favor regional techniques for BCP shoulder procedures due to the belief that systemic hemodynamics and cerebral blood flow/ perfusion is better maintained in the awake, spontaneously breathing patient.

**Objectives:** The aim of this investigation was to determine the effect of anesthetic technique (general anesthesia or interscalene block with sedation) on brain oxygenation (SctO<sub>2</sub>) and the incidence of cerebral desaturation events (CDE) during BCP shoulder surgery.

**Methods:** Sixty consecutive patients undergoing shoulder arthroscopy in the BCP were enrolled in this observational cohort trial; 30 patients in the general anesthesia group (GA group-tracheal intubation and controlled ventilation) and 30 in the interscalene block group (ISB group-ISB with propofol sedation and spontaneous ventilation). Anesthetic management was standardized in both study cohorts. Baseline measurements for SctO<sub>2</sub>, mean arterial pressure, heart rate, and peripheral oxygen saturation were measured on

arrival to the operating room and then recorded until emergence from anesthesia. Mean arterial blood pressure was maintained within 20% of baseline values using phenylephrine boluses. A CDE was defined as a  $\geq 20\%$  decrease in SctO<sub>2</sub> from baseline values. A CDE was treated using a predefined algorithm.

**Results:** The GA and ISB groups were similar in preoperative demographic characteristics. The incidence of CDE was significantly higher in the GA group (56.7%) compared to the ISB group (0%,  $P<0.0001$ ), as was the median number of CDE (1 (0-20) GA group vs. 0 (0-0) ISB group,  $P<0.0001$ ). Furthermore, the percentage of patients requiring interventions for decreases in SctO<sub>2</sub> was higher in the GA group (43% vs. 0% ISB group,  $P<0.0001$ ). Although mean arterial pressure was also similar between groups, more patients in the GA group required treatments for hypotension (73.3% vs. 10% ISB group,  $P<0.001$ ), and total median doses of phenylephrine were larger in this cohort ( $400 \mu\text{g}$  vs.  $0 \mu\text{g}$  ISB group,  $P<0.0001$ ).

**Conclusions:** The incidence of CDE is significantly reduced when BCP shoulder surgery is performed under regional anesthesia.

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## Paper No: 403.00

### The relationship between shivering and opioid-induced hyperalgesia induced by high doses of remifentanyl in patients undergoing single port gynecologic surgeries

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**Introduction:** Opioid-induced hyperalgesia (OIH) and post-anesthetic shivering (PAS) in high-dose remifentanyl based anesthesia has been reported. They can be prevented by N-methyl-D-aspartate (NMDA) receptors antagonists.

**Objectives:** This study was aimed to determine the correlation between OIH and shivering induced by high-dose remifentanyl and effects of low-dose ketamine on OIH and shivering.

**Methods:** Seventy-five patients scheduled for single-port laparoscopic gynecologic surgeries were randomly allocated into three groups who receive intraoperative remifentanyl: Group L at  $0.05 \mu\text{g}/\text{kg}/\text{min}$ , group H at  $0.3 \mu\text{g}/\text{kg}/\text{min}$ , and group HK at  $0.3 \mu\text{g}/\text{kg}/\text{min}$  and  $0.25 \text{ mg}/\text{kg}$  ketamine just before incision, followed by continuous infusion of  $5 \mu\text{g}/\text{kg}/\text{min}$  until skin closure. PAS for 1 h in PACU, perioperative

tympanic membrane temperature, preoperative tactile pain threshold and tactile pain threshold and extent of hyperalgesia at 24h after surgery, pain scores in 1 hour after surgery, time to first postoperative analgesic requirement and postoperative cumulative injected volume through PCA pump during 24 h were recorded.

**Results:** PAS, postoperative tactile pain threshold and extent of hyperalgesia in group H were significant greater ( $p < 0.05$ ) than in the other groups. PAS correlated with postoperative tactile pain threshold ( $r = -0.496$ ,  $p < 0.01$ ) and extent of hyperalgesia ( $r = 0.422$ ,  $p < 0.01$ ). Tympanic membrane temperature, time to first postoperative analgesic requirement, postoperative pain scores and analgesic consumption and postoperative cumulative injected volume through PCA were comparable in three groups.

**Conclusions:** OIH including enhanced perception of pain and PAS which associated with high-dose remifentanyl, had moderate correlation and were attenuated by low-dose ketamine, which implicates a common mechanism such as activation of NMDA receptors underlie two effects induced by high-dose remifentanyl.

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## Paper No: 514.00

### Respiratory support in acute brain injury

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**Introduction:** In spite of some successes achieved in treating patients with acute brain injury the mortality and incapacitating still remains at the high level. one of the ways to eliminate Intracranial Hypertension is the use of Artificial Pulmonary Ventilation (APV). The influence of APV on the system haemodynamics is widely known but cerebral-vascular effects of APV are not still studied sufficiently. We have studied the dynamics of intracranial and cerebral perfusive pressures data under different conditions and ways of lungs ventilation in patients with acute brain injury.

**Objectives:** We investigated 58 patients with acute brain injury: 32 with traumatic brain injury and 26 with hemorrhagic stroke, SCG was at  $7 \pm 3$  points.

**Methods:** At the postoperative period all patients were given mechanical ventilation against a background of the standard intensive therapy. At first the IPPV regimen was used. Further, we individually applied two different APVs: BIPAP

and SIMV. Invasive ICP measurements and hemodynamic indexes was done during the respiratory therapy.

**Results:** The received data shows that subsidiary regimens of ventilation do not influence essentially on the ICP and the function of cardio-vascular system do not influence negatively to the CPP. It also demonstrated the advantage of the subsidiary regimens and advisability of their usage for performing respiratory supporting in the practice of the intensive therapy of the patients with acute brain injury. We also illustrated the importance of monitoring gas mixture of vein's blood indexes from cranium cavity and arterial-vein difference by oxygen during performing respiratory supporting of these patients.

**Conclusions:** In patients with acute cerebral affection, independently from applying types of ventilation the APV should not provoke the increasing of ICP and AVDO<sub>2</sub> and must provide adequate cerebral oxygenation. BIPAP differs by more physiological action and less negative influence on intrathoracic pressure, ICP and cardiac output.

## Paper No: 542.00

### To study the incidence and characteristics of postoperative complications during hospital stay in patients undergoing transsphenoidal removal of pituitary tumors

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**Introduction:** Considering the important role of pituitary gland in regulating various endocrine systems and its unique anatomic location, various post operative complications can be anticipated resulting from surgery on pituitary tumors. Since pituitary tumors may be secretory or non-secretory, there exists a distinct possibility that the incidence and nature of complications are influenced by the tumor pathology.

**Objectives:** To note various post operative complications during neurosurgical intensive care unit stay in patients undergoing transsphenoidal surgery, observe overall mortality and to find the bearing of tumor characteristics with complications.

**Methods:** We carried out a prospective study in 152 patients undergoing transsphenoidal surgery. We categorized patients into five groups based on the type of tumor and noted different postoperative complications.

**Results:** In our study, the most common pituitary tumor was found to be nonfunctioning (46%) followed by GH secreting adenoma (22%). Various groups showed different postoperative complications in which CSF leak was the commonest followed by diabetes insipidus, post operative nausea and

	Acromegaly (N= 33)	Cushing (N= 27)	Prolactinoma (N= 13)	Nonfunctioning (N= 69)	Apoplexy (N= 7)
Age	36.4(7.9)	29.5(12.1)	35.9(12.5)	44.8(12.6)	33.4(5.8)
Sex (M: F)	19:14	11:16	8:5	47:22	5:2
Micro: Macro	4:29	19:8	5:8	3:66	0:7
Duration	174(34.7)	174.5(28.8)	177.3(45.1)	172(33.2)	171.1(30.1)
Hospital stay	4.7(1.6)	4.6(1.9)	4.8(2.2)	5.6(3.7)	6.1(2.2)
Complications Prolonged ventilation	7(21)	8(30) 1(8)	6(9)	0(0)	
PONV	4(12)	1(4)	1(8)	4(6)	0(0)
CSF leak	21(64)	7(26)	6(46)	23(33)	2(29)
Diabetes Insipidus	0(0)	6(22)	2(15)	9(13)	5(71)
Electrolyte disturbances	3(9)	1(4)	0(0)	4(6)	1(14)
Vision loss	1(3)	1(4)	0(0)	2(3)	1(14)
New cranial nerve palsy	0(0)	0(0)	1(8)	0(0)	0(0)
Bleeding/hematoma	3(9)	3(11)	0(0)	8(12)	1(14)
Hydrocephalus	0(0)	3(11)	0(0)	0(0)	0(0)
Death (with in 48 hrs)	0(0)	1(4)	0(0)	0(0)	0(0)

N- number of patients, PON -post operative nausea and vomiting, CSF-cerebrospinal fluid

vomiting, and hematoma at operation site. A total of 4% patients died Postoperative CSF leak has some relationship with the tumor type and size, and also related with increased incidence of PONV.

**Conclusion:** Transsphenoidal surgery is considered a safe procedure but it does carry the risks of various postoperative complications and even death. The incidence of various complications was unrelated to tumor size or pathology but may have been influenced by the experience of neurosurgeon.

Table 1. Demographic profile [Mean (SD)], tumor characteristics, intraoperative variables, length of hospital stay, immediate postoperative (with in 48 hrs) complications and mortality in patients undergoing transsphenoidal surgery for pituitary adenoma [number (percentage)]

quantity of local (meningitis, ventriculitis, wound suppuration) and systemic (postoperative pneumonia, sepsis) infectious complications. In the group of patients with preventive antibacterial treatment we observed infectious complications in 1,77% cases which was less then in group without preventive antibiotics where infectious complications occurred in 4,69%cases. The difference was statistically authentic ( $p < 0,05$ ). Thus, it is a certain fact, that preventive antibiotics decrease the number of suppurative and inflammatory complications in patients, undergoing neurosurgical operations for about 2, 92%. The most effective antibiotics are cephalosporins of the third and the fourth generations and ftorhynolones.

## Paper No: 588.00

### Perioperative preventive antibacterial therapy in neurosurgical patients

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The study of publications about the efficiency of perioperative preventive antibiotics showed, that there were different opinions about its benefits. We have analyzed the case histories of 3805 neurosurgical patients, who had undergone the operation in our hospital in 1998-2004 years. In 3038 cases there were preventive intraoperative antibiotics by using of cephalosporins of the third generation, and in 767 cases there were no preventive treatment. In our research we estimated the

## Paper No: 841.00

### Respiratory complications in the early postoperative period following elective craniotomies

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**Introduction:** Patients undergoing craniotomy procedures are predisposed to a number of respiratory complications in the postoperative period (1,2). Quantification of the problem and identification of patients at risk can be of immense value for patient care.

#### Objectives:

- (1) To assess the incidences of various postoperative respiratory complications (PRCs) following intracranial

procedures in the initial 72 hrs after surgery and the impact of PRCs on patient outcome. .

- (2) To identify the risk factors associated with the occurrence of PRCs.

**Methods:** After approval of the ethics committee, patients undergoing elective craniotomies in our hospital from August 2009 to October 2010 were studied prospectively. Using a standard proforma, the information pertinent to the preoperative history, physical examinations, investigation reports, anaesthesia techniques, intraoperative events, post-operative events and outcome at the time of discharge were recorded. Occurrence of any signs or symptoms of respiratory system dysfunction like hypoventilation (respiratory rate <8 bpm), airway obstruction, dyspnoea, bronchospasm, purulent tracheobronchial secretions or the occurrence of atelectasis, pneumonia, pneumothorax, pleural effusion, ARDS, respiratory failure, need for reintubation, tracheostomy and the need to increase ventilatory support were considered as respiratory complication.

**Results:** Out of 961 patients, 137(14.3%) patients developed (PRCs) within 72 hrs of surgery. Ninety nine (10.3%) patients developed chest infection. Sixty eight (7%) patients required reintubation and ventilatory support. Twenty seven (2.8%) patients were reintubated due to respiratory causes which include respiratory distress (20), increased tracheobronchial secretions (4) and pulmonary edema (3). Forty one (4.2%) patients were reintubated due to neurological deterioration and altered sensorium. The neurological causes were post-operative hematoma (15), development of cerebral infarcts (15), seizure (8) and residual tumor edema (3). Fifty patients (5.2%) were tracheostomised due to weaning failures and prolonged ventilation. The patients who had PRCs had longer hospital stays and poorer Glasgow outcome scale at the time of discharge from the hospital. On multivariate analysis, the variables which were significantly associated with increased risk of PRCs were tachycardia during the intraoperative period and deterioration in consciousness, blood transfusion, hypokalemia and fever in the postoperative period.

**Conclusions:** Respiratory complications during the initial 72 hours after surgery are common in patients undergoing elective craniotomies and are associated with prolonged hospital stay and poor neurological outcome at the time of discharge. The factors which are significantly associated with increased risk of PRCs are tachycardia during the intraoperative period and GCS deterioration, blood transfusion, hypokalemia and fever in the postoperative period.

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## Paper No: 926.00

### Diagnostic and prognostic importance disorders purine metabolism in acute cerebral ischemia

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**Introduction:** It was established that hypoxanthine, xanthine and uric acid are present in the brain, their content is changed after ischemia [1,2]. Objectives We examined 402 patients in the acutest period (1st 7-10 days) of cerebral ischemic stroke at the age of 30-87 years. Methods Patients, in addition to conventional laboratory parameters, determined the blood levels of guanine, hypoxanthine, adenine, xanthine and uric acid by direct spectrophotometry [3]. Evaluated the effects of the conservation of coma and death following the onset of which drugs are widely used in intensive neurology.

**Results:** The most adverse prognostic factors associated with prolongation of sopor or coma are: laboratory - and hyperuricemia and hyperHYPOXANTHINemia, The most favorable prognostic factor, "countering" the preservation of a coma and the coming of death in cerebral ischemic stroke is the use of antiplatelet agents. Discussion Hyperuricemia most researchers viewed as an unfavorable prognostic factor, although intravenous injection of uric acid in acute cerebral ischemia can improve the results of thrombolytic therapy. Prognostic value of supranormal blood hypoxanthine level in contrast to the hyperuricemia has been insufficiently studied.

**Conclusion:** Launched from the development of acute cerebral ischemia, dynamic control of the blood levels of uric acid and hypoxanthine to predict its course and outcome.

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## Paper No: 936.00

### Early extubation after prolonged intracranial tumour surgery in children

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**Introduction:** Tracheal extubation is one of the most critical steps following intracranial tumour surgery (ITS), and



timing of tracheal extubation is still debated. Over the last few years a number of studies have described the use of early or even immediate extubation in the operating room for those patients undergoing ITS. These reports involved a small series of patients and did not include pediatric ITS patients.

**Patients and Methods:** We reviewed the records of consecutive prospective study of patients who had undergone ITS at Pediatrics Universitary Virgen del Rocio Hospital during 10 years. In this preliminary paper, we reviewed prolonged cranial surgeries of more than seven hours. Successful extubation was defined as no reintubation at any time during the intensive care unit course except reintubation secondary to other clinical events unrelated with primary surgery or anesthesia. The criteria for early extubation after IST included: awake patient (obeys verbal commands or spontaneous motor activity if <2 yr), adequate ventilation (respiratory rate <30 breaths/min, good respiratory pattern, oxygen saturation >95% in room air, end-tidal carbon dioxide concentration 30–40 mmHg), hemodynamic stability, normothermia, clinical findings indicating complete reversal of neuromuscular blockade and adequate hemostasis. All patients were admitted to the PICU. All patients were observed in terms of respiratory and neurological complications during their PICU stay within the first week.

**Results:** A total of 3261 patients were performed during this period. 79 prolonged cranial surgeries of more than seven hours was identified. 65% posterior fossa surgery and 35% supratentorial surgery. 74 patients were extubed immediately after the procedure. 2 patients had intraoperative complications that contraindicated an early extubation. In other 3 cases, they were not extubed for other criteria. There were two reintubations for epileptical status and intracranial haematoma in the first 24 h. Another one was reintubated for not complete consciousness level recovery.

**Conclusions:** In recent years and specialties as heart surgery, early awakening have been advocated in order to avoid respiratory complications that produces prolonged period in ICU. Furthermore, in neurosurgery, an early extubation is important to rule out neurological complications. The availability of ultrashort intravenous anesthetic agents and adrenergic blocking agents has added to the flexibility in the immediate emergence period after intracranial surgery. In our experience, an early extubation in the OR could be safe in experienced anesthesiological and neurosurgical teams.

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## Paper No: 1090.0

### Thalamocortical networks participate in propofol-induced unconsciousness: a functional imaging study

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**Introduction:** The neurophysiologic mechanism of unconsciousness during general anesthesia is not fully understood. Information and integration are two constituents of human consciousness [1], presumably instantiated by the specific and nonspecific divisions of the thalamocortical system [2]. How anesthesia may influence the specific and nonspecific thalamocortical networks has not been determined.

**Objectives:** We studied the effect of propofol on thalamocortical functional connectivity using blood oxygen level-dependent (BOLD) functional magnetic resonance imaging (fMRI) in healthy volunteers. We targeted an anesthetic depth at which conversational responsiveness and auditory verbal memory were suppressed but cortical sensory reactivity was preserved. We hypothesized that under this condition, nonspecific thalamocortical connectivity would be disrupted more than specific thalamocortical connectivity indicating a failure of information integration but not sensory transmission [3].

**Methods:** Eight volunteers were instructed to listen to and encode 40 English words during wakefulness, light sedation, deep sedation, and recovery while lying in the fMRI scanner. Target-controlled infusion of propofol was adjusted to achieve 0.5 or 1.0 ug/ml plasma concentration. Subjects were able to communicate during light but not deep sedation (Observer's Assessment of Alertness and Sedation scores: 1–2 and 3–4, respectively). Thalamocortical functional connectivity was determined from the temporal correlation of low-frequency (<0.1Hz) BOLD signals with seed regions manually defined within specific (medial dorsal, ventral lateral, ventral posterior), and nonspecific (centromedian parafascicular) nuclei.

**Results:** In wakefulness, specific and nonspecific thalamocortical connectivity showed differential distribution: dominantly bilateral frontal and temporal (specific), vs. medial frontal and medial parietal (nonspecific). Propofol administered to deep sedation preserved auditory cortex BOLD activation, reduced the left-lateralized response in parts of the fronto-temporal cortex, and augmented the negative

responses in the medial posterior regions. Propofol at the same dose reduced extensive functional connectivity by 43% in the specific, and by 79% in the nonspecific thalamo-cortical system (with robust reductions in the superior medial frontal, orbitofrontal and medial parietal cortex). Subjects had no explicit or implicit memory of words presented during deep sedation. A dramatic increase in connectivity, particularly in the nonspecific system, occurred upon emergence.

**Conclusions:** Deep sedation with propofol conferred distinct changes in the specific and nonspecific thalamocortical networks that presumably mediate the transmission and integration of sensory information, respectively. The finding that auditory activations and functional connectivity were preserved in the specific but suppressed in the nonspecific system lends further support the theory [3] that information disintegration, but not an inhibition of sensory reactivity, underlies the mechanism of anesthetic-induced unconsciousness.

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## Paper No: 1092.0

### Comparison of preexisting cognitive impairment, amnestic mild cognitive impairment, and multiple domain mild cognitive impairment in men scheduled for coronary artery surgery

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**Introduction:** Preoperative cognitive function is an important factor in determining the incidence and severity of post-operative cognitive dysfunction. 1-3 Patients with coronary atherosclerosis may have preoperative cognitive impairment (PreCI) because of concomitant major risk factors for cerebrovascular disease.

**Objective:** We compared the incidence of PreCI, amnestic mild cognitive impairment (aMCI), and multimodal mild cognitive impairment with amnesia (mdMCI+a) in male veterans scheduled for elective coronary artery bypass graft (CABG) surgery. aMCI and mdMCI+a are known predictors of Alzheimer's disease. How often these indices of cognitive impairment occur in cardiac surgical patients is currently unknown.

**Methods:** 100 men  $\geq 55$  yr undergoing CABG surgery were enrolled; 100 control subjects without coronary artery disease were recruited from hospital clinics.

**Results:** Recent verbal and nonverbal memory and executive functions were assessed using a psychometric test battery before surgery. Performance of patients scheduled for surgery was below that of controls on 8 of 10 psychometric tests. Cohen's d indicated that the difference between patients and controls was "large" for the Immediate and Delayed Story Recall tests, "medium" for the Immediate Word List Recall, and "small" for the Figure Reconstruction, Delayed Figure Reproduction, Immediate and Delayed Word List Recall, Phonemic Fluency, and Stroop tests. 25, 20, and 21 patients satisfied the criteria for PreCI ( $\geq 2$  SD below controls in two or more of the ten tests), aMCI ( $\geq 1.5$  SD below controls in patients in memory tests and a subjective complaint of memory loss), and mdMCI+a (multiple cognitive domain impairment plus memory loss), respectively. 15 patients satisfied the criteria for both PreCI and mdMCI+a, whereas only 5 patients satisfied the criteria for both PreCI and aMCI. PreCI was not significantly associated with aMCI, but PreCI was significantly ( $P < 0.05$ ) associated with mdMCI+a. Multivariate analysis demonstrated that PreCI and mdMCI+a, but not aMCI, were associated with age; mdMCI+a was also associated with depression.

**Conclusion:** The current results indicate that PreCI, aMCI, and mdMCI+a are common, often independent indicators of pre-operative cognitive abnormalities in patients scheduled for CABG. The assessment of preoperative cognitive dysfunction may be important in identifying patients who are most at risk of progressive cognitive deterioration after surgery or those at risk of subsequent development of Alzheimer's dementia.

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## Paper No: 1192.0

### Meta-Analysis on the Accuracy of Neuromonitoring in Awake Patients undergoing Carotid Endarterectomy

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**Introduction:** The choice of neuromonitoring for detecting cerebral ischemia during carotid endarterectomy is still

discussed controversial. Several studies evaluated the accuracy of different neuromonitoring devices in patients under regional anesthesia as clinical deterioration provides a good gold standard for the diagnosis of cerebral hypoperfusion. The aim of this meta-analysis is to summarize these results and to compare the accuracy of the different monitoring systems used.

**Material:** We searched 36 databases for studies on carotid endarterectomy under regional anesthesia and the simultaneous use of electroencephalography (EEG), stump pressure measurement (SP), somatosensory evoked potentials (SEP), cerebral oximetry by near infrared spectroscopy (NIRS) or transcranial Doppler sonography (TCD). In addition, a manual search of references cited in published reports and reviews was also performed. The frequency of true-positive, true-negative, false positive and false negative results were abstracted from all selected studies. For statistical analysis we calculated the area under the curve (AUC) of a summary receiver operating characteristic (ROC) curve. Z-statistics were used for comparison of AUCs. Heterogeneity among studies was assessed using the Cochrane Q test and the I<sup>2</sup> Index. The pooled estimates of the sensitivity, specificity, positive and negative likelihood ratio were determined. For data analysis MetaDisc 1.4 was used.

**Results:** 37 studies (EEG=8; SP=19; SEP=6; NIRS=6; TCD=9) were identified to met the inclusion criteria; These studies included a total of 4347 patients (EEG=1011; SP=2882; SEP=349; NIRS=398; TCD=736). The overall shunting rate was 15.4% and varied among the different monitoring devices used. The area under the summary ROC curves were 0.915 for EEG, 0.905 for SP, 0.785 for SEP, 0.952 for NIRS and 0.939 for TCD. The AUC of NIRS was significantly higher than stump pressure ( $p<0.01$ ) and SEP ( $p<0.01$ ), but was similar to the AUC of TCD and EEG monitoring. The AUCs of stump pressure, TCD and EEG did not differ significantly, but were all higher than the AUC of SEP (all  $p<0.01$ ). The pooled estimates for sensitivity and specificity were 68% and 96% for EEG, 84% and 85% for SP, 53% and 86% for SEP, 92% and 89% for NIRS and 86% and 90% for TCD.

**Conclusion:** NIRS, Stump pressure, EEG and TCD provide similar accuracy for the detection of cerebral ischemia during carotid artery clamping. Lower accuracy was found for somatosensory evoked potentials.

**Paper No: 1222.0**

### Glasgow Coma Score in Patients with Severe Traumatic Brain Injury with or without Intracranial Pressure Monitoring

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**Introduction:** Despite Intracranial Pressure Monitoring (ICP) is widely used in patients with severe traumatic brain injury "there are insufficient data to support a treatment standard for this topics.

**Objectives:** At our NICU we are not able to measure ICP in all the patients we think it is necessary. From that reason we tried to make our small study to see if are there any differences in the outcome according TBI-tracTM program.

**Methods:** During 18 months 47 patients which fulfil TBI-tracTM criteria were treated in our NICU. In 23 patients we were using intraventricular system for ICP monitoring, and 24 patients were treated without ICP monitoring. There were 6 female and 17 male in the ICP monitoring group and 7 female and 17 male in the non ICP monitoring group. The age in ICP group was from 15 to 77 years (average 44,6) and in non ICP group from 32 to 94 years (average 64,5). 10 patients in ICP group were operated because of subdural, epidural or intracerebral hematoma and 14 patients were operated in non ICP group. At admission and within next 6 hours there were 6 patients with GCS 3 to 4, 8 patients with scores 5 to 6, and 9 patients with scores 7 to 8. In non ICP group there were 13 patients with GCS 3 to 4, 2 patients with scores 5 to 6, and 9 patients scores 7 to 8. In ICP group ICP was monitored from 3 to 9 days. ICP group were mechanically ventilated from 3 to 12 days and non ICP group from 3 to 13 days. In all the patients direct arterial pressure, central venous pressure, end-expiratory CO<sub>2</sub>, and peripheral oxygen saturation were monitoring.

**Results:** During 3 to 10 days monitoring all parameters 5 patients died in ICP group, and 6 died in non ICP group. There were 5 patients in ICP group with outcome with GCS from 4 to 7 and 13 patients with scores from 10 to 15. In non ICP group there were 8 patients with scores from 3 to 7, and 10 patients with scores from 9 to 15.

**Conclusions:** The main objections to our study is very small number of patients. The second there is great differences in age between the groups and even more GCS at admission were worse in non ICP group. Also more patients were operated in non ICP group. According to all this it seems that there is no significant differences in GCS scores between both groups in the first 10 days. It seems that statement from the Guidelines that probably never prospective study to reach standard for indications for ICP monitoring will be done.

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**Paper No: 1234.0**

### Clonidine vs dexmedetomidine in intracranial tumor surgeries: comparison of haemodynamic stability, brain relaxation and emergence

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Alpha2-Adrenergic agonists are known for their sympatholytic, sedative, anaesthetic sparing and haemodynamic stabilizing properties. Dexmedetomidine and clonidine have been widely studied as anaesthetic adjuvants. They have been introduced in neuroanaesthesia for the following novel properties - controllability (e.g. rapid onset and offset of effect), stability of intracranial homeostasis, haemodynamic stability, noninterference with neurophysiologic monitoring and neuroprotection. In addition, they have also been reported to increase the risk of hypotension and bradycardia. Is there a difference in action of Dexmedetomidine and clonidine on brain relaxation and emergence after neurosurgical tumour surgery is not well studied. We therefore compared the effect of these two drugs in patients undergoing craniotomy for tumour decompression.

**Aims and Objectives:** To compare the effects of clonidine and dexmedetomidine in intracranial tumor surgeries on Brain Relaxation and Emergence.

**Methods:** 60 Patients of ASA grade 1 or 2 in the age group of 18-65 years coming for supratentorial tumor excision were randomised into 2 groups of 30 each. Group C received Clonidine administered as an intravenous bolus dose of 0.04mg/kg, 10mins before induction of anaesthesia. Additional dose of 0.02mg/kg of clonidine was given if the duration of surgery was more than 3hours. In group D patients Dexmedetomidine was administered intravenous bolus dose of 1 µg/kg over 10mins, 10mins before induction, followed by 0.5 µg/kg/hr as infusion throughout the surgery. All patients received a standard anaesthetic technique. At the end of surgery, after neuromuscular block was reversed. The patients were extubated when respiration was deemed

sufficient and obeyed commands. Brain relaxation was assessed at the opening and closure of the dura assessed by a senior anaesthesiologists on a scale from 1 to 4

- 1= brain surface bulging beyond craniotomy margin
- 2= brain surface flush with craniotomy margin
- 3= brain surface just below craniotomy margin
- 4= brain surface well below craniotomy margin

If brain relaxation is grade I or II, Mannitol 20% 1gm/kg was given over 10mins. Hemodynamic variables: SBP, DBP, MAP, HR, SPO<sub>2</sub>, ETCO<sub>2</sub>. were recorded at base line, 1 min intervals until 10 min after induction and at 5 min intervals thereafter till 2hours, followed by 30min intervals till the end of the surgery and for 6hours after the procedure. Recovery was assessed by Postoperative GCS and level of consciousness on Ramsay sedation scale, Immediate post operative pain score on VAS.

**Results:** In Dexmedetomidine group, 2 patients had Grade 1 relaxation, 13 patients had grade 2 and 12 patients grade 3 brain relaxation. 3 patients had grade 4 relaxation. In Clonidine group 3 patients had grade 1 relaxation, 15 patients grade 2, 10 patients grade 3 and 2 patients grade 4. There was no statistical significant difference between the two groups in terms of brain relaxation. The GCS score on recovery was  $13.8 \pm 0.64$  in clonidine group as compared to  $14.0 \pm 1$  in dexmedetomidine group. The sedation scores in clonidine group was  $2.29 \pm 4.9$  in clonidine group and  $2.1 \pm 0.22$  in dexmedetomidine group. There was no statistical difference between the group in terms of recovery. Hemodynamic changes during induction, intubation, maintenance and recovery was similar between the group.

**Discussion:** Both clonidine and dexmedetomidine show similar changes on hemodynamics, brain relaxation and recovery. However, being shorter acting dexmedetomidine needs to be given as continuous infusion, as compared to clonidine.



## CRITICAL CARE

(The names of the authors presenting each paper are shown in bold type)

### Paper No: 45.00

#### **Dexmedetomidine sedation for the management of delirium tremens in patient with acute alcoholic pancreatitis**

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**Introduction:** Acute alcoholic pancreatitis with deranged liver functions can rapidly progress from mild epigastric discomfort to multi organ failure requiring critical care admission. The mortality in these patients are high and ranges from 2% - 8%.<sup>1</sup> The mortality further increases if there is an acute alcohol withdrawal which culminates into delirium tremens. Providing adequate sedation for prolonged ventilation is difficult in clinical settings. Dexmedetomidine - an alpha 2 agonist, was successfully used for sedation which helped in managing alcohol withdrawal and control of delirium tremens.

**Objective:** Evaluate the usefulness of dexmedetomidine in the management of a critically ill alcoholic pancreatitis patient with multi-organ failure.

**Method/ Case report:** A 64 years Indian man with BMI of 35 kg/m<sup>2</sup> with medical history of obstructive sleep apnoea, type 2 dia-betes mellitus, hypertension, ischemic heart disease and had previously undergone coronary artery bypass grafting, presented with acute abdomen. A diagnosis of acute alcoholic pancreatitis was made after com-puted tomography scan and other supporting laboratory investigations. He rapidly progressed to multi-organ failure with acute lung injury and delirium tremens requiring cardio-respiratory support and seda-tion. Patient was sedated with benzodiazepine, propofol and fentanyl. He became hemodynamically un-stable and required increasing inotropic support. Although sedation appeared adequate but delirium tre-mens control was suboptimal as exhibited by agitation, hallucination and

hypersympathetic drive. Also, subsequent weaning from ventilator proved difficult. On third day of ICU admission other sedative agents were stopped and a trial of dex-medetomidine infusion (0.5–0.7 mcg/kg/min) was administered for 2 days.<sup>2,3</sup> This was subsequently reduced to 0.2 mcg/kg/min and patient was successfully extubated after 2 days.

**Result:** Dexmedetomidine is associated with less delirium and in low dose allowed hemodynamic and respiratory stability, thus allowing the patient to breathe spontaneously and extubation was possible without requiring further respiratory intervention.

**Conclusion:** Dexmedetomidine helps in sedation for critically ill acute alcoholic pancreatitis with delirium tremens. Further scientific research is desirable for its generic use

### Acknowledgments

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**Paper No: 65.00****Do sedation and neuromuscular blockade influence the outcome of adult intensive care patients? – a prospective observational study**

**Pavani Jagan**, Seetharaman Hariharan and Deryk Chen

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**Introduction:** Sedatives, analgesics, and neuromuscular blocking agents (NMBA) are commonly used in the intensive care unit (ICU) to provide patient comfort. More efficient utilization of these drugs is vitally important to prevent morbidity in ICU patients. There can be prolongation of mechanical ventilation attributable to these drugs, leading to increased duration of ICU stay and cost of hospitalization. Currently, minimal sedation or interruption is advocated. Hence this paradigm should be studied in every setting.

**Objectives:** To investigate the pattern of sedation, analgesia and neuromuscular blockade in adult ICU patients and determine its influence on patient outcomes.

**Methods:** A prospective observational study was conducted on patients admitted to an adult ICU over the period of six months. Data including age, gender, diagnoses, the type of sedatives, analgesics and neuromuscular blocking agents, route of administration, dosage, duration of mechanical ventilation, admission and weaning sedation scores, ICU length of stay and outcomes were recorded and compared between patients with and without neuromuscular blockade.

**Results:** 1550 patient-days were studied from 140 mechanically ventilated patients. 55% were male. The median age was 47 years (interquartile range: 32–60). Sepsis was the most common diagnosis. 3.6% did not receive any form of sedation, analgesia and neuromuscular blockade. The most common drugs used were midazolam (93.6%), morphine (64%), fentanyl (35%) and cis-atracurium (37%). Age, length of stay, duration of mechanical ventilation, admission and weaning sedation scores were not different between patients who did and did not receive NMBA. Weaning sedation score was a good predictor of survival - area under the ROC curve: 0.94 (95% CI: 0.89, 0.98) ( $p < 0.001$ ). Kaplan-Meier curves showed that although patients without neuromuscular blockade had a better survival at 30 days, this was not significant (Log rank  $p=0.18$ ).

**Conclusion:** Neuromuscular blockade did not significantly impact on the duration of mechanical ventilation, length of stay and overall outcome of adult ICU patients.

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**Paper No: 158.00****Enteral feeding should not be taken lightly in head injured patients**

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**Introduction:** Benefits of early enteral feeding (EN) after head trauma (HT) is well established. These include fewer infections, trend towards better survival and disability outcomes in these hypercatabolic patients. Our busy neurosurgical intensive care unit (NICU) has no established regimen of feeding, relying on individual staff's preferences.

**Objectives:** To establish a feeding regimen in intubated HT patients, our study sought to determine timeliness, adequacy of EN provided in NICU and to identify barriers to effective EN.

**Methods:** With IRB approval, this prospective observational study enrolled all intubated patients with isolated HT admitted to the NICU. Data on the provision of EN (Ensure TM) via naso / orogastric tube feeding was collected until extubation or for 7 days. A dietician assisted with analyzing the type, amount of EN. Estimated requirements based on the Harris-Benedict equation with adjustments for diagnoses and comorbidities for each patient was calculated. Frequency and causes of feeds interruption were identified.

**Results:** 24 consecutive eligible patients were recruited over 10 months. EN was commenced within 24 hours of NICU admission in only 8.3% of patients and within 48 hours in 67%. After initiation of feeds, patients received a mean of  $59.9 \pm 24.9\%$  and  $50.0 \pm 21.8\%$  of their recommended caloric and protein intakes respectively. 68% of patients had episodes of feeds interruption exceeding 6hrs, of which the most frequent causes were fasting prior to extubation (52%), gastrointestinal intolerance (19%) and fasting prior to surgery or procedures (14%).

**Discussion:** Head injured patients are known to have hypoalbuminaemia which may negatively impact brain swelling and intracranial pressure. Albumin level of our patients post-extubation was inconclusive though all were below normal. Patients did not get differentiated caloric supply according to GCS score. The disappointing trend from this study showed that only 8.3% and 67% of intubated HT patients were commenced on EN within 24 and 48 hours respectively with caloric and protein provision falling far short of recommended values, contributed by inadequate nutritional targets and frequent feeds interruptions.

**Conclusion:** Early nutrition in adequate amount is associated with significant reduction in 2 week mortality and is an easy therapeutic intervention that affects outcome. These results proved a wake-up call for our NICU. A Nutrition Workgroup to implement feeding targets will be established. Early enteral feeding protocols, frequent dietician input and reminder posters for clinicians have been proposed and a repeat study planned. Caloric intake according to GCS score is considered.

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### Paper No: 239.00

#### Influence of epidural anesthesia on the disorders hemocoagulation and quantity of septic complications at patients with acute necrotizing pancreatitis

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**Introduction:** According to many authors, the acute necrotizing pancreatitis (ANP) still remains one of the difficult problems of abdominal surgery. The complexity of the pathogenesis of the disease, features of the pancreas pathomorphology, abdominal hypertension, high mortality (30–70%), necessitate search for new ways to treat this disease.

**Methods:** The study was conducted in 44 patients with the ANP, which were divided into 2 groups according to type of analgesia: epidural or opioids. Patients from 1st group (23) had epidural analgesia by ropivacaine 6–14 mg/hour during 7–10 days, and from 2nd (21) – opioid analgesia by trimeperidine 20 mg 3 times a day during the same period. We monitored level of septic and thrombo-hemorrhagic complications by clinical and instrumental data, during month after treatment starting. The hemostatic system was evaluated using indicators of hemoviscoelastography (Analyzer “Mednord-01M”).

**Results:** It was found that all patients with ANP initially have hypercoagulation and fibrinolysis inhibition. Level of hemostatic disorders correlate with the level of septic complications, treatment in ICU, mortality. In 1st group we noted a deep vein thrombosis (DVT), 2 pneumonia, 7 - pseudopancreatic cysts and abscesses, 2 deaths and time of stay in the ICU to 15.4 days. In the 2nd group: 3 cases of deep

vein thrombosis, 4 - pneumonia, 10 - pseudopancreatic cysts and abscesses, 2 episodes of gastro-duodenal bleeding, 5 deaths and time of stay in the ICU to 27.8 days.

**Conclusions:** The using of epidural anesthesia in patients with ANP reduced the number of septic complications on 36.6%, and reduce the mortality rate from 23.8% (2nd gr.) to 8.7% (1st gr.). We think, that violations of blood coagulation and microcirculation are the basis for ischemia, necrosis in tissues and septic complications. Epidural analgesia is effective method to decreasing level of septic and thrombo-hemorrhagic complications and mortality in ANP patients.

### Paper No: 286.00

#### Angiogenic factors and their soluble receptors for predicting organ dysfunction in disseminated intravascular coagulation associated with sepsis

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**Introduction:** Disseminated intravascular coagulation (DIC) precipitated by sepsis is characterized by capillary leak and multiple organ dysfunction syndrome (MODS). Angiogenic factors and their soluble receptors regulate vascular quiescence and permeability as a result of the balance of their expression levels.

**Objectives:** We studied 1) the relationships between angiogenic factors, their soluble receptors and organ dysfunction and 2) the effects of DIC-induced platelet consumption, thrombin generation and tissue hypoxia on the expression of the factors and receptors.

**Methods:** Fifty patients with sepsis were classified into two subgroups: 37 patients with DIC and 13 patients without DIC.

**Results:** DIC patients showed higher Sequential Organ Failure Assessment (SOFA) scores, the prevalence of MODS, and more increased soluble fibrin and lactate levels. We observed lower levels of vascular endothelial growth factor (VEGF), soluble VEGF receptor 2 (sVEGFR2), angiopoietin 1 (Ang1) and Ang1/Ang2, and higher sVEGFR1 and Ang2 levels in DIC patients, but not significant differences in sTie2 expression during the study period. The levels of VEGF, sVEGFR1, and Ang2 were correlated with the SOFA scores. In particular, Ang2 was an independent predictor of an increase in the SOFA score, MODS, and a poor outcome in DIC patients. The VEGF levels showed a marked correlation with the platelet counts. Soluble fibrin and lactate levels independently predicted increases in the levels of sVEGFR1 and Ang2 in DIC patients.

**Conclusions:** VEGF, sVEGFR1, Ang2, and Ang1/Ang2, in particular Ang2, have important roles in the development of MODS in DIC associated with sepsis. DIC-induced platelet

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**Paper No: 348.00****The Coagulopathy of Major Trauma and Massive Transfusion****Darko Goli, Dragan Milošević, Nela Rašeta, Predrag Beri and Edita Grbavac**

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**Introduction:** Trauma is a serious global health problem. Approximately 40% of trauma deaths are attributed to or caused by coagulopathy and bleeding after severe injury. The combination of acidosis, hypothermia and coagulopathy has been labelled the triad of death, and it is very important in viscous cycle of haemorrhage, resuscitation, hemodilution, coagulopathy and continued bleeding.

**Objectives:** We want to prove how much massive transfusion correct coagulopathy in trauma patient.

**Methods:** Prospective data were collected on 50 patient with severe trauma, admitted to the SICU University Hospital Banjaluka, Bosnia and Herzegovina, over 36 months period, from January 2005. to December 2008. The patient with brain injury were excluded. Red blood cells(RBC), Hemoglobin(Hb), Platelet concentration, prothrombin time(PT), Activated partial thromboplastin time (APTT), fibrinogen and Thromboelastography (TEG) were determined on admission, after 12 hours and after 24 hours.

**Result:** The mean age of the study group was  $46 \pm 30$ , the mean APACHE score was  $20 \pm 5$ , 64 % were male, and 38% died. The patient were transfused mean 5038 ml (20 unit) RBC, 3589 ml (14 unit) FFP (fresh frozen plasma), cristaloid 7078 ml and colloid 607,14 ml. Mean RBC on admission were 2,57, after 12 hours 2,43 and after 24 hours 2,66. Hb values were 81,10 after 12 hours 77,72 and after 24 hours 81,36. Platelet number on admission were 155,46, after 12 hours 102,20 and after 24 hours 81,62 ( $p < 0.001$ ). Mean PT on admission was 25,00, after 12 hours 22,10 and after 24 hours 20,00 shortening significantly. Mean APTT during this period shortening from 75 on admission to 53,28 ( $p < 0.001$ ). Mean values of fibrinogen decreased 2,60 to 1,58 significantly. TEG reaction time (R) was on admission 15,00, after 12 hours 11,96 and after 24 hours 11,04. Coagulation time (k) are decreased significantly during 24 hours (7,48. ....7,32. ....7,25). ? angle are below the referent values (32,06. ....30,46. ....28,74- $p < 0.001$ ). Mean Maximum amplitude was on admission 33,44, after 12 hours 31,36 and after 24 hours 30,28( $p < 0.001$ ).

**Conclusion:** The resuscitation of trauma patient with haemorrhagic shock has improved progressively over recent years. Blood component replacement therapy remains the mainstay. In our group, in spite of transfusion, we can conclude that all observing parameters after 24 hours remain hypocoagulable.

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**Paper No: 357.00****Inadvertent hypothermia in a general adult intensive care unit: an audit of over 500 patients****Adrian Wong<sup>1</sup>, Joe Masters<sup>2</sup> and Giles Morgan<sup>3</sup>**<sup>1</sup> Dept of Anaesthesia, Southampton University Hospital, UK,<sup>2</sup> Dept of Anaesthesia, Royal Hampshire and County, <sup>3</sup> Dept of Critical Care, Queen Alexandra Hospital, UK

**Introduction:** Inadvertent hypothermia is associated with multiple physiological effects in various organ systems which can lead to adverse outcomes. The incidence of inadvertent hypothermia amongst patients admitted to Intensive Care Units (ICU) is alarmingly high. In the UK, the National Institute of Clinical Excellence (NICE) recently published guidelines<sup>1</sup> defining hypothermia as a core temperature below 36°C. NICE advocates that all patients should not be discharged from the recovery area to the ward if hypothermic and they should have their temperature monitored whilst back on the ward. If found to be hypothermic, forced air warming devices should be applied.

**Objectives:** We aimed to assess the incidence of inadvertent hypothermia amongst patients admitted to our general ICU and audit our compliance with published UK guidelines.

**Methods:** We conducted a retrospective analysis on all patients admitted to the ICU in Queen Alexandra Hospital, Portsmouth, United Kingdom from January to June 2010. Temperature measurements were recorded on admission to the ICU and throughout the duration of their admission. Patients who were being cooled for therapeutic reasons were excluded from the analysis.

**Results:** Of the 573 patients admitted to the ICU during the 6 month period, 186 patients had at least one incident of inadvertent hypothermia. These patients comprised: 140 emergency admissions, 20 post scheduled surgery admission and 26 post unscheduled surgery admissions. Overall incidence of inadvertent hypothermia was 32.4%. Only 18.8% of hypothermic patients had documented use of a warming device.

**Conclusions:** Inadvertent perioperative hypothermia is a common but preventable complication which is associated

with poor outcomes for patients. This must be differentiated from therapeutic hypothermia where a lowered core temperature is induced to improve patient outcome in conditions such as out-of-hospital cardiac arrest. The quoted incidence of inadvertent hypothermia amongst ICU patients is high ( $>50\%$ )<sup>2</sup>. Karapillai et al<sup>3</sup> carried out a large retrospective audit of over 5000 patients and concluded that inadvertent hypothermia amongst ICU patients is not only common but also associated with increased patient mortality and morbidity. There was an increased incidence of cardiac events, bleeding, wound infection and longer hospital stay. The overall incidence of hypothermia on our ICU during the first half of 2010 was a surprisingly high 32.4%; 13.1% of patients had a temperature below 35°C. Following the publication of the NICE guidelines on hypothermia in 2008, this figure is a cause for concern.

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## Paper No: 359.00

### Device-associated infection rate in intensive care unit of university hospital in Poland, data for 2010: findings of the International Nosocomial Infection Control Consortium (INICC)

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<sup>1</sup> Department of Anaesthesiology and Intensive Therapy, Wrocław Medical University, Wrocław, Poland, <sup>2</sup> International Nosocomial Infection Control Consortium

**Introduction:** The device-associated infections (DAIs) are the main threats to patients safety in the intensive care unit (ICU). The systematic surveillance becomes the basic tool to reduce and control the incidence of DAIs.<sup>(1)</sup> In Poland the surveillance of DAIs in ICU has no unified national program and is based on the decisions of individual hospitals.

**Objectives:** To measure prospectively the device-associated infection rates, ICU length of stay (LOS), mortality attributable to DAI and quality of infections prevention, according to the INICC project.<sup>(2)</sup>

**Material and methods:** An 12 month (2010) surveillance of DAIs was conducted in new 25-bed ICU in University Hospital, Wrocław, Poland. The definitions of Centers for Disease Control and Prevention, National Nosocomial

Surveillance System were used and site-specific DAI rate were calculated. The actual data were compared with the results from the same institution obtained during the period 2007 – 2010 in the old 15-bed ICU.<sup>(3)</sup>

**Results:** During 1 year surveillance 444 patients acquired 126 DAIs (28,4%) The most common infection was ventilator-associated pneumonia (VAP) – 53% than catheter-associated urinary tract infection (CAUTI) – 30% and catheter-related bloodstream infection (CLABSI) – 17%. The rate of VAP was 13.1 per 1000 device-days (old ICU 18,2), CAUTI 6.2 per 1000 device-days (old ICU 4,0) and CLABSI 2.9 per 1000 device-days (old ICU 4,8). The DAIs prolonged hospitalization in the ICU for 41 days. The extra mortality was 43% for CLABSI. Hand washing compliance was; physician – 60%, nurses – 49%. No marked changes of hand washing compliance by work shift were observed.

**Conclusions:** The DAI rate data from 2010 are lower than observed during the earlier study in the same institution, but still higher than reported by the NISS. The implementation of guidelines based on INICC network reduced the DAIs rate and improved the safety of ICU patients. Such approach should become a routine in all ICUs in Poland.

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## Paper No: 392.00

### Biological markers of nutritional status in surgical intensive care units

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**Introduction:** It is established that malnutrition is an independent factor of morbidity and mortality in patients at ICU. The prognostic inflammatory and nutritional index (PINI) is frequently used as a marker of malnutrition but this scoring system was not studied in surgical intensive care units. Aim of the study: Assessment of nutritional status with biomarkers and search for a correlation between biological markers and prognosis, using the PINI.

**Methods:** An open prospective study was performed in the intensive care unit, started in July 2010. Twenty surgical patients aged from 18 to 80 years, spent at least seven days at the ICU were enrolled. An early nutritional care was given (first 24 hours). The patients were evaluated each week clinically (weight, BMI, MODS ratio...) and biologically (Albumin, Prealbumin, Orosomuroid, CRP measurements) in order to establish the prognostic inflammatory and nutritional index ( $PINI = CRP \times oroso / ALB \times preALB$ ).

**Results:** The average age was  $56 \pm 11$  years, IGS II score was  $48 \pm 7$ , APACHE II score was  $25 \pm 12$  and MODS ratio was  $6 \pm 4$ . The mean duration of stay was  $40 \pm 25$  days; the mortality rate was 35%. The average calorie intake was  $2300 \pm 600$  kcal. There was a weight gain and an increase of the BMI either in surviving and dead patients. There was an initial increase of the CRP and the orosomuroid rate during the acute phase of aggression followed by a progressive decrease. The nutritional proteins (albumin, prealbumin, RBP) were always low, despite a progressive increase. The PINI was initially high and decreased progressively but remained high ( $> 20$ ). The Albumin and Prealbumin rate were correlated with the MODS ratio respectively ( $p = 0.012$ ;  $r = -0.822$ ), ( $p = 0.045$ ;  $r = -0.465$ ). There was a correlation between the orosomuroid rate and the organ failure ( $p = 0.043$ ;  $r = 0.681$ ). The PINI was correlated to the MODS ratio and to the IGS II with respectively ( $p = 0.001$ ;  $r = 0.681$ ); ( $p = 0.045$ ;  $r = 0.677$ ) but not with mortality.

**Conclusion:** The malnutrition in surgical patients at ICU has an early onset and is always severe. Biological markers and IPNI are correlated with organ failure but not mortality

## Paper No: 427.00

### Reintubation predictors in TICU

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Reintubation Predictors in the Trauma ICU Saeed Mahmood, Mushrek Alani, Hassan Althani From Trauma ICU, section of trauma Surgery, Depts. Gen.Surgery Hamad General Hospital, Doha -Qatar

Reintubation after failure of planned extubation is common in intensive care unit; it can increase intensive care unit stay, cost and the rate of tracheostomy.

**Objective:** To determine the causes, outcomes, and predictors of extubation failure in patients who had passed a spontaneous breathing trial.

**Methods:** Retrospective study of extubation failure in Trauma ICU Patients reintubated within 48 hr after extubation were compared to successfully extubated patients. Multivariable analysis was performed, using significant parameters in the univariable analysis ( $P = 0.05$ ). Accidental extubation (unplanned) was not including in this study.

**Result:** During the study period of 24 months, there were 954 patients admitted to the trauma ICU, there were 386

patients intubated. The reintubation rate was 6.2%, 24 times per 386 patients. 88% of reintubation patients were with head injury, 64% associated with pulmonary contusion. the median delay for reintubation was 18.5 hr(2–33)hr. 9% of reintubated patients had an increase length of stay 25(19–40) days in TICU, all left the ICU with tracheostomy.

**Conclusion:** Clinical outcomes in this study were an increased length of ICU stay incidence of pneumonia and rate of tracheostomy, but no increase in mortality rate. In addition of old age, severity of illness, prolonged duration of ventilation and a case of continues sedation have been identified as a predictors of reintubation.

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## Paper No: 428.00

### Nutrition in Traumatic Brain Injured Patients A Prospective Audit

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#### Introduction:

- Patients with traumatic brain injury (TBI) have an increased calorie requirement. Guidelines suggest that patients should be fed to full requirement within 7 days of the injury<sup>1</sup>. A reduction of 10kcal/kg in calorie intake increases mortality by 30–40%<sup>2</sup>.
- A recent Cochrane review shows improved survival and reduced disability with early feeding<sup>3</sup>.

#### Objectives:

- To evaluate nutrition of TBI patients on our unit

#### Methods:

- Prospective audit of patients with traumatic brain injury admitted to NICU over a period of 4 months

- Patients who were ventilated for less than 72 hours or died within 72 hours of admission were excluded.

## Results:

Total number of patients

17 (14 males, 3 females)

Age range 17-75 years

Total number of ventilated days 358 Level of ICP management required Level 1 (sedated) 7/17(41%) Level 2 (paralysis/cooling) 5/17(29.5%) Level 3 (decompressive craniectomy) 5/17 (29.5%)

Time to haemodynamic stability 0 - 24 hrs 15/17(88%) 48 hrs 2/17(12%)

- Total number of ventilated days (12%)
- Average length of stay 20.7 days (range 8–62 days)
- Average GCS on admission 6 (range 3–14)
- Neither weight nor expected calorie intake was recorded for any of the patients by the doctors
- Weight was estimated by [MG] who did the data collection
- None of the patients were reviewed by a dietician
- Only 17.6% of patients achieved full feed by day 7
- There was a trend to better feeding in patients with a jejunal tube
- Reasons for shortfall Not absorbing (16.2%) Operation / X ray (9.5%) Extubation (3.1%) Tracheostomy (1.1%) No gastric tube (0.8%) Transfer (0.2%) Hypernatraemia (0.2%) NG Phenytoin (0.2%)

Reason for shortfall recorded in 31% cases

**Conclusions:** This audit indicates that the majority of our patients are not achieving full feed within the recommended time frame.

Strategies to improve nutritional input need to be considered, including increased awareness of the importance of nutrition in TBI patients, access to dieticians, and early insertion of jejunal tubes.

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## Paper No: 435.00

### Morbi-mortality in acutely poisoned comatose patients related to aspiration pneumonia

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**Introduction:** Acutely poisoned comatose patients exhibit a high risk of aspiration pneumonia (AP). Morbidity related to AP is not well known. We evaluated the association between AP and the morbi-mortality in patients with acute poisoning requiring mechanical ventilation.

**Methods:** Ancillary study of the randomized controlled multicenter “KETASED” trial that compared the morbidity after a single dose of etomidate (0.3 mg/kg) versus ketamine (2 mg/kg) used for emergency rapid sequence intubation (ClinicalTrials.gov number, NCT00440102). All adult patients necessitating intubation were included (n = 650). Patients in cardiac arrest were excluded. AP was defined by either witnessed aspiration during intubation and/or pneumonia occurring within 48h following ICU hospitalization on pulmonary radiography or biological findings suggestive of pneumonia. Morbidity variables and mortality were recorded until day 28 of ICU hospitalization. The primary end-point was the maximum value of Sequential Organ Failure Assessment score (SOFAmax) during the first in-hospital 3 days. Results are given as means  $\pm$  SD, medians and interquartile range or as numbers and percentages. The two groups were compared by the Wilcoxon test for quantitative variables and by either the chi-square or Fisher’s exact test for categorical variables.

**Results:** Among the initial 650 included patients, 197 patients (30%) were admitted because of acute poisoning. AP was found in 77/197 patients (39%). Baseline patient characteristics and intubation conditions did not differ between the two groups. The mean SOFAmax score between the two groups was significantly different ( $8 \pm 3$  for AP group vs.  $6 \pm 3$  for non AP group;  $p = <0.0001$ ), as well as the number of patients needing catecholamine (25 [33%] for AP group vs. 17 [14%],  $p = 0.002$ ) and median [IQR] ventilator-free days (27 [24–27] for AP group vs. 27 [27–28],  $p < 0.0001$ ) and median [IQR] ICU-free days (24 [21–26] for AP group vs. 26 [26–27],  $p < 0.0001$ ). There was no significant difference in 28-day mortality (1 [1%] deaths in both groups).

**Conclusions:** Our results reveal that at day 28, aspiration pneumonia complicating comatose acute poisoning was associated with an important in-hospital morbidity among critically ill patients. However, mortality does not seem to be higher in these patients.

## Paper No: 438.00

### Ultra-fast-track anesthesia technique using high thoracic epidural catheter in patients undergoing cardiac surgery

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**Introduction:** An early extubation in cardiac surgery is an important aspect of fast-track cardiac anesthesia. It refers to extubation during 1–6 hours after the intervention, the extubation criteria being the same as for any other surgery. Immediate extubation is an extension of this concept, ultra-fast-track anesthesia, allowing the extubation of the patient in the operating theater.

**Objectives:** Report the routine application of a technique that allows immediate extubation in the majority of patients undergoing on-pump cardiac surgery using short-acting anesthetic and thoracic epidural analgesia.

**Methods:** Seven hundred and forty four patients (Age 15 to 89, mean 65.2 years) underwent schedule coronary (44%), valve (46%), combined surgery (10%) were included in a retrospective observational study of ultra-fast-track anesthesia with epidural anesthesia placed at T3–T4. The percentage of patients extubated at the end of the surgery after skin closure was the primary end point.

**Results:** Most of the patients (79%) were extubated successfully in the operation room at the end of the surgery, although 6% of them were intubated during the stay at the intensive care unit. There were significant difference in respiratory failure between immediate extubated and non-immediate extubated patients (7% and 20% respectively,  $p < 0.05$ ), there were also significant difference in mortality rates (5.5% and 19.2% respectively,  $p < 0.05$ ).

**Conclusion:** Ultra-fast-track anesthesia in cardiac surgery is feasible in most of the patient with epidural catheter and short-acting anesthetics. There were significant difference in respiratory failure and mortality between immediate and non-immediate extubated patient, although further randomized prospective studies are needed.

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## Paper No: 503.00

### Ultrasound guided central line catheterization: a randomized control trial

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**Introduction:** Even though ultrasound guided central catheterization has been proven to be effective (1), there is lack of good quality evidence that analyze the influence of expertise operator in the success of placement and complications.

**Objective:** Compare the rates of success and complications of central line placement in patients in ICU and under general anesthesia, with and without ultrasound. Analyze the influence of operator training (“E” experts and “NE” non experts) as well as anatomic neck difficulties in the ultrasound vs. non ultrasound technique.

**Métodos:** We included 270 consecutive patients (160 in the expert “E” group and 110 in the non expert “NE” group). We randomly divided each group in technique with ultrasound (“U”) and without ultrasound (“NU”). 8 patients were discarded from the study, so 257 were analyzed: 80 patients in “E-NU” group, 72 in the “NE-U”, 54 in the “E-U” and 51 in the “NE-NU”.

**Results:** The incidence of success in the placement of central line was higher in the expert group (“E” = 88%vs.”NE” = 79%;  $p = 0.04$ ) and so does in the ultrasound guided group (“U” = 91%vs.”NU” = 78%;  $p = 0.005$ ). This better performance with ultrasound was demonstrated for both groups: “E” and “NE”.

Global incidence of complication was 11.7% and most of them were Carotid punctures. In the group of experts (“E”) there were no differences in complications with or without ultrasound (7%vs.8.5%), but there were differences in the “NE” group: “U”: 7.8%vs.”NU”24% ( $p = 0.03$ ).

In 65 necks considered “difficult”, the “E” group had a high rate of success with ultrasound than without it: 92.6%vs.65% ( $p = 0.049$ ). The success rate was not different for “NE” group with or without ultrasound (79%VS.71%). No differences in complication were registered related to the type of neck in any group.

**Conclusions:** Ultrasound guided placement of central lines improves success and diminish complications mainly in non trained Doctors. Ultrasound must be available in all training centers.

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mechanical complications: a prospective observational study of 1,978 consecutive catheterizations. Cavanna L, et al. *World J Surg Oncol* 2010.

## Paper No: 524.00

### Cost effective blood transfusion in the intensive care unit

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**Introduction:** Red blood cell (RBC) transfusion is common in critically ill patients and the most frequent indication for transfusion is critical care-associated anaemia (1). There is little evidence to support the efficacy of RBC transfusion in haemodynamically stable critically ill patients with a low haemoglobin (Hb). Recently there has been growing recognition that transfusion-related complications, such as transfusion-related infections may be associated with worse clinical outcomes.

In 2009 a Clinical Practice Guideline regarding blood transfusion in critically ill patients was published in *Critical Care Medicine* (2) based upon the best available evidence. The Guideline recommends that in the absence of acute haemorrhage or acute coronary syndrome, RBC transfusion should only be considered if the Hb  $\leq$  7g/dl.

**Objectives:** Our Critical Care Unit does not have a protocol trigger for the transfusion of RBCs and practice may vary between Consultants. We retrospectively reviewed our blood transfusion practice against the new Clinical Practice Guideline and performed a cost analysis.

**Methods:** Sample population: All patients on the Critical Care Unit who had received RBC transfusions between 1st January – 1st July 2010 were identified from our Clinical Information System (Metavision, iMDsoft, Tel Aviv). Excluded: Those actively haemorrhaging. Of these patients, 37 were randomly selected for in-depth review.

Each episode of RBC transfusion was correlated with the laboratory-measured haemoglobin concentration immediately before transfusion. Each episode of blood transfusion was classed as 'appropriate' (Hb  $\leq$  7g/dl) or 'inappropriate' (Hb  $>$  7g/dl). The 'inappropriate' group was further subdivided to include a 'borderline' group (Hb 7-8g/dl). The costs of RBC transfusions were calculated using a cost per unit of £124.21 (price at the time of the study).

**Results:** 139 patients received non-urgent blood transfusions, a total of 380 units. The 37 patients selected for in depth review accounted for 67 episodes, a 141 units, at a cost of £17,513.61. Of the 67 episodes, 21 (31%) were 'appropriate', 33 (49%) were 'borderline' and 13 (20%) were inappropriate, in accordance to the published Guidelines.

**Conclusions:** Assuming that the patients reviewed give an accurate reflection of our department blood transfusion practice. If blood had been given when the haemoglobin was  $<$  8g/dl the cost would have been £14,010.88. If as per

published Guideline blood was given when the haemoglobin was  $\leq$  7g/dl the cost would have been £5,429.22, a cost saving of 69%. If extrapolated to include all patients who received non-urgent blood transfusion in the six month period concerned, the cost saving would have been £32,567.

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## Paper No: 525.00

### Unplanned admission to icu/hdu: a 10 year review

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**Introduction:** Unplanned Intensive Care Admissions (UIAs) often result from preventable incidents, which result in increased morbidity and length of stay. As they can result from complications of patient care, they are a useful clinical indicator for patient safety measurements, as well as surgical and anaesthesia-related morbidity and mortality.(1,2) The largest contribution to anaesthetic morbidity is related to airway complications, of particular relevance in light of the recent Royal College of Anaesthetists' 4th National Audit Project (NAP4) on major complications of airway management in the United Kingdom. (3,4)

**Objectives:** To review all cases of anaesthetic-related UIAs from 2000 to 2009. In addition, to identify and highlight any pre-morbid risk factors, at-risk groups and procedural factors that predispose to UIAs.

**Methods:** This prospective survey was performed at St. Helier Hospital Intensive Care Unit (ICU) and High Dependency Unit (HDU) over a 10 year period from January 2000 to August 2009. Data collected included demographic characteristics, pre-operative co-morbidities, American Society of Anaesthesiologists (ASA) physical status classification, procedure details, urgency and timing of surgery. The phase of anaesthesia and grade of anaesthetist was recorded. The reason for admission, location of admission (ICU or HDU) and severity of illness scores for ICU admissions (APACHE II) were also recorded. UIA patients were identified as those who were not scheduled for postoperative admission to ICU/HDU at the beginning of the procedure.

**Results:** A total of 117 cases were identified, and patient demographics followed a normal distribution; smoking history (43%) and obesity (38%) were recorded. A greater percentage of general surgery and orthopaedic cases were

involved that other surgical specialities. Most incidents leading to admission occurred in recovery (58/117), as opposed to upon induction (35/117) and in theatre (24/117). There were more HDU (63/117) than ICU (54/117) admissions, with higher ASA patients more likely to require ICU admission. Consultant or senior anaesthetists were involved in 76% of cases. Various respiratory complications accounted for the overwhelming number of cases (94/117), followed by drug-related (8/117), anaphylaxis (7/117) and others (8/117). Length of stay was usually less than 24-48 hours. with 16 cases requiring admission beyond 1 week.

**Conclusions:** Respiratory complications remain the biggest cause for UIAs, many of which are preventable. Our results were comparable with the literature and showed a decreasing trend in UIAs thought to be due to greater senior involvement as well as improved awareness of groups thought to be at risk (obesity, smokers, surgical categories).

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**Paper No: 553.00**

## Prevention of the protein balance disturbances and hypoalbuminemia during the enteral nutrition support of patients with stroke in critical conditions

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**Introduction:** Patients with stroke in critical conditions have a tendency to hypoproteinemia and hypoalbuminemia. This depends on several factors, and hypermetabolism and hypercatabolism in particular.

**Objectives:** The aim of current study was to find out methods of prevention of the protein balance disturbances during enteral nutrition support (ENS) of patients with stroke in critical conditions.

**Methods:** Two groups of patients (total 44 patients) were studied. Each group consisted of 22 patients (11-female, 11-male) with stroke (14-hemorrhagic, 8-ischemic). Patients' age was  $55.3 \pm 12.6$ . APACHE score was  $17.5 \pm 5.5$ . Duration of ENS was  $19.84 \pm 10.3$  days. First group patients received proper calories with proper amount of proteins. Second group patients were given nutrients with additional protein components. Daily measurements of albumin level in serum and calculation of nitrogen balance was performed during nutrition support. Student's t- test was used for statistical analyzes of data.

**Results:** At the first day the serum level of albumin of patients in the first group was  $37.5 \pm 5.3$ , whereas it compiled  $35.6 \pm 7.56$  in patients of the second group ( $p = 0.1$ ). Patients of the first group received  $1.0 \pm 0.2$  g/kg/day proteins, of the second group  $1.8 \pm 0.3$  g/kg/day. Nitrogen balance was positive in both of the groups (I group  $5.45 \pm 2.3$ , II group  $7.26 \pm 3.23$  ( $p = 0.12$ )). The level of albumins decreased by 45 % ( $20.625 \pm 2.9$ ,  $p < 0.005$ ) in the first and by 20% ( $28.48 \pm 6.05$ ,  $p = 0.03$ ) in the second group, respectively.

**Discussion:** Data obtained have shown that despite positive nitrogen balance and adequate protein supply the serum level of albumins decreased in both groups. Furthermore, that was as high as 2 times more expressed in the patients of the first group.

**Conclusion:** The serum level of albumins decreases continuously during enteral nutrition support even when positive nitrogen balance presents. Therefore the use of additional protein components despite of positive nutrition balance is recommended for patients with stroke in critical conditions.

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**Paper No: 558.00**

## Use of surfactant in esophageal cancer surgery: a randomized, controlled pilot study with 20 patients

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**Introduction:** Esophageal cancer surgery usually involves a thoraco-abdominal approach. During the thoracic part of the surgical procedure, one-lung ventilation (OLV) is performed. OLV involves risk of ventilation-perfusion mismatch. Early postoperative restoration of deteriorated pulmonary

function may be crucial for successful post-esophagectomy recovery.

**Objectives:** To investigate whether intraoperative use of diluted surfactant can reduce alveolar damage and thereby improve recovery from esophageal cancer surgery.

**Methods:** This prospective, randomized, controlled study was performed from April 2010 to March 2011 in the Department of Thoracic Surgery of University Hospital Centre Zagreb with 20 patients scheduled for esophageal cancer surgery. No patient had any known lung disease. After intubation with a double lumen tube, 10 patients received surfactant in the main bronchus of the dependent lung (1.5 ml of 120 mg surfactant diluted into 18.5 ml of saline). The other patients received 20 ml of saline solution. Several lung function parameters were measured preoperatively (time 0) and at 12, 24 and 48 h after surfactant application: inspired oxygen fraction (FiO<sub>2</sub>), oxygen saturation oxygen (SpO<sub>2</sub>), oxygen partial pressure in arterial blood (PaO<sub>2</sub>), and carbon dioxide partial pressure in arterial blood (PaCO<sub>2</sub>). Mean airway pressure (MAP) was measured at the same time points except 48 h, because by that time all patients had been extubated.

**Results:** Independent- and dependent-sample t-tests were performed to determine significant differences in mean values between study groups and between measurements, respectively. The two groups showed no significant differences in lung function at 0, 12 or 24 h after surfactant application. However, at 48 h, FiO<sub>2</sub> was significantly lower in the group that received surfactant ( $0.27 \pm 0.04$  vs  $0.40 \pm 0.07$ ,  $p < 0.05$ ).

**Discussion:** The lack of significant differences in lung function between the two groups up to 24 h after surfactant application suggests that surfactant did not alter the effects of the surgery. Nevertheless, the surfactant group showed faster recovery: by 48 h after surfactant application, this group showed better oxygenation, reflected in constant SpO<sub>2</sub> and decreasing FiO<sub>2</sub>.

**Conclusion:** Thus this pilot study suggests that surfactant application during esophagectomy may improve patient recovery. Further research on this question seems justified.

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## Paper No: 592.00

### The incidence and risk of acute kidney injury after myocardial revascularization

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**Introduction:** Acute kidney injury (AKI) after cardiac surgery is associated with increased postoperative morbidity and mortality (1,2).

**Objectives:** We investigated the incidence of AKI after coronary artery bypass grafting (CABG) surgery using RIFLE (Risk, Injury, Failure, Loss, and End-stage kidney disease) criteria (3).

**Methods:** 95 consecutive patients (24 women, 71 men, mean age 68 years) following CABG procedures with 53 patients (55.8%) on-pump and 42 (44.2%) off-pump techniques were analyzed. Mean EuroSCORE was 4. 41 patients (43.1%) were older than 70, 19 (20.0%) had reduced ( $f$ –50%) EF, 74 (77.9%) arterial hypertension, and 32 (33.6%) diabetes as risk factors of chronic renal damage preoperatively. Preexisting renal dysfunction (estimated glomerular filtration rate, eGFR  $f$ –70 mL/min) was present in 32 (33.7%) patients.

**Results:** AKI (d25% decrease in baseline eGFR within 1 week of surgery or need for renal replacement therapy) occurred in 24 (23.2%) patients, 9/53 (17.0%) in on-pump and 13/42 (31.0%) in off-pump group. 4 patients (2 in both groups) needed peritoneal dialysis. Of them, one patient operated on with acute myocardial infarction died on the second postoperative day from cardiogenic shock. 18 (75.0%) patients with AKI had renal dysfunction preoperatively. Low output state (need for d2 inotropic drug and/or insertion of intra-aortic balloon pump) developed in 10 (41.7%) patients. Red blood cells were transfused to 14 (58.3%) patients. Study mortality was 1.1%.

**Conclusions:** The incidence of AKI was higher in off-pump group, because of the prevalence of risk factors for the development of AKI in this group. Majority of AKI patients had renal dysfunction preoperatively. Strategies optimizing



perioperative care may prevent renal failure in patients with preexisting renal dysfunction.

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## Paper No: 593.00

### Prognosis value of NT-pro-BNP, troponin I and procalcitonin in intensive care unit

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**Introduction:** The NT-pro-BNP and procalcitonin have been proposed by some authors as prognostic markers in ICU. This study aims to evaluate the prognostic value of NT-proBNP, troponin I (TnI) procalcitonin (PCT) and CRP with the outcome at Day 28.

**Material and methods:** Prospective study carried out in a intensive care unit during four years (2006–2010). The assays were performed on D0, D2 and D4.

**Main Outcome:** Mortality at day 28. The association between mortality at day 28 was made with the biological points of each biomarker and not patients.

**Results:** We included 275 patients. The 28-day mortality was 26.2%. There is a significant difference in levels of NT-pro-BNP, Tn I and PCT between the dies and the survivors, but no differences in CRP. Determination of the cut off to predict mortality at day 28 was made by the ROC curves for NT-pro-BNP, TnI and the PCT and they were respectively 800 pg / ml, 0.16 ng / ml and 0.87 ng / ml. The odds ratio were calculated for these thresholds: it is 3 (1.5 to 3.7) for NT-pro-BNP, 2 (1.3 to 3) for Tn I and 1.9 (1.3 to 2.9) for PCT.

**Conclusion:** The elevated levels of NT-pro-BNP, TnI and PCT are correlated with increased mortality at day 28 in patients admitted to ICU regardless of patterns of admission. Biomarkers are a quick and relatively reliable for prognostic evaluation.

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## Paper No: 642.00

### Informativeness of current markers of sepsis

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**Introduction:** Sepsis is one of the most dangerous infectious complication, early diagnosis of sepsis facilitate effective control of pathological process and reduce mortality.

**Objectives:** The aim of study was to analyse informativity of current markers of sepsis (procalcitonin, glucose, C-reactive protein, microbiological methods). The purpose was to improve current diagnosing of sepsis.

**Methods:** During 2004–2011 years 1589 patients were observed. 263(16.6%) patients (76,3% (n = 200) male and 23,7% (n = 63) female) had sepsis. Average age was 16–84 year ( $43,8 \pm 17,1$ ). Days of hospitalizations were  $18,1 \pm 18,8$  (2–116 days); mortality- 33,8%; consciousness by Glasgow Coma Scale -  $11,8 \pm 7,6$  points:  $\Delta \Delta \Delta \Delta \Delta$  II was  $14,3 \pm 6,9$ . Validity of markers was estimated using following statistician methods: sensitivity (Se,%), specificity (Sp,%), positive predictive value (PV+,%), negative predictive value (PV-,%), prevalence (D,%), positive likelihood ratio (LR+) negative likelihood ratio (LR-). The research have already finished.

**Results:** Data obtained that maximal Se had procalcitonin, and microbiological methods (100%) Se of cytokines were -91,3%, glucose-94,7%. High level of Sp typical for microbiological methods (57,9%) and C-reactive protein ( $\approx 45,8\%$ ). Procalcitonin (28,9%), cytokines (28,1%) and glucose (27,8%) had low level of Sp. PV+ of microbiological methods (81,8%) and C-reactive protein (70,5%) were approximately two time more than PV+ of cytokines (47,7%), glucose (40,9%) and procalcitonin (38,6%). C-reactive protein, microbiological methods and procalcitonin had zero level of PV-. Cytokines had 18,2% and glucose 9,1% of PV-. The level of LR+ of cytokines(3,4), procalcitonin(3,6) and glucose(3,5) were in the same level. But LR+ of C-reactive protein(2,2), microbiological methods (1,8) were lower. Identically LR- of cytokines were 3,2, glucose and procalcitonin - 3,4, C-reactive protein - 2,2, microbiological methods - 1,7. Maximal level of P had microbiological methods (65%) and C-reactive protein (56%), minimal level -procalcitonin (31%). All statistic parameters showed that diagnosis of sepsis actual when microbiological methods (Sp = 57,9%; PV+ = 81,8%; P = 65%) and C-reactive protein (Sp = 45,8%; PV+ = 70,5%; P = 56%) were positive. Really negative result present in case of negative response of procalcitonin, C-reactive protein and microbiological methods ( $S_{\Delta} = 100\%$ ; PV- = 0, respectively). LR+ of cytokines (3,4), procalcitonin (3,6) glucose (3,5) the most probably were positive in patients with sepsis. However, LR- negative result of C-reactive protein (2,2) and microbiological methods (1,7) were typical for healthy patients.

**Results:** After statistical analysis of obtained parameters only positive microbiological cultures (Sp = 57,9%; PV+ = 81,8%; LR+ = 2,4; P = 65%), diagnostically relevant levels of C-reactive protein (Sp = 45,8%; PV+ = 70,5%; LR+ = 1,9; P = 56%) and high white blood count ( $S_{\Delta} = 90,9\%$ ; PV+ = 95,5%; LR+ = 5,3;  $\Delta = 80\%$ ) showed to be true positive results. True negative results were stated in case of negative levels of Procalcitonine ( $S_{\Delta} = 100\%$ ; PV- = 0; LR- = 0; P = 31%), C-reactive Protein ( $S_{\Delta} = 100\%$ ; PV- = 0; LR- = 0; P = 56%), bacteriological cultures ( $S_{\Delta} = 100\%$ ; PV- = 0; LR- = 0;

P = 65%) and heart rate (S? = 90,9%; PV- = 66,7%; LR- = 0,5; ? = 80%).

**Conclusions:** Among investigated markers of sepsis positive blood cultures, detection of Procalcitonine levels and White blood count are required for establishing the diagnosis of sepsis. The most sensitive tests for exclusion of diagnosis of sepsis were detection of blood Procalcitonine and C-reactive protein levels as well as microbiological control and heart rate.

## Paper No: 699.00

### The effect of high inspired O<sub>2</sub> concentration (FiO<sub>2</sub> > 0,4) on the lungs at the patients on mechanical ventilation

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**Introduction:** Beside high tidal volume and plateau pressure, hyperoxia can also induce lung injury at the patients on mechanical ventilation. Considerable variations exist in the attitudes, beliefs, and stated practices relating to the management of oxygen therapy at the patients on mechanical ventilation. Although most of the doctors believed that levels of FiO<sub>2</sub> up to 0.40 are not harmful and that the ideal range of FiO<sub>2</sub> is when PaO<sub>2</sub> permit, oxygen toxicity is presumed to occur at levels exceeding 0.40 (1,2). There is evidence of worse outcomes after hyperoxia in a number of patients mechanically ventilated, but in most cases this did not lead to adjustment of ventilator settings (3). Endothelial cell injury, an increase in pulmonary capillary permeability, and a marked increase in inflammatory cells are the main manifestations of hyperoxic lung injury (4,5). In the clinical practice, the reduction of FIO<sub>2</sub> to safe levels through appropriate use of positive end expiratory pressure (PEEP) and alignment of mean airway pressure is appropriate goal. Aim: to examine and set up FIO<sub>2</sub> on safe levels that is accomplished using a goal PaO<sub>2</sub>/ FIO<sub>2</sub> ratio with a lower limit of FIO<sub>2</sub> to achieve acceptable levels of PaO<sub>2</sub> needed to ensure adequate tissue oxygenation.

**Methods:** At 60 patients (surgical and trauma) who underwent more than 72 hours on mechanical ventilation, ARDSnet protocol (based on open lung concept) was used for ventilator setup and adjustment. Patients were divided in to three groups, Group 1 with FiO<sub>2</sub> = 0.5; Group 2 with FiO<sub>2</sub> = 0.4 and Group 3 where FiO<sub>2</sub> = 0.35. Arterial blood gases were monitored routinely half an hour after every MV adjustment. Cytokines that are involved in the inflammatory response (IL-1, IL-6) were determined after 48 and 72 h on mechanical ventilation in order to help in the therapeutic approach to counteract oxygen toxicity. CT scan was performed at the same time to detect pathological phases of diffuse alveolar damage.

**Results:** Cytokines IL-1, IL-6 were elevated in Group 1 and Group 2. The difference between the levels of cytokines in the Group 1 and Group 3 was significant (p < 0.05) while the levels in Group 2 were only slightly above the normal. CT scan findings supported alveolar damage at the Group 1. It was confirmed that even FiO<sub>2</sub> levels of 0.40 and lower can provoke pulmonary toxicity. Conclusion: investigation improved that hyperoxia (FIO<sub>2</sub> = 0.4) is detrimental for mechanically ventilated patients and may lead to lung injury.

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## Paper No: 708.00

### Haemostatic therapy with fibrinogen concentrate for controlling major bleeding during complex cardiovascular surgery: results of a randomised, placebo-controlled trial

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**Introduction:** The supplementation of fibrinogen with human fibrinogen concentrate may contribute to the successful management of major bleeding.(1-4)

**Objectives:** To evaluate the efficacy and safety of fibrinogen concentrate as first-line haemostatic therapy for the treatment of major bleeding during complex cardiovascular surgery.

**Methods:** This was a Phase II, prospective, randomised, double-blind, placebo-controlled study conducted at a single centre (Hannover Medical School, Hannover, Germany). Eligible patients were aged >18 years and undergoing complex cardiovascular surgery. Patients were randomised before surgery to receive fibrinogen concentrate or placebo at the end of cardiopulmonary bypass (CPB) in the event of clinically relevant bleeding. Clinically relevant bleeding was defined as a bleeding mass of

between 60 g and 250 g into the surgical site within 5 minutes immediately after removal from CPB and completion of surgical haemostasis. The dose of fibrinogen concentrate was determined using the maximum clot firmness parameter of the FIBTEM test performed before the end of CPB. If clinically relevant bleeding continued after administration of fibrinogen concentrate or placebo, a standardised algorithm for transfusion of allogeneic blood products was followed until bleeding was controlled. The total transfusion requirements in the 24 hours following administration of fibrinogen concentrate or placebo were compared between treatment groups.

**Results:** The efficacy population comprised 60 patients (fibrinogen concentrate,  $n = 29$ ; placebo,  $n = 31$ ). The demographics and perioperative characteristics of the study population were similar between treatment groups. Patients who received fibrinogen concentrate were transfused with significantly fewer units of allogeneic blood products than those who received placebo (median 2.0 U (range 0–31) vs. 13.0 U (range 4–42), respectively;  $p < 0.0001$ ). All patients in the placebo group required transfusion with allogeneic blood products to control their bleeding, whilst 45% ( $n = 13$ ) of patients who received fibrinogen concentrate completely avoided the need for transfusion ( $p < 0.0001$ , Chi square test). Treatment-emergent adverse events (TEAEs) (fibrinogen concentrate:  $n = 24$  [82.8%]; placebo:  $n = 27$  [84.4%]) and serious adverse events (fibrinogen concentrate:  $n = 5$  [17.2%]; placebo:  $n = 5$  [15.6%]). The nature of TEAEs was typical for patients undergoing complex cardiac surgery.

**Conclusions:** Point-of-care guided administration of fibrinogen concentrate can be used to successfully control major bleeding in patients undergoing complex cardiovascular surgery, reducing the need for transfusion with allogeneic blood products. Further studies would be beneficial to establish fibrinogen concentrate as first-line haemostatic therapy in the management of major bleeding.

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## Paper No: 770.00

### Ram's jet ventilation for insertion of the montgomery t-tube in a patient with basilar artery syndrome : anaesthesia for tracheoplasty

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**Introduction:** Long term tracheostomy can be associated with complications like mucosal inflammation, tracheal or superficial tissue pressure necrosis, ischaemia, tracheal collapse and tracheal stenosis. A soft silicone T-shaped tube (with an upward and downward laryngo-tracheal and an external lumen) was developed by William Montgomery for use after tracheoplasty instead of a tracheostomy tube and to overcome some of the harmful effects of tracheostomy tubes. Basilar Artery syndrome with quadriplegia can be an agonizing clinical condition and can require a long term artificial airway for suction and ventilation. In view of the mentioned complications of long term tracheostomy insertion of a Montgomery T-tube in exchange of tracheostomy tube has been advocated. The Montgomery T-tube acts as combined tracheal stent and can be combined with devices for humidification and phonation. The sporadic use and unfamiliarity with Montgomery T-tube insertion and securing it safely within tracheal lumen requires specialized ear-nose and throat and anaesthetic personnel. Sharing the airway and anaesthetizing the patient for insertion of a Montgomery T-tube is challenging.

**Objectives:** Description of total intravenous anaesthesia and use of an ingenious jet ventilator developed by the author, the Ram's Jet ventilator, in a case of tracheoplasty and change of a tracheostomy tube for a Montgomery T-tube in a patient with Basilar Artery Syndrome.

**Methods:** A 40 years male with quadriplegia due to Basilar Artery Syndrome who had had a tracheostomy tube for one and half years was scheduled for tracheoplasty. He was pre-medicated with i.v. 0.2mg. of glycopyrrolate and pre-oxygenated. Induction of anaesthesia was with 200mg. thio-pentone, 50 mcg fentanyl and 30mg atracurium. The maintenance of anaesthesia was with propofol infusion and titrated dose of atracurium.

The tracheostomy tube was removed and replaced with a 6.0mm internal diameter cuffed endotracheal tube. Jet ventilation was applied with a small 3.0mm catheter through the lumen of endotracheal tube. After tracheoplasty, the vertical lower limb of the lower tracheal part of the 12 size Montgomery T-tube was passed with 3mm catheter through the extra-tracheal lumen of the T-tube for jet ventilation. During insertion of upper laryngeal part of the tube, jet ventilation was interrupted for a short while to prevent barotrauma. Otherwise, ventilation was not a problem. . After securing the tube in the tracheal lumen neuromuscular block was reversed with 2.5mg of neostigmine and 0.4mg of glycopyrrolate and the patient allowed to breath spontaneously.

**Results:** Total duration of Jet ventilation: 40 min. Vitals Minimum Maximum H.R 70/min 110/min. B.P 110/70mm Hg 140/90mm Hg SP02 96% 99%.

**Conclusion:** Very few anaesthetic techniques have been described with simplicity and satisfaction in the management of insertion of Montgomery T-tube under anaesthesia with associated airway problems. In our case, we have used inexpensive local made jet ventilation and total intravenous anaesthesia without any problems.

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### Paper No: 777.00

#### The de-escalation therapy for VAP, does it work in antibiotics abuse region ICU?

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**Introduction:** "Ventilator-associated pneumonia (VAP) is associated with increased, duration of mechanical ventilation, mortality rate and health care system costs, the optimal management remains controversial. Observational studies demonstrate that early empirical appropriate antibiotics therapy is associated with lower mortality rate. To ensure adequate empirical antibiotics in the face of increasing antibiotics resistance, broad spectrum empirical antibiotics are required. However this can lead to a vicious cycle of increasing antibiotics resistance by excessive antibiotics use.

**Objective:** A possible solution for this problem is de-escalation of antibiotics: the use of fewer or narrower spectrum antibiotics once culture results are available, or a shorter course of therapy, or both. Shorter courses of the only sensitive antibiotic therapy for VAP are associated with lower rates of antibiotics resistance, mortality, and length of stay in ICU.

**Method:** We studied all the patients who are admitted to ICU of Aleppo university hospital during year 2008, depending on CPIS for diagnosis of VAP, and randomly divided into two groups according to the treatment: (group A) classic way (wide spectrum antibiotics for 15-21 days), (group B) de-escalating therapy (appropriate antibiotic depending on culture, for 8 days).

**Result:** The proportion of patients with late and early VAP in group A was: 56.25%, 43.75%, and group B was: 54.34%, 45.65%, respectively. The mortality rate was significantly higher in late than early VAP in both groups, group A (72.22%, 57.14), group B (64%, 47.61%).

The two groups were followed up according to CPIS (clinical pulmonary infection score) at day Zero, three, eight and fourteen. There was significant difference in day Eight and fourteen between two groups.  $CPIS < 6$  in the day eight was 28.12%, 39.13% in group A and B respectively. The mortality rate in group A and B was 65.62%, 56.52%. The duration of stay on ventilator in group A and B was  $13.9 \pm 2.1$ ,  $12.71 \pm 0.9$ .

**In conclusion:** We observed that the prevalence of VAP, and the mortality rate, are still unacceptably high in our ICU. De-escalating therapy appears to be associated with less antibiotics use, mechanical ventilation duration, and mortality rate.

### Paper No: 785.00

#### Graphical assessment of oxygen metabolism by lactate level and central venous oxygen saturation

Kazumasa Tazawa, Hideki Miyao, Katsuo Terui, Tatsuya Fukuyama and Kaoru Koyama

**Introduction:** Whole body integral assessment of oxygen supply/demand has been investigated with central venous oxygen saturation (ScvO<sub>2</sub>). Lactate is produced via anaerobic glucose metabolism and can be used as a definitive metabolite. In theory, ScvO<sub>2</sub> reflects whole body oxygen metabolism while lactate level reflects the condition of peripheral oxygen debt.

**Objectives:** The objective of this study was to propose a graphical assessment of oxygen metabolism using ScvO<sub>2</sub> and lactate level, and to show the potential availability of this method using two cases with impaired oxygen metabolism.

**Methods:** The graph we propose is divided into four subset areas by lactate concentration (horizontal; cutoff 2 mmol/l); and ScvO<sub>2</sub> (vertical; cutoff 70%). Left upper (subset I) is "normal" area. Left lower (subset II) is "unbalanced oxygen supply/demand". Right upper (subset III) is "peripheral hypoperfusion, and/or dysoxia". Right lower (subset IV) is overlapped with subset II and III. The patient data were drawn into this graph during ICU stay.

**Results:** A 34-year-old female with connective tissue disease was suffering from severe hypotension of unknown cause. She had an extremely high lactate level (19.7 mmol/l) with borderline ScvO<sub>2</sub> (68%) and was classified as subset IV at ICU admission. With catecholamine infusion, we initiated infused milrinone from 18h later and she moved into subset I 50h later. She finally recovered and was discharged from the ICU 4 days later.

A 96-year-old female undergone hip surgery was admitted to the ICU. Nurses could not recognize considerable post-operative bleeding because internal blood had not been drained into a drainage bag. ScvO<sub>2</sub> decreased from 60% to 37%, lactate increased from 3.5 to 6 mmol/l, and hemoglobin



decreased from 8.4 to 5.9 g/dl until 2h after ICU admission. After massive transfusion, she finally recovered and discharged from the ICU. The graph provided better indicator for these conditions than other monitors and parameters (BP, CI, CVP, etc).

**Discussion:** Attention must be paid not only to the area point itself, but also to the direction of the arrow. Serial assessment over time on the graph could elicit an intuitive evaluation of the on-going therapy and create a consensus assessment of oxygen metabolism among doctors, nurses, and other healthcare professionals. This method can be used for an educational tool for residents and medical students.

**Conclusion:** A two-dimensional, four-subset classification graph using lactate and ScvO<sub>2</sub> can be a simple and useful tool to assess the complicated impaired oxygen metabolism.

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**Paper No: 795.00**

## Incidence and outcome of ventilator-associated pneumonia: an audit

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Ventilator-associated pneumonia (VAP) is the most common nosocomial infection in critically ill patients.<sup>1</sup> There are no corroborating diagnostic criteria for VAP and it is extremely difficult to measure its exact incidence. However, the incidence reported in different studies varies between 8–28%.<sup>2</sup> Clinical pulmonary infection score (CPIS) was developed by

Pugin et al<sup>3</sup> to facilitate the diagnosis of VAP; a CPIS score of  $>6$  indicates a high probability for VAP.

We conducted a prospective audit of 50 patients admitted to the intensive care unit to measure the incidence and outcome of VAP as part of re-audit. Thirteen out of 50 patients (26%) developed VAP with a CPIS score  $>6$ , who had invasive mechanical ventilation of  $>48$  hours (endotracheal tube or tracheostomy). Intensive care and 28-day mortality were 38.4% and 53.8% in patients with VAP compared to 16.2% and 24.3% in those without VAP respectively. Median hospital stay was 26 days in VAP-patients compared to 14 days in patients without VAP. Mean Intensive Care stay was also prolonged in VAP patients (11 versus 4.3 days). Nine patients were diagnosed as ARDS (acute respiratory distress syndrome) and five patients were positive for both VAP & ARDS. VAP is difficult to distinguish clinically from other processes affecting patients on mechanical ventilation.<sup>1</sup> 2 4 Concurrent pulmonary infection is found in more than 70% of patients with ARDS and is associated with higher mortality.<sup>2</sup> The mortality rate for VAP ranges from 24 to 50% and can reach 76% in some specific settings.<sup>2</sup> A diagnosis of VAP results in an increased length of stay and financial cost.<sup>2</sup> Appropriate and early antimicrobial therapy for VAP has shown to improve outcome significantly. Therefore, an important clinical goal must be rapid diagnosis of VAP and identification of causative organisms to ensure early and appropriate treatment of VAP.<sup>2</sup> However, inappropriate use of antimicrobial should be avoided. A randomised control trial by Singh et al<sup>5</sup> showed that a targeted antibiotic regime, guided by an algorithm based on CPIS score, significantly reduced antimicrobial resistance and super-infection without adversely affecting the length of stay or mortality. It also demonstrated decreased antimicrobial therapy cost. In conclusion, VAP is a leading cause of infection in intensive care and is associated with high morbidity and mortality. Prevention, early detection and appropriate treatment are necessary to reduce the incidence and mortality due to VAP.

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**Paper No: 820.00****Central venous catheterization in critically ill patients(1995–2010)**

**Fredys Arrechea-Tartabull, Ernesto Bernal Castaño and Virginia Soto Mena**

\*\*\* Undoubtedly, knowledge of puncture techniques of deep venous pathways is essential for any physician, who should also have enough training to carry out these procedures under the most diverse conditions.

Venopuncture procedures do entail risks indeed, thus they require accurate knowledge of the regional anatomy, major indications, different techniques and ways to prevent complications.

We initially hypothesized that complications would (have) changed with medical developments, scientific and technical advancement, together with the passage of time.

Our overall objective was aimed at establishing the deep venous catheterization morbidity in our patients during the period comprised between January 1995 and December 2010. More specifically, the idea was to relate patient age and sex with complications, comparing deep venous catheterization indications in terms of morbidity, as well as to mention the most frequent complications at stake.

To develop our hypotheses we conducted a prospective and descriptive study with 531 patients who underwent deep venous catheterization at the Intensive Care and Surgical Units in Joaquín Albarrán, Dr. Carlos J. Finlay and Julio Trigo López Hospitals in Havana (Cuba), pre-hospital care units in the Cuban capital, Bansang Hospital (Gambia, Sub-Saharan Africa), Holberton and Mount St. John's Medical Centres (Antigua and Barbuda, West Indies).

Data were collected from the patients' medical records and surgical unit record books. ? In the statistical analysis we applied a multivariate test.

Once the data analysis was finished, it was concluded that the indication for catheterization increased in direct ratio to age.

In the female sex the subclavian vein catheterization was found to be the most frequent, whereas with the males the most common turned out to be the jugular.

The need for emergency intravenous access was the main indication of deep venous catheterization (68.36%).

It was observed that morbidity was present in 7.53% of the cases due to the occurrence of two main complications: haematoma and arterial puncture.

Complications were more frequent in female patients (9.82%), compared to male patients (4.88%).

These results question our initial hypothesis, for both indications and complications seem to have varied very little, despite medical evolvement over large stretches of time, since the first deep venous puncture techniques in the 1920s. \*\*\*

**Keywords:** Central Venous Approach; Venous Catheterization

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**Paper No: 828.00****The Assessment of Intensive Care Unit Patient Relatives in Terms of Anxiety and Depression**

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**Objectives:** In our study, we aimed to determine the factors related to and the frequencies of anxiety and depression symptoms manifested in the relatives of intensive care patients by using Hospital Anxiety and Depression Scale (HADS).

**Methods:** A total of 150 of relatives over the age of 18 whose patients were hospitalized in Intensive Care Unit (ICU) over 48 hours were included in the study. Patients' sociodemographic information (age, gender, marital status, education), reasons for ICU stay, hemodynamic parameters, and Glasgow Coma Score (GCS), Multiple Organ Dysfunction Score (MODS), Acute Physiology and Chronic Health Evaluation (APACHE) II score were recorded. Relatives were asked to fill in the questionnaire that included sociodemographic information (age, gender, marital status, education and work status), efficiency of information about the patient and HADS. When all clinical anxiety and depression data were assessed together; 76% of relatives showed symptoms of anxiety and 72.6% of relatives showed symptoms of depression. Women exhibited more depression and anxiety symptoms compared to men. Anxiety and depression symptoms were found in 67.8% and 66.7% of women, respectively. There were higher levels of anxiety and depression symptoms in spouses, parents, children and siblings compared to other relatives. Relatives with high APACHE II score had more anxiety and depression symptoms. Moreover, relatives with high MODS and low GCS had more depression symptoms. Relatives who were sufficiently informed compared to those who were not showed more anxiety symptoms at borderline.

**Conclusions:** Education level and previous ICU experience of patient relatives, their frequency of being informed and

getting information from the same person did not affect anxiety and depression symptoms. More levels of anxiety was reported in the unemployed relatives compared to those employed, but there was no significant difference in depression frequency.

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## Paper No: 844.00

### The effects of recombinant human soluble thrombomodulin treatment in patients with peritonitis with disseminated intravascular coagulation

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**Introduction:** Recombinant human soluble thrombomodulin (rTM) is expected to be effective in the treatment of disseminated intravascular coagulation (DIC). In Japan, rTM has been used commercially for the treatment of DIC since 2008.

**Objectives:** We evaluated whether rTM is effective for the treatment of peritonitis in patients with DIC and whether rTM has a tendency to cause bleeding.

**Methods:** We performed a retrospective study in the intensive care unit (ICU) of the Hospital of Hyogo College of Medicine from January 2006 to December 2007 when rTM was not administered commercially (rTM non-administration period) and from May 2008 to September 2010 when rTM was administered commercially (rTM administration period). We collected the following data before treatment of DIC (day 0) and after treatment of DIC (day 7); the following parameters were considered for determining DIC: Japanese Association for Acute Medicine-defined DIC criteria score (JAAM DIC score), sequential organ failure assessment (SOFA) score, length of ICU stay, length of hospital stay, and the volume of bleeding. Criteria of JAAM DIC are systematic inflammatory response syndrome criteria (score is from 0 to 1), platelet count (score is from 0 to 3), prothrombin time (value of patient/normal value) (score is from 0 to 1), fibrin/fibrinogen degradation products (score is from 0 to 3). JAAM DIC score is from 0 point to 8 points. The diagnoses of the DIC are more than four points.

**Results:** We treated 9 patients in the rTM non-administration period and 7 patients in the rTM administration period. The baseline characteristics were almost similar between the 2 groups. In the rTM non-administration group, the JAAM DIC score decreased from 4.6 (day 0) to 2.6 (day 7) ( $P = 0.55$ ). In the rTM administration group, the JAAM DIC score decreased from 5.7 (day 0) to 1.9 (day 7) ( $P < 0.05$ ). Thus, the rTM administration group showed more improved DIC

than the rTM non-administration group. There was no significant difference in the volume of bleeding between both groups.

**Conclusions:** In the rTM administration group, the DIC scores improved significantly, suggesting that rTM could be effective for the treatment of DIC.

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## Paper No: 855.00

### Risks factors for biliary tract carriage of multidrug resistant Gram-negative bacilli in community patients

Genaro Maggi, Emilio Maseda and Fernando Gilsanz

**Introduction:** There is little clinical information about community biliary tract carriage caused by multidrug resistant (MDR) Gram-negative bacilli. We investigated the prevalence and risk factors of MDR Gram-negative bacilli in bile sample obtained during cholecystectomy from asymptomatic patients with cholelithiasis from the community population.

**Methods:** Risk factors were assessed using a case-control-control study. To be classed as MDR, Gram-negative bacilli should be resistant to at least three antibiotic families. These isolates included extended-spectrum cephalosporin (ESC)-resistant Enterobacteriaceae and *Pseudomonas aeruginosa* resistant to ceftazidime. Statistical analysis was performed using Fisher's exact test for categorical variables and T student test for continuous variables.

**Results:** We included 150 asymptomatic patients who underwent aspiration of bile during cholecystectomy due to cholelithiasis. The presence of MDR bacteria was low (3 of 150 patients, 2%). MDR were: extended-spectrum  $\beta$ -lactamase (ESBL)-producing *Escherichia coli* (1, 0.6%), ESBL-producing *Klebsiella pneumoniae* (1, 0.6%) and *Pseudomonas aeruginosa* resistant to ceftazidime (1, 0.6%). Comparison with both control groups disclosed association with previous endoscopic into the biliary tract procedures ( $p = 0.013$ ).

**Conclusions:** Although rates of colonization by MDR Gram-negative bacilli (included ESBL-producing organisms) have increased dramatically worldwide and it is a public health concern among community patients our results suggest that it isn't a problem in the biliary tract. Only patients with previous endoscopic procedures into biliary tract is associated with the presence of MDR bacteria. This result could

help to improve the adequacy of empirical antibiotic therapy in patients from community population with a diagnosis of cholecystitis and/or cholangitis requiring admission to ICU.

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## Paper No: 866.00

### Emergency tracheal intubation of critically ill patients: anaesthesiology still required

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**Introduction:** Tracheal intubation for emergency critically ill patients in the acute setting presents greater challenges than for those undergoing routine surgical anaesthesia. In the UK, anaesthesiologists perform the vast majority of emergency intubations. However, this is not reflected internationally, with separate critical care training programs and physicians thus inevitably exposed to less airway experience. Indeed the UK is following suit with the UK faculty of intensive care medicine and its training program.

**Objectives:** To determine the local incidence of difficult laryngoscopy (Cormack-Lehane grade III and IV) and complications arising during emergency intubation of critically ill patients who were not about to undergo surgery.

**Methods:** Information was gathered directly from the on-call anaesthesiologist following emergency intubation. Data collected included Cormack-Lehane laryngoscopy grade, complications from tracheal intubation and drugs used.

**Results:** Information on 86 non-cardiac arrest emergency intubations was collected over eight months. There were 11 (12.8%) intubations with grade III views at laryngoscopy and all of these were performed by senior anaesthesiology trainees with at least four years experience. There were 14 complications: 8 cases of arterial desaturation, 3 of hypotension and 1 each of gastric contents aspiration, oesophageal intubation and traumatic bleeding from the airway. Notably, 11 of these occurred during straightforward (grade I and II) laryngoscopy. Propofol was the most widely used induction agent (45.3% of cases) and a combination of midazolam and fentanyl were used in the place of induction agents in 36% of cases. Suxamethonium and atracurium were the most widely used muscle relaxants (45.3% and 41.9% of cases respectively). 44 (51.2%) intubations were carried out in critical care areas, and the remainder in other parts of the hospital.

**Conclusions:** Our observational study found a high incidence of difficult laryngoscopy and complications from tracheal intubation, even by experienced anaesthetic trainees. It is vital that such difficulties are rapidly and appropriately managed in the acute setting. 48.8% of intubations occurred outside critical care areas, where conditions for emergency tracheal intubation are often sub-optimal. The broad variations and combinations of drugs used demonstrate a significant departure from the classical standardised rapid sequence induction believed to improve clinical outcomes in critically ill patients. This variation according to the individual patient's clinical condition requires familiarity and versatility with the full range of intubating drugs. These results highlight the difficulties and risks involved in the tracheal intubation of critically ill patients, and support a continued role for the anaesthesiologist in these cases.

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## Paper No: 871.00

### Effect of bilirubin and Carboxy-hemoglobin Concentrations on Mortality in Critically Ill Patients

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**Introduction:** Serum bilirubin concentration is routinely measured in intensive care patients. Its elevation can suggest liver dysfunction or biliary pathology, but also sometimes haemolysis. However, the clear cause of its elevation is often unclear. Physiologically, bilirubin is a one of three heme metabolites, which also include ferrous ion and carbon monoxide (CO), but this fact is almost completely ignored in our daily physiological assessments. Intensive care physicians hardly ever take notice of carboxy-hemoglobin (CO-Hb) in routine blood gas analysis except for specific patients (e.g. burns). In this study, we examined the prognostic value of the two products of heme metabolism: Total bilirubin (T-Bil) and carboxy-haemoglobin (CO-Hb) in a general ICU populations. We previously reported higher T-bil and CO-Hb concentrations in patients with the highest mortality (Ref.). In this study, we compared the characteristics of these patients in a little more detail.



**Objectives:** To assess the prognostic significance of serum total bilirubin and carboxy-hemoglobin concentrations in critically ill patients.

**Methods:** We retrospectively studied 491 ICU patients and their 1882 blood gas measurements and laboratory results in 22-beds general ICU during 1 year period. We collected these patients' demographics and APACHE II scores on ICU admission. We specifically assessed the prognostic significance of serum T-Bil and CO-Hb and their combination. We divided these ICU patients in four groups by T-bil and CO-Hb values. The cut off value for T-bil was 1.05mg/dL and for CO-Hb 1.7%. We divided the patients in four groups according to their T-Bil and CO-Hb results: Group HH: high T-bil and high CO-Hb Group LL: low T-bil and low CO-Hb. Group HL: high T-bil and low CO-Hb Group LH: low T-bil and high CO-Hb

**Results:** Our ICU patients had a mean age of 61.8 (SD: 16.1), a mean APACHE II score of 12.1 (SD 4.4). They stayed for a mean of 7.3 (SD 9.3) days in the ICU. Their hospital mortality was 5.5%. Group HH had a significantly higher mortality than other groups: HH: 11.1%, LH: 1.2%, HL: 3%, LL: 3.5%;  $p < 0.0001$  (Chi-square test). The APACHE II scores of the four groups were not significantly different (APACHE II score, HH: 12.4 (SD 5.3), LH: 11.9 (SD 3.6), HL: 12.1 (SD 4.5), LL: 11.8 (SD 3.7);  $p = 0.63$ ). Even after adjustment for APACHE II score, the four groups had different odds for mortality (Adjusted Odds ratio; HH = 3.48 (95%CI 1.34-10.8), reference LL = 1).

**Discussion:** Almost 80% of our patients were post-surgical and they were not very sick. Our result should be assessed in the sicker patients. The clear mechanisms of the increased T-bil and CO-Hb were unknown. However, we believe that the breakdown of heme proteins such as hemoglobin, myoglobin, and cytochromes will be important pathophysiology in ICU patients.

**Conclusions:** The combination of a higher T-bil and CO-Hb was associated with significantly higher hospitalmortality, independent of APACHE II score.

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## Paper No: 879.00

### The effects of pentoxifylline on proinflammatory and anti-inflammatory cytokines induced by peritonitis in rats

Wen-Jinn Liaw, Cheng-Ming Tsao and Chin-Chen Wu

**Introduction:** Much of evidence has found that pentoxifylline (PTX) can improve cardiovascular function and decrease mortality by decreasing the plasma level of TNF-alpha in animal and human studies. PTX has now been found to have a

variety of pharmacological effects, which could be of benefit in sepsis.

**Objectives:** Our current study is to investigate the different cytokines expression during the time course of sepsis and to elucidate the therapeutic effect of PTX in the different stage of sepsis.

**Methods:** Samples were collected at 0, 3, 6, 9 and 18 hour in each animal unless animal died. Animals who received CLP were divided into five groups. Group I received intravenous injection of PTX (5 mg/kg) treatment immediately after surgery. Group II received the same dose of PTX injection at hour 3, Group III at hour 6 and Group IV at hour 9, respectively. Group V just received normal saline injection instead of PTX. Additionally, a sham group was used as control. Samples were collected just before each PTX administration separately. Both proinflammatory (TNF-alpha, IL-1beta/ $\gamma$ ) and anti-inflammatory (IL-4, IL-10) cytokines were analyzed to investigate the alterations according to the time course.

**Results:** After CLP, the plasma level of TNF-alpha increased as the time went on and reached its peak at the time point hour 3. TPX administered at time zero could significantly decrease the plasma level of TNF-alpha at the time point hour 3. The plasma level of IL-1beta increased as the time went on and reached its peak at the time point hour 6, and then kept at a plateau level till hour 9 and then decreased. TPX administered at time zero, hour 3 and 6 could all significantly decreased the plasma level of IL-1beta at their subsequent time point separately after giving the drug. The plasma level of IL-4/ $\gamma$  increased from the time point hour 9 to 18. TPX administered at time zero, hour 3, 6 and 9 could all significantly decreased the plasma level of IL-4/ $\gamma$  at the time point 18. The plasma level of IL-10/ $\gamma$  increased as the time went on and reached its peak at the time point hour 3. Only PTX administered at time zero could significantly increase the plasma level of IL-10 at the time point of hour 6 and 9.

**Conclusions:** Administration of PTX in the early stage is found to be better than in the late stage of sepsis.

## Paper No: 887.00

### Use of remifentanyl for awake tracheal intubation in critically ill

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**Abstract:** Awake intubation requires an anesthetic management that provides the security and comfort given adequate intubation conditions and hemodynamic variables stability. In this prospective clinical study, the purpose was to evaluate the hemodynamic variables with the use of remifentanyl for awake intubation in critically ill patients.

**Methods:** 20 critical ill patients received a remifentanyl as continuous infusion (0,1 microgr/kg/min) for ten min before

endotracheal intubation using a fiber optic laryngoscope while remaining awake. HR, SBP, DBP, RR, SatO<sub>2</sub> and Glasgow values were recorded at baseline, 10 minutes post remifentanyl infusion, and at postintubation. The hemodynamic change were compared with 20 patients scheduled for elective surgery. For intubation an optic fiber laryngoscope and induction was performed with midazolam bolus (0,5 to 0,7 mg/Kg) followed by a fentanyl (1.5 microg/kg) and propofol (2,5 mg/Kg) bolus. Statistical analysis was performed using ANOVA, and t-test, ( $p < 0.05$  with statistical significance).

**Results:** UCI: basal: SBP: 116.8 mmHg, DBP: 65 mmHg HR: 121.4 beats/min, RR: 30 vent/ min, SatO<sub>2</sub>: 84.9%, Glasgow: 13 pts. At 10 min: SBP: 91.3 mmHg ( $p < 0.0001$ ), DBP: 42.8 mmHg ( $p < 0.0001$ ) HR: 107.8 ( $p < 0.01$ ) beats/min, RR: 22.1 vent/min ( $p < 0.0001$ ), SatO<sub>2</sub>: 91.95% ( $p < 0.0001$ ), Glasgow: 10.5 pts. Stability in hemodynamic variables was observed during intubation, with slight increase in HR (110.4 beats/min) while obtaining the patient's cooperation in the procedure with spontaneous mouth opening and all intubations were successful in the first attempt. Elective surgery patients: ASA I - III, baseline SBP: 111.7 mmHg, DBP: 72.1 mmHg, HR: 121.8 beats/min, RR: 24 vent/min, SatO<sub>2</sub>: 96.7%, Glasgow: 14 pts. Following induction: SBP: 92.5 mmHg ( $p < 0.0001$ ), DBP: 53 mmHg ( $p < 0.0001$ ) HR: 105.3 beats/min ( $p < 0.0001$ ) SatO<sub>2</sub>: 100 % ( $p < 0.0001$ ). In all cases a muscle relaxant was used for intubation. The only significant difference between groups was in SatO<sub>2</sub>, RR ( $p < 0.05$ ), due to respiratory failure in UCI patients. Both groups demonstrated a significant decrease during induction in SBP, DBP, HR, RR and increased SatO<sub>2</sub>.

**Discussion:** Usually, for intubation in critically ill patients, drugs are used that depress hemodynamic variables, ventilation, and in a greater or lesser extent the patient's neurological state. With the remifentanyl infusion, hypotension resulted which responded to expanders solutions, but this decrease was less pronounced ( $p < 0.05$ ) than midazolam-fentanyl-propofol. Also observed was little neurological depression and maintenance of spontaneous ventilation, with improvement in oxygen saturation in patients with symptoms respiratory failure, making intubation safer.

**Conclusion:** Remifentanyl induction proved to be safe for intubation in critically ill patients and allowed them to remain awake, with slight hemodynamic alterations.

**Keywords:** Remifentanyl; awake intubation; critical ill; hemodynamic variables

**Paper No: 892.00**

### Cardiopulmonary bypass for cardiac arrest due to accidental hypothermia - factors associated with survival

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**Introduction:** Cardiopulmonary bypass (CPB) is considered the optimal treatment for patients with cardiac arrest (CA) due to accidental hypothermia. With CPB, outcomes exceeding those from sudden witnessed CA from ventricular fibrillation (VF) have been reported despite prolonged CPR. In a previous study, we reported our 10-year experience of using CPB for all hypothermic CA patients (1). In this paper we have expanded the study period to cover 18 years with the focus on identifying factors associated with survival.

**Methods:** Prehospital patients in Southern Finland with CA due to accidental hypothermia between 1991 and 2008 were included. EMS crews identified patients as hypothermic and in CA immediately initiated transportation with ongoing conventional CPR, which was continued en route to hospital. All such patients in Southern Finland are admitted to a single institution, which has a protocol for CPB for these patients. EMS run sheets and hospital records of all consecutive patients admitted because of CA due hypothermia were abstracted for demographic and treatment data.

**Results:** The median age of the 43 patients with CA due to accidental hypothermia was 54 years (range 17-72), and 84 % were male. The mechanism of hypothermia was exposure to cold air in 49 %, immersion in cold water in 35 % and submersion in 16 %. The patients received a median of 70 min (range 20-230 min) of external CPR (pre- and in-hospital) before institution of CPB. Sixty percent of the patients survived to hospital discharge, 19 of them (44 %) were neurologically intact at discharge. The survivors were significantly younger (46 years) than the patients who died (64 years;  $p < 0.004$ ), had higher pH ( $p < 0.02$ ) and base excess values ( $p < 0.02$ ), and a lower potassium level ( $p < 0.008$ ) than the non-survivors (Mann-Whitney).

**Conclusions:** The outcome data confirm that patients with cardiac arrest due to accidental hypothermia and who are treated with CPB have a favorable prognosis despite exceedingly long periods of external CPR before institution of CPB. The observed significant differences were not clinically relevant, and no single parameter assessed on admittance permitted prognostication of outcome. The potassium level on admittance was within physiologic range in 13 of the 17 non-survivors.

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**Paper No: 952.00**

### Specificity of scoring systems in outcome prediction in geriatric patients in intensive care unit

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**Introduction:** Scoring systems defining the severity of illnesses, also predicts the risk of mortality in ICUs.

**Objectives:** The aim of this study is to compare the mortality predictions of the Acute Physiology and Chronic Health Evaluation (APACHE II) score and Simplified Acute Physiology Score (SAPS II) with actual mortality rate in elderly patients who require ICU.

**Methods:** The patients who were admitted to an ICU since the establishment (2006-2011) were included in this study. The files of the patients older than 70 years and staying in ICU more than 24 hours were retrospectively evaluated. Only the first admission was accepted for multi admission. Demographical information, diagnosis at admission, additional diseases, duration of ICU stay, survival/mortality and APACHE II and SAPS II scores at admission were recorded and standardized mortality rate (SMR) was calculated. Correlation analysis ( $r^2$ ) was performed. Mean, standard deviation and minimum and maximum values were presented here.

**Results:** One-hundred seventy-six patients (88 male, 88 female) fulfilled the criteria. Patients age varied between 70-94 years, mean age was  $79.8 \pm 5.3$  years. Duration of ICU stay was 1-67 days ( $8.4 \pm 10.3$  days). Mortality rate was 36.9%.

	Average	$\pm$ std	Min	Max	$r^2$
APACHE II	score	$23.8 \pm 8.3$	8	53	0.38
APACHE II	predict mort.	$47.6 \pm 23.8$	8.7	99	0.39
APACHE II	adjust. mort.	$44.8 \pm 25.1$	3.2	98	0.28
SAPS II	score	$48.5 \pm 17.1$	12	99	0.36
SAPS II	predict. mort.	$46.3 \pm 26.3$	3.9	97	0.43

There was no correlation between age and mortality rate ( $r^2 = 0.1$ ), SMR was 77%, 82% and 80% for APACHE II predicted, APACHE II adjusted and SAPSII predicted mortality rates, respectively. Stratification of patients according to primary diagnosis of admission to ICU resulted with variable mortality rates. Patients with metastasis of carcinoma and with acute on chronic renal failure had 100% mortality. Patients with polytrauma, neurological disorders, aggravation of chronic multi organ problems ( $n = 42$ ), and sepsis ( $n = 15$ ) had mortality rates 66%, 52%, 42% and 40%, respectively. Mortality rates in patients with isolated respiratory problems or cardiac problems were 29% and 23%. Interestingly post CPR ( $n = 3$ ) patients had mortality rate of 14% which is a little higher than postoperative care of elderly ( $n = 18$ , 11%).

**Discussion:** In contrast to study of Ip et al APACHE II and SAPS II scores were insufficient to predict the mortality rate in elderly.

**Conclusion:** The patients with metastatic carcinoma or renal insufficiency and polytrauma have mortality rate more than

50%, so this may predict poor prognosis in ICU for elderly patients.

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## Paper No: 958.00

### Sodium bicarbonate infusion in prevention acute kidney injury in adult cardiac surgical patients with preoperative chronic renal failure

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**Introduction:** Acute kidney injury is common complication after cardiac surgery with cardiopulmonary bypass use. Cardiopulmonary bypass leads to release cytokines (IL-6, IL-8, TNF-?), free hemoglobin and free ferric ions. Sodium bicarbonate can protect kidney from oxydant injury by slowing PH dependent reaction of free radical production, directly scavenges peroxynitrite and others reactive oxygen species and protects from free hemoglobin and free ferric ions mediated injury.

**Objective:** The aim of this study was to evaluate whether sodium-bicarbonate infusion can prevent increase in serum creatinine level in cardiac surgical patients with chronic kidney failure.

**Methods:** This prospective study included 30 adult cardiac surgical patients with preoperative chronic kidney failure (serum creatinine level above  $132 \mu\text{mol/l}$ ) independent of hemodialysis. Patients were divided in two groups (normal saline group- 15 patients who received 4 ml/kg/24h normal saline and sodium bicarbonate group- 15 patients who received 4 mmol/kg/24h sodium bicarbonate diluted in 1000 ml D5W). Infusions of normal saline or sodium bicarbonate started after induction in anesthesia. For statistical analysis we used Fischer's exact test and Chi square test.

**Results:** There were no statistical significant differences between two groups in terms of age (saline group  $72 \pm 8$  years vs. sodium bicarbonate group  $74 \pm 8$  years,  $P > 0.05$ ), duration of cardiopulmonary bypass (saline group  $116 \pm 18$  minutes vs. sodium bicarbonate group  $110 \pm 10$  minutes,  $P > 0.05$ ), aortic cross clamping time (saline group  $78 \pm 7$  minutes vs. sodium bicarbonate group  $75 \pm 8$  minutes,  $P > 0.05$ ), type of surgery CABG (saline group 9 vs. sodium bicarbonate group 8,  $P > 0.05$ ), aortic valve surgery (saline group 3 vs. sodium bicarbonate group 4,  $P > 0.05$ ), mitral valve surgery (saline group 2 vs. sodium bicarbonate group 0,  $P > 0.05$ ), mixed CABG and valve surgery (saline group 2 vs. sodium bicarbonate group 2,  $P > 0.05$ ). There was no

significant difference in preoperative serum creatinine level (saline group  $194 \pm 26$   $\mu\text{mol/l}$  vs. sodium bicarbonate group  $197 \pm 29$   $\mu\text{mol/l}$ ,  $P > 0,05$ ). There was statistically significant difference in peak postoperative serum creatinine level between two groups (saline group  $287 \pm 48$   $\mu\text{mol/l}$  vs. sodium bicarbonate group  $237 \pm 33$   $\mu\text{mol/l}$ ,  $P < 0,01$ ). Two patients normal saline group were on hemodialysis after surgery but no one of patients sodium bicarbonate group (no statistical significant difference,  $p > 0,05$ ).

**Conclusions:** Infusion of sodium bicarbonate in dose of 4 mmol/kg/24h can prevent significant increase in serum creatinine level in cardiac surgical patients with preoperative chronic kidney failure.

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## Paper No: 1003.0

### Expanding an anesthesiologist role beyond an operating room. Volatile based sedation in cardiac surgical patients

**Marcin Wasowicz**, Adriaan van Rensburg, Rita Katznelson, Angela Jerath and George Djaiani

**Introduction:** Sedation is a key-stone of the ICU therapy. No currently available sedative agent possesses the features of 'an ideal' medication used for ICU sedation. Most commonly used sedatives have considerable negative side effects such as withdrawal, delirium accumulation and tolerance. Theoretically, volatile anesthetics offer better sedation profile since we have very precise control over their action, emerge is rapid and since they are not metabolized the accumulation effect is minimal. Until recently their use in ICU setting was not practical due to technical requirements. Introduction of anesthetic conserving device (Anaconda, Sedana Medical, Sweden) allows use of volatile-based sedation in connection with any ICU ventilator. The aim of the presents study was to compare the volatile-based sedation to intravenous sedation in patients who underwent cardiac surgery. Hypothesis. Volatile-based sedation results in better outcomes when compared when compared to intravenous sedation protocol using propofol.

**Methods:** Local REB approved study protocol. Investigation was designed as randomized, prospective, evaluator blinded study. 139 patients scheduled for elective coronary artery bypass surgery were randomized to receive volatile based sedation (VS) or propofol-based sedation (PS). Volatile-based sedation was provided with use of Anaconda device. Remaining perioperative procedures were standardized and protocolized including readiness for extubation and ICU discharge. Primary outcomes measured: length of mechanical

ventilation and ICU stay. Secondary outcomes: Length of hospital stay and kidney function after surgery. Continuous variables were described by median and interquartile range values and the two groups were compared with the use of Wilcoxon non-parametric test. Categorical variables were described with frequencies and percentages, while the two groups were compared using Fisher's Exact test.

**Results:** 70 patients received VS and 69 PS. Patient characteristics were similar for both groups. VS resulted in shorter readiness/extubation time when compared to PS group (138 vs 209min/ 185 vs. 291min,  $p < 0.001$ ). Both groups have similar readiness/ discharge time from ICU. There was no difference in hospital stay between groups. Kidney function measured as glomerular filtration rate was similar in both groups.

**Conclusions:** Volatile based-sedation offers better sedation profile resulting in faster extubation time when compared to short-acting intravenous agent propofol. Study analyzed relatively short- term sedation after major surgical procedure (CABG). Based on these findings analyzing short-term VS we suggest that potential of this novel sedation technique should be explored in patients requiring prolonged ICU stay.

## Paper No: 1026.0

### Nosocomial infections in ICU

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**Introduction:** The origin and development of the nosocomial infections (NCI) in mechanically ventilated ICU-patients is not easily definable. The precise frequency of NCI cannot be determined, due to variations in patients' demographic characteristics and lack of specific criteria.

**Objectives:** The aim of this study is to define NCI-frequency in mechanically ventilated ICU-patients.

**Methods:** In this prospective, opened study held in Alexandrovska University Hospital, 381 patients were followed in the course of six years (2000-2006). All patients were mechanically ventilated more than 7 days in a row. Data concerning clinical and paraclinical parameters, epidemiology and demographic characteristics were collected in order to determine the most common infections developed in mechanically ventilated patients.

**Results:** Patients, included in the study needed artificial ventilation for the following reasons:

- Multiple trauma (head, thorax, abdomen): 41%
- Primary pulmonary infection: 20%
- Postoperative respiratory failure: 19%
- Genitourinary infection: 11%
- Isolated thoracic trauma: 9% Total amount of 953 infections were recorded, among them:



- Catheter-related urinary nosocomial infections (CRUNCI): 37%
- Catheter-related nosocomial infections (CRNCI): 29%
- Respiratory nosocomial infections (RNCI): 20%
- Surgical nosocomial infections (SNCI): 14% Catheter-related nosocomial infections predominated when the insertion site was right/left internal jugular vein (22%) and right/left subclavian vein (17%).

**Conclusions:** A significant factor for developing RNCI, CRNCI and CRUNCI is the age after 55 years. Sex does not play an important role. Mechanical ventilation over the course of more than 20 days is a crucial risk factor. Patients who are mechanically ventilated during more than 21 days are the most resistant to the applied treatment.

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## Paper No: 1051.0

### Peri-operative management of phaeochromocytoma, cardiovascular instability and patient outcomes

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**Introduction:** Phaeochromocytoma is a rare catecholamine-releasing tumour which was historically feared peri-operatively for its cardiovascular volatility during tumour resection. Due to its relatively high morbidity in the pioneer stages of treatment, adrenalectomy patients were routinely admitted to intensive care post operatively. However, current advances in its preoperative medical treatment, mode of surgery and intraoperative control of blood pressure have contributed in reducing the mortality and morbidity to almost zero.

**Objectives:** To compare peri-operative cardiovascular variability and course in 25 patients undergoing laparoscopic adrenalectomy, in a London teaching hospital. We assessed whether different regimes of blockade pre-operatively and anaesthetic technique had an effect on cardiovascular stability and also on postoperative recovery.

**Methods:** Data was collected retrospectively from reviewing the notes on 25 patients that were scheduled for an elective laparoscopic adrenalectomy in the period from 2008 to 2011. Data regarding the type of a blockade administered pre-operatively, catecholamine levels, size of tumour, mode of surgery, intraoperative techniques used, as well as intraoperative haemodynamic variability and complications were collected.

**Results:** All patients received the non selective a blocker phenoxybenzamine. 20 (80%) of these, were admitted for a 3day course of intravenous phenoxybenzamine, immediately prior to the operation. 18 out of 25 (72%) had dual blockade with both alpha and beta antagonists, and only 2(8%) were on a third antihypertensive agent. The preoperative MAP ranged from 67 to 113 with a mean of 91.68 and mode of 90. Anaesthetic technique for BP control varied with Remifentanyl infusion being used in 12 out of 25 with a mean of 3 periods of instability (+/- 5.5SD), in 5 (20%) cases as the sole infusion. Other infusions used were: GTN in 11 cases with 9 mean episodes of instability and a SD of +/-13.7, magnesium sulphate in 9 cases with 10.7 episodes of instability and a SD of +/-14.9, and a b blocker infusion. Phentolamine was used as a bolus in 3/25 (12%). Only 1 patient (4%) required cardiovascular support post operatively, after acute massive haemorrhage. Out of all the operations that were planned laparoscopically, 2 were converted to open. Other complications included development of fast atrial fibrillation in a patient with known disease 48 hours postoperatively.

**Conclusion:** We conclude that differences in the preoperative and intraoperative management were not associated with any significant clinical changes in patient outcomes regarding organ support, intensive care admission, complications or prolonged hospital stay.

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**Paper No: 1071.0****Scoring Systems for the prognosis of haematological oncology patients in critical care**

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**Introduction:** Admission of haematological oncology patients to the critical care frequently requires use of extensive technological and physical resources. Therefore; admission of haematological oncology patients to the intensive care units lead to ethical dilemmas for oncologists and anaesthetists. The prediction of prognosis becomes important with respect to regulation of patient therapy and informing the patients and their relatives about mortality and morbidity.

**Objectives:** In our study, we aimed to evaluate the capability of the acute physiology and organ insufficiency scores with respect to prediction of mortality in the hematological oncology patients who were transplanted or nontransplanted bone-marrow and followed-up in the intensive care unit.

**Methods:** The scores APACHE II, III, IV, SAPS III and SOFA were evaluated and their predictive capabilities were compared. The patient files of the patients who were transplanted (Group 1, n = 25) or nontransplanted (Group 2, n = 25) bone-marrow and followed-up in the intensive care unit of the Yeditepe University Hospital between the years 2005 to 2010 have been reviewed retrospectively. The scores of the patients were recorded on a daily basis or in the first 24 hours following admission to intensive care unit depending on their specifications and their predictive capabilities with respect to mortality have been evaluated statistically. The SPSS 17.0 (SPSS Inc. Chicago, III, USA) software was used in the statistical evaluation.

**Results:** It has been detected that SOFA 1st day value ( $p < 0,05$ ), SOFA 3rd day value ( $p < 0,01$ ), vasopressor requirement ( $p < 0,05$ ), aPTT value ( $p < 0,05$ ), presence of reproduction in the blood culture ( $p < 0,05$ ) of the Group I patients and APACHE III value ( $p < 0,05$ ), SOFA 3rd day value ( $p < 0,05$ ), vasopressor requirement ( $p < 0,001$ ) and creatinin value ( $p < 0,05$ ) of the Group II patients shown correlation with exitus in the intensive care unit.

**Conclusions:** APACHE III and SOFA can be used for evaluating the prognosis of haematological oncology patients.

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**Paper No: 1116.0****Genotyping of acinetobacter baumannii isolates from patients with severe sepsis in anesthesia intensive care unit**

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**Aim:** Acinetobacter baumannii is considered as an emerging nosocomial pathogen in intensive care units. The most frequently clinical manifestation is sepsis and a fulminating course is observed when the patient presents septic shock. The aim of this study was to make an epidemiological surveillance of A.baumannii blood isolates from severe sepsis patients.

**Material and Methods:** Blood samples were collected from patients with severe sepsis which has occurred in anesthesia intensive care unit treatment over a three months period. In 11 of these blood samples A.baumannii was identified and RAPD-fingerprinting was performed for genotyping.

**Results:** DNA fingerprints generated with M13 and DAF4 primers identified 6 distinct strains in 11 patients. Genotype 1 and 2 were found in three patients, genotype 3-6 were found in one patient.

**Discussion:** This study demonstrates that there was patient-to-patient spread of strains and also epidemic behaviour airborne spread of A. baumannii in hospital wards. RAPD-fingerprinting should be applicable to other units for epidemiological investigation of a hospital outbreak.

**Keywords:** Acinetobacter baumannii; RAPD-fingerprinting; anesthesia intensive care unit

**Paper No: 1130.0****Effect of gender difference in patients of coronary artery bypass graft surgery and its impact on outcome in patients of Bangladesh – an observational study in BSMMU (Bangabandhu Sheikh Mujib Medical University) cardiac critical care unit****Zerzina Rahman**

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**Introduction:** According to worldwide studies, females run an increased risk of early death and the development of post-operative complications after coronary artery bypass graft surgery as compared with males. In a study in United States for CABG patients, findings suggested that gender differences both within and across the races may be greater than the differences among racial groups<sup>1</sup>. The crude mortality rates for coronary artery bypass surgery for men and women were 3.08% and 5.43% respectively, in New York State in 19892.

**Objectives:** This study in Bangladesh was an observational study from 1 year's collection of data. This study was done to find out the cause of difference in outcome or course of Coronary Artery Diseases in different sexes within a same socio-cultural and economic background of a least developed country.

**Methods:** Patients (n = 33) who were undergoing CABG surgery were included, both male and female and within the age range of 40 to 70 years. Patient with an H/O previous cardiac surgery and more than four (4) risk factors were excluded. This study analyzed the risk factors and outcome parameters in relation to gender with assistance of a questionnaire. The baseline risk factors such as age, indication of CABG, pre-operative ejection fraction, post-CABG treatment etc. were matched. It also pointed to identify some socio-cultural factors that influence the patient outcome and to the analysis of the relation of the outcomes (mortality, morbidity and others) with the gender.

**Results:** Statistical analysis (Student's T test) was done for baseline clinical variables, for socio-demographic profile on the basis of gender, for outcome parameters and for patients' personal data. There was certain significant difference in outcome in different genders. (P = <0.05 – significant, P = <0.01- highly significant).

**Conclusions:** This study had an underlying research question that whether the difference of outcome of CABG in different gender is due to delayed approach of patient to the physician and delayed diagnosis of the CAD which indicates the gender-specific socio-demographic access to the health facilities in Bangladesh. Female gender is a predictor of higher morbidity in patients undergoing coronary artery bypass graft<sup>3</sup>. Social problems are higher in the group of females: such as delay in

approaching the nearby GP or access to the cardiac specialists for her heart problem is delayed due to her dependence on the male population who are the earners<sup>4</sup>.

**Paper No: 1141.0****Postoperative Delirium as a determinant of mortality in critical surgical patients**

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**Introduction:** Outcomes in critical surgical patients have been primarily described as mortality adjusted for severity of illness. However, other perioperative factors may be determinants.<sup>1</sup> Such is the case of postoperative delirium (POD).

**Objectives:** Evaluation of the incidence and determinants of mortality, up to six months, in critical surgical patients.

**Methods:** Prospective cohort study conducted in a Post-Anesthetics Care Unit (PACU), with five intensive care beds, during 10 months. Exclusion criteria were: no informed consent, central nervous system disease, neurological or cardiac surgery, length of stay in the UCPA <12 hours, age <18 years, permanent paralysis and a score <25 The Mini Mental State Examination Test. Demographic data, perioperative variables, length of stay (LOS) in the PACU and in hospital and hospital mortality and at 6 months were collected. POD was evaluated using the Intensive Care Delirium Checklist (ICDSC). Descriptive analyses were carried and the Mann-Whitney U test, Chi-square or Fischer's exact test were used for comparisons. Logistic regression analysis was used to evaluate the determinants of mortality with calculation of Odds Ratio (OR) and its confidence interval 95% (95% CI).

**Results:** 775 patients were admitted to the PACU, of which 680 met the inclusion criteria. The mortality rate at 6 months was 16% (n = 108). Univariate analysis showed that age (OR 1.03, 95% CI 1.02-1.05, p < 0.001), ASA physical status (OR 1.09, 95% CI 1.14-3.01, p = 0.013 for ASA III / IV), Revised Cardiac Risk Index (OR 2.59, 95% CI 1.57-3.01, p < 0.001, for IRCR > 2), emergent surgery (OR 2,70, 95% CI 1.67-4.26, p < 0.001), units of Erythrocytes (OR 1.15, 95% CI 1.04-1.27, p = 0.006), and units of platelets used during surgery (OR 1.25, 95% CI 1.05-1.49, p = 0.012), POD (OR 4.92, 95% CI 3.15-7.69, p < 0.001), APACHE II (OR 1.14, 95% CI 1.09-1.19, p < 0.001), SAPS II (OR 1.07, 95% CI 1.05-1.09, p < 0.001), PACU LOS (OR 1.01, 95% CI 1.00-1.01, p < 0.001) and hospital LOS (OR 1.01, 95% CI 1.01-1.02, p < 0.001) were considered risk factors for mortality. In multivariate analysis, delirium (OR 3.26, 95% CI 2.01-5.29, p < 0.001), SAPS II (OR 1.06, 95% CI 1.04-1.08, p < 0.001) and hospital LOS (OR 1.01, 95% CI 1.01-1.02, p < 0.001) were independent risk factors of mortality.

**Conclusions:** Delirium, SAPS II score and hospital LOS were considered independent risk factors of mortality, up to 6 months, in critical surgical patients.

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### Paper No: 1154.0

## Topical tenecteplase for dissolution of a life threatening endobronchial clot

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**Introduction:** Large endobronchial clots can result in substantial respiratory impairment and potentially life threatening airway obstruction. Therapeutic modalities include: suctioning (both blind and with the use of flexible bronchoscopy), lavage, forceps, rigid bronchoscopy,<sup>1</sup> cryotherapy<sup>2</sup> and topical thrombolytics.<sup>3-5</sup> Experience in the use of topical thrombolytic agents is limited to a number of case reports including the successful use of streptokinase<sup>3,4</sup> and urokinase<sup>5</sup> typically administered via flexible bronchoscope. To our knowledge the use of recombinant tissue plasminogen activators as a topical thrombolytic for endobronchial clots has never been reported.

**Objectives:** To report the successful use of tenecteplase (TNK), a recombinant tissue plasminogen activator, to dissolve a life threatening endobronchial clot.

**Results:** Research ethics board approved reporting the case. An otherwise healthy fifty-six year old male presented to the emergency department with acute onset gross hemoptysis nine-days after a left mucosal bronchial biopsy for recurrent pleural effusion. He had been asymptomatic since a single bout of hemoptysis immediately post-biopsy. The patient was brought to the operating room and had his airway secured with a single-lumen endotracheal tube and a bronchial blocker was placed in the left main stem. He was admitted to the intensive care unit for ongoing monitoring and subsequently underwent a pulmonary angiogram. During the evening of post-admission day 5 he developed a massive endobronchial clot with intermittent total airway compromise. Initial interventions including blind suction, flexible bronchoscopy and lavage were unsuccessful in relieving the obstruction. Subsequently, suction was applied directly to the endotracheal tube which was withdrawn pulling with it large portions of clot and subsequent re-intubation. Thoracic surgery was consulted for rigid bronchoscopy, though the patient's condition deteriorated prior to their arrival. Traditional methods failed to control the clot burden and the patient decompensated resulting in a hypoxic cardiac arrest. CPR was commenced and 50mg of TNK was injected down the endotracheal tube. Within 60s the respiratory therapist noted a decrease in airway pressure and greater lung volumes. The patient returned to sinus tachycardia after 7 minutes of CPR. The patient had bilateral

chest tubes placed and was stabilized prior to an emergent lobectomy. The patient had a protracted ICU stay, though was discharged 30 days post-operatively for rehabilitation secondary to an anoxic brain injury.

**Conclusions:** Large endobronchial clots are life-threatening emergencies. TNK, as a topical thrombolytic, was a successful adjunct in this resuscitation. Further reports examining indications, safety and dosing of endobronchial thrombolytics would better delineate their use.

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### Paper No: 1164.0

## Risk factor identification for prolonged mechanical ventilation following cardiac surgery

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**Introduction:** Prolonged mechanical ventilation following cardiac surgery is associated with increased morbi-mortality. Numerous studies have identified risk factors for prolonged ventilation in this particular population. The Prolonged Ventilation Score was developed by Reddy et al. in 2007 to assess accurately the risk of a ventilation time greater than 48 hours. (1) This score, validated on more than 10,000 patients, can be easily used in day-to-day practice to calculate patient-specific risk.

**Objectives:** The first objective of this study was to identify risk factors associated with prolonged mechanical ventilation in our cardiac surgery patients. The second objective was to evaluate the relevance of the Prolonged Ventilation Score in our population.

**Methods:** This retrospective study analyzed 331 consecutive adult patients undergoing cardiac surgery between September 2008 and December 2010. Prolonged ventilation time was defined as a postoperative ventilation time lasting for more than 24 hours. This cut-off value was chosen according to the definition of the Society of Thoracic Surgeons. (2) A multivariate logistic regression analysis was undertaken to identify independent risk factors for prolonged ventilation. The area under the receiver operating characteristic (ROC) curve was calculated to assess the performance of the Prolonged Ventilation Score to predict a postoperative ventilation time greater than 48 hours.



**Results:** Among the study population, 24% of patients (79/331) met our criteria of prolonged ventilation. The following independent risk factors were found: left ventricular ejection fraction less than 30%, complex surgical procedure including coronary artery bypass grafting, high logistic EuroSCORE and high intraoperative doses of vasoactive drugs. ROC curve analysis demonstrated the accuracy of the Prolonged Ventilation Score in our patients, with an area under the curve of 0.775.

**Conclusions:** Compared to the literature, the incidence of prolonged ventilation time was higher in our population. This could be explained by the absence of sedation and ventilator weaning protocols in our intensive care unit. However, risk factors for prolonged mechanical ventilation were found similar to those identified in previous studies. The Prolonged Ventilation Score appeared interesting to predict ventilation time greater than 48 hours. Specific strategies, including sedation and ventilator weaning protocols, should be undertaken in order to reduce postoperative ventilation and its associated morbi-mortality.

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## Paper No: 1175.0

### Frequency of microbiological isolates in the intensive care unit – five year audit

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**Introduction:** Surveillance data for health-care associated infection (HCAI) exist in most developed countries (1). In intensive care medicine infection control represents the most important issue for safe management (2).

**Objective:** The aim of this study was to analyze microbiological isolates from different patients' samples, taken on admittance in the intensive care unit (ICU) and further on, once weekly until discharge.

**Design:** Prospective, randomised, observational cohort study between January 1, 2007 and August 1, 2011.

**Setting:** Sixteen-bed, adult, tertiary level surgical-medical intensive care unit.

**Methods:** All patients hospitalized more than 48 hrs during study period were eligible for study entry. They were underwent to routine microbiological screening at admission into the intensive care, and weekly thereafter. Samples were taken from tracheal aspirate, nasal, inguinal and axilla swabs. Urine, skin around central venous catheters, surgical and pressure ulcer wounds, abdominal and chest drainage and blood culture, if it was indicated, were microbiologically analyzed, as well. Susceptibility to antibiotics of all isolates was tested in vitro. As full "sensitivity" were considered more than 75% of isolates susceptible to antimicrobial drugs, as "intermediate" if more than 25% and less than 75% were susceptible, and as resistant in the case that less than 25% of isolates were susceptible to certain antibiotic.

**Results:** In comparison to the first year of study (2007), there was more samples without any colonisation in the last study year -2011 (65,23% vs 71,16%). In the 2011, the most frequently Enterococcus species was isolated (13,6%), while it was Klebsiella species (6,03%) in the first study year. Both species were sensitive to carbapenemes. Acinetobacter species was more frequent in the last study period (10%) versus 5,6% in 2007, with intermediate "sensitivity to carbapenemes only. Increase in the Pseudomonas aeruginosa isolates was observed in the last two years (7,5%) too, which was less sensitive to cephalosporins III generation than previously.

**Conclusion:** In the five year study period our local epidemiology indicates better infection control measures, but still insufficient respect of standardized antibiotic prescription protocols.

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## Paper No: 1179.0

### Descriptive study of a capacity assessment tool to emergency medical care service delivery at the district health level

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**Introduction:** The evaluation of provision of emergency medical care in the developing country's setting is challenging for both development program managers and local country partners. A capacity assessment tool was developed by the collaborative work between development agency's

technical assistant, heads of health centers and dispensaries, representative consultant physician of the department of emergency medicine of the district hospital, and representative of ambulance drivers. It was designed to help health facility managers assess their capacity to emergency medical care provision.

#### Objectives:

- To describe the structure of the capacity assessment tool
- To describe the capacity profile of different care delivery sites

**Methods:** In order to describe the design, the relevance of each core component of the tool to appraise the capacity for emergency care service delivery provision was commented. While applied to the everyday practice's setting of the local service delivery sites, the tool yielded a stratified characterization of each site's challenges. The related result was described as well.

**Results:** The tool incorporated indicators for service provision including accessibility, availability, and basic service capacity standards indexes. Indexes were based on 5 items ranking scoring.

Stratified capacity assessment of different key sites of emergency care service delivery has identified the difficulties faced at each level. As a consequence, the priority capacity strengthening needs have been determined: pre hospital management faced concerns related to infrastructure, drug and equipment; transport system suffers from knowledge and guidelines' issue; intra hospital management dealt with challenges related to drugs and equipment issues.

**Discussion:** The process of conducting stratified assessment of emergency care service delivery sites may be facilitated by the use of comprehensive and simplified capacity assessment tool. The tool could be considered a supplementary specific tool to complement the global facility assessment tools.

**Conclusion:** Further managed rather than random strengthening of the health system in the specific domain of critical care could be developed on the basis of the priority strengthening needs identified through field elaborated capacity assessment tool.

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## Paper No: 1194.0

### Recruitment maneuver and inhaler treatment with selective endobronchial intubation for treatment of atelectasia due to car accýdent

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**Introduction:** The treatment of atelectasia is composed of respiratory exercise, inhaler therapies and bronchoscopic procedures. Here, we want to present a case with atelectasia which is refractory to conventional treatment and treated with bronchoscopic aspiration, recruitment maneuver to one lung performed with endobronchial blocker and inhaler treatment.

**Case Report:** A 37-year old male was accepted to intensive care unit with a diagnosis of left lung contusion, multiple extremity and rib fractures at another facility. The patient developed a dyspnea and referred to our department. The chest X-ray and computerized tomography revealed a left total atelectasia. A bronchoscopy was performed and a severe secretion was observed at the left bronchial branches and the secretion was aspirated. The patient is observed in intensive care unit for the next 5 days and respiratory exercises, inhaler therapies were performed. However, the blood gas parameters worsened so a bronchoscopy under general anesthesia was planned. Bronchoscopy revealed a total obstruction of left main bronchus with secretion. The secretion was washed with saline and aspirated. In order to provide ventilation of the left lung, an Arndt endobronchial blocker (9F,65cm) was placed to the right main bronchus. The patient was ventilated with 100% oxygen for 3 minutes and the endobronchial cuff was inflated. With pressure controlled ventilation at 20 cmH<sub>2</sub>O recruitment maneuver was performed to left lung. In order to prevent reflex bronchospasm, 2.5 mg salbutamol suphate and 0.5 mg budesonid was applied as inhaler for 10 minutes. Left bronchus was washed with saline and aspirated. Recruitment treatment was re-performed to the left lung and followed with inhaler therapy. A chest X-ray obtained at the OR revealed that the majority of the left lung was ventilated. The patient was extubated at the PACU at the 4th hour of the procedure. The computerized tomography obtained at 24th hour showed that the atelectasia was totally resolved.

**Conclusion:** There are studies in the literature reporting bronchial entubation for treatment of atelectasia. However, atelectasia treatment with endobronchial blocker which is a less invasive procedure is not reported. There are larger

studies are needed in order to determine the efficacy and the possible complications of this treatment modality.

## Paper No: 1198.0

### Does renal function improve after open abdominal aneurysmal repair?

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**Introduction:** Renal failure occurs in 2-30% of patients following open Abdominal Aneurysmal repair [1,2]. However, there are not many studies at present which map the renal function immediately post-operative.

**Objectives:** To investigate whether or not, renal function in patients with pre-existing dysfunction improves after open repair.

**Methods:** Retrospective review of patients undergoing elective open Abdominal Aneurysmal repair was done over a 2 year period between January 2009 and December 2010. Data was collected on 105 patients who were admitted to our Intensive Care using 'Carevue' IT system. Serum Creatinine was used as an indicator of renal dysfunction and measured pre-operatively and 4 consecutive days post-operative.

**Results:** Of the 105 patients, 1 died due to bleeding. Worsening of renal function was categorised with an increase in Serum Creatinine of >30% of the pre-operative status.

34.6% (n = 36) of patients had pre-op renal dysfunction. Course following surgery is as below.

Improved renal function -19 (52.7%) Status unchanged-9 (25%) Worsened renal function-8 (22.2%)

We also noted that the improvement in renal function was immediate in most of our patients. Of the patients with normal pre-op renal function (N = 68), 16% had a deterioration in renal function. Only two patients with worsening renal function received renal replacement therapy.

**Discussion:** Renal dysfunction is known to be a predictor of mortality in Abdominal aneurysmal patients undergoing surgery. However, there is no consensus regarding the definition of renal dysfunction. We are aware of the limitations of using Serum Creatinine as an indicator of renal dysfunction. Also other variables like the renal ischemic time, fluid status and medications were not taken into consideration. Initiation of renal replacement therapy was at the discretion of the Intensivist, as we don't have a consensus on the timing.

**Conclusion:** Though ours is a small cohort of patients, we noted that the renal function improved in a majority of our patients with renal dysfunction. Only 2 patients received renal replacement therapy. Our ICU mortality was <1%.

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## Paper No: 1203.0

### Inhaled nitric oxide combined with corticosteroids attenuate kidney and heart toll-like receptors 4 expression in a porcine suprarenal aortic cross clamping ischemia reperfusion model

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**Introduction:** Inhalation of nitric oxide (iNO 80 ppm) modifies ischemia reperfusion injury (I/R-I) in extrapulmonary tissues [1]. The combination of iNO (30ppm) and intravenous corticosteroids modifies endotoxin-induced organ damage in a piglet endotoxin model [2]. Toll-like receptor 4 (TLR4) signalling is a critical modulator of cell survival and I/R-I in many organs [3].

**Objectives:** We evaluated a combination of iNO and corticosteroid therapies on renal and heart TLR4 mRNA activation determined by quantitative real time PCR after 90 minutes of suprarenal aortic cross clamping (SRACC) followed by 20 hours observation in a I/R\_I piglet model.

**Methods:** Piglets were subjected to abdominal laparotomy and SRACC for 90 minutes, and then observed for additional 20 h of intensive-care treatment. Renal cortex biopsies were sampled (stored in RNeasy Lysis Solution) at: T0; 1h before SRACC, T3; 3 h after SRACC release, T20; 20 h after SRACC release. Heart left ventricle tissue was sampled only at T20. Piglets (n = 23) were randomized into 3 groups: 1) (n = 10) iNO (80ppm)+i.v. corticosteroids (25 mg x 3) started 30 min. before SRACC and continued 2 h after SRACC release followed with decreased iNO (30 ppm) until 20 h after SRACC release (sevoflurane ANCONDA anesthesia/sedation). 2) (n = 10) control, after SRACC a 20 h observation period (sevoflurane ANCONDA anesthesia/sedation). 3) (n = 3) Sham surgery (no SRACC), thereafter a 20 h observation period (sevoflurane ANCONDA anesthesia/sedation).

**Results:** Renal TLR-4 mRNA activation was seen (p < 0.05) at T3, in all groups subjected to SRACC after 3 h of reperfusion, compared to baseline and sham surgery animals. This increase was reduced (p < 0.05) in animals treated with iNO+

corticosteroids, compared to pigs without treatment with the same anesthesia. Heart TLR-4 mRNA activation was reduced ( $p < 0.05$ ) in animals treated with iNO+corticosteroid, when compared to animals without treatment.

**Conclusions:** The combination of inhaled Nitric Oxide and i.v. corticosteroids diminishes kidney and heart TLR-4 mRNA expression in a porcine SRACC I/R-I model.

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## Paper No: 1213.0

### Elevated myoglobin following restraint of a prisoner in the icu: a case of exertional rhabdomyolysis

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**Introduction:** Rhabdomyolysis is a known sequela of extreme physical activity (1). Release of metabolic products following muscle breakdown produces a diverse clinical picture. Complications range from mild muscle soreness to acute renal failure requiring hemodialysis (2). These situations can be further complicated by arrhythmias, coma, and death (3). We report a case of a prisoner requiring restraint after attempted escape and violent behavior against the staff in the ICU.

**Case Description:** A 51 year old male prisoner with known psychiatric history was admitted to the SAICU following attempted suicide by hanging in his cell. He arrived in the Emergency Department and was found to have significant laryngeal edema with possible laryngeal fracture. He was intubated for airway protection following complaints of dyspnea and dysphagia. After his airway was further evaluated, the patient was extubated. Approximately one hour after extubation, the patient became violent, assaulted an armed guard and nurse. He attempted escape but was unsuccessful as his left lower extremity was shackled to the bed. Restraint was accomplished using capsicum spray and IM haloperidol. Two male physicians restrained him in the prone position. Post restraint labs showed elevated myoglobin, hyperkalemia, hyperphosphatemia, hyperlactemia and acidemia. The patient was not cooperative with the physicians and therefore we were unable to obtain a review of systems.

**Discussion:** Restraint of patients in the ICU is occasionally required for safety of the patient and staff. However, this is not an innocuous event. Extreme resistance to restraint can result in exertional rhabdomyolysis. Complications include metabolic abnormalities, rhabdomyolysis, compartment

syndrome, disseminated intravascular coagulation and acute renal failure (4). Treatment involves aggressive IV rehydration and alkalinization of the urine to prevent renal damage. Electrolyte abnormalities should be corrected to avoid arrhythmias (5). It is also important to have an appropriate course of action in place for patients who require restraint. The use of prone position and capsicum sprays have been determined to be detrimental to a patient's cardiac and pulmonary systems and can even result in death (6).

**Conclusion:** This case illustrates the complications that are encountered when restraint of a violent patient is required in the ICU. Early diagnosis and treatment are essential to prevent serious morbidity. ICU staff should be educated on the possibility of these interactions and should be trained to appropriately respond. Although restraint may be necessary, upright techniques used wherever possible may prevent serious injury to the patient and their care team.

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## Paper No: 1221.0

### Is endovascular cooling less stressful than surface cooling? stress, cerebral, and metabolic responses in a porcine model of mild hypothermia

Kristian Kjaer Andersen, Andreas Rauff Mortensen, Christoffer Sølling, Hanne Birke and Else Tønnesen

**Introduction:** Mild therapeutic hypothermia (MTH) reduces morbidity after cardiac arrest(1). In the post cardiac arrest setting, organs are susceptible to ischemia if hypoperfused. Endovascular or surface cooling methods can be used(2). Surface cooling elicits a strong sympathoadrenal response, which can have adverse effects on muscle and brain(3,4). Lowering of metabolic needs and perfusion of the tissues might not occur concomitantly, resulting in hypoxia or



ischemia. The cardiac arrest can result in anoxic brain damage. This presents as edema of the brain(5). Some patients with brain edema has also been exposed to MTH. The effect of hypothermia per se on possible brain edema has not been investigated.

**Objectives:** 1) To investigate whether endovascular cooling is superior to surface cooling during mild hypothermia in regards to eliciting a lower stress-response. 2) To elucidate the effect of hypothermia on possible brain edema.

**Methods:** Eighteen 60 kg female pigs are anesthetized and ventilated. Microdialysis catheters are placed in the brain, muscle, and subcutaneous tissue. A probe measuring temperature, oxygen saturation and pressure is placed in the cerebrum using a stereotactical procedure. Near Infrared Spectroscopy is used for regional saturation (rSO<sub>2</sub>) monitoring. After baseline MRI of the cerebrum, six animals are allocated to each group by randomisation: 1) Surface cooling using EMCOOLS® pads, 2) endovascular cooling using Alsios Coolgaard® system, or 3) control. In groups 1 and 2, cooling is commenced. After 8 hours a second MRI is obtained and the animals are euthanized. Bloodsamples are obtained at discrete timepoints. Microdialysis is harvested at 30 min. intervals. Primary endpoint is the difference in plasma epinephrine between groups. Secondary endpoints include p-norepinephrine, s-cortisol, s-ACTH, electrolytes, acid-base status. Intra cerebral pressure, oxygen saturation, temperature, and decrease in rSO<sub>2</sub>. Tissue ischemia is based on lactate, pyroate, glucose and glycerol dialysate values, and is considered when lactate levels exceed 15 mmol/L or glucose levels below 0.2 mmol/L.

**Results (preliminary):** Pilot studies have been conducted, results were not available at the time of submission of the abstract.

**Conclusions (discussion):** It is important to know the effects of a given therapy. The differences in stress-response and cerebral impact of different cooling methods need to be elucidated to provide the best care in the post resuscitation setting.

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## Paper No: 1236.0

### Inhibition of NF- $\kappa$ B by pyrrolidine dithiocarbamate attenuates sepsis-induced acute renal failure

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**Introduction:** Sepsis-caused multi-organ failure remains still a leading cause of death in patients of intensive care units with a mortality rate higher than 50% (1). Acute renal failure (ARF) is a critical complication of sepsis, because it clearly worsens the survival prognosis during sepsis (2). Pyrrolidine dithiocarbamate (PDTC), a well known inhibitor of Nuclear factor (NF)- $\kappa$ B, has been shown to attenuate the formation of proinflammatory cytokines, to prevent the development of systemic hypotension and to improve survival in endotoxemic animals.

**Objectives:** The present study was therefore undertaken to examine the effect of NF- $\kappa$ B inhibition on sepsis-induced ARF and on sepsis-induced downregulation of V2 receptor and AQP2 expression being essential transporting systems for adequate tubular function. Additionally, NF- $\kappa$ B may be an interesting target also for treating sepsis-induced ARF.

**Methods:** All animal experiments were performed according to the National Institutes of Health Guide for the Care and Use of Laboratory Animals and were approved by the local animal protection committee. In the present study, we examined the effect of PDTC on sepsis-induced downregulation of vasopressin V2 receptors and aquaporin (AQP)-2 channels using a cecal ligation and puncture (CLP) mouse model (C57/BL6 mice). Hemodynamic parameters and expression of vasopressin V2 receptors and aquaporin (AQP)-2 channels on the mRNA (rt-PCR) and protein (western blotting) level were examined.

**Results:** CLP caused a time-dependent downregulation of renal vasopressin V2 receptor and of AQP2 expression without alterations in plasma vasopressin levels. Renal activation of NF- $\kappa$ B in response to CLP was attenuated by PDTC pretreatment, which also attenuated the downregulation of V2 receptor and AQP2 expression. Furthermore, a strong nuclear staining for NF- $\kappa$ B throughout the whole kidney in response to CLP was observed. Additionally, PDTC pretreatment inhibited the CLP-induced increase in renal TNF- $\alpha$  and IL-1 $\alpha$  concentration and NOS-2 mRNA abundance. Moreover, PDTC pretreatment ameliorated CLP-induced hypotension and ARF demonstrated by increased urine output, renal perfusion and tubular reabsorption activity.

**Conclusion:** Our findings suggest that NF- $\kappa$ B activation is of utmost importance for the downregulation of AQP2 channel and vasopressin V2 receptor expression during

sepsis, being essentially involved in the pathogenesis of septic tubulal dysfunction. In addition, our data indicate that NF- $\kappa$ B inhibition ameliorates sepsis-induced ARF.

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## Paper No: 1245.0

### Brain dead: the value of brain perfusion scan

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**Introduction:** The concept of brain death appears in the second half of the twentieth century, when technological advances allowed for the maintenance of cardiorespiratory function in the absence of cerebral functioning 1. The determination requires the obligatory presence of several clinical criteria, which may implicate the extension of the time until confirmation. 2 Although the diagnosis is clinical, the role of complementary tests, namely the Brain Perfusion Scan (BPC), represents, in some cases, a way to remedy the confirmation, which would translate into an unquestionable benefit, particularly when it comes to organ transplantation. 1, 2

**Objective:** To analyze the importance of the BPC in the diagnosis of brain death with regard to two cases of patients, potential donors, with clinical criteria for brain death, but with positive findings for benzodiazepines.

**Method** A literature review based on a Medline. Keywords included the following: brain dead, brain perfusion scan, cerebral blood flow and organ donor. Search parameters were combined to find articles relevant for to the discussion of BPC in the evaluation of brain death.

**Results:** The BPC is a reliable and effective method in the confirmation of brain death, determining the absence of cerebral blood flow through the use of radiopharmaceuticals that are captured by the blood circulation or the blood brain tissue itself, and the result is easily interpreted objectively by an expert in nuclear medicine.<sup>1,2</sup> The patient should be stable, with normal ventilation parameters, and without biochemical disturbances.<sup>2</sup> It is indicated in cases of hypothermia, presence of depressing agents of the central nervous system or neuromuscular blocking agents in the circulation, severe facial trauma or as part of an institutional protocol. It does not induce changes in the potential for organ donation and the results are not affected by metabolic, toxic or

electrical interference. Also, head injuries are not counter-indicated. 1

**Discussion** The determination of brain death is of clinical nature, and arises from technical need consequent to the technological replacement of other organs, and there currently are unquestionable, reliable and reproducible criteria for its determination. In specific clinical situations, BPC minimizes the time until the definitive brain death diagnosis, allowing for a faster organ donation, with all the benefits that come with it.

**Conclusion** Although brain death remains a clinical determination, it is important to recognize that auxiliary techniques are often used to support the diagnosis, particularly when contradictory factors may delay or difficult clinical diagnosis.

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## Paper No: 1248.0

### The gradient between the oxygen saturation of the superior cava vein and the pulmonary artery (ÄSO2) may reflect myocardial oxygen metabolism during sepsis

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**Introduction:** A positive gradient between the oxygen saturation of the superior cava vein and pulmonary artery (ÄSO2) are associated with better outcomes in critical patients. This may correspond to a better cardiac metabolism this determines a reduction of the coronary sinus saturation. Understanding this, would determine its clinical use. Objective Analyze the ÄSO2 at different times in a septic animal model.

**Methods:** Twelve pigs were anesthetized and mechanically ventilated. In the Septic group (S) (n = 8) LPS from E. coli was given and then was treated with fluid resuscitation and vasopressor drugs. No intervention was made in the control group (SHAM). The measurements were obtained at baseline, 60, 120, 180 and 240 minutes. Blood flow in the left anterior descending artery (LADF), superior cava vein oxygen saturation (SscvO2), pulmonary artery oxygen saturation (SvO2), inferior cava vein oxygen saturation (SicvO2) and the coronary sinus oxygen saturation (ScsO2) were measured. The myocardial O2 extraction (EmO2) was calculated. Both groups were compared with (T test considered significant p < 0.05). Data are expressed as mean  $\pm$  SD.

**Results:** The  $\ddot{A}SO_2$  was different between both groups at 60 min ( $p = 0.024$ ), the S group decreased and was negative ( $-0.075 \pm 5$ ) the SHAM group increased ( $8 \pm 5$ ). Following that, the  $\ddot{A}SO_2$  in both groups it descended, however SHAM remained positive and the S stayed negative during the study. The  $SvO_2$  increased in group S after 180 ( $p = 0.02$ ) and 240 min ( $p = 0.05$ ). There were no differences in either the  $SicvO_2$  nor the  $SscvO_2$ . The  $ScsO_2$  showed a statistically limited difference at the 120 min ( $p = 0.057$ ) and 180 min ( $p = 0.058$ ). The LADF increased and was different at 180 min ( $p = 0.008$ ) and 240 min ( $p = 0.014$ ). The  $EmO_2$  decreased at the 120 min ( $p = 0.011$ ) and 180 min ( $p = 0.030$ ). The S group showed a fall in MAP and SVR. The GC did not differ.

**Conclusions:** The S group showed a decrease and inversion in  $\ddot{A}SO_2$ , due to an increase in the  $ScsO_2$ . Coronary flow is increased compared to baseline and SHAM group. Therefore, in the coronary circulation there would be a change in self-

regulation with increased coronary flow and decreased  $EmO_2$  which explains the change in  $ScsO_2$ . This pattern is similar to what occurs in the systemic circulation during shock. According to our results,  $\ddot{A}SO_2$  is a useful measure to assess changes in myocardial metabolism and coronary circulation during sepsis.

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## DRUG DEPOSITION

(The names of the authors presenting each paper are shown in bold type)

### Paper No: 328.00

#### Cardioprotective effects of short-term statins administration in diabetic rats

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**Introduction:** Diabetic patients have a higher incidence of cardiovascular diseases and are more prone to cardiac complications than non-diabetic individuals. The HMG-CoA reductase inhibitors (statins) are used extensively in the treatment of hyperlipidemia.<sup>1</sup> Statins have also demonstrated cardiovascular improvement in postoperative outcomes among patients taking them in the perioperative period<sup>2</sup> regardless of their cholesterol level. This improvement may be related to the pleiotropic effects of these drugs.<sup>3</sup> Although multiple clinical trials have demonstrated the beneficial effects of statin therapy for primary and secondary prevention of cardiovascular disease, the optimal time for administration of these drugs to improve postoperative outcomes is still unclear.

**Objectives:** To determine the optimal time of administration of statins that cardioprotective effects are obtained during the preoperative period in streptozotocin (STZ)-induced diabetic rats.

**Methods:** To evaluate the effect of statins on the cardiovascular system, echocardiographic evaluations were performed on STZ- diabetic rats treated with simvastatin (SV, 10 mg/kg/day); pravastatin (PV, 10 mg/kg/day); or atorvastatin (AV, 10 mg/kg/day). Untreated diabetic rats were used as controls. Diabetes was induced in male Sprague-Dawley rats by IP injection of streptozotocin (STZ, 65 mg/kg). Diabetic rats were used at four weeks after diabetes induction, and glucose levels were monitored once a week. Serial transthoracic echocardiographic evaluations

were performed in treated and untreated diabetic rats. Cardiac function was evaluated at 24-hour and 1 week after statin administration.

**Results:** A significant increase in ejection fraction was found after 24-hour administration of statins in the three groups (AV:  $57.67 \pm 10.47\%$ ; PV:  $51 \pm 8.44\%$ ; SV  $65 \pm 9.5\%$ ; N=4) when compared to non-treated diabetic rats ( $44 \pm 0.1\%$ , N=4). Cardiac output index (ml/min  $\times$  100 gBW) (AV:  $88.55 \pm 29.54$ ; PV:  $81.58 \pm 29.31$ ; SV:  $90.39 \pm 18.86$ ; N=4) and stroke volume (mL) (AV:  $0.63 \pm 0.23$ ; PV:  $0.58 \pm 0.17$ ; SV:  $0.60 \pm 0.16$ ; N=4) were also significantly increased compared with non-treated diabetic rats (COI:  $52 \pm 15.76$ ; Stroke Volume:  $0.31 \pm 0.03$  mL). No significant changes in heart rate were noted in any group. After one week administration of AV and SV, cardiovascular parameters were similar to those observed after 24-hour treatment. However, in the PV group, the beneficial effect was not maintained and ejection fraction and cardiac output index were similar to those in untreated-diabetic rats.

**Conclusions:** These results showed that cardioprotective effects of statins in diabetic rats are seen as early as 24 hours after administration of the drugs. The later may have positive clinical implications on diabetic patients during perioperative period.

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**Paper No: 362.00****Comparative Effects of Lipid Emulsion on the Recovery from Levobupivacaine-induced or from Ropivacaine-induced Cardiac Arrest in Rats****Masashi Yoshimoto, Takashi Horiguchi, Toshiaki Nishikawa and Yoshitsugu Tobe**

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**Introduction:** The infusion of lipid emulsions is a promising approach to treat local anesthetics-induced cardiac arrest. As the postulated mechanism of action, the so-called "lipid sink" effect, may depend on the lipophilicity of local anesthetics.

**Objectives:** To test the hypothesis that the lipophilicity of local anesthetics has a marked impact on the efficacy of lipid infusions to treat cardiac arrest induced by these drugs, we compared lipid resuscitation from levobupivacaine (high lipophilicity) and ropivacaine (low lipophilicity)-induced cardiac arrest in awake rats.

**Methods:** Twelve female SD rats anesthetized with sevoflurane were underwent tracheostomy and cannulated through the right femoral artery and vein. Two hours after discontinuation of sevoflurane inhalation, the rats received one of the two local anesthetics, levobupivacaine 0.25% (n=6), or ropivacaine 0.2% (n=6) at a rate of 2 mg/kg/min. We calculated the cumulative doses of local anesthetics required to induce the first seizure activity and pulse pressure of 0 mmHg. When pulse pressure decreased to zero, infusion of local anesthetics was stopped, and ventilation with 100% oxygen and chest compressions were begun immediately, along with intravenous treatment with 30% lipid emulsion (5 ml/kg bolus plus continuous infusion at 0.5 ml/kg/min). Chest compressions were continued until the native rate-pressure product increased by more than 20% of baseline. Electrocardiogram and arterial blood pressure were monitored continuously. Data were expressed as mean  $\pm$  SD. Statistical analysis were using Student-t test with Bonferroni correction, and  $P < 0.05$  was considered statistically significant.

**Results:** Baseline (before infusion of local anesthetics) arterial blood gas values, mean arterial blood pressure (MAP) and heart rate (HR) did not differ between groups. There were no significant differences between cumulative doses of levobupivacaine and ropivacaine that produced seizures and no pulse pressure. When pulse pressure decreased to 0 mmHg, MAP and HR did not differ between groups ( $6.8 \pm 1.3$  vs  $7.6 \pm 1.3$  mmHg,  $47 \pm 15$  vs  $40 \pm 25$  bpm, respectively). The values of MAP were higher in levobupivacaine group than ropivacaine group at 2, 3, 4, 5 and 10 min after the start of resuscitation. ( $22 \pm 6$  vs  $11 \pm 7$ ,  $31 \pm 5$  vs  $16 \pm 6$ ,  $38 \pm 13$  vs  $16 \pm 5$ ,  $54 \pm 32$  vs  $16 \pm 4$ ,  $184 \pm 15$  vs  $77 \pm 60$  mmHg, respectively) ( $P < 0.05$ ). The HR values were higher in

levobupivacaine group than ropivacaine group at 5 min after resuscitation. ( $302 \pm 84$  vs  $152 \pm 75$  bpm) ( $P < 0.05$ ).

**Conclusions:** Though there were no significant differences between cumulative doses of levobupivacaine and ropivacaine that produced seizures and cardiac arrest, lipid therapy was more effective in resuscitation from levobupivacaine-induced than ropivacaine-induced cardiac arrest.

**Paper No: 363.00****Residual Concentrations of Propofol in the Blood and Brain after Administration in Rats****Takashi Horiguchi, Toshiaki Nishikawa, Toko Masaki and Yoshitsugu Tobe**

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**Introduction:** Mechanism of postoperative cognitive dysfunction (POCD) is not well understood. Spatial memory is reported to be impaired after administration of inhaled anesthetics but not propofol in rats (1). We have also observed that sevoflurane remained in the brain more than 7 days after inhalation in rats (2).

**Objectives:** If residual anesthetics account for POCD, propofol would disappear from the brain sooner as compared with sevoflurane. To test this hypothesis, we measured propofol concentrations in the blood and brain after administration in rats.

**Methods:** After approval by the animal research committee, fifteen SD rats were anesthetized with propofol (10 mg/kg bolus plus continuous infusion at 1 mg/kg/min) for 2 hours. Five minutes, 1 and 2 days (n=5 in each group) after discontinuation of propofol infusion, blood samples were collected and brains were perfused with heparinized saline. We also observed control rats without anesthesia (n=3). The blood (1 mL) was placed into a vial containing saline (1 mL) and boric acid buffer solution (0.5 mL, pH=9). Mixture of chloroform and ethyl acetate (extraction solution, 0.5 mL), containing 10 ppm of thymol (an internal standard substance) was added. The blood-solvent mixture was poured into the Ultrafree-CL filter devices and was centrifuged. A 1  $\mu$ L sample of the extraction solution containing propofol and thymol was injected into the gas chromatograph-mass spectrometry (GCMS-QP2010 Plus, Shimadzu, Kyoto, Japan). The sampled brain was placed into a vial containing the mixture of 2M KCl and 2M NaOH (1 mL, pH=12.4) and was homogenized. All other protocols were identical to those in blood sample. The minimum detection limit is 0.2 ppm, and the concentrations of propofol were calculated as  $\mu$ g/g. Data were expressed as median (min, max).

**Results:** Propofol concentrations in the blood and brain after propofol anesthesia were 8.31 (6.79-9.14) and 10.98

(10.86-15.74)  $\mu\text{g/g}$  after 5 minutes, and 0.20 (0.19-0.22) and 0.94 (0.91-1.05)  $\mu\text{g/g}$  after 1 day, respectively. Propofol was not detected in both blood and brain 2 days after anesthesia as well as in the control rats. Propofol concentrations in the blood and brain 1 day after anesthesia were 2.4 and 8.6% of those of 5 min after anesthesia, respectively. The brain concentrations of propofol 5 min and 1 day after anesthesia were approximately 1.3 and 4.7 times of the corresponding blood concentrations, respectively.

**Conclusions:** Propofol disappeared in both blood and brain 2 days after propofol anesthesia. Our results indicate that subanesthetic concentration of anesthetics could be one of the causes of POCD.

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## Paper No: 505.00

### Effects of intra-operative sedation with low-doses of s-ketamine on depression: randomized double-blind controlled trial

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**Introduction:** The available antidepressants block neuronal reuptake of catecholamines, serotonin or both. They take weeks to produce full clinical effects, which suggest that the NMDA system may be involved in the pathophysiology of depression [1]. Ketamine, a non competitive antagonist acting at NMDA receptors, is reported to have a rapid onset of anti-depressive effects [2,3,4].

**Objective:** To investigate the effect of intra-operative sedation of S-ketamine on indices of depression. **METHOD:** 80 patients aged 60 to 83 years of age, selected for surgery under epidural anesthesia, were classified as depressed (D) or non-depressed (ND), according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) criteria, and randomized into two sub-groups D1, D2 and ND1, ND2. The sub-groups D1 and ND1 received S-ketamine and midazolam, while the groups D2 and ND2, received only midazolam. Sedation was titrated to achieve grade 3-4 of the Ramsay Sedation Scale. Depression was assessed using the Hamilton Depression Rating (HDR) Scale of 21 items, applied preoperatively and postoperatively.

**Results:** The mean HDR score decreased from the preoperative value of  $18.8 \pm 6.3$  to  $12.7 \pm 4.5$  on the second postoperative day in depressed patients who received S-ketamine+midazolam ( $P < 0.0001$ ). There were no significant differences between the non depressed groups.

**Discussion:** Racemic ketamine have clinical effects similar to the classic antidepressants, but with a quicker onset and a lasting effect [2,3,4]. We demonstrated that S-ketamine can improve depressed patients the same way. The modest doses of S-ketamine and the epidural anesthesia may have accounted for the absence of hypertension in all groups. No arrhythmias were found. The use of midazolam lowered the incidence of psychotomimetic effects [5], decreased the cardiovascular stimulating effects of ketamine on the systemic and pulmonary circulation [6,7] and allowed intra-operative sedation. Patients who suffer from depression appear to appreciate pain with greater acuity [8]. Actually, depressed patients felt more pain in the postoperative period than the non-depressed ones. Postoperative analgesic effects of S-ketamine are still under discussion [9,10], but they could potentially have improved depression. However depressed patients (D1) had a significant amelioration in the severity of their depression despite no significant differences in pain scores, from D2 group. Therefore we exclude the putative analgesic effects of S-ketamine as a cause for the improved postoperative depressed state of these patients.

**Conclusions:** Intra-operative sedation with low doses of S-ketamine has a beneficial effect on depressed patients.

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## Paper No: 599.00

### Physical stability of propofol-ketamine mixture

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**Introduction:** Administering propofol and ketamine mixed in the same syringe (propofol/ketamine) is gaining popularity for procedural sedation and analgesia

- (1) Ketofol is believed to provide both sedation and analgesia, with less unwanted side effects such as injection pain, and cardiovascular and respiratory depression due to the opposing effects of each drug.
- (2) However, propofol is formulated as an emulsion. Propofol's labeling cautions against mixing with other drugs prior to administration because of the potential instability of the emulsion. We have previously shown no visual and chemical incompatibility of the propofol-ketamine mixture.
- (3) However, a physicochemical compatibility study of propofol-lidocaine mixture suggests that the addition of lidocaine to propofol results in coalescence of oil droplets ( $\approx 5000$  nm) with potential risk of pulmonary embolism (4).

**Objective:** The purpose of this study is to detect change in the size of oil droplets in the propofol-ketamine mixture (1:1).

**Methods:** 20 ml of Propofol (1%, TEVA, North Wales, PA) and 2 ml of ketamine HCl (10%, Hospira, Lake Forest, IL) were mixed in 30 ml plastic syringe. Propofol alone was drawn up separately and used as control. Aliquots of the mixture were taken at different time-points (0, 60, 120, 240, 300, 360 minutes), and droplet size was measured. The droplet size was determined by photon correlation spectroscopy using Zetasizer Nano ZS Zen3600 (Malvern Instruments Inc., Westborough, MA, USA). The measurements were obtained using a He-Ne laser of 633 nm and the droplet size analysis data were evaluated using volume distribution.

**Results:** The mean oil droplets size of the mixture did not change significantly ( $\approx 200$  nm). See Figure 1.

**Conclusions:** The addition of ketamine to propofol did not result in significant change of the oil droplets size. The propofol-ketamine mixture used in clinical practice is stable and may not pose risk of pulmonary embolism.

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**Paper No: 875.00**

## Comparison of kinetics of acetated Ringers infusion analyzed by invasive, point of care and non invasive hemoglobin

Christer Svensen, Peter Rodhe and Jacob Broms

**Introduction:** Volume kinetics is a tool to better understand fluid distribution in the body. The method requires repetitive

invasive sampling of hemoglobin values for calculation of fluid kinetic parameters. This is not, however, clinically feasible. A non invasive device that could be used for analysis of hemoglobin would be useful.

**Objectives:** This study was undertaken to see whether a non-invasive device could replace invasive sampling of hemoglobin for kinetic calculations.

**Methods:** Twelve volunteers in a crossover study were subjected to a series of boluses of acetated Ringer solution (2,5 mL/kg, 5 minutes, 5 minutes steady state). The subjects went through two experiments, one normohydrated and one dehydrated. Venous invasive hemoglobin were analyzed (by a laboratory as well as by point-of-care, HemoCue on site) together with a non invasive hemoglobin analyzer (SpHb, Masimo Rainbow SET<sup>®</sup> Radical 7; Masimo Corp, USA). Probes used were R1-25. The experiment lasted for approximately three hours each. Hemodynamic monitoring was undertaken by non invasive cardiac stroke volume using a bio-impedance based noninvasive device (PhysioFlowTM). A total of 24 experiments were performed. Plasmadilution was calculated as follows: Plasma dilution (t) =  $\frac{([HbO]_{baseline} - [HbO]_{t})}{[HbO]_{baseline} - [HbO]_{t}}$  The infused fluid is thought to expand a single body fluid space called v (ml) which the body strives to maintain at the target volume V. Elimination of fluid occurs by baseline urinary excretion and evaporation,  $Cl_0$  (ml $\cdot$ min<sup>-1</sup>) and by dilution-dependent mechanism governed by a constant, Cl (ml $\cdot$ min<sup>-1</sup>). The kinetic data were further analyzed by a partition of the constants V, Cl and  $Cl_0$ , which were estimated during and after infusion for both the invasive as well SpHb data. This analysis was made by the use of MatLab (MatLab<sup>®</sup> 7.0.4.365 (R14), Mathworks, Inc, Natick, Massachusetts, U.S.A.). We used fminsearch (Nelder-Mead simplex method) to find initial estimates, and nlinfit (Levenberg-Marquardt algorithm) for the final estimation with error estimates. The differential equation was solved by ode45 (explicit Runge-Kutta).

**Results and Conclusions:** Preliminary results show that the non invasive data are accurate enough to allow kinetic calculations. There were no significant differences in the sizes of V, Cl and  $Cl_0$ .

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**Paper No: 1034.0**

## Subcutaneous Adipose Tissue and Serum Concentrations of Cefazolin in Morbidly Obese Patients Undergoing Laparoscopic Gastric Bypass Surgery

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**Introduction:** Morbidly obese patients are prone to surgical site infections [1,2]. To reduce the risk of infection, prophylactic antibiotics are administered before initial surgical incision to attain adequate levels of antibiotic in the bloodstream and tissues [3]. Cefazolin is commonly used as prophylaxis in adult surgery. For morbidly obese patients a standard dose of 2 grams is applied. Recently it was shown that unbound cefazolin serum concentrations in morbidly obese patients were higher than 1 ig/ml until at least 4 hours after dosing [4].

**Objectives:** This study evaluated cefazolin concentrations in both subcutaneous adipose tissue and serum in morbidly obese patients, as the penetration of cefazolin into subcutaneous adipose tissue in this patient group is unknown.

**Methods:** Eight morbidly obese patients with a median BMI of 47 kg/m<sup>2</sup> (range 41– 57 kg/m<sup>2</sup>) and median weight of 140 kg (range 107-175 kg) participated in the study. At induction of anesthesia, patients received cefazolin 2 gram i.v. Samples of unbound cefazolin concentrations in subcutaneous adipose tissue were taken using a microdialysis catheter which was placed in the subcutaneous tissue of the abdomen. The catheter exists of a semipermeable membrane through which solutes can diffuse and subcutaneous samples can be collected [5]. Microdialysis samples were collected every 20 minutes until 4 hours after dosing, serum samples were collected at T=0, 5, 10, 30, 60, 120 and 240 min. All samples were analyzed using high-performance liquid chromatography with UV detection.

**Results:** Mean unbound cefazolin concentrations in serum at 5 minutes after dose was  $53.3 \pm 14.3$  ig/ml. Mean cefazoline concentration in subcutaneous tissue at 10 and 30 minutes after dosing was  $18.8 \pm 9.4$  and  $26.7 \pm 12.6$  ig/ml, respectively. Subcutaneous cefazolin penetration, expressed as unbound cefazolin AUC<sub>tissue</sub>/AUC<sub>serum</sub> ratio (0-4 hours) was  $0.91 \pm 0.40$ . Until four hours after dosing, both unbound cefazolin concentrations in subcutaneous tissue and serum remained above 2.8 ig/ml (mean  $\pm$  SD:  $6.5 \pm 4.4$  ig/ml and  $5.1 \pm 2.0$  ig/ml, respectively) while the MIC<sub>90</sub> (minimal inhibitory concentration for 90% of methicillin sensitive isolates of *S. aureus*) for cefazolin in Europe is 1 ig/ml.

**Conclusions:** Cefazolin seems to penetrate well into subcutaneous adipose tissue in morbidly obese patients as unbound subcutaneous cefazolin exposure (AUC<sub>tissue</sub>) was found to correspond with unbound serum exposure (AUC<sub>serum</sub>). In morbidly obese patients, unbound subcutaneous cefazolin concentrations exceeded a MIC<sub>90</sub> of 1 ug/ml until four hours after dosing. Final dose recommendations for antibiotic prophylaxis however depend on local information on MIC<sub>90</sub>.

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## Paper No: 1195.0

### Comparison between sedative effects of propofol-fentanyl versus propofol-midazolam combinations in microlaryngeal surgeries

**Masih Ebrahimy Dehkordy and  
Sajad Razavi Siros Momenzadeh**

**Background and objectives:** Considering the growing trend of laryngeal surgeries and the need to protect the airway during and after surgery, among several therapeutic regimens to induce sedation, two regimens of propofol-fentanyl and propofol-midazolam were compared in microlaryngeal surgeries.

**Methods:** Forty ASA I-II class patients undergoing microlaryngeal surgeries and referring routinely for postoperative visits were randomly recruited into two groups. In all the patients, 0.5 mg/kg of propofol was used as bolus and then after 50 mcg/kg/min of the drug was infused intravenously. One group 0.03 mg/kg bolus of midazolam and in the other group, 2 mcg/kg bolus of fentanyl was administered in combination with propofol. Ramsay system was used in order to evaluate the effect of the two drugs in inducing sedation. The need for additional dose, blood pressure, heart rate, arterial blood oxygen saturation, and also recovery time and adverse effects such as nausea/vomiting and recalling intraoperative memories, were assessed.

**Results:** The patients in the two groups were not statistically different regarding number of patients, age, sex, preoperative vital signs, the need for additional doses of propofol, systolic blood pressure and mean systolic blood pressure during laryngoscopy. However, mean systolic blood pressure 1 minute after removal of laryngoscope returned faster to the baseline in midazolam group ( $P < 0.01$ ). Mean heart rate returned sooner to the baseline in fentanyl group following removal of stimulation. Besides, heart rate showed a more reduction following administration of fentanyl ( $P < 0.02$ ). Mean arterial blood oxygen saturation during laryngoscopy significantly decreased more in fentanyl



group ( $P < 0.05$ ). The time it took to achieve a full consciousness was shorter in midazolam group ( $P < 0.01$ ). Nausea/vomiting was significantly more prevalent in fentanyl group while the patients in midazolam group apparently experienced amnesia more ( $P < 0.01$ ).

**Conclusion:** Inducing laryngeal block and local anesthesia using propofol-midazolam regimen is not only associated

with a more rapid recovery and less recalling of unpleasant memories, but also better prevents from reduction of arterial oxygen saturation during laryngoscopy compared with propofol-fentanyl regimen.

**Keywords:** Sedation; Microlaryngeal surgery; Propofol; Midazolam; Fentanyl

## EQUIPMENT, MONITORING, AND ENGINEERING TECHNOLOGY

(The names of the authors presenting each paper are shown in bold type)

### Paper No: 8.00

#### **Nindex monitor performance vs. bispectral index (bis) in anesthesia for cardiac surgery in adult patients**

**Domingo Bianchi**

Servicio de Anestesiología Cirugía Cardíaca A.E.P.S.M.

**Purpose:** Monitors of depth of anesthesia use mathematical algorithms to transform the spontaneous or evoked brain electrical activity in numerical indices. These indices are in a scale from 0 to 100, and are correlated with the anesthetic depth. The purpose of this study is to evaluate the performance of the NINDEX monitor (Controles S.A. y Dr. D. Cibils, Uruguay) compared with the BIS monitor (Aspect Medical Systems, MA, USA), in adult patients undergoing anesthesia for cardiac surgery.

**Methods:** Monitorize the course of anesthesia with both monitors simultaneously, in 30 adult patients undergoing cardiac surgery. Most of them with cardiopulmonary bypass (CPB). The monitors are placed on patients forehead using adhesive electrodes, following the manufacturers recommendations. Numerical indices from the monitors are recorded while the patients are awake, and then during the induction and maintenance of the anesthesia all along the surgery. ANOVA test and curvilinear estimation are used to quantify the statistical significance.  $p < 0.05$  is considered significant, data are presented as mean  $\pm$  sd.

**Results:** The mean values found during the monitorization are:

BIS	93	49	47	50	47	48	49	50	52
NINDEX	98	57	50	56	53	53	52	55	61

While the patients are awake, values are: BIS =  $93 \pm 4$ , NINDEX =  $98 \pm 1.8$ . After induction of anesthesia, the values of both monitors are compatible with “general anesthesia”. Those values are: BIS 47–52, NINDEX 50–61. For superficial and deeper anesthesia both values tend to agree: BIS 54–59 and 40–43, NINDEX 61–72 and 40–48. NINDEX monitor

delay to show the first numerical index is  $84 \pm 16$  seconds larger than BIS monitor. The statistical correlation in both tests used shows a value of  $p = 0.0001$ .

**Conclusions:** The results found on the 30 patients using NINDEX monitor are very similar to the ones found using the BIS monitor. The data correlation is statistically significant. NINDEX monitor operating characteristics may offer additional benefits, such as disposable electrodes, wireless communication, and the ability to run it in a notebook or net book. This could reduce operating costs, which is of particular relevance for developing countries like Uruguay.

**Keywords:** monitoring of anesthesia; BIS; NINDEX

### Paper No: 10.00

#### **The accuracy of continuous noninvasive measurement of hemoglobin via pulse co-oximetry in patients undergoing knee arthroplasty**

**Raquel García Álvarez, Ane Abad Motos, David Stolle Dueñas, Lucio González Montero and Jose María Calvo Vecino**

HOSPITAL INFANTA LEONOR MADRID SPAIN

**Introduction:** Hemoglobin is one of the most frequently ordered laboratory measurements in patients, especially in surgery patients. A continuous and non invasive measurement of hemoglobin concentration would be a great advantage in clinical monitoring.

**Objectives:** The purpose of this study was to compare simultaneous measurements of hemoglobin using non-invasive pulse co-oximetry and invasive laboratory co-oximetry in subjects undergoing knee arthroplasty.

**Methods:** After approval of the local ethics committee and obtaining informed consent, a prospective clinical study in 31 patients undergoing knee arthroplasty was performed. Hemoglobin measured with non-invasive pulse co-oximetry (SpHb) (Masimo Radical-7<sup>®</sup>) and hemoglobin measured with invasive blood sample (Hb) were collected four times in each patient during and after surgery: 1) after initial monitoring, 2) one hour after tourniquet

release (TR), 3) three hours after TR and 4) six hours after TR. Accuracy (mean difference) and precision (standard deviation) were used to determine the measurement discrepancy.

**Results:** One hundred and twenty four data pairs were collected from a total of 31 patients (23 female, 8 male) with a median age of 76 years. Bland-Altman plots demonstrated good agreement between values obtained by the non invasive device compared with the gold standard. Hemoglobin measurements correlated well ( $r = 0.868$ )

**Conclusions:** Non-invasive co-oximetry provides clinically acceptable accuracy compared to laboratory co-oximetry in surgery patients. Our study shows its accuracy improves as time goes by.

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## Paper No: 13.00

### Local adherence to national peri-operative temperature monitoring guidelines

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**Introduction:** Temperature is normally maintained around 37°C by the body's thermoregulatory mechanism. Anaesthesia (GA & RA) impairs normal thermoregulation. Adverse effects of Hypothermia - Morbid cardiac events, Increased risk of wound infection, Coagulopathy, Pressure sores, Decreased drug metabolism, Shivering, Prolonged recovery & hospital stay. The NICE guidelines: The management of inadvertent perioperative hypothermia in adults. (NICE Clinical Guideline 29. London: National Institute for Health and Clinical Excellence), Hypothermia - core temp < 36°C should be measured and prevented in the Pre-operative phase - 1 hour before induction of anaesthesia Intra-operative phase - total anaesthetic time Post-operative phase - 24 hrs after entry into recovery area in the theatre suite

## Objectives:

- (1) The adherence of the current hospital practice of peri-operative temperature monitoring to the NICE Guidelines.
- (2) Local measures taken to prevent peri-operative hypothermia.
- (3) Local hospital incidence of Hypothermia

**Methods:** After Proforma design, data was collected prospectively over a 6 week period. Patients who were presenting for elective surgery were evaluated in the post-operative stage in the Post-operative recovery Unit.

**Results:** Data was collected on 88 (46 male & 42 female) elective patients. Temperature was recorded on 59 patients (67%); Pre-operative period - 28% were hypothermic on arrival from the ward (< 36 deg celcius). Only one patient had a blanket provided as recommended. Intra-operative 85% of the patients had a GA, while 8% RA, 1% had sedation only, 1% regional and sedation, 3% GA and local while 2% of the forms were incomplete. In 56% of cases the anaesthetic was more than 30 minutes duration. Of the patients who were preoperatively hypothermic, only 5 cases had intra-operative warming.

Post-operative In the recovery ward, 45% of the patients were hypothermic.

**Conclusion(s):** Temperature monitoring was not compliant with NICE guidelines. It is the joint responsibility of ward staff & the peri-operative team to ensure that temperature is maintained during the perioperative period. There is a need for a local, trust wide protocol aiming to prevent hypothermia and a need for regular re-audit

## Acknowledgements

Special thanks to the recovery staff for collecting the data.

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## Paper No: 14.00

### Case report of the early detection of potential aspiration through the nasogastric port of the igel supraglottic airway

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**Introduction:** Supraglottic airways are not definitive airways neither do they prevent of aspiration. The nasogastric port in the I-gel supraglottic airway not only aids in passing the nasogastric tube, but may also help in early detection of regurgitation & prevent aspiration

Case Report A 46 year old, otherwise fit & healthy, gentleman presented for an urgent lower limb orthopaedic procedure. He had been fasted for more than 24hours and the trauma had occurred 48hours prior to surgery. His only significant background was of moderate/severe alcohol consumption but no evidence of neuropathy.

GA was induced with Propofol 200mgs and Fentanyl 1200umgs. An LMA-Classic size 5 LMA was inserted with ease, and secured with tie. Adequate ventilation was confirmed with capnograph and bilateral chest movement. Anaesthesia was maintained with oxygen, air and sevoflurane. The patient was ventilated with pressure control ventilation at peak airway pressures of 14 at a RR of 12 achieving TV of 550mls.

On the theatre table, the LMA developed a leak around the airway, and machine bellows collapsed. Despite repositioning LMA, ventilation remained inadequate. Absence of bronchospasm was confirmed by auscultation. The airway was replaced with an I-gel airway size five, nothing untoward was noticed at replacement or on suction. This corrected the ventilation initially. But ventilation became difficult again and the patient's SpO<sub>2</sub> dropped to 94% from 99%. At this stage, (clear/yellow) fluid was seen in nasogastric port. The airway was removed; an emergency RSI was performed with Suxamethonium 100mgs and airway was secured with a size 8.0 oral endotracheal tube. The saturations improved to 98% on 40% FiO<sub>2</sub>. The rest of the operative period was uneventful.

At the end of surgery, the patient was extubated when fully awake and following verbal commands. The chest X-ray performed post-operatively was normal. Clinically the patient did not have any respiratory embarrassment with adequate gas exchange noted throughout the recovery period. Prophylactic postoperative physiotherapy was organised.

**Discussion:** The Igel airway provides a port, which aids the insertion of a nasogastric tube. In our case where the first evidence of potential aspiration was the regurgitate seen in the nasogastric port. This alerted us and immediate action was taken to secure a definite airway. By aiding the early detection of regurgitation, it prevented aspiration and subsequent consequences like potential ARDS. This case demonstrates, and supports evidence<sup>3</sup>, that the IGel offers a portal that the classic laryngeal mask airway doesn't possess, which allowed the early detection of potential aspiration.

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## Paper No: 18.00

### Respiratory mechanics changes on PCV for obesity patient underwent laparoscopic surgery

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**Introduction:** Among the various pressure control ventilation (PCV) systems, the Smart Vent Compensation System (SVCS) is automated to reach the set pressure at the fastest rate when the inspiratory flow rate (IFR) is not set and the operating pressure for PCV (PPCV:hPa) is set. In this study, with the use of this system, we compared and examined the effects of intra-abdominal pressure (IAP:hPa) during surgery for pneumoperitoneum by dividing the results of changes in PPCV, tidal volume (TV: ml), and thoracic-lung compliance (C: ml/hPa) between a group with a BMI of 25 or higher (Group O) and a group with a BMI of less than 25 (Group S). Method: Before starting this research we obtained written informed consent from the patients. The subjects comprised 40 scheduled cases of surgery for pneumoperitoneum with no lung complications of ASA1, and these cases were divided into 20 cases for Group O and 20 cases for Group S, wherein after the introduction of intubation, the TV and C were measured by changing the PPCV to 10E0 and the IAP to 0 and 8. Results: In Group O, TV significantly decreased from 430±230 to 370±100 and C significantly decreased from 31±12 to 26±6 as the pneumoperitoneum progressed. Furthermore, PPCV remained at 15±4 without any changes. In Group S, TV significantly decreased from 640±120 to 430±120 and C significantly decreased from 45±7 to 30±8 as the pneumoperitoneum progressed. Moreover, PPCV remained at 15±2 without any changes. There were significant differences in C and TV between Group O and Group S before pneumoperitoneum ( $p < 0.01$ ).

**Conclusions:** Conventionally, it has been reported that an obese patient has little changes of lung-thoracic compliance during pneumoperitoneum. However, the C decreased more in Group O than in Group S before pneumoperitoneum, and it was necessary to respond by changing the PPCV during pneumoperitoneum. Although the usefulness of PCV during pneumoperitoneum has already been reported, it was possible to control respiration effectively with an airway pressure lower than VCV even in the obese cases of this study, and it is possible to reduce both the effects on the cardiovascular system during surgery for



pneumoperitoneum and excess loads on the airway, thereby increasing the safety of respiratory management.

### Paper No: 43.00

#### Does near infrared spectroscopy provide an early warning of low haematocrit following the initiation of hypothermic cardiopulmonary bypass in cardiac surgery?

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**Introduction:** Near infrared spectroscopy (NIRS) may provide a transfusion trigger based on decreased regional cerebral oxygen saturation (rScO<sub>2</sub>), occurring in proportion to compensated or uncompensated blood loss, during cardiopulmonary bypass (CPB).

**Objectives:** This study investigated whether NIRS could warn a low haematocrit following the initiation of hypothermic CPB in cardiac surgery.

**Methods:** The study was prospectively conducted in patients undergoing cardiac surgery with hypothermic CPB using cardioplegic solutions. The rScO<sub>2</sub>, haemoglobin (Hb), haematocrit (Hct), and arterial partial pressures of carbon dioxide and oxygen recorded at 5 min after the initial administration of heparin for CPB were analyzed as before CPB values; and values recorded at 90 s after completion of the first cardioplegic solution injection, as after initiation of hypothermic CPB values. Mean systemic blood pressure and temperatures were also recorded.

**Results:** Immediately following initiation of hypothermic CPB, the rScO<sub>2</sub>, Hb, and Hct values were significantly decreased compared with those before CPB. Mean systemic blood pressure did not differ between before and after initiation of CPB. The temperature was significantly decreased after initiation of CPB. The change in the Hct ( $13.5 \pm 2.9\%$ ) between before and after initiation of hypothermic CPB was not significantly correlated with the change in the left ( $11.8 \pm 9.3\%$ ;  $r = 0.14$ ), right ( $14.1 \pm 9.1\%$ ;  $r = 0.13$ ) or mean rScO<sub>2</sub> ( $14.1 \pm 9.9\%$ ;  $r = 0.18$ ).

**Conclusion:** NIRS did not provide an early alert to a low Hct following the initiation of hypothermic CPB in cardiac surgery.

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### Paper No: 56.00

#### TCI System in Morbidly Obese Patients during Laparoscopic Bariatric Surgery under TCI Propofol & TCI Remifentanyl Anesthesia

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**Introduction:** Drug pharmacokinetics differ in obese compared with non-obese patients, depending on factors related both to obesity and the drug used. The distribution of drugs changes in obese patients although the volume of the central compartment (where drugs are first distributed) is not changed significantly by obesity. However, absolute body water content and lean body and adipose tissue mass are increased, affecting lipophilic and polar drug redistribution, and may lead to mistakes in the doses administered.

**Objectives:** Because obesity might affect pharmacokinetic parameters, the authors evaluated the predictive performance of target-controlled propofol infusion in morbidly obese patients by using an empirical formula suggested by Servin for the calculation of the infusion rate on a "Diprifusor" TCI system.

**Methods:** 420 morbidly obese patients aged  $45 \pm 15$  yrs (mean  $\pm$  SD, range 29–60) and weighing  $150 \pm 40$  kg (mean  $\pm$  SD, range 110–220) with a body mass index (BMI) of  $55 \pm 12$  kg/m<sup>2</sup> (mean  $\pm$  SD, range 35–80) and an ideal body weight (IBW) of  $70 \pm 8$  (mean  $\pm$  SD, range 55–86), ASA physical status II–III were studied during laparoscopic bariatric surgery. In all patients the weight used to set Diprifusor TCI system was established using an empirical formula suggested by Servin (corrected weight = ideal weight +  $[0.4 \times (\text{weight} - \text{ideal body weight})]$ ). The target plasma propofol concentration was initially set at 8.0 mcg/ml for two minutes then was reduced at 4.0 mcg/ml. This value was maintained constant for at least 20 min before collection of blood sample. This equilibration period allowed for complete equilibration between plasma and effect site concentrations of propofol. Intrasubject data analysed included calculation of performance error (PE %). Finally we studied the strength of the relationship between the blood concentrations obtained for individual patients and anthropometric characteristics of patients.

**Results:** All blood concentrations measured were below the predicted propofol concentrations with a mean performance error of 55%. Among anthropometric characteristics only the height of patients showed a strong association with propofol blood concentration measured.

**Conclusions:** Although the mean performance error of Diprifusor TCI system cannot be considered acceptable in morbidly obese patients, the strong association between propofol measured and patient's height must be considered in

further investigations to improve development of a new pharmacokinetic model.

## Paper No: 59.00

### Intraoperative electromyographic monitoring of cranial nerves V, VII, IX, X, XI and XII in posterior fossa surgery

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**Introduction:** Posterior fossa surgery is a high-risk intervention and complex surgical anaesthetic management. The main risks are intraoperative bleeding, air embolism and neurological sequelae. The resection of tumours near the brain stem can lead to injury of cranial nerves with significant neurological sequelae.

**Objectives:** The neurophysiological intraoperative monitoring techniques allow continuous monitoring of functional integrity of the nervous system during brain tumour resections. Intraoperative electrophysiological monitoring can prevent or minimize the injury of cranial nerves. From the standpoint of anaesthesia is necessary not to interfere with drugs on evoked potentials.

**Material and methods:** We report a 24-yr-old man, known to have a recurrent brain glioma. His previous neurological history included a glioma resection 20 years ago and facial palsy and residual left hemiparesis.

Anaesthesia was induced with propofol and remifentanyl intravenous. The tracheal intubation was facilitated by rocuronium. Monitoring consisted of pulse oximetry, ECG, invasive arterial pressure, BIS, central venous pressure by subclavian central line, and placement of oesophageal stethoscope for detecting air embolism. The prone position was chosen because of surgeon preference. Electrophysiological monitoring was performed with two electrodes type hook wise placed on right vocal cord to record the response of the X cranial nerve. It is also held the record EMG of muscles innervated by cranial nerves V, VII, IX, XI and XII.

Electrical stimulation is used to identify the neural structures at the beginning. Later, the objective is to verify the absence of nerve injury, through the registration of any change in amplitude, morphology and latency of motor responses.

**Results:** During the surgical procedure the tumour was partial removed. There were no postoperative complications.

**Conclusions:** EMG monitoring is a safe and effective tool for the identification and location of the cranial nerves. EMG monitoring is a helping to preserve neurological and anatomical function. Also, EMG monitoring helps to define the extent of tumour resection.

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## Paper No: 81.00

### The role of transesophageal echocardiography in critical ill patients underwent major surgery

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**Introduction:** The aim of this study was to evaluate the role of transesophageal echocardiography (TOE) in the management of critically ill patients who underwent major surgery. **Methods** From January 2005 to December 2008, 1714 patients underwent cardiac surgery; Out of the 1714 patients, 514 were in preoperative critical conditions assessed by Euroscore (mean 12.0%). TOE was performed on 308 pts (60.1%, group A) while on 206 pts (39.9%, group B) only preoperative TOE was performed. There were no differences in surgical procedure between the 2 groups. In group A, left and right ventricular functions were assessed by bidimensional (left ventricular ejection fraction) and M-MODE (tricuspid anular plan systolic excursion, TAPSE) TOE. Primary end-points analysed were low output syndrome (LOS), acute renal failure (ARF), acute respiratory failure (AResPF), ICU stay, hospital stay and intraoperative mortality. **Results** We observed low incidence statistically significant for all the end-points in group A vs group B (LOS: 8.1% vs 16.8%,  $p < .05$ ; IRA: 5.1% vs 8.9%,  $p < .05$ ; AResPF: 7.1% vs 13.9%,  $p < .05$ ; ICU stay: 2.7 days vs 5.0 days,  $p < .05$ ; hospital stay: 7.5 days vs 17.8 days,  $p < .05$ ; intraoperative mortality: 1% vs 4%,  $p < .05$ ).

**Conclusion:** Good results in group A were probably due to better management of intraoperative fluid administration,

inotropic use and dosage, operative time reduction. All these factors led to low incidence of morbidity, mortality, ICU and Hospital stay. These results strongly support the routine use of ETE in such critical areas as emergency unit, intensive care unit and in operative rooms of cardiac, thoracic and vascular surgery.

## Paper No: 93.00

### Acquisition of intubation skills with difficult airway devices. a comparison of airtraq® and levitan scopes in a manikin

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**Introduction:** Tracheal intubation failure, oesophageal intubations and repeat laryngoscopy remain leading causes of anaesthetic morbidity and mortality. Airtraq® and levitan laryngoscopes have been developed for the management of normal and difficult airways. Airtraq® has been shown to perform better than the Macintosh laryngoscope in different intubation scenarios. However literature comparing Airtraq® with levitan is limited.

**Objective:** To compare skill acquisition pattern and device performance with the Airtraq® and Levitan scopes for tracheal intubation in a manikin.

**Methods:** Trainee anaesthetists who had not previously used the devices performed seven consecutive tracheal intubations on a Cormack and Lehane 1 manikin using Airtraq® and Levitan devices. End points were time to successful tracheal intubation, number of attempts and number of oesophageal intubations. The stabilization attempt was defined as the attempt after which no further improvement was observed.

**Results:** Thirteen anaesthetist trainees participated in the study. Time to intubation was greater with Levitan during attempts 1, 2 and 3 and was not different between groups thereafter. The stabilisation point occurred at the fourth and fifth attempts for Airtraq® and Levitan respectively (Fig 1). There was no further difference in either group thereafter. All the trainees intubated the trachea with the Airtraq® on first attempt in comparison with 76.9% success rate with the levitan. There were eight oesophageal intubations with Levitan and none with Airtraq® ( $P = 0.011$ ).

**Conclusion:** Skill acquisition and performance time were faster with Airtraq®. Trainees achieved 100% successful intubation at first attempt with Airtraq® and was considered to be easier to use. Airtraq® may therefore offer an effective tool to achieve first time intubation success and reduce the incidence of misplaced tracheal tubes especially in difficult circumstances.

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## Paper No: 95.00

### Stroke Volume Variation and Cardiac Index measured by FloTrack system during hepatic surgery

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**Introduction and Objectives:** In our institution Vena Cava half occlusion (VCHO) and Pringle method are used to reduce surgical bleeding in liver surgery. We found that Stroke Volume Variation (SVV) is significantly correlated with CVP and both are significantly changed by VCHO and VCHO+the Pringle. We showed the optimal SVV for liver resection is 19–20% from the standpoint of blood loss. The aim of this study is to investigate the systemic circulation during liver surgery under these conditions.

**Material and Methods:** 35 patients who underwent liver resection were monitored by the FloTrac system. SVV, Cardiac Index (CI) and CVP were recorded during the Pringle, VCHO and VCHO+the Pringle. We measured the SVO<sub>2</sub> saturation in 14 patients at the same time.

**Results:** CI and SVO<sub>2</sub> were not changed by the Pringle. CI, however, was significantly changed by VCHO and VCHO+the Pringle as were SVV (11% to 20%) and CVP (9 mmHg to 6 mmHg). The CI minimum value 2.45 L/m<sup>2</sup> was recorded at the first VCHO+the Pringle. SVO<sub>2</sub> was also changed with CI but not significantly. SVO<sub>2</sub> were over 75% at the first to third VCHO+the Pringle and the minimum value was 72.9% at fourth VCHO +the Pringle.

**Discussion:** To reduce arterial bleeding, arterial and portal blood inflow to the liver is blocked by the Pringle, which does not affect CVP, SVV or CI. This indicates that systemic circulation is not interrupted by the Pringle. To reduce venous bleeding, blood outflow to a systemic circulation from the liver is increased by decreasing CVP. VCHO decreased CVP and affected SVV and CI. This indicates that systemic circulation is disturbed by VCHO. This effect was increased by adding the Pringle. In the goal of achieving systemic circulation of clinically ill patients, CI and SVO<sub>2</sub> are aimed over 2.5 L/mm<sup>2</sup> and 75%, respectively. Our data were less than the goal values. However SVO<sub>2</sub> under 75% was recorded only at 4th VCHO+Pringle. The goal values were gained quickly by release of the Pringle and then the lowered duration dose not lasting over 15 minutes. We conclude that in the optimal condition for blood loss of liver

surgery indicated by SVV the systemic circulation is maintained.

**Conclusion:** SVV and CI measured by FloTrack system are useful parameters for liver surgery.

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## Paper No: 113.00

### Evaluation of the airtraq and levitan laryngoscopes in simulated difficult laryngoscopy. a manikin study

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**Introduction:** Successful tracheal intubation may require a range of techniques or approaches in addition to conventional laryngoscopy each technique, while ultimately resulting in the placement of a cuffed tracheal tube in the larynx, has different skill requirements. Tracheal intubation failure, oesophageal intubations and repeat laryngoscopy remain leading causes of anaesthetic morbidity and mortality. Airway associated adverse outcomes in anaesthesia have lead to the concepts of difficult airway management. Airtraq® has been shown to perform better than the Macintosh laryngoscope in the simulated difficult and normal airways when used by experienced, inexperienced and even novice laryngoscopists. However literature comparing Airtraq® with levitan is limited.

**Objective:** To evaluate skill acquisition pattern and device performance of the Airtraq and Levitan scopes for endotracheal intubation in a simulated difficult airway in a manikin model.

**Methods:** After informed consent, trainee anaesthetists who had not previously used the devices performed ten consecutive tracheal intubations on a Cormack and Lehane III manikin using Airtraq and Levitan devices. End points were time to successful tracheal intubation, number of attempts, number of oesophageal intubations and dental damage. The stabilization attempt was defined as the attempt after which no further improvement was observed.

**Results:** Fifteen anaesthetist trainees participated in the study. Time to intubation was greater with Levitan than Airtraq during attempts 1, 2, 3 and 4 and was not different between groups thereafter. The duration of intubation attempts with Airtraq was significantly shorter both at the start and end of the protocol 27.9s vs 16.7s in comparison with Levitan 112.6s vs 28.2s. The stabilisation point occurred at the fifth and sixth attempts for Airtraq and Levitan respectively. There were twenty eight oesophageal intubations with Levitan and eight with Airtraq. Conclusion Trainees achieved more successful tracheal intubation, requiring less time to successfully intubate and recording less dental

damage and oesophageal intubations with Airtraq. Skill acquisition is more rapid and performance time was faster with Airtraq.

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## Paper No: 119.00

### The effects of fentanyl and esmolol on qt intervals and hemodynamic parameters according the different age groups during anesthesia

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**Introduction:** Anesthetic agents might possess arrhythmogenic or properties due to their effects on cardiac electrical activity and they have been shown to prolong the QT intervals. Advanced age is one of the most common identifiable preexisting factors for drug-induced prolonged QT intervals.

**Objective:** In this study, we investigated the QT interval and hemodynamic effects of fentanyl and esmolol in the different age groups during anesthesia.

**Methods:** Patients were divided as 20–39, 40–59 and over 60 years old based on their ages. Patients, classified as ASA physical status I and II were randomly divided nine different groups including control, fentanyl and esmolol and totally 135 patients were included the study. The premedication was administered by 0.1 mg/kg of midazolam. Electrocardiography for all patients was performed before induction, after induction, 60 minutes after intubation. The mean arterial pressure and heart rate were also measured at each time point. QT intervals were measured on all ECGs. QTc intervals were determined using the Bazett formula. The QT segment measures was done on ECG traces and QT interval restituted according ( $QTc = \frac{QT}{\sqrt{RR}}$ ). Anesthesia was induced with isoflurane inhalation and intravenous of thiopental sodium. In fentanyl group, 1  $\mu$ g/kg of fentanyl bolus was administered. Esmolol group received 1 mg/kg of esmolol bolus and 100  $\mu$ g/kg/min of esmolol infusion. The serum physiologic was administered in control group and infusion was stopped at the end of the extubation. In anesthesia maintenance, 1-2 % of isoflurane was applied with 50 % O<sub>2</sub> and 50 % N<sub>2</sub>O in both groups. Results Analysis of intragroup variations revealed that in esmolol group, QT and QTc intervals were significantly shorter than those in the fentanyl and control group at after induction ( $p < 0.05$ ) in all age groups. QTc duration measured at 60 minutes after intubation in fentanyl group was significantly longer compared with the esmolol



group ( $p < 0.05$ ) in all age groups. When intragroup mean arterial pressure variations were analyzed, it was observed in esmolol groups that mean arterial pressure at after induction, after intubation and during anesthesia was significantly lower compared with control groups. But mean arterial pressure was significantly lower compared with control groups in only elderly age groups in fentanyl group ( $p < 0.05$ ).

**Conclusions:** We concluded that esmolol can provide the hemodynamic and electrophysiological stability in all ages and fentanyl can provide only hemodynamic stability except young patients and it has no electrophysiological effect.

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## Paper No: 143.00

### It's possible to develop a tool for real time skills evaluation in life surgery?. initial security study

**Maria Jose Mayorga-Buiza**, Juan Emmerich, Antonio Ontanilla, Emilio Gomez-Gonzalez and Javier Marquez-Rivas

It's possible to develop a tool for real time skills evaluation in life surgery?. initial security study

**Background:** Probably the ideal of simulation is evaluation of competence in real life. However, few papers have been dedicated to assess the competence in real time and life surgery.

**Aim:** Develop and test the security and interest of a new evaluation concept of clinical skills based in augmented reality by multiparametric source integration in order to offer real-time assessment for anesthesiology in life surgery.

**Method:** We use own systems developed by SSPA and US for augmentation of reality. This patented system (SAGIQ) allow us recording, visualization and distribution of virtually all images and source data from OR. For initial testing we decide add elements that could evaluate better the skills needed to survey very complex surgeries: Inputs: Real time cameras over surgery room oriented to operating table, anesthesia machine and overall OR. In addition, video image from surgical field (microscope, endoscope or helmet microscope), neurophysiologic control, and machine anesthesia monitors was introduced in the system. Outputs: 1. Main surgical field, as decided by the surgeon, 2. Main monitor from anesthesia machine. 3. Combined imaged with all sources

selected Audio bi-directional lines. For initial evaluation two complex neurosurgery operations was selected: After induction anesthesia and indwelling catheters were in place, the surgery was conducted all time by a last year resident. No inside OR staff control was offered, but the outputs were redirected to a specially designed area for external control.

**Results:** The surgical procedures were uneventful. No complications or interferences with surgical devices were detected during the 14 h surgery time. The staff could assess in real time the decision-making process of the trainee and suggest changes or ask about decisions taken. No interferences with the surgeries were recorded by independent questioning to surgical team and nurses.

**Conclusion:** This preliminary report permits us to consider the possibility to understand the real life surgeries as simulations situations if technical conditions are provided.

## Paper No: 147.00

### Association between preoperative thromboelastography and mortality after liver transplantation

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**Introduction:** The coagulation monitoring during liver transplantation (LT) is of fundamental importance because the hemostatic balance of the patient is complex and excessive bleeding may compromise the result of the transplantation. Several studies have pointed out a discrepancy between the usual coagulation tests and bleeding in patients undergoing LT. Some authors believe that the use of thromboelastography (TEG) during LT is linked to the rational use of blood components, lowering costs and exposure to risks associated with blood transfusions. Despite the benefits of the use of thromboelastogram in LT, no study evaluated its impact on survival at five years of patients transplanted. The main objective of this study is to evaluate the association between preoperative TEG profile and survival, up to 5 years after the LT.

**Methods:** Upon approval by the hospital ethics committee, a cohort study was held, having as its inclusion criteria the patients undergoing orthotopic LT in the institution. The exclusion criteria were patients younger than 18 years, donor related transplantation, retransplantation, surgery for fulminant hepatitis and death during surgery or those occurred within the first 24 hours after the end of the operation. Quantitative variables were analyzed according to Levene's tests and Spearman correlation, whereas the qualitative ones according to the chi-square test. It was adopted the 5% significance level.

**Results:** A total of 113 patients were analyzed and 20 were excluded because did not fill the inclusion criteria. According to the thromboelastography profile, 45 patients (48.4%) showed hypocoagulable TEG, 14 (15.0%) a normal one and 34 (36.6%) hypercoagulable TEG. During the follow up, 22 patients (23.7%) died. Survival ranged from two to 1.495 days: 86% in 30 days, 82% in 1 year and 76% in 5 years. The hypocoagulable thromboelastography profile associated with a higher survival at 30 days (table 1). When the patients of hypercoagulable and normal profile are grouped, patients with hypocoagulable preoperative TEG show a higher survival, at 30 days and 5 years (table 2).

**Discussion:** Although it is known that changes in coagulation of liver diseases are highly complex, the hypocoagulable TEG showed to be a protective factor for mortality after LT. It is probable that patients with hypocoagulable TEG present a lower activation of the inflammatory system and a lower incidence of vascular thrombosis. However prospective, controlled, randomized and multicentre studies are necessary to confirm this hypothesis.

**Conclusion:** The preoperative hypocoagulable thromboelastogram was a protective mortality factor after liver transplantation.

**Paper No: 163.00**

## The use of mcgrath<sup>®</sup> mac for awake laryngoscopy and intubation in an obese patient with predicted difficult airway

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**Introduction:** Although awake fiberoptic intubation is the gold standard for difficult airway, there are recent reports of awake intubation facilitated by videolaryngoscopes. (1,2)

**Objective:** We present a case in which the McGrath<sup>®</sup> MAC (Aircraft Medical Limited, Edinburgh, UK) videolaryngoscope was used for awake intubation.

**Methods/results:** The patient was a 38-year old female planned for elective orthopaedic surgery. Her medical history included obesity (body mass index 36 kgm<sup>-2</sup>, body weight 89kg) and hypertension. Assessment of the airway indicated possible difficult intubation-she had a receding chin and short neck.

Awake intubation using the McGrath<sup>®</sup> MAC videolaryngoscope was planned. After the application of routine monitoring, oxygen was administered via a nasal cannula. Intravenous glycopyrrolate 0.2mg and midazolam 1.5mg were administered. Lignocaine gel 2%, 10 ml was gargled and lignocaine 10% was sprayed twice on the tongue and in the hypopharynx via an atomisation device (Long Flexi Nozzle, ENT Technologies, Victoria, Australia). Remifentanyl target controlled infusion at 2 ng/ml was commenced.

Laryngoscopy performed with minimal force and without cervical manipulation showed a Cormack and Lehane grade 1 view of the larynx. After 2 sprays of lignocaine 10% on the vocal cords, a 7.0 mm tracheal tube was passed through the larynx over a malleable stylet. There were no complications such as coughing, gagging or bleeding. Capnographic confirmation of successful tracheal intubation was followed by induction of anaesthesia.

In the postoperative period, she reported that although she could recall the intubation process, it was not unpleasant.

**Discussion:** As visualization of the glottis during videolaryngoscopy is not dependent on aligning the oral-pharyngeal-laryngeal axes, there is less airway and cervical manipulation.(4) This allows better patient tolerance and less cervical spine movements. These are obvious advantages in difficult airways or unstable cervical spines requiring awake intubations.

McGrath<sup>®</sup> Mac improves the grade of laryngoscopic view whilst using a conventional laryngoscopy technique. It allows viewing of glottis directly, similar to the traditional Macintosh or via the indirect camera view, thus reducing blind spots and risks of trauma. In the difficult intubations, the anterior image can reduce the possibility of blind tube insertion and obtain otherwise difficult views with little force.

**Conclusion:** MacGrath<sup>®</sup> MAC seems to be able to facilitate awake intubation well. More studies are needed to compare MacGrath<sup>®</sup> MAC videolaryngoscopy and flexible fiberoptic endoscopy for awake intubation so as to allow meaningful conclusions to be drawn.

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**Paper No: 182.00**

## Differences between cardio-q and uscom doppler cardiac output readings in high risk surgery patients

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**Introduction:** Doppler ultrasound measurement of cardiac output, and related parameters, is being promoted to guide goal directed fluid therapy in high risk surgery patients, as

part of enhanced surgical recovery. Two commercial devices are available: CardioQ (Deltex Medical, Chichester, England) and USCOM (USCOM Ltd, Sydney, Australia). They differ slightly in application, the CardioQ uses an oesophageal probe which detects flow in the descending aorta and the USCOM uses a suprasternal probe which detects flow at the aortic valve. Thus, differences exist in their measurements. In clinical practice these two devices are interchangeable, and as the reliability of clinical ultrasound is very patient-operator dependant, when data from one device is unreliable, the other may be used. Objective: To compare the performance of these two devices in high risk surgery patients.

**Methods:** In high-risk surgery patients paired CardioQ and USCOM cardiac output readings were made at regular intervals throughout surgery.

**Results:** Overall 71 (range: 5 to 17) data pairs were collected from 6 patients. Data was spread evenly across the range of cardiac outputs. Data in all cases showed good correlation ( $r = 0.88$  (range 0.64 to 0.98) ( $p < 0.001$ ). The slope of the regression line (mean(range)) was 0.83 (0.49 to 1.14) [x-axis representing CardioQ cardiac outputs and y-axis representing USCOM cardiac outputs], indicating differences in calibration between the two devices and patients. Furthermore, the regression lines did not pass through the origin cutting the y-axis at 1.2 L/min (range: 0.4 to 1.9), suggesting that the CardioQ under-read compared to the USCOM at low cardiac outputs, but over-read compared to the USCOM at high cardiac outputs. Bland & Altman analysis of all the data showed a mean(range) cardiac output of 5.7(2.5 to 9.4) L/min, bias of 0.0 L/min and wide limits of agreements (95% confidence intervals of the bias) of  $-3.3$  to  $+3.4$  L/min; partly due to the bias varying with cardiac output from  $+1.0$  L/min at low readings to  $-1.0$  L/min at high readings.

**Conclusions:** Both the CardioQ and USCOM were capable of trending changes in cardiac output during surgery. However, variations in calibration between patients existed. Also, an offset in readings between devices exists with the CardioQ under-reading at low values against USCOM, and vice versa. This may be explained by the different origins of the Doppler flow signal, as descending aorta flow used by the CardioQ is 70% of cardiac output and requires a correction factor that may vary during surgery.

## Paper No: 207.00

### Relationship of resistin, interleukin 6 and lipid profile to the extent of vessel disease determined by angiography in diabetes and ischemic heart disease (ihd) patients

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**Background:** Studies in animals have shown that hyperresistinemia impairs glucose tolerance and induces hepatic

insulin resistance in rodents, while mice deficient in resistin are protected from obesity-associated insulin resistance. Although assays for human resistin are in their infancy, but several small studies have reported that circulating resistin levels are increased in human obesity and diabetes.

**Aims:** To measure serum Resistin levels, Interleukin 6 (IL6) and lipid profile in, diabetic patients and non diabetic controls, with and without ischemic heart disease (IHD).

**Methods:** Patients between the ages of 50–70 years coming to angiography department for evaluation of their heart disease were divided into 2 groups i.e. patients with diabetes mellitus and those without diabetes. Each group was further divided into two groups of those having coronary heart disease and those without coronary heart disease, thus making 4 groups of patients i.e diabetes with IHD, diabetes without IHD, non diabetics with IHD and non diabetic without IHD who served as controls. The study was approved by ethical committee Ziauddin University and consent was taken from each patient. Fasting blood sample was taken and serum was stored at  $-70^{\circ}\text{C}$  for analysis. Diabetes mellitus was diagnosed if fasting blood sugar exceeds 110mg/dl and random blood sugar  $>140$  mg/dl. The extent of vessel block was determined by angiography in cases having ischemic heart disease while serum Resistin and Interleukin 6 were done using ELISA and lipid profile by standard kit method. Single two vessel and three vessel occlusions were included in the study. More than 50% of artery lumen occlusion were termed as Ischemic Heart Disease(IHD) Results: A total of 147 subjects were included in the study, while 13 subjects were dropped from the study due to other cardiac complications. They were divided into four groups of Non diabetic controls and diabetic patients and each group was further divided into those with coronary heart disease and those without heart disease (IHD). The relationship of circulating resistin and interleukin 6 was checked in IHD patients with and without diabetes. High circulating levels of resistin and IL6 were seen in IHD patients with and without diabetes as compared to the controls. Significant positive correlation was found between the resistin and interleukin-6 in patients having IHD without diabetes ( $r = 0.66$ ,  $p < 0.01$ ) and IHD with diabetes ( $r = 0.41$ ,  $p < 0.05$ ). Age and waist hip ratio of the four groups were comparable. The study also looked into the variation of resistin and interleukin-6 with the extent of coronary vessel disease and showed significant raise in interleukin 6 and resistin levels with the increase in number of affected vessels.

**Conclusions:** There was a significant increase in the levels of resistin and interleukin 6 in three vessel disease as compared to single vessel disease

## Paper No: 215.00

### Comparison of haemodynamic response to McCoy and Macintosh laryngoscopy

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Laryngoscopy and intubation causes changes in heart rate, hypertension and arrhythmias. In this study we compared the haemodynamic response with Macintosh laryngoscopy (ML) to that with Mc Coy laryngoscopy (McL) in patients requiring laryngoscopy and endotracheal intubation (LETI). 60 ASA I or II adult patients, scheduled for an elective procedure and requiring LETI were randomly allocated to either Macintosh or Mc Coy laryngoscopy group. Haemodynamic response was observed for 10 minutes after LETI. Anaesthesia was induced with fentanyl (2 µg/kg), thiopentone (5mg/kg) and atracurium (0.5mg/kg) in all patients. Total time taken for LETI was significantly less in ML (16.6±4.0s) than McL (22.8±4.1s) with a p-value of 0.000. Rise in HR was significantly greater in ML than that for McL immediately, 1, 2, 3, 4 and 5 minutes after LETI (p-value – 0.000, 0.000, 0.000, 0.003 and 0.003 respectively). A statistically significant difference in SBP was observed between the two study groups immediately after LETI, first, second, third and fourth minute after LETI with a p value of 0.000, 0.000, 0.001, 0.007 and 0.017 respectively. Comparison of the DBP in ML and McL groups showed statistically significant difference till four minutes after LETI (p-value 0.000, 0.001, 0.002, 0.001 and 0.013 respectively). Comparison of MBP between the two groups showed statistically significant difference immediately, one, two, three and four minutes after LETI (p-value 0.000, 0.000, 0.00, 0.002 and 0.006 respectively). PP comparison between the groups showed statistical significance only for the first two readings i.e. immediately after and one minute after LETI (p-value 0.011, 0.000). The results of our study concluded that the hemodynamic (heart rate and blood pressure) response to LETI with McCoy aryngoscope was significantly more stable than that with the Macintosh laryngoscope.

**Keywords:** Hemodynamic response; Laryngoscopy; Intubation; Macintosh; Mc Coy

**Paper No: 235.00**

## Relationship of cerebral oxygenation and oxygen transport in complex valve surgery

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**Introduction:** Complex valve surgery represents a high-risk cardiac intervention frequently accompanied by hemodynamic disorders and deterioration of oxygen transport [1]. In these patients, the extraction of O<sub>2</sub> by tissues may be severely disturbed, particularly following cardiopulmonary bypass (CPB) [2]. Thus, monitoring of oxygenation parameters may be of importance during operation and in early postoperative period. The continuous measurement of central venous (ScvO<sub>2</sub>) and cerebral (ScO<sub>2</sub>) oxygen saturation in cardiac surgery may be a valuable adjunct to

routine hemodynamics that can facilitate the achievement of a balance between oxygen delivery (DO<sub>2</sub>) and consumption (VO<sub>2</sub>) and attenuate cerebral hypoperfusion and organ dysfunction [3,4]. Combination of these parameters seems to be an attractive approach for the “global view” on systemic and cerebral oxygen delivery. However, the correlation of cerebral oxygenation and oxygen transport during complex valve surgery is still to be investigated.

**Objective:** The aim of our study was to assess the relationship between ScO<sub>2</sub> and parameters of oxygen transport during complex valve surgery.

**Methods:** We enrolled 12 patients who underwent elective complex valve replacement/repair (2 or more valves) with total intravenous anaesthesia (propofol/fentanyl). The depth of anaesthesia was maintained aiming at cerebral state index values within 30–40 (Danmeter, Radiometer, Denmark). All patients have received perioperative monitoring of ECG, SpO<sub>2</sub>, heart rate, arterial pressure (LifeScope, Nihon Kohden, Japan), cardiac index (CI), ScvO<sub>2</sub>, DO<sub>2</sub>, VO<sub>2</sub> (PiCCO<sub>2</sub>, Pulsion Medical Systems, Germany), ScO<sub>2</sub> (ForeSight, CAS Medical Systems, USA), blood gases, lactate, hemoglobin and glucose (ABL800Flex, Radiometer, Denmark). Cardiopulmonary bypass was performed in non-pulsatile mode with perfusion index of 2.5 l/min/m<sup>2</sup> using a standard roller-pump CPB-machine (Jostra HL 20, Maquet, Sweden). The hemodynamic measurements were performed after induction of anaesthesia, during CPB, at the end of surgery, and during 24 hrs postoperatively. The data were assessed by SPSS 15.0. The correlations were estimated using Spearman's r coefficient. A p < 0.05 was regarded as statistically significant.

**Results:** Cerebral oxygen saturation correlated with ScvO<sub>2</sub> and DO<sub>2</sub> after induction of anaesthesia, at 2, 18 and 24 ÷ hrs after operation (p < 0.05). During CPB, we found correlation of ScO<sub>2</sub> with arterial lactate (r = -0.6; p < 0.05) that might be explained by tissue hypoperfusion. During surgery and postoperatively, ScO<sub>2</sub> was not related significantly with CI, hemoglobin and PaO<sub>2</sub>.

**Conclusion:** In complex valve surgery and postoperatively, ScO<sub>2</sub> correlates with ScvO<sub>2</sub>, DO<sub>2</sub> and lactate, thus it can reflect decreased oxygen transport during perioperative period and hypoperfusion during CPB.

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**Paper No: 271.00****Non-invasive continuous blood pressure monitoring vs invasive blood pressure monitoring during vascular surgery****Valery Subbotin, Alexey Sitnikov, Alexey Bukarev and Anna Malakhova**

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**Introduction:** Continuous non-invasive arterial pressure (CNAP) monitoring is using over the last 25 years [1]. Different authors have contradictory opinions about accuracy of measurement and usability of this method for critically ill patients [2,3].

**Objectives:** Our study was designed to compare CNAP and invasive blood pressure during (IBP) vascular surgery.

**Methods:** Ten patients undergoing major vascular surgery were included. We compared systolic blood pressure only because this was a main characteristic that determines decision makes algorithm. All data collected by the Infinity Delta XL (Dräger Medical AG & Co. KG, Lübeck, Germany) simultaneously. Calibration time for CNAP was 15 minutes. Results. One hundred and seventy eight pairs of simultaneous CNAP and IBP measurements were compared. The range of IBP measurements was 77–220 mmHg for CNAP 56–179 mmHg. Correlation between IBP and CNAP was  $r = 0.83$  ( $p < 0.001$ ). Bias and 1.96 SD limit of agreement between invasive BP and CNAP measurements were respectively -13.7 and -12.0 to 39.4 mmHg. The percentage of unidirectional changes IBP and CNAP measurements were depended on time after calibration. There was 90, 80 and 73 for calibration period, 5 min and 10 min after calibration respectively. Infinity CNAP module cannot make a measurements during systolic IBP low 65 mmHg and has a big dispersion after 140 mmHg.

**Conclusions:** CNAP have a good correlation with IBP in the normal systolic blood pressure interval (70–140 mmHg). In spite of continuous BP monitoring by CNAP it cannot replace IBP monitoring during major vascular surgery because of substantial changes BP during this type of operation.

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**Paper No: 292.00****Continuous non-invasive perioperative monitoring of cardiac output by pulmonary capnotracking****Philip Peyton**

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**Introduction:** A number of technologies are available for minimally-invasive cardiac output measurement in patients during surgery. A growing body of research suggests that improvements in patient outcomes can be achieved with their use. However, the penetration of these devices into the routine haemodynamic management of patients undergoing major surgery remains limited. This may be due their cost and complexity.

**Objectives:** A novel system was developed based on CO<sub>2</sub> elimination (VCO<sub>2</sub>) by the lungs for use in ventilated patients, which can be fully integrated into a modern anaesthesia/monitoring platform, and provides automated, hands-free continuous breath-by-breath cardiac output monitoring. After initial testing in an animal model [1], the system was validated in patients during or after major surgery.

**Methods:** A prototype measurement system was constructed to measure VCO<sub>2</sub> and end-tidal CO<sub>2</sub> with each breath. A baseline measurement of non-shunt cardiac output was made during a brief change in ventilator rate and I:E ratio, according to the differential CO<sub>2</sub> approach [2–4]. Continuous breath-by-breath monitoring of cardiac output was then performed from measurement of VCO<sub>2</sub>, using a derivation of the Fick equation applied to pulmonary CO<sub>2</sub> elimination. Automated recalibration was done periodically or on command by the anaesthesiologist. Data was processed and cardiac output displayed in real time. Measurements were compared with simultaneous measurements by bolus thermodilution in 77 patients undergoing cardiac surgery or liver transplantation.

**Results:** Overall mean bias [standard deviation] for agreement in cardiac output measurement (capnotracking – thermodilution) was - 0.1 [1.2] L/min, with a percentage error of 44.2%,  $r = 0.92$ . The slope of the regression relationship was  $y = (0.9x + 0.41)$  L/min. Concordance in measurement of changes in cardiac output from baseline was 90.4%. The method followed sudden changes in cardiac output due to arrhythmias and run onto cardiopulmonary bypass in real time.

**Conclusions:** The accuracy and precision were comparable to other more invasive clinical techniques [5]. The method is seamless and fully automated and has potential for continuous, cardiac output monitoring in ventilated patients during anaesthesia and critical care.

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**Paper No: 294.00****Survey of condition of equipments of managers of airway in mazandaran province Hospital emergency Department, 2010****Yousef Mortazavi and Ebrahim Nasiri**

Department of anesthesia Babol and Mazandaran(Sari) university of medical sciences.

**Introduction:** In the situation that hamonō s life is at risk Hospital emergency Department should try to ward that factors off and save patients controlling and keeping airway open with proper equipments particularly for truma patients and emergency cases are of importance and lack of having access to facilities of airway can cause many problems, even it can increase deaths of paitients . The objective of this research was to Survey of condition of equipments of managers of airway in mazandaran province Hospital emergency Department, 2010.

**Methods:** In this descriptive study, Mazandaran province divided in to three zones: west, east and center and three cities were chosen from each zones randomly, and each Hospital emergency Department of these chosen cities were seen and surveyed by researchers in respect of equipments of managers of airway . The data gothered by questionnaire.

**Results:** Findings of this research shows us that in respect of necessary equipments of airway for emergency situations, there were defects in some of them as percent of presence of tracheal tubes in infants with 3.5–2.5 measure was 80 %, but the percent of presence of tracheal tubes in adults, with 7.5–6 was 95% which was approximately complete . Ambobage in adults one of the important equipments presence 98 % and oropharynx airway presence 99 % which was approximately complete. Therwerent any non nasopharynx Airway.The percent of presence of a good suction in strument for use was 86%.

**Conclusion:** Findings shows us that in the most areas which research was going on equigments of managers of airway has not been complete and it needs improvement and stitution of somethings is necessary.

**Keywords:** Equipments; Managers of airway; Hospital Emergency Department Department; Mazandaran province

**Paper No: 325.00****Relationship between bispectral index and auditory evoked potential index for propofol and midazolam during induction of general anesthesia****Atsushi Hashimoto and Yoshihiro Fujiwara**

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**Introduction:** Several monitors are used to prevent awareness during anesthesia. The bispectral index (BIS), derived from bispectral analysis of the electroencephalogram, has been used to monitor the depth of anesthesia. In particular, during propofol-induced hypnosis, it is highly predictive of depth of sedation. However it is reported that BIS is not an accurate measure of the depth of anesthesia when using midazolam and fentanyl (1). Whereas the auditory evoked potential index (aepEX) is derived from the middle latency auditory evoked potential. It is reported that the auditory evoked potentials is an effective tool for monitoring sedation induced by midazolam (2).

**Objectives:** We investigated the relationship between BIS and aepEX for propofol and midazolam during induction of general anesthesia.

**Methods:** After institutional approval and written informed consent was obtained, ten patients scheduled for lower abdominal surgery under general anesthesia@participated in this study. They were randomly divided into two groups, one group was received propofol infusion (Group P), and the other was received midazolam infusion (Group M). Before the drugs started, monitoring BIS and aepEX was started. Propofol and midazolam infusion were given until BIS or aepEX reached 35 at a rate of 10mg/kg/h and 0.3mg/kg/h, respectively. BIS and aepEX were simultaneously recorded and the relationship between two indices was evaluated.

**Results:** The relationship between BIS and aepEX indices was  $BIS = 1.25 \times aepEX + 8.32$  ( $R^2 = 0.58$ ) in group P, and  $BIS = 0.68 \times aepEX + 39.99$  ( $R^2 = 0.24$ ) in group M. The relationship between BIS and aepEX was more associated in group P than group M. BIS tended to be higher than aepEX in group M.

**Conclusion:** The aepEX may be better than BIS at distinguishing the depth of anesthesia during induction of general anesthesia with midazolam.

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**Paper No: 334.00****Cardiac output and spinal anesthesia: An echocardiographic study****Carolina Cabrera<sup>1</sup>, Miguel Hervé<sup>2</sup>, Jaime de la Maza<sup>3</sup>, Irini Semertzakis<sup>2</sup> and Marcela Labbé<sup>2</sup>**

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**Introduction:** Spinal anesthesia produces hemodynamic changes, like hypotension (described in up to 30% of patients) and bradycardia. The physiology of these changes has been studied years ago in experimental animal models

and humans. At present transthoracic echocardiography (TTE) can be a useful modern non-invasive monitor to study what happens to the cardiac output (CO) after a subarachnoid block in patients during real clinical practice.

**Objective:** To evaluate the performance of the CO with the use of TTE after the installation of a spinal anaesthesia.

**Methods:** ASA I patients proposed for surgery under spinal anaesthesia were prospectively studied. The basal CO was studied using the left paraesternal window where the diameter of the outflow tract of the left ventricle was measured and its area was calculated. Then, from the apical five-chamber window with continuous Doppler the velocity time integral from the outflow tract (VTI) was measured. Multiplying VTI by the area, the stroke volume (SV) was obtained, which again multiplied by the heart rate (HR), determined CO. After this basal examination, a spinal anaesthesia was started using a standardized mixture with Chirocaine 0.5% and fentanyl 20 micrograms in a volume between 2.5 and 3 ml. The same echocardiographic examination was performed to measure CO after verifying the installation of the spinal block.

**Results:** We studied 68 patients, in only 4 echocardiographic windows were not satisfactory. The average age was  $42.6 \pm 10$  years. All patients underwent surgery with spinal block. The block level was T6 achieved a 34.26% of the cases and 31.11% in T4. Variations in systolic, diastolic and heart rate had a statistically significant decrease. There was no significant difference in the GC before ( $4.41 \pm 0.34$  l min<sup>-1</sup>) and after spinal anaesthesia ( $4.22 \pm 0.36$  l min<sup>-1</sup>). Maximum height of sensory subarachnoid block was not correlated with the decrease in MAP and the echocardiographic parameters.

**Conclusions:** Spinal anaesthesia decreased hemodynamic parameters, but not the CO. The intraoperative use of transthoracic echocardiography allowed direct and real study of cardiovascular physiology and demonstrates that despite low blood pressure, and heart rate, CO tended to remain normal, probably because of offset by other mechanisms such as increased myocardial contractility and improvement diastolic function. In the future, the TTE may be a study tool to evaluate what happens with different anaesthetics and different types of patients like obstetric patients, patients having abnormal myocardium and hypertensive patients.

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## Paper No: 358.00

### The difficult airway trolley: an audit of das guidelines in 3 acute department across all hospitals in a uk school of anaesthesia

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**Introduction:** There is a huge range of equipment available to the anaesthetist to deal with both the anticipated and unanticipated difficult airway. However, without adequate and appropriate training, the use of such equipment might paradoxically put the patient at increased risk. The 4th National Audit Project (NAP4)[1] found that airway events on Intensive Care Unit (ICU) are likely to be more serious and result in permanent neurological damage or death. Following a critical incident in Scotland, the Fatal Accident Enquiry[2] recommended that equipment available on the difficult airway trolley should be rationalised and standardised.

**Objective:** We surveyed the theatres, Emergency Department (ED) and ICU of all hospitals in the Wessex Deanery with regarding the equipment stocked on their respective difficult airway trolleys against guidelines published by the Difficult Airway Society (DAS)[3].

**Methods:** A postal survey was sent to a named doctor in the three departments at all eight hospitals in the Wessex Deanery. A reminder letter was later sent to non-responders.

**Results:** The response rate was 100%. One of the ED surveyed did not have a difficult airway trolley but were in the process of setting it up. There was a high degree of variation across the departments and hospitals in the type of equipment stocked on the trolleys. Only two hospitals had identical equipment on their difficult airway trolley across the three departments.

**Conclusion:** Anaesthetic trainees and consultants are now expected to work in various departments providing acute care. Furthermore, UK trainees rotate through various hospitals within a region. NAP4 concluded that at least a quarter of major airway events occur in the ICU or ED and these are associated with particularly poor outcomes<sup>1</sup>. In particular, assessors judged airway management in ICU to be good less frequently compared to either anaesthesia or ED. They found that issues with the lack of equipment and appropriate training arose frequently and recommend that every difficult airway trolley should have the same content and layout in all departments within the hospital. Our survey highlights the considerable intra- and inter-hospital differences in a single school of anaesthesia in the UK.

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**Paper No: 368.00****Temporal Comparison of Ultrasound versus Auscultation and Capnography in Verification of Endotracheal Tube Placement in Obese Patients**

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**Introduction:** Ultrasound can be as fast as auscultation in verifying endotracheal intubation in a normal weight population.<sup>1</sup> Obesity has been reported to compromise the use of ultrasound.<sup>2</sup> We set out to evaluate the use of ultrasound to verify endotracheal intubation in obese patients.

**Objectives:** This study was designed to compare the time consumption of bilateral lung ultrasound with auscultation for verifying endotracheal intubation in the obese patient. We hypothesized that, in obese patients, verification of endotracheal intubation would be as fast with ultrasound as with auscultation.

**Methods:** A prospective, paired and investigator blinded study carried out in the operating theater. Twenty-four adult obese patients scheduled for gastric bypass surgery were enrolled. During intubation transtracheal ultrasound was performed to visualize passage of the endotracheal tube. During bag ventilation bilateral lung ultrasound was performed for detection of lungsliding as sign of ventilation simultaneous with capnography and auscultation of the epigastrium and the chest. Primary outcome measure was time difference to confirmed endotracheal intubation between ultrasound and auscultation alone. Secondary outcome measure was time difference between ultrasound and auscultation combined with capnography.

**Results:** Twenty-two patients were included and two were excluded. Median body mass index was 41.5 [IQR 39–45]. Both methods verified endotracheal tube placement in all patients. No significant difference was found between ultrasound compared with auscultation alone. Median time for ultrasound was 43 sec [IQR 40–51 sec] and for auscultation alone it was 47.5 sec [IQR 40–51 sec], with a mean difference of -0.3 sec in favor of ultrasound (95% CI -3.5–2.9 sec),  $p = 0.87$ . Comparing ultrasound with the combination of auscultation and capnography, there was a significant difference between the two methods. Median time for the combination of auscultation and capnography was 55 sec [IQR 46–65 sec], with a mean difference of -8.0 sec in favor of ultrasound (95% CI -9.4 -4.8 sec),  $p < 0.0001$ .

**Conclusion:** In obese patients verification of endotracheal tube placement with ultrasound can be as fast as auscultation alone, and faster than the standard method of auscultation and capnography.

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**Paper No: 381.00****Platelet function analysis after cardiopulmonary bypass in patients taking antiplatelet agents: a pilot study**

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**Introduction:** Transfusion of blood products is associated with significant morbidity and mortality (1,2). Cardiopulmonary bypass (CPB) however, detrimentally affects platelet structure and function, leading to increased blood loss and transfusion requirements(3,4).

ACC/AHA guidelines recommend stopping Aspirin and Clopidogrel prior to coronary artery bypass grafting (CABG) in order to reduce blood loss(5). However, many patients with left main stem disease and unstable angina are unable to safely discontinue antiplatelet therapy prior to surgery.

Platelets are transfused according to low platelet counts and clinical suspicion of poor function. Although thromboelastography parameters such as maximum amplitude are useful indicators of clot strength, they are not as sensitive with regard to platelet function as aggregometry (6).

**Objectives:** This prospective, blinded, pilot study was designed to assess the ability of a new platelet function analyzer (Multiplate, Verum Diagnostica GmbH) to predict transfusion requirements in on-pump CABG in patients continuing antiplatelet agents in the perioperative period.

**Methods:** 17 patients undergoing on-pump CABG while taking aspirin were included in the study. Anaesthesia was standardised to include equivalent doses of tranexamic acid and heparin. Multiplate analyses of arachidonic acid (ASPItest), thrombin receptor agonist (TRAPtest) and adenosine diphosphate (ADPtest) were performed at baseline and during chest closure. All clinicians involved in the patient's care were blinded to the results. Blood loss and transfusion requirements were recorded for 24 hours post-operatively.

**Results and discussion:** All patients were taking aspirin at least two days prior to surgery and this effect is confirmed by mean baseline ASPItest value of 39 (normal range 75–136) and explains the high proportion (59%) of patients receiving packed red blood cell (PRBC) transfusion. This inference is strengthened by the differing baseline ASPItest (31 vs 50,  $p = 0.08$ ) in the transfused and non-transfused groups.



Examining platelet transfusion requirement in isolation reveals an interesting trend. Patients requiring platelet transfusion (24%) have significantly lower TRAPtest (82 vs 137,  $p = 0.02$ ) and ADPtest (35 vs 60,  $p = 0.05$ ) values during chest closure compared to the non-platelet transfused group. **Conclusion:** This study demonstrates the efficacy of Multiplate in detecting reduced platelet function secondary to aspirin use as well as the quantitative trend between greater inhibition and PRBC requirement. We also demonstrate a significant association between two Multiplate modalities measured after CPB and peri-operative platelet transfusion requirement. We suggest further large scale study into the use of Multiplate analysis to predict the need for perioperative blood products, in patients undergoing CPB who are unable to stop antiplatelet agents.

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**Paper No: 382.00**

## Comparison of the macintosh, mccoys, airtraq® laryngoscopes and intubating lma in a simulated difficult airway with manual in-line stabilisation - a randomised crossover simulation study

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**Introduction:** Patients with multi-system trauma undergoing intubation with manual in-line stabilisation (MILS) have a higher incidence of difficult or failed intubations. The purpose of this study was to compare the effectiveness of the Macintosh laryngoscope with three other intubating devices in a high fidelity simulation model.

**Methods:** The study had local approval from the audit department and further formal ethical approval was not deemed necessary. Thirty-five anaesthetists performed oro-tracheal intubations on a Laerdal SimMan manikin in both a normal airway and a difficult airway scenario with MILS. The four devices utilised, in a randomised order, were the Macintosh, McCoy, Airtraq® laryngoscopes and the intubating Laryngeal Mask Airway (iLMA). The success rate of tracheal intubation, time to intubation, grade of laryngoscopy and force of intubation were measured. In a previous similar study, clinicians utilised a Macintosh laryngoscope in an easy airway scenario, with time taken for tracheal intubation found to be approximately 16 s, with a standard deviation of 5 s. We considered an absolute change of 25% in time taken to intubate to be important [1]. On this basis, an  $\alpha$  value of 0.05 and  $\beta$  value of 0.2, we calculated that 35 participants would be needed. Data analysis and comparison was made of the different intubating devices for each simulated scenario and not between the scenarios themselves.

**Results:** In the normal airway scenario, there was no difference in success rates and time to intubation between all four devices. In the difficult airway scenario there was no difference in success rates, but use of the Airtraq® was associated with a significant prolongation in the time to intubation, while the iLMA returned the fastest time ( $P < 0.0001$ ). The Airtraq® delivered the best glottic visualisation and lowest force of intubation in both scenarios ( $P < 0.0001$ ). Use of the McCoy was associated with a significant improvement in the glottic visualisation and force of intubation over the Macintosh ( $P < 0.0001$ ).

**Conclusions:** In this manikin study, the McCoy demonstrated some advantage over the Macintosh and may have a role as a primary intubating device in trauma patients with manual in-line stabilisation. The Airtraq® was associated with improved glottic visualisation and a lower force of laryngoscopy, which may make it useful as a secondary intubating device.

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**Paper No: 386.00**

## Proseal® lma for laparoscopic cholecystectomy: the experience in a tertiary hospital in the philippines

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**Introduction:** Laparoscopic cholecystectomy has, in recent years, been rapidly growing in popularity here in the Philippines. Seafarers who are found to have gallbladder stones,

symptomatic or otherwise, are prohibited to embark on their respective vessels for fear of the symptoms manifesting while on board. The Proseal<sup>®</sup> laryngeal mask airway was introduced to the hospital in the year 2007. It is an oropharyngeal airway that may be an alternative to the endotracheal tube, and has a separate tube that allows for the insertion of a gastric tube to empty gastric contents. There has been no local recommendation or consensus with the use of the Proseal LMA for laparoscopic cholecystectomy, and thus the reluctance of anesthesiologists to use it.

**Objective:** To describe the effects of the laryngeal mask airway among patients who underwent laparoscopic cholecystectomy.

**Methods:** The anesthesia records of all cases done at the operating room were reviewed from January 2007 to December 2010. Of these, cases of laparoscopic cholecystectomy were identified. Laparoscopic cholecystectomies done using the Proseal<sup>®</sup> LMA were then selected for this study. Outcome measures include patient weight, gender, ASA risk, length of procedure and length of hospital stay. When postoperative days were more than four, the charts were retrieved from the records department and scrutinized for the reason for the delay in discharge. Reasons for delays in discharge were noted.

**Results:** A total of 1,112 patients underwent laparoscopic cholecystectomy using Proseal LMA. The average age was 41.5 years, with a standard deviation of 9.6 years. The majority of patients were male (79.8% vs 20.2%). The average weight of patients was  $70.81 \pm 12.2$  kg. The average length of hospital stay was  $2.9 \pm 1.2$  days while duration of surgery was  $116.1 \pm 41.1$  minutes. Results show that the use of the Proseal LMA as the airway management of choice for laparoscopic cholecystectomy at the Seamen's Hospital has increased since its introduction in 2007. From 45% in 2007, the percentage has gone up to almost 90% in 2010. This may indicate the increasing confidence of anesthesiologists on the Proseal LMA on such procedures. No complications were seen with the use of the Proseal LMA.

**Conclusion:** The use of the Proseal LMA for laparoscopic cholecystectomy has gained popularity among anesthesiologists. This study also shows that it is safe. It may be recommended that the Proseal LMA may be used as an alternative to the endotracheal tube as the airway management of choice for laparoscopic cholecystectomy.

**Paper No: 414.00**

### Propofol consumption and narcotrend index during tci anaesthesia for laparoscopic cholecystectomy

Mirjana Kendrisic and Nikac Tomanovic

**Introduction and Objectives:** The following study examines the efficacy of the use of Narcotrend monitoring for defining the depth of anaesthesia and reduction of propofol

consumption during TCI anesthesia (target controlled infusions) in patients undergoing laparoscopic cholecystectomy.

**Methods:** After approval of the local ethics committee, 80 patients, aged  $52 \pm 7.8$  (ASA II-III) were included in this prospective, randomised, double blind study. Patients were divided into four groups of 20 patients (A1,A2,B1,B2). Blood-targeted Marsh model for propofol was used in groups A1 and A2. Effect-site Schnider model for propofol was used in groups B1 and B2. Anaesthetic induction was started with infusion of propofol (Marsh Vs. Schnider) and remifentanyl (Minto model) at target concentrations of  $6 \mu\text{g/ml}$  and  $6 \text{ ng/ml}$  respectively. After the loss of consciousness muscle relaxant rocuronium was administered  $0.6 \text{ mg/kg}$ . Following intubation, remifentanyl was reduced to  $3 \text{ ng/ml}$ . Propofol infusion was adjusted according to target values (Narcotrend index between 40–60) in groups A1 and B1 and according to clinical parameters in groups A2 and B2. Heart rate (HR), arterial pressure (MAP), respiratory rate, oxygen saturation, end tidal carbon dioxide and Narcotrend index were recorded. Statistics were analysed with the Chi-Squared test and Student's t test.

**Results:** A1 A2 B1 B2 p value Narcotrend index(induction)  $45 \pm 7$   $42 \pm 5$   $45 \pm 2$   $48 \pm 2$  NS Narcotrend index(maintenance)  $42 \pm 12$   $36 \pm 10$   $50 \pm 8$   $48 \pm 8$   $p < 0,05$  Propofol consumption-ind.(mg)  $152 \pm 22$   $166 \pm 24$   $98 \pm 12$   $88 \pm 14$   $p < 0,01$  Prop. consumption-maint. (mg)  $515 \pm 32$   $592 \pm 46$   $370 \pm 24$   $452 \pm 34$   $p < 0,05$  HR (bpm)  $62 \pm 14$   $70 \pm 12$   $78 \pm 12$   $76 \pm 16$   $p < 0,05$  MAP (mmHg)  $74 \pm 15$   $68 \pm 14$   $90 \pm 9$   $84 \pm 2$   $p < 0,01$ .

**Conclusions:** Narcotrend index was significantly lower and anaesthesia was deeper than expected in A2 group during maintenance. Propofol consumption was significantly lower in the Narcotrend guided groups when compared to standard practice. Cardiovascular stability was better in B1 and B2 group (Schnider model) during the induction and maintenance. Narcotrend guided Schnider model for propofol is the most effective in providing stabile depth of anaesthesia and reduces propofol consumption comparing to Marsh model for laparoscopic cholecystectomy.

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**Paper No: 445.00**

### Preliminary experiences of heart beat detector as a first mass monitoring equipment outside hospital

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**Introduction:** We cannot monitor heart rate outside hospital in mass casualties or in military context, which would be essential in detecting deteriorating patients needing instant treatment.

**Objectives:** Using single dispensable heart rate indicator to detect worsening condition of patients in field at military practice

**Methods:** Volunteers participating in main Military Field Operation tested SPEKTICOR. LED unit flashes green light, when heart rate is between 40–150 beats/min, and 2 red lights, when heart rate is below 40 /min or over 150 /min. Time to identify patients, whose condition demanded instant medical care, was observed in four different multiple patient situations in spot, in FAP (First Aid Post) and in ACP (Advanced Care Post) and during transportation in military field ambulance.

**Results:** detecting time for worsening condition was in Spektikor group only 2–6 seconds compared to 5–10 minutes in control group, even in forest surroundings.

**Conclusions:** Using Spektikor deteriorating condition of patients was observed markedly quicker than using conventional patient examination and follow up. This quick response time makes possible to start urgent medical care and treatment in time, and patient survival rate increases. Also control of many patients at the same time is possible, because Field Medic can actually see all patients with Spektikor at once, so all medical capacity can concentrate for patient in urgent need on therapy. There are no other single dispensable monitors available to help in triage, treatment and follow up of many patient situations. Tests confirmed, that this technology and Spektikor can be successfully used in field, where multiple patients must be taken care by minimal medical personnel, bringing monitoring onto field.

## Paper No: 446.00

### The universal anaesthesia machine - experience in 2 large uk centres

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**Introduction:** The Universal Anaesthesia Machine (UAM) is a recently introduced low cost anaesthetic machine designed to enable safe reliable anaesthesia in poorly resourced countries. The machine function is based on time tested principles and engineered using modern technology. It is straightforward to use and teach, using high flow oxygen from a concentrator, cylinder or piped supply in either continuous flow or drawover modes. We describe an early evaluation in adults and children in a district and university teaching hospital in the UK.

**Objectives:** As the first CE marked anaesthetic machine for use in developing countries, it was important to establish

its ease of use and dependability in a conventional, highly monitored setting for both adults and children across a broad spectrum of clinical practice.

**Methods:** A variety of adult and paediatric patients (age range 1 month to 92 years; weight 4 to 134kgs) were anaesthetised using the UAM. Basic information was logged; the study was observational and non interventional. The majority of patients were anaesthetised using a combination of oxygen, air or nitrous oxide and isoflurane. Evaluation forms were subsequently analysed by an independent observer.

**Results:** The UAM was used in a total of 261 cases, including 52 paediatric cases (age > 10 years), 6 of whom were infants or neonates. There were no cases of machine malfunction or untoward incidents. Cases ranged from short simple procedures to long complex cases lasting over 4 hours, with spontaneous breathing or hand ventilation, prone cases, complex patients (eg cardiac) and in infants using the Ayres T piece. The UAM was successfully used in 3 adult critical airway incidents. The bellows functioned well, with good movement and ease of use including in small children. The UAM was rated very positively, scoring above average for most criteria. Innate end expiratory pressure of approximately 5cm H<sub>2</sub>O during spontaneous ventilation is a feature, deemed beneficial by one evaluator, excessive by another. The draw-over vaporiser had some minor inconsequential inaccuracies in set versus measured inspired isoflurane.

**Conclusion:** The UAM is safe, reliable and versatile. Together with a comprehensive but simple educational training program, the UAM offers solutions for the delivery of safe anaesthesia in a variety of settings. Its options to function in both continuous and drawover modes, its ease of use and versatility for adult and paediatric use make it an attractive option for resource scarce settings.

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## Paper No: 463.00

### Assessing the newly developed grapid grip device compared with conventional methods

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**Introduction:** Anesthesia practitioners often encounter situations, such as intraoperative bleeding and anaphylactic shock in which they need to administer a large amount of fluid rapidly. Lately, a new transfusion line with a reservoir called grapid griph became available in Japan, however, there have never been any research done regarding the efficiency of the new device.

**Objectives:** The purpose of this study is to evaluate the efficiency of this newly developed line, in comparison with other conventional devices.

**Methods:** Fifteen residents, all of who had less than 1 year of anesthetic experience, participated in this study. All participants were asked to administer 250ml of normal saline into an empty bag by the following four different methods. Method A: participants were asked to administer fluid, using a 20 ml syringe and a conventional transfusion line Terufusion transfusion set<sup>®</sup> (Terumo, Tokyo, Japan). Method B: participants were asked to administer fluid, using a 20 ml syringe and a newly developed transfusion line SQ40s-RBYZ with grapid griph<sup>®</sup> (Pall, Tokyo, Japan). Method C: participants were asked to administer fluid by squeezing grapid griph of SQ40s-RBYZ. Method D: participants were asked to administer fluid by squeezing the fluid bag connected to terufusion transfusion set<sup>®</sup>. The primary outcome was the time taken to deliver 250 ml of normal saline and the secondary outcomes included time to fatigue and the fatigue score on a scale of 1 to 5.

**Results:** Average times taken to administer 250 ml of normal saline by Method A, B, C and D were 173s, 137s, 235s and 315s, respectively. It was significantly shorter with Method B, compared with the other three methods ( $p < 0.05$ ). On the other hand, Method D needed more time than the other three and this is statistically significant ( $p < 0.05$ ). Time to fatigue was the longest with Method B and the shortest with Method C at 101s and 70s, respectively. Method D showed the highest fatigue score.

**Conclusions:** The present study suggests the conventional way of rapid fluid administration with 20 ml syringe and SQ40s-RBYZ transfusion set was the most efficient. Although grapid griph of SQ40s-RBYZ functioned as a reservoir and facilitated drawing of fluid by syringe, fluid administration by squeezing grapid griph turned out to be less efficient. This is due to the fact that the reservoir of grapid griph takes longer to fill up and needs more physical strength than the other three methods. Bag squeezing, on the other hand, proved to be the least efficient, which is contrary to what many anesthesiologists have believed. In summary, fluid administration with 20ml syringe and SQ40s-RBYZ is the method of choice and bag squeezing is not recommended when administering fluid rapidly.

## Paper No: 480.00

### Use of PVI for Guidance of Fluid Management during Major Abdominal Surgery

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**Introduction:** The validity of 'dynamic' preload parameters such as stroke volume variation or pulse pressure variation to predict volume responsiveness in patients under controlled positive pressure ventilation has been previously reported. [1]. These parameters can add to the guidance of intraoperative fluid management and improve clinical decision-making. Recently, Pleth Variability Index (PVI) – obtained noninvasively from a pulse oximeter's plethysmographic waveform – was commercially introduced [2]. According to the manufacturer, PVI is derived automatically from the changes in the perfusion index over the respiratory cycle.

**Objectives:** We studied the ability of PVI to predict fluid responsiveness in the setting of major abdominal surgery.

**Methods:** Twenty consecutive patients were connected to a Radical-7 Pulse CO-Oximeter with PVI through an adhesive finger sensor (Masimo Corp., USA). Hemodynamic parameters such as stroke volume and corrected flow time were measured by an esophageal doppler device (CardioQ<sup>TM</sup>, Deltex Medical, USA). In case of suspected hypovolemia (corrected flow time  $< 350$  ms) a 250 ml colloid bolus (6% Hydroxyethyl Starch, 130/0.4) was administered. Study parameters (PVI and hemodynamic variables) were recorded before and 10 minutes after completion of fluid bolus administration. A positive fluid response was defined as an increase in stroke volume of 15% [1] to the first fluid bolus.

**Results:** The response to the first fluid bolus was studied in 10 female and 10 male patients with median age of 48 years (range: 41 – 67 years), and mean ( $\pm$  SD) BMI of  $26.2 \text{ kg/m}^2$  ( $\pm 5.6 \text{ kg/m}^2$ ). The mean ( $\pm$  SD) duration of surgery was 247 min ( $\pm 102$  min). A positive fluid response was noted in 11 of 20 patients. PVI achieved an area under the receiver operating characteristic (ROC) curve of 0.67. A cut-off point for PVI (maximising sensitivity and specificity) for the prediction of fluid responsiveness was found to be  $\geq 8.0\%$  (sensitivity: 100 %; specificity: 44 %; positive predictive value: 69 %; and negative predictive value: 100 %).

**Conclusion:** In the setting of major abdominal surgery, PVI may serve as useful tool for guiding intraoperative fluid management.

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**Paper No: 544.00****Assessment of the hemodynamic and cerebral oximetry response to phenylephrine using the lidcorapid and invos cerebral oximeter in high risk surgical patients****David Green, Audrey Tan and Buzz Shepard**

Department of Anaesthetics, Intensive Care and Pain

**Introduction:** Phenylephrine (P) is a commonly used vaso-active drug for treatment of hypotensive episodes during general anaesthesia (GA). Since mean blood pressure (MBP) is the product of cardiac output (CO) and systemic vascular resistance (SVR) it is essential to assess the contribution of each of these parameters to MBP increase as studies suggested the increase in MBP was associated with a decrease in CO and reduction in cerebral oxygenation<sup>2</sup>, which in itself may predict poor outcome<sup>3</sup>.

**Objectives:** To quantify the relative contribution of CO and SVR to MBP increase using the LiDCOrapid (LR) and associated changes in cerebral oxygenation (rSO<sub>2</sub>) using the InVos cerebral oximeter, (ICO) Covidien USA).

**Methods:** The LR (which measures CO) and the ICO, which measures changes in rSO<sub>2</sub> allow assessment of the contribution of SVR and CO to MBP change and the effects of P on cerebral oxygenation. 22 high risk patients undergoing major vascular surgery were studied where P was required to treat hypotension. P was given in a starting dose of 0.1 mg iv followed by an infusion. Percentage change in MBP, stroke volume (SV) and stroke volume variation (SVV), SVR and CO were calculated and change in rSO<sub>2</sub> value, pre and post treatment of hypotension was recorded.

**Results.** Demography 22 pts, age 69 (46–87), wt. 80 (48–106), ASA 3 (2–4), Duration 4.4 (2.8–6.9). Haemodynamic response (mean and range) initial MBP 59mmHg (43 to 86), increase MBP % 52 (8 to 109)  $p = 0.0001$ , increase in SVR % 26 (0 to 79), increase in SV % 35 (3 to 86)  $p = 0.0002$ , correlation increase in MBP and increase in SV ( $r = .62$   $p = 0.002$ ). Correlation between start SVV and inc. in SV ( $r = .52$   $p = 0.01$ ). There were minimal changes in heart rate. Effect of P on rSO<sub>2</sub> Mean starting rSO<sub>2</sub> % 59 (72 to 49), mean post P rSO<sub>2</sub> % 59 (77 to 37), mean % change -1 (8 to -18)

**Discussion:** P caused a significant increase in SV/CO. We did not see the reduction in CO nor the consistent reduction in rSO<sub>2</sub> seen with P in a previous study<sup>2</sup>. The effect of P on rSO<sub>2</sub> was variable but overall the effect was minimal. P had a greater effect on SV increase if SVV was high suggesting effects on venous and arteriolar tone.

**Conclusion:** P produced consistent increases in MBP and CO but may be associated with reduced rSO<sub>2</sub> in some patients.

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**Paper No: 545.00****Assessment of the hemodynamic effects of phenylephrine versus metaraminol for correction of anaesthesia induced hypotension using the lidcorapid****David Green, Audrey Tan and Buzz Shepard**Department of Anaesthetics, Intensive Care and Pain Eric Mills  
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**Introduction:** Drugs used to treat anaesthesia induced hypotension include metaraminol (M) and phenylephrine (P). P increases mean blood pressure (MBP) but its effect on stroke volume (SV), cardiac output (CO) and systemic vascular resistance (SVR) is controversial<sup>1–3</sup>. The effect on SV/CO with M during general anaesthesia (GA) has not been studied.

**Objectives:** To assess the relative contribution of SV/CO and SVR to the increase in MBP with P and M using the LiDCOrapid (LR, LiDCO Ltd, Cambridge, UK).

**Methods.** We retrospectively analysed data from 22 patients (P) and 9 patients (M) where either drug was used to restore MBP. P and M were given i.v. (100 – 200ug) followed by an infusion as required. Percentage change in MBP, stroke volume variation (SVV), SVR and SV were calculated.

**Results.** Demography (mean and range) P group 22 pts, age 69 (46–87), wt. 80 (48–106), ASA 3 (2–4), Duration 4.4 (2.8–6.9). M group 9 pts, age 59 (32–78), wt. 90 (54–136), ASA 3 (1–4), Duration 4 (1–7.3) Haemodynamic response PM starting MBP 59 (43 to 86) 51 (41 to 57) increase MBP % 52 (8 to 109)  $p = 0.0001$  47 (20 to 92)  $p = 0.0001$  increase in SVR % 26 (0 to 79) 55 (20 to 102)  $p = 0.02$  vs P increase in SV % 35 (3 to 86)  $p = 0.0002$  3 (-23 to 47) ns.  $p = 0.5$  corr inc in MBP and inc in SV  $r = .62$   $p = 0.002$  ns  $p = 0.15$  corr between start SVV and inc. in SV  $r = .52$   $p = 0.01$   $r = .3$   $p = 0.05$  All  $p$  values are versus control reading except where indicated. The effect on HR in the doses used was negligible.

**Discussion.** P, but not M, caused a significant increase in SV/CO. The increase in MBP with M was mainly due to SVR increase which was significantly greater than with P. We did not see the reduction in CO seen with P in previous studies<sup>1,2</sup>. Both P and M increased MBP and SV more if SVV was high (P better than M) suggesting effects on venous and arteriolar tone. The increase in SVR seen with M suggests a more marked effect on arteriolar tone.

**Conclusion.** The less beneficial effect on SV/CO of M versus P suggests that M should be re-considered as a front line agent in the treatment of hypotensive episodes under anaesthesia until a formal RCT using the LR has been conducted.

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## Paper No: 581.00

### Clinical evaluation of closed-loop controlled propofol infusion in children

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**Introduction:** Although target controlled infusion (TCI) for general anesthesia in adults is widely accepted, its use in children is limited, due to the debated validity of pediatric pharmacokinetic (PK) and pharmacodynamic (PD) models and the large interpatient variability of PK/PD behaviour in children [1]. In closed-loop controlled systems, a measure of the clinical effect is used for feedback to adjust drug infusion. This is expected to improve stability of the depth of anesthesia, reduce the effect of interpatient variability and reduce drug overdosing.

**Objectives:** To clinically evaluate, in a pilot study, closed-loop controlled propofol anesthesia in children and to demonstrate that the closed-loop system can 1) automate induction of anesthesia while maintaining spontaneous breathing, 2) provide adequate maintenance of anesthesia for moderately painful procedures, 3) accommodate the interpatient variability in the sensitivity to the effect of propofol observed in children.

**Methods:** Following REB approval, and informed consent/assent, twenty children aged 6–15 ( $12y \pm 3$ ,  $45kg \pm 13$ ,  $154cm \pm 16$ ), ASA I–II, requiring anesthesia for elective upper or lower gastrointestinal endoscopic investigations were enrolled. A robust proportional-integral-derivative (PID) controller [2] was designed for the pediatric population. The WAVcns measure of the depth of hypnosis [3] was used for feedback. Propofol infusion was continuously adjusted using the Alaris TIVA infusion device. Induction and maintenance of anesthesia were closed-loop controlled, infusion was

stopped for emergence. Remifentanyl was administered as a bolus ( $0.5 \text{ mcg/kg}$ ) followed by continuous infusion ( $0.03 \text{ mcg/kg/min}$ ).

**Results:** The WAVcns index first passed below 60 on average (SD)  $4\text{min}20\text{s} (\pm 79\text{s})$  after the start of induction of anesthesia, and decreased to mean (SD)  $38 (\pm 5)$ . Spontaneous breathing was maintained for all subjects. During maintenance of anesthesia, the WAVcns was within 10 units of the setpoint for median (range) 89% (22–100%) of the time. The predicted plasma concentration, using the Paedfusor model [4], when the WAVcns first crossed 60 varied between 1.75 and  $5.93 \text{ mcg/ml}$ . The peak concentration during maintenance of anesthesia (WAVcns setpoint of 50) varied between 3.10 and  $6.75 \text{ mcg/ml}$ . The predicted concentrations continued to decline during the cases despite a stable setpoint.

**Conclusions:** Adequate depth of hypnosis can be provided by closed-loop control of propofol anesthesia in children. This study confirms the large interpatient variability previously found in PK/PD studies in children. This variability makes the development of TCI for children a challenging undertaking. The evaluated closed-loop system reduces the effect of interpatient variability. In future work, the controller performance will be optimized.

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## Paper No: 616.00

### Cerebral oxygen saturation monitoring during laparoscopic surgery under sevoflurane anesthesia: jugular bulb oxygen saturation versus near-infrared spectroscopy

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**Introduction:** The introduction of Trendelenburg position and pneumoperitoneum during laparoscopic surgery has the potential to cause significant cerebral hemodynamic changes. Jugular bulb oxygen saturation ( $\text{SjvO}_2$ ) is a useful indicator

of cerebral blood flow, since it reflects the relationship between global cerebral oxygen supply and demand. However, jugular bulb catheterization is an invasive procedure and has inherent potential complications. Near-infrared spectroscopy is a monitoring device for non-invasive assessment of regional cerebral oxygen saturation (rSO<sub>2</sub>). To our knowledge, the relationship between SjvO<sub>2</sub> and rSO<sub>2</sub> in the Trendelenburg-pneumoperitoneum condition has not been investigated.

**Objectives:** In this study, we hypothesized that rSO<sub>2</sub> could reflect SjvO<sub>2</sub> in the Trendelenburg position under pneumoperitoneum. Therefore, we evaluated the relationship between SjvO<sub>2</sub> and rSO<sub>2</sub> during laparoscopic surgery.

**Methods:** Thirty-five consecutive male patients undergoing laparoscopic radical prostatectomy were enrolled prospectively. Anesthesia was maintained with sevoflurane 1.5–2.0 vol.% and remifentanyl 0.1–0.2 µg/kg/min. The depth of anesthesia was monitored continuously with a bispectral index score monitor. After induction of anesthesia, mechanical ventilation was adjusted to increase PaCO<sub>2</sub> from 35 to 45 mmHg in the supine position, and the changes in SjvO<sub>2</sub> and rSO<sub>2</sub> were measured. Then, after establishment of pneumoperitoneum and Trendelenburg position, the CO<sub>2</sub> step and measurements were repeated. The changes in SjvO<sub>2</sub> (rSO<sub>2</sub>)-CO<sub>2</sub> reactivity were compared in the supine position and Trendelenburg-pneumoperitoneum condition, respectively.

**Results:** We detected a little correlation between SjvO<sub>2</sub> and rSO<sub>2</sub> in the supine position (concordance correlation coefficient = 0.2819). Bland-Altman plots showed a mean bias of 8.4% with a limit of agreement of 21.6% and -4.7%. Also, SjvO<sub>2</sub> and rSO<sub>2</sub> were not correlated during Trendelenburg-pneumoperitoneum condition (concordance correlation coefficient = 0.3657). Bland-Altman plots showed a mean bias of 10.6% with a limit of agreement of 23.6% and -2.4%. The SjvO<sub>2</sub>-CO<sub>2</sub> reactivity was higher than rSO<sub>2</sub>-CO<sub>2</sub> reactivity in the supine position and Trendelenburg-pneumoperitoneum condition, respectively ( $0.9 \pm 1.1$  vs.  $0.4 \pm 1.2\%/mmHg$ ,  $P = 0.04$ ;  $16.5 \pm 12.7$  vs.  $5.2 \pm 10.5\%/mmHg$ ,  $P < 0.001$ , respectively).

**Conclusions:** There is a little correlation between SjvO<sub>2</sub> and rSO<sub>2</sub> in the supine position and Trendelenburg-pneumoperitoneum condition during sevoflurane anesthesia. We conclude that rSO<sub>2</sub> could not replace SjvO<sub>2</sub> during laparoscopic surgery under sevoflurane anesthesia.

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**Paper No: 617.00**

## The universal anesthesia machine towards achieving mdg5 in nepal

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**Introduction:** About half of the people in the world do not have access to anesthesia services. This ultimately results in disability or death of individual due to the lack of emergency surgical facilities with an affordable, functioning anesthesia machine. The root causes the high technology and cost of currently available anesthesia machines. Nepal is doing well within its territory on MDG 5 towards its goal. Nepal is rapidly producing doctors capable of providing obstetric care including c-section as well as anesthesia assistants (non-physician anesthetists) to provide anesthesia under supervision. Nepal is also attempting to imp access to surgical services by evaluating an anesthesia machine the Universal Anesthesia Machine (UAM) which is affordable, simple to use, and requiring little maintenance.

### Objectives:

- To assess the functions of the UAM in terms of reliable oxygen supply, anesthetic agent flow, breathing system and scavenging system.
- To assess the user friendliness

**Methods:** Four UAM machines provided free by the NICK SIMONS Foundation, New York were distributed to four hospitals (two central and two peripheral hospitals). Three to five days orientation to all anesthetists and anesthesia assistants of each of individual sites were given with didactic and live demonstration. All the users were also oriented with an evaluation system by filling the prepared form. A team of anesthetist, biomedical technician and administrator carried out follow-up visits to each site every two months. Continuous communication was maintained between follow-up visits through email and phone calls to help for any problem and their management. Adequate forms to record various parameters of patient and the machine were also made available. Records were collected periodically.

**Results:** Six hundred and forty-one patient records were collected within a period of 6 months and one week. Patients ranged from neonate to geriatric. Emergency surgery 31% and elective 69%. Among the cases 35% were from general surgery, 17% were obstetric and rest from other departments. The original bellow was used in majority of the cases though Ayre's T-piece and Bain's circuit were also used.

**Conclusion:** This initial impression to the UAM is very positive in Nepal's context. It is reliable in terms of oxygen supply system, vaporizer and use of a variety of breathing systems. It is possible to orient the UAM within a week period time. It is cheaper and can be easily used in Nepal's vague geographic locations.

**Keywords:** anesthesia; UAM; Bellow MDG

**Paper No: 645.00****Continuous blood glucose monitoring revealed that blood glucose levels change markedly in a short time during surgery for pheochromocytoma****Takahiko Tamura**, Tomoaki Yatabe, Hiroki Tateiw, Takashi Kawano and Koichi Yamashita

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**Introduction:** Inadequate anesthetic management of pheochromocytoma is known to be life-threatening, causing hypertensive crisis, wide fluctuations in blood pressure, and serious arrhythmia. In addition to these hemodynamic changes, it is important to manage blood glucose levels. The presence of hyperglycemia preoperatively reflects the metabolic effects of catecholamines, but resolves with tumor resection, potentially leading to hypoglycemia. However, few reports have described in detail the changes in blood glucose levels during surgery for pheochromocytoma.

**Objectives:** We previously reported that a continuous blood glucose monitoring system (STG-22; Nikkiso, Tokyo, Japan) is useful for detecting sudden changes in blood glucose levels during hepatectomy and large vessel surgery [1,2]. The purpose of the present study was to measure blood glucose levels continuously during pheochromocytoma surgery using the STG-22 system, and to reveal how the surgical procedure affects blood glucose levels.

**Methods:** We enrolled consecutive patients who underwent urologic surgery for pheochromocytoma in our hospital between October 2007 and July 2011. After general anesthetic induction, a 20-G intravenous catheter was inserted into a peripheral vein and connected to an STG-22 continuous blood glucose monitor. Continuous blood sampling was performed through the tube by drawing blood at a rate of 2 ml/h. Collected blood samples were passed through a glucose sensor, which displayed the glucose levels in real time by measuring them using the glucose oxidase method.

**Results:** (essential): Four patients participated in this study: 3 with an adrenaline-predominant pheochromocytoma and 1 with a dopamine-predominant pheochromocytoma. All patients received glucose at a dose of 0.08–0.1 g/kg/h using acetate-Ringer's solution containing 1% glucose. In the 3 adrenaline-predominant patients, blood glucose concentration was  $108 \pm 11$  mg/dl at the start of the operation. During surgical manipulation around the tumor, there were marked increases in blood glucose to  $200 \pm 34$  mg/dl, which represented a  $185\% \pm 14\%$  increase compared with the baseline. However, blood glucose decreased to  $101 \pm 17$  mg/dl within 1 h after tumor resection. In the dopamine-dominant patient, blood glucose increased from 86 mg/dl to 125 mg/dl, representing a 145% increase compared with the baseline.

**Conclusions:** Continuous blood glucose monitoring revealed that the blood glucose level was markedly changed in a

short time as a result of surgical manipulation around the pheochromocytoma. This knowledge might contribute to optimal blood glucose management during surgery for pheochromocytoma.

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**Paper No: 710.00****Measurements of oxygen saturation of brain, liver and heart areas in the supine and sitting position by the INVOS 4100 near-infrared spectrophotometer****Athanasia Tsaroucha**, Andeia Paraskeva and Argyro Fassoulaki

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**Introduction:** Cerebral oximetry by near-infrared spectroscopy (NIRS) measures regional intracerebral oxygen saturation (rSO<sub>2</sub>) continuously and non-invasively [1]. The method has been validated and used extensively during carotid endarterectomy [2]. It has also been used in stroke and cardiac arrest [3] and it has been found useful in coronary artery bypass surgery [4]. Objective: The present study investigates the rSO<sub>2</sub> values of the brain, heart and liver tissue as assessed by NIRS in the supine and the sitting position.

**Methods:** After obtaining approval from the IRB and written informed consent from forty-nine healthy volunteers, rSO<sub>2</sub> values were recorded in the heart and liver areas in the supine and the sitting position, recording simultaneously the rSO<sub>2</sub> values of the brain.

**Results:** The rSO<sub>2</sub> brain values in the supine and the sitting position were  $69 \pm 6.0$  and  $66 \pm 5.7$  respectively ( $p = 0.0001$ ). The rSO<sub>2</sub> values in the supine and the sitting position were  $76 \pm 10.5$  and  $79 \pm 6.7$  for the heart ( $p = 0.212$ ) and  $85 \pm 6.8$  and  $82 \pm 7.2$  for the liver ( $p = 0.007$ ) respectively. Heart rSO<sub>2</sub> values were higher than the brain rSO<sub>2</sub> values in both the supine ( $76 \pm 10.4$  and  $69 \pm 6.6$ , respectively,  $p = 0.0001$ ) and the sitting position ( $79 \pm 6.7$  and  $66 \pm 6.1$  respectively,  $p = 0.0001$ ). The liver rSO<sub>2</sub> values were also higher than the brain rSO<sub>2</sub> values in the supine ( $85 \pm 6.8$  versus  $69 \pm 6.0$ ,  $p = 0.0001$ ) and in the sitting position ( $82 \pm 7.2$  versus  $66 \pm 5.7$ ,  $p = 0.0001$ ). Arterial blood pressure and SpO<sub>2</sub> did not differ between the two positions but the heart rate was higher in the sitting position ( $p = 0.030$ ).

**Conclusions:** We conclude that in the supine position rSO<sub>2</sub> values are higher in liver and brain. Also NIRS may be useful to assess heart and liver oxygenation.



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## Paper No: 716.00

### A comparison of continuous hemodynamic monitoring by lidcorapid via simultaneous intra-arterial vs non-invasive bp waveforms using nexfin

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**Introduction:** Continuous non-invasive blood pressure (NIBP) monitoring that generates a reliable blood pressure waveform has been recently introduced. The NexFin (NF, BMEye, Amsterdam, NL) provides a continuous NIBP waveform that can be integrated into the LiDCOrapid (LiDCO Ltd, London, UK) to estimate hemodynamic parameters.

**Objectives:** This study aims to determine if the NIBP waveform, when compared with an intra-arterial waveform, is reliable for analysis by the LiDCOrapid's PulseCO algorithm and provide clinically useful measures of advanced hemodynamic parameters.

**Methods:** Vascular surgery patients having routine invasive arterial BP (IABP) monitoring were recruited. Each BP waveform was inputted to a separate LiDCOrapid monitor synchronised at the start. Continuous Stroke Volume (SV), Mean Arterial Pressure (MAP), Stroke Volume Variation (SVV) and Pulse Pressure Variation (PPV) were measured until extubation, for IABP (I) and NIBP (N) waveforms. Measurements were taken every 15 min from the sync event and averaged over 60 sec. Comparisons were made for changes in MAP and SV pairs across the surgical interval. SVV and PPV pairs were compared to determine if they gave consistent indication of fluid responsiveness (eg SVV < 10%; PPV < 13%). Individual fluid challenges were collated from each patient to determine concordance of fluid response.

**Results:** 8 vascular surgery patients (7male) age 71+/-5yrs, weight 86+/-13Kg, ASA3(3–4) were recruited. A total of 97 measures were obtained. Bland-Altman Analysis of MAPN to MAPI yielded 8+/-22mmHg difference. In 46 instances SVI changed by >5% and SVN agreed 43 times (93%).

MAPI changed by >5% 51 times and MAPN agreed 50 times (98%). SVVN and PPVN gave the same indication of fluid responsiveness in 92% and 88% of comparisons to SVVI and PPVI, respectively. 25 fluid challenges were given, 68% were fluid responsive. Concordance was seen in 24 instances (96%).

**Discussion:** MAPN has a large bias and limits of agreement compared with MAPI in this population. However, MAPN and SVN both trended consistently with MAPI and SVI. SVVN and PPVN were consistent with SVVI and PPVI values, with SVV slightly more consistent than PPV. Most importantly, the SVN usually gave the same indication of fluid response.

**Conclusion:** The NF NIBP MAP value is not comparable to MAP from an invasive arterial catheter. The LiDCOrapid/PulseCO algorithm is able to reliably provide clinically useful hemodynamic monitoring based on this waveform.

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## Paper No: 737.00

### Hemodynamic Changes During Pneumoperitoneum and Steep Trendelenburg Position in Patients Undergoing Robot Assisted Laparoscopic Radical Prostatectomy: A Study Using Semi-Invasive Pulse Contour Analysis Device (FloTrac/Vigileo™)

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**Introduction:** Technical advances have led an evolution in radical prostatectomy from open to minimally invasive methods. Robotic assisted laparoscopy prostatectomy (RALRP) requires a steep Trendelenburg position (40–450) and high pressure (16–18 mmHg) CO<sub>2</sub> pneumoperitoneum. This lead to significant hemodynamic and respiratory consequences. Since the published data is very limited related to this subject.

**Objectives:** To find out the effect of steep trendelenburg position with high pressure CO<sub>2</sub> pneumoperitoneum on hemodynamic parameters in a patient undergoing RALRP using FloTrac/Vigileo™1.10

**Methods:** Fifteen ASA I-II patients scheduled for RALRP were included in the study.. Patient's radial artery and internal jugular vein were cannulated. Cardiac output(CO), cardiac index(CI), stroke volume(SV) and stroke volume variation (SVV)were recorded from FloTrac. Pre-sep CVP was connected to Vigileo monitor to measure CVP. Readings were taken at following intervals: Pre-induction (Baseline value), after

5 minutes of induction of anesthesia, after 5 minutes of creating CO<sub>2</sub> pneumoperitoneum, after 5 minutes of 450 Trendelenburg position with CO<sub>2</sub> pneumoperitoneum, after 20 minutes of 450 Trendelenburg position with CO<sub>2</sub> pneumoperitoneum, then hourly till the end of surgery.

**Results:** After induction HR, SV, CO and CI were decreased ( $p$  value  $< 0.05$ ). SV, CO and CI further decreased after creating pneumoperitoneum ( $p$  value  $< 0.05$ ). At 450 Trendelenburg position HR, SV, CO and CI were decreased compared to baseline. CO and CI were persistently low throughout 450 Trendelenburg position ( $p$  value: 0.001). CVP increased after pneumoperitoneum and at 450 Trendelenburg position (after 5 minutes and 20 minutes) compared to baseline ( $p$  value  $< 0.05$ ). There were no significant changes in SVV throughout the study period.

**Discussion:** Hemodynamic changes occur during RALP might be harmful for elderly patients. We found significant decrease in HR, MAP, SV, CO and CI, and increased CVP. However, no change in SVV. In view of this we are of the opinion that SVV may be of use in guiding the intravascular volume status in RALP surgery where CVP may not be reliable. Previous studies with Flotrac (version) 1.10 have shown SVV to be a reliable data in determining fluid responsiveness. **Conclusion:** Steep trendelenburg position and CO<sub>2</sub> pneumoperitoneum, during RALP, leads to significant decrease in SV and CO. So we suggest continuous CO monitoring is useful in selected group of patients with significant cardio respiratory co-morbidities undergoing RALP. SVV may be a better and reliable predictor for assessment of fluid status in RALP.

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**Paper No: 768.00**

## Double-lumen tube placement without headrest minimized displacement during lateral positioning

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**Introduction:** The proper position of a double-lumen tube (DLT) is usually confirmed by a fiberoptic bronchoscope with the head on a headrest following intubation. However, displacement of the DLT usually occurs while a patient is placed into the lateral position.

**Objectives:** The purpose of this study was to determine whether bronchoscopic confirmation of the DLT position should be performed with or without a headrest in the supine position.

**Methods:** One hundred patients scheduled for elective thoracic surgery were randomly divided into two groups depending on presence or absence of a headrest. Only left-sided DLTs were used during this study. In the headrest group, the DLT position was correctly adjusted with the head on a headrest following intubation. In the no-headrest group, the DLT was correctly placed without the headrest. Using a fiberoptic bronchoscope, the distances from tracheal opening to main carina and from bronchial opening to left bronchial carina were measured in both supine and lateral positions.

**Results:** Displacement of the DLT (mean  $\pm$  SD) during lateral positioning was greater in the headrest group than in the no-headrest group (12.3  $\pm$  6.5 mm vs. 6.8  $\pm$  5.5 mm in the trachea; 11.6  $\pm$  6.7 mm vs. 6.0  $\pm$  4.6 mm in the bronchus) ( $P < 0.001$ ). The incidence of the significant DLT displacement, greater than 1 cm from the initial correct position, was higher in the headrest group than in the no-headrest group (64% vs. 28% in the trachea; 58% vs. 20% in the bronchus) ( $P < 0.001$ ).

**Conclusions:** Displacement of the DLT during lateral positioning seems to be caused primarily by extension of the neck. Bronchoscopy-guided adjustment of the DLT position without a headrest is an easy and effective method to reduce DLT displacement during lateral positioning.

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**Paper No: 786.00**

## To study the success rate of radial artery catheterization at various degrees of wrist angulations –A randomized, prospective study

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**Introduction:** Optimal wrist position is essential for successful catheterization of radial artery. Ultrasonographic evidence

of wrist position on radial artery diameter has demonstrated that antero posterior diameter of radial artery is decreased when wrist is extended to an angle of 60° in healthy subjects and 75° in patients having atherosclerosis (CABG) patients.

**Objectives:** To study the success rate of radial artery catheterization at various degrees of wrist extension angulations.

**Methods:** This prospective, randomized study was conducted in 60 consenting patients of age group 18–65 years undergoing various surgeries requiring arterial catheterization. All patients were randomized into three groups: Group 300 (n = 20)-radial artery was cannulated at 30° of wrist extension, Group 450 (n = 20) radial artery was cannulated at 45° of wrist extension and Group 600 (n = 20) - radial artery was cannulated at 60°. Three metallic angulated wrist boards with angles of 30°, 45°, 60° (angle measured with calipers) were prepared, on which patient's wrist was kept at the above mentioned angles of extension. During the radial artery catheterization success rate, catheterization time, numbers of attempts were recorded by the person not involved in the study.

**Results:** 60 patients were enrolled and no patients were excluded from the study. The base line demographic parameters were comparable ( $p > 0.05$ ). The catheterization time was  $36.00 \pm 14.19$  sec,  $30.50 \pm 16.82$  sec and  $43.50 \pm 13.80$  sec, in group 300, 450 and 600 respectively ( $p = 0.046$ ). Radial artery was cannulated in first attempt in 60% of patients in group 450 and group 600, 50% in group 300 ( $p$  value 0.559). The arterial catheterization was maximum successful in group 450 and least in group 300 though the difference was statistically insignificant ( $p = 0.121$ ).

**Discussion:** Extension of the wrist joint reduces the mobility of the vessels, aiding its cannulation but over extension reduces the anterior posterior diameter of the radial artery rendering the cannulation difficult. So the wrist joint must be kept at an optimum degree of extension to make radial artery cannulation easier. Mizukoshi et al, observed that the radial artery height (anteroposterior diameter) decreases when the wrist joint is extended to an angle of 60° in healthy subjects.

**Conclusion:** We conclude that the wrist extension at 45° angulation appears to be optimal wrist joint extension for successful radial artery cannulation.

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## Paper No: 794.00

### Effect of an intubation dose of atracurium on spectral entropy responses to laryngoscopy

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**Introduction.** Entropy is an anaesthetic EEG monitoring method, calculating two numerical parameters: State Entropy (SE, range 0–91) and Response Entropy (RE, range 0–100). Low Entropy numbers indicate unconsciousness. SE uses the frequency range 0.8–32 Hz, representing predominantly the EEG activity. RE is calculated at 0.8–47 Hz, consisting of both EEG and facial EMG. RE–SE difference (RE–SE) can indicate EMG, reflecting nociception.

**Objectives:** To evaluate the effect of atracurium on entropy responses (RE- and SE-entropy) to laryngoscopy.

**Methods:** A total of 25 patients, undergoing urologic surgery were anaesthetized with propofol 2.5–3 mg/kg until loss of consciousness. At steady state, they randomly received 0.6 mg/kg atracurium (A) or saline (S). After 3 min, a 20 s laryngoscopy was applied. RE- and SE-entropy were recorded continuously and averaged over 1 min during baseline, at steady state, 2 min after A or S administration (A/S+2) and 0, 1, 2 and 3 min after laryngoscopy (L0, L1, L2, L3).

**Results:** At A/S+2, the RE–SE gradient was higher in Group S than in Group A. Laryngoscopy provoked an increase in RE- and SE-entropy. Comparing A/S+2 and L0 values in Groups A and S, SE increased from 43 (7) to 50 (8) and 41 (10) to 55 (12), and RE increased from 46 (8) to 54 (9) and 47 (12) to 66 (15), respectively. SE did not differ between groups. At L0, RE and RE–SE were higher in Group S [66 (15) and 11 (4), respectively] than in Group A [54 (9) and 4 (2), respectively].

**Conclusions:** Atracurium alters the RE–SE gradient and the RE and RE–SE responses to laryngoscopy. Muscle relaxation may confound interpretation of entropy monitoring.

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## Paper No: 805.00

### Evaluation and comparison of BIS, spectral entropy and quantified EEG in measuring anesthetic depth

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**Introduction:** The monitoring of anesthetic depth is difficult but of vital importance in order to avoid inadvertent intraoperative awareness during general anesthesia. Several parameters derived from electroencephalogram (EEG) have been developed to measure the depth of hypnotic state.

**Methods:** 40 patients undergoing ambulatory gynaecologic surgery were included in the study. BIS, SE, RE, spectral edge frequency (SEF), relative power in delta, beta, theta and alpha and beta/ delta ratio were recorded for posterior analysis during general anesthesia maintained with 1–2% sevoflurane. Correlations among variables were studied using logistic and linear regression models. The ability to properly discriminate awake from anesthetized states were analyzed with ROC curves. We also determined the cutoff points for SEF, SE, RE, delta ratio and beta/ delta ratio with higher sensitivity and specificity to distinguish awake versus unconsciousness according to BIS values categorized as BIS < 60 ( anesthetized) and BIS >60 ( awake).

**Results:** Relative power in delta, beta / delta ratio and RE showed relationship with BIS values in the linear and logistic regression models. Moreover, BIS, SE and RE presented a strong concordance during different stages of anesthesia (ICC>0.7). RE and SE were able to correctly discriminate awake from anesthetized patient, and were significantly superior to quantitative EEG derived parameters ( $p < 0.05$ ). ROC curves were SE(0.974) and RE (0.979). Using as reference BIS = 60, the sensitivity and specificity for RE (87.5/98) and SE (84.6/97) parameters were high, with cutoff values of 60 for RE and 56.5 for SE. In contrast, the sensitivity and specificity of quantified EEG parameters were much lower: Delta (50.96/80), SEF (39.42/45.27), Beta/delta ratio(22/75.31). The optimal cutoff values to discriminate conscious versus unconscious state were: Delta 85.5, SEF 11.5, Beta/Delta ratio 0.052.

**Conclusions:** BIS, SE and RE have similar ability to discriminate the states of hypnosis and also present a similar behaviour during the different anesthetic stages. Quantified EEG derived parameters are not good predictors of depth of anesthesia. We demonstrate a relationship among quantified EEG derived parameters, RE and BIS.

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## Paper No: 807.00

### Comparative evaluation of hemodynamic variables and time-frequency balanced spectral entropy during different states of sevoflurane anesthesia

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**Introduction.** Hemodynamic variables have been traditionally used to assess if the patients were correctly anesthetized, as they reflect the autonomic nervous system function. However, heart rate and blood pressure changes are frequently attenuated or distorted by the administration of adjuvant drugs, which can lead to inadvertent intraoperative awareness periods. The electroencephalogram (EEG) would provide a more accurate measure of anesthetic depth. During the last 2 decades, processed electroencephalogram derived parameters have been developed in order to improve depth of anesthesia monitoring, and therefore, to diminish intraoperative awareness and potential morbidity due to overdose of anesthetic drugs. One of the latest published parameters is the time-frequency balanced spectral entropy. This entropy generates two indices, the state entropy (SE) which analyzes frequency range from 0.8 to 32 Hz (EEG frequencies) and the response entropy(RE), that includes facial electromyography information.

**Objectives:** This study was performed to compare the effectiveness of hemodynamic variables and time-frequency balanced entropy to adequately assess anesthetic depth. Moreover, we evaluated the influence of nociceptive stimulus such as laryngoscopy on the accuracy of those parameters.

**Material and Methods:** 21 patients scheduled for minor abdominal surgery were enrolled in the study. Heart rate (HR), mean arterial pressure (MAP), SE and RE were recorded during different stages of sevoflurane induced anesthesia: awake, before laryngoscopy, 10 minutes after surgical incision (surgical anesthesia) and at emergence. The ability of each variable to distinguish between the different anesthetic stages was analyzed using the area under receiver operating curve (ROC curves).

**Results:** During induction stage, SE and RE were considerably superior to HR and MAP to discriminate anesthesia depth (ROC curves 0.99, 0.99; 0.51 and 0.75; respectively). At laryngoscopy and 10 minutes after surgical incision, SE and RE maintained the accuracy for monitoring anesthetic depth



(ROC 0.95; 0.99), whereas hemodynamic variables were not better than chance to distinguish awake from anesthetized patients (ROC < 0.5). During emergence, SE and RE were worse to measure the depth of anesthesia (ROC 0.86) compared to previously studied stages. However, entropy was still superior to HR and MAP (ROC 0.603 and 0.635 respectively).

**Conclusion:** SE and RE are more reliable indicators of depth of anesthesia than hemodynamic variables in all studied anesthetic stages. -Noxious stimulus produces an increase of SE and RE values without altering their capacity to distinguish between awake and anesthesia state. -During noxious stimuli, HR and MAP fail in measuring the depth of anesthesia.

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## Paper No: 889.00

### Use of supraglottic airway devices by the non-anaesthetists

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**Introduction:** Supraglottic airway devices (SADs) are an alternative to bag-valve-mask ventilation (BVMV) in the control of the airway of a patient and their safe use by paramedics in the pre-hospital setting during cardio-pulmonary resuscitation has already been documented<sup>1</sup>. In a more recent study, the ease and speed of use of the I Gel, LMA Unique and laryngeal tube airway (LTA) as SADs was demonstrated<sup>2</sup> but the LMA Supreme was not tested.

**Objectives:** Our aim was to determine which SAD out of the three tested is the most efficient and preferred in the hands of non-anaesthetists.

**Methods:** 120 non-anaesthetic volunteers were recruited and tasked with the insertion of a SAD into a manikin with a deflated balloon attached to the trachea. An AMBU bag was used for ventilation. Our primary end-points were the

time to first inflation of the balloon and the number of breaths required to full inflation of the balloon. All volunteers tested the I Gel, LMA Supreme and LMA Unique. Feedback was then obtained from the volunteers.

#### Results:

- 81.7% (98) of candidates found the I Gel or LMA Supreme easiest to insert while 18.3% (49) preferred the LMA Unique for ease of insertion.
- 33.3% (40) of candidates found the LMA Supreme easiest to ventilate with compared to 30% (36) for the I Gel and 12.5% (21) for the LMA Unique. 13.3%

(16) found no difference between the three SADs.

Average time until first breath (s) Number of breaths to fill bag Ease of insertion (%) Ease of ventilation (%) I Gel 16.3 5.3 40.8 30.8 LMA Supreme 14.6 5.1 40.8 33.3 LMA Unique 18.9 5.5 18.3 12.5

**Conclusions:** Both the I Gel and the LMA Supreme were equivalent in terms of ease of use but markedly superior in this respect compared to the LMA Unique. Candidates perceived the LMA Supreme to be slightly easier to ventilate with when compared to the I Gel. The LMA Unique was the least preferred SAD to ventilate with.

**Results:** of the average time taken to first inflation of the balloon are consistent with this. All three SADs were similar with regard to the number of breaths required to fully inflate the balloon. Our results indicate that the LMA Supreme may be the most efficient and preferred SAD for the non-anaesthetist. Interestingly, most of the candidates had not used the LMA Supreme before and were more familiar with the I Gel.

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## Paper No: 910.00

### SensaScope® Semirigid Intuboscope: a new and safe device in a super morbidly obese with previously failed fiberoptic intubation attempts

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**Introduction:** SensaScope® is a recent advance in difficult airway and we describe a case of successful difficult tracheal intubation in a morbidly obese patient. Case: A 47 year obese male (BMI 54.6, 147 kg) was scheduled for a laparoscopic

gastric bypass procedure. He had two failed fiberoptic intubation at a district general hospital. Patient was known to have hypertension and obstructive sleep apnoea (OSA) needing CPAP. He smoked 20 cigarettes every day. His exercise tolerance was limited to 200 yards. His airway assessment was as follows: good mouth opening (4cm) with a receding mandible, Mallampatti grade 3, very limited neck extension with a large fat pad behind with neck circumference of 61cm. The local anesthesia and sedation for intubation was explained and consented. In theatre, patient was attached to standard monitors and a peripheral venous access was secured with a 16G Cannula. Oxygen was administered through a nasal cannula (3L/min) and sedation was initiated with a bolus intravenous injection of midazolam (2mg) and an infusion of Remifentanyl (20 mcg/ml) at a rate of 20ml/hour. Airway anaesthesia was accomplished with Lignocaine (4%) spray into nostrils and mouth. Sensascope<sup>®</sup> was railroaded with a size 8 reinforced endotracheal tube. Sensascope<sup>®</sup> was passed into the mouth and further sprays of Lignocaine (4%) were done deep into the oropharynx with an atomiser (MAD device). A Cormack Lehane (CL) grade 1 view of the glottis was obtained. The pharyngeal mucosa was hypertrophied with very limited air space. A large and thick epiglottis was falling on the view with a reduced glottic opening. Successful tracheal intubation was confirmed with EtCO<sub>2</sub> trace on the monitor. The general anaesthesia was induced with Propofol (2mg/kg BW) and Rocuronium (0.5mg/kg BW). The patient was extubated awake in the end.

**Discussion:** SensaScope<sup>®</sup> was successfully evaluated and used in cases of anticipated difficult airway to perform intubation awake. This device has shown to improve view and the CL grade 1. Our experience confirms the above finding from a previous study. Incidence of failed fiberoptic intubation is about 1.2% (Ovassapian-1983). Traumatic airway with secretions and blood can affect the view. Another important consideration is the lack of airspace with in the oral and nasopharynx. In this case, the patient is a known super obese individual with OSA and mucosal hypertrophy. As Sensascope is rigid equipment with a flexible tip, this could potentially help to create an air space as it is advanced deeper into the nasopharynx.

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**Paper No: 948.00**

## A portable anaesthetic machine for all situations

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**Introduction:** The ability to provide safe and reliable anaesthesia in the developing world is fraught with difficulties, draw over anaesthesia remains popular in these difficult situations – it is inexpensive, simple, safe and can work without oxygen and electricity.

**Objectives:** The requirement for drawover anaesthesia in areas of limited resource led to the production of the DPA01 Diamedica Portable Anaesthetic Machine. This system has already been used with great success<sup>1</sup>. As with other drawover systems agents were limited to halothane and isoflurane. Previously sevoflurane for gaseous induction in a drawover system was not practical, due to the inability of drawover vaporisers to deliver a suitably high output concentration of sevoflurane. The advantages of using sevoflurane in drawover include, a smoother and quicker gas induction than with isoflurane and halothane respectively, less cardiovascular effects than with halothane, quicker wake up and less irritation to airways especially in patients with a history of reactive airways disease.

**Methods:** The new DPA03 has been designed to allow maintenance of anaesthesia through the drawover method using isoflurane or halothane but it also enables gaseous induction with sevoflurane. The sevoflurane vaporiser has been developed to have a low resistance to ensure minimal work of breathing and provide an output of up to 8%. Due to the low resistance supplementary oxygen, where available, can be supplied by an oxygen concentrator or cylinder, although the system is designed to work on entrainment of air only. The component parts of the DPA03 are a reservoir bag (to allow visual confirmation of respiratory effort and allow an increase in inspiratory oxygen concentration when external oxygen is used), two vaporisers in series, a self inflating bag (for assisting ventilation), a non re-breathing valve<sup>2</sup> and light weight double lumen tubing.

**Results:** The new vaporiser for sevoflurane is placed in series with an isoflurane/halothane vapouriser. Once induced the maintenance agent can be switched to isoflurane or halothane allowing significant cost saving. The system provides safe, reliable and self controlled anaesthesia for use in remote areas and emergency or disaster situations.

**Discussion:** The use of drawover anaesthesia should be used more widely and modern and safe equipment to provide anaesthesia in this way should be available at reasonable cost.

**Conclusion:** We have demonstrated that drawover anaesthesia can provide safe anaesthesia in resource poor environments and that by use of the DPA03 sevoflurane, isoflurane and halothane usage is available to the anaesthetic practitioner.

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**Paper No: 954.00****It's possible to develop a tool for real time skills evaluation in life surgery? initial security study**

**Maria Jose Mayorga-Buiza M.D.PhD.,**  
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Antonio Ontanilla and Javier Marquez-Rivas

**Background:** Probably the ideal of simulation is evaluation of competence in real life. However, few papers have been dedicated to assess the competence in real time and life surgery. Aim Develop and test the security and interest of a new evaluation concept of clinical skills based in augmented reality by multiparametric source integration in order to offer real-time assessment for anesthesiology in life surgery. Method We use own systems developed by SSPA and US for augmentation of reality. This patented system (SAGIQ) allow us recording, visualization and distribution of virtually all images and source data from OR. For initial testing we decide add elements that could evaluate better the skills needed to survey very complex surgeries: Inputs: Real time cameras over surgery room oriented to operating table, anesthesia machine and overall OR. In addition: Video image from surgical field (microscope, endoscope or helmet microscope), Neurophysiologic control, and machine anesthesia monitors was introduced in the system. Outputs: 1. Main surgical field, as decided by the surgeon, 2 Main monitor from anesthesia machine. 3 Combined imaged with all sources selected 4 Audio bi-directional lines. For initial evaluation two complex neurosurgery operations was selected: After induction anesthesia and indwelling catheters were in place, the surgery was conducted all time by a last year resident. No inside OR staff control was offered, but the outputs were redirected to a specially designed area for external control.

**Results:** The surgical procedures were unevenful. No complications or interferences with surgical devices were detected during the 14 h surgery time. The staff could assess in real time the decision-making process of the trainee and suggest changes or ask about decisions taken. No interferences with the surgeries were recorded by independent questioning to surgical team and nurses.

**Conclusion:** This preliminary report permits us to consider the possibility to understand the real life surgeries as simulations situations if technical conditions are provided.

**Paper No: 1020.0****Comparison of the LMA Supreme™ and the LMA ProSeal™ concerning insertion success rate, insertion time and the****success rate of gastric tube insertion into a manikin**

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**Introduction:** The LMA Supreme (SLMA), introduced into Japan in 2010, is a single-use supraglottic airway device with gastric access developed as an alternative to the reusable LMA ProSeal (PLMA).

**Objectives:** We examined the usefulness of SLMA compared with PLMA which also has gastric access, using a manikin model. Items of evaluation were (1) success rate of the LMA insertion, (2) insertion time for the LMA, and (3) success rate of gastric tube insertion.

**Methods:** This research was performed by forty-two medical doctors consisting of 3 groups (15 residents, 13 registered anesthetists and 14 anesthetic specialists). We used LMA size #4 (both of the SLMA and PLMA). Only one experienced anesthetic specialist inflated cuff and evaluated the LMA insertion. Criteria of evaluation included: (1) success or failure of the LMA insertion was judged by effective bag ventilation (full thoracic expansion), (2) time for the insertion was measured as interval time from the LMA holding to the first effective ventilation. (3) success or failure of gastric tube (14 Fr.) insertion was judged by visual observation of the manikin's esophagus. Statistical analyses were performed using either two-sampled Student t test or Fisher exact test.

**Results:**

- (1) There was no significant difference statistically in the success rate of SLMA insertion into the manikin between that of PLMA in the 3 groups (overall first attempt; 98% vs 88%).
- (2) Insertion times for SLMA by residents and registered anesthetists were almost within the same range (15 sec) compared to anesthetic specialists, and were also shorter than those for PLMA.
- (3) There was no significant difference statistically in the success rate of gastric tube insertion via SLMA and PLMA (overall first attempt; 100% vs 90%).

**Discussion:** The SLMA has no risk of cross infection because of its single use disposable device, and SLMA is anatomically shaped airway tube enclosing a drain tube to insert a gastric tube

**Conclusion:** The SLMA might be more useful for the less experienced doctors than the PLMA. [

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**Paper No: 1022.0****Comparisons of three different warming devices on body temperature changes during open gastrectomy**

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**Introduction:** All patients undergoing surgery are at risk of developing hypothermia, and prevention of hypothermia not only reduces the incidence of complications, but patients also experience a greater level of comfort. Several methods or devices to prevent hypothermia during surgery are applicable in a clinical setting these days.

**Objectives:** We performed this study to determine which devices are the most effective in preventing hypothermia among three devices.

**Methods:** Under the controlled operating room temperature, ninety patients who received open gastrectomy were randomly applied three different warming devices during anesthesia (fluid warming, forced surface air warming and heated breathing circuit devices, 30 patients each). We measured body temperature(axillary and rectal) and serum bicarbonate serially (30 minutes interval) till the patients were discharged from recovery room.

**Results:** All groups showed significant body temperature changes during anesthesia, even no difference in parenteral fluids and patients demographics. There was no statistical difference among groups in serum bicarbonate and rectal temperature changes but the dropping of axillary temperature was more prominent in heated breathing circuit device group(Group HBC) in 180 min. and end of operation. Axillary temperature recovery also significantly delayed in Group HBC.

**Conclusions:** Body temperatures are decreased continuously during open laparotomy even single warming device is applied. Heated breathing circuit device is inferior to other two modalities in this study. We better applied multiple warming devices to keep patient in normothermia during open laparotomy.

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**Paper No: 1030.0****Clinical performance of electrical control for aisys™ carestation, to automatically adjust fresh gas, end-tidal agent and oxygen**

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**Introduction:** Traditionally, anesthesiologists administer oxygen and anesthesia agent (AA) by manually adjusting vaporizer (VAP) and FGF settings, observing airway gas concentrations, and according to clinical judgment. However, it is technically possible to design a feed-back system for the anesthesia workstation (AWS) to automate manual adjustment.

**Objectives:** After extensive lab testing, end-tidal control (EtC) prototype designed for Aisys™ (GE Healthcare), was ready for evaluation on human subjects. Our aim was to access clinical performance vs. expectations of anesthesiologist, plus to compare behavior of the control system vs. technical specs by analyzing real time response data.

**Methods:** After approvals of ethical committee and authorities, written informed consent was obtained from 20 ASA 1-3 patients undergoing gynecological procedures according to hospital standards. Anesthesiologist responsible of patient care stayed in the O.R., continuously observing the control system. In addition, there was a technical observer to record time marked notes and comments. At induction, anesthesiologist deciding about target concentrations for EtAA and EtO<sub>2</sub> dialed them to the controller, thus enabling software algorithm to start adjusting FGF and VAP settings automatically. Non-invasive monitoring (AS/3, independent of the controller), collected ECG, SpO<sub>2</sub>, NIBP, Entropy, NMT, spirometry, and airway gas concentrations of O<sub>2</sub>, N<sub>2</sub>O, CO<sub>2</sub> and AA. Clinical data were automatically stored. Control system's high resolution data flow was also stored in real time. Clinical quality indications (e.g. hemodynamic variability) had been defined a priori. After each completed case, anesthesiologist estimated whether variability in monitored variables was due to technical or clinical reasons.

**Results:** Enrolled 20 patients met all inclusions criteria; none had to exit during study. Five anesthesiologist administered sevoflurane general anesthesia with the system: three were senior staff and two were anesthesia residents. There were no adverse effects. HR and BP remained stable ( $\pm 25\%$  from control) in 16/20 patients, in 4/16 patients the reason was clinical. In 18/20 cases SpO<sub>2</sub> was above 90% all the time, in 2/20 the reason for deviation was clinical. None of the clinicians stopped using controller during the cases. Neither did AWS exit from the EtC unexpectedly. Technical assessment of control performance parameters included response and setting times, command overshoot and steady state deviations of both EtO<sub>2</sub> and EtAA.

**Conclusions:** This open observational study was the first systematic comparison on human subjects, with the prototype end-tidal control designed for the Aisys™ Carestation by GE. Both clinical findings and technical data were according to preset specifications.

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**Paper No: 1074.0****Bispectral index monitoring in open heart surgery**

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**Introduction / Background:** In cardiovascular anesthesia, 1) reduced cardiac contractility related many factors such as manipulation of the heart, hemodilution after cardiopulmonary bypass, hypotension, and hypothermia, and 2) bleeding which causes hemodynamic instability are treated with superficial anesthesia. This situation increases the risk of wakefulness. Hemodynamic data may not correlate exactly with the patient's conscious state. Only these measurements are inadequate for the evaluation of depth of the anesthesia and sedation. In this study, we used to Bispectral Index (BIS) monitor in patients with open heart surgery for determination of depth of anesthesia. The effects of BIS monitor using on the anesthetic, analgesic and inotropic drug consumption and intraoperative awareness were investigated.

**Materials And Methods:** 70 patients undergoing open-heart surgery were randomized divided into two groups. Group 1 (35): anesthesia was performed with BIS monitor were open and BIS values were known from anaesthetist team. GROUP 2 (35): BIS monitor was connected to the patients. BIS value of the monitor screen was closed to the anaesthetist. Anesthesia was performed according to patient's clinical conditions. Data's on the monitor were recorded. At the beginning, the patients underwent monitoring of the systolic blood pressure, diastolic blood pressure, mean blood pressure, ECG and pulse oximetry. Additionally, the probe of BIS monitor was adhered to the forehead and the values were recorded. Anesthesia induction and endotracheal intubation were performed with fentanyl, and etomidate and vecuronium. Maintenance of anesthesia was performed with propofol and remifentanyl. In group 1, propofol and remifentanyl infusion doses were titrated throughout the operation according to BIS level kept at 35–45%. In group 2 propofol and remifentanyl infusion doses were titrated according to clinical data. Hemodynamic data and BIS values were recorded at preoperatively after induction of anesthesia, skin incision, and sternotomy, before and after bypass, and postoperative period. Respiratory parameters including arterial blood gases were also recorded.

**Results:** Patient's characteristics, hemodynamic data, ventilator parameters, blood gas values, BIS monitoring, and anesthetic drug dosages were compared in group 1 and 2. There were no statistical difference between group 1 and 2 ( $p > 0.05$ ). Intraoperative awareness and awakening were not observed at any patient.

**Discussion.**

**Conclusion:** In our study, we concluded that use of BIS monitoring in cardiovascular surgery has not effects on the total intra-operative anesthetic drug consumption.

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**Paper No: 1084.0**

**Correlation between deviations of target parameters during a perioperative crystalloid fluid loading in a 3-step minimal volume loading test for total knee arthroplasty patients**

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**Introduction:** Goal directed fluid management implies maximization of cardiac stroke volume (SV). However, measurement of SV has numerous limitations. Thus, indirect assessment of SV by measurement of more available parameters such as perfusion index (PI), venous and capillary hemoglobin concentration (Hb) or mean arterial blood pressure (MAP) seems attractive. Theoretically, it is possible since acute change in capillary PI is associated with change in systemic vascular resistance, haemodilution induced change in venous Hb is associated with change of blood volume that tends to change preload, and change in MAP may be associated with changing sympathetic stimulation and volume status. Correlation of SV deviations and capillary haemodilution can also exist since SV and arteriolar/venular tone are affected by the same neuro-humoral stimulus.

**Objectives:** Our prospective clinical trial aimed to investigate correlation between deviations of SV and MAP, capillary PI, venous and capillary Hb during crystalloid loading performed according to 3-step minimal volume loading test (mVLT) [1].

**Methods:** After approval by Ethics and signed consent, fifteen ASA II patients scheduled for primary total knee arthroplasty were enrolled. The 3-step mVLT was performed before anesthesia induction and after 24 postoperative hours. Every step consisted of 5 ml/kg bolus of acetated Ringer's followed by 5 minutes without fluid. Parameters were recorded before and after each mVLT step. Radial artery was cannulated for MAP (DASH 3000®, GE Medical Systems Information Technologies, Milwaukee, USA) and SV (LiDCOTMPlus, London, UK) measurements. Venous Hb was analyzed in laboratory. Capillary Hb (SpHb) and PI were measured noninvasively (Radical 7,

Masimo, USA). Mathematical model of bolus induced response of deviations (BIRD-math) was used to calculate continuous and shifting residual-to-baseline deviations [1]. Continuous deviations reflect dynamics of parameter's fractional change during one mVLT step, and shifting reflect the tendency of continuous deviations by comparing two steps.

**Results:** Twelve subjects completed the study. Good correlation was found between the continuous ( $r_{xy} = 0.843$ ,  $p = 0.035$ ) and shifting ( $r_{xy} = 0.893$ ,  $p = 0.035$ ) deviations of MAP and SV, also between shifting deviations of SpHb and SV ( $r_{xy} = 0.959$ ,  $p = 0.016$ ).

**Conclusions:** Monitoring of MAP and SpHb provides indirect evaluation of SV response to fluid challenges. Project was supported by ESA Research Grant 2009.

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## Paper No: 1094.0

### Low tidal volume do not affect the dynamic indicators of fluid responsiveness

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**Introduction.** The magnitude of dynamic preload indicators is affected by the tidal volume (VT). Pulse pressure variation (PPV) might less accurately predict fluid responsiveness in patients mechanically ventilated with protective strategy (VT as low as 6 ml/kg). We analyze the effects of VT on different invasive and non-invasive dynamic preload responsiveness indicators in a hemorrhage animal model. Ten rabbits were anesthetized and mechanically ventilated using a VT of 6 ml/kg and 12 ml/kg. PEEP was set at 5 cmH<sub>2</sub>O. Central venous pressure, infra-diaphragmatic aortic blood flow (Transonic) and pressure (Statham) were measured and pulse oximetry (LNOP newborn, Masimo Corp) was recorded. PPV and stroke volume variation (SVV) were obtained by the variation of beat-to-beat PP and SV respectively. Non-invasive plethysmographic waveform variations ( $\Delta$ POP) and pleth variability index (PVI) were also obtained. SV was estimated by the integral of aortic flow. Animals were studied during normovolemia (BL), after blood progressive withdrawal (20% of volemia, BW) and after fluid loading with 6% hydroxyl-ethyl-starch (FL). Data are expressed as mean  $\pm$  SD and presented in the table. Pearson product moment correlation, unpaired t test and ANOVA were used ( $P < 0.05$ ). All dynamic preload indicators were significantly correlated with PPV during the different experimental conditions ( $R^2$  between 0.5 and 0.75).

VT = 6 ml/kg VT = 12 ml/kg

BL BWFL BL BWFL PPV, %  $12 \pm 4$   $32 \pm 12^*$   $10 \pm 5^\dagger$   $14 \pm 2$   $30 \pm 12$   $6 \pm 2^\dagger$  SVV, %  $10 \pm 2$   $41 \pm 36$   $10 \pm 1$   $14 \pm 3$   $31 \pm 12$   $10 \pm 5^\dagger$  PVI, %  $15 \pm 2$   $22 \pm 7$   $13 \pm 2$   $14 \pm 1$   $34 \pm 7^*$   $11 \pm 1^\dagger$   $\Delta$ POP, %  $9 \pm 4$   $26 \pm 8^*$   $18 \pm 10$   $7 \pm 5$   $31 \pm 10^*$   $11 \pm 7^\dagger$  MAP, mmHg  $67 \pm 6$   $64 \pm 13$   $76 \pm 11$   $80 \pm 17$   $77 \pm 4$   $77 \pm 2$  SV, ml  $0.3 \pm 0.2$   $0.3 \pm 0.2$   $0.3 \pm 0.1$   $0.4 \pm 0.1$   $0.3 \pm 0.1$   $0.5 \pm 0.2$  HR, bpm  $244 \pm 19$   $267 \pm 21$   $231 \pm 12$   $247 \pm 18$   $261 \pm 33$   $248 \pm 24$

\* $p < 0.05$  BL vs BW;  $^\dagger p < 0.05$  BW vs FL. MAP: mean aortic pressure.

Dynamic indicators of fluid responsiveness increase with hypovolemia during both, high and low VT in this hemorrhage animal model. The lower transmission of respiratory pressure to the cardiovascular system and not the low VT in patients with acute lung injury would explain the absence to predict fluid responsiveness of dynamic indicators during protective ventilation.

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## Paper No: 1098.0

### The increase of vasomotor tone avoids the ability to predict fluid responsiveness of the dynamic preload indicators

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Respiratory variations in pulse pressure (PPV), stroke volume (SVV), pulse oximetry photoplethysmographic waveform amplitude ( $\Delta$ POP) and perfusion index (PVI: pleth variability index) has been proposed as a fluid responsiveness indicators. As vasopressors directly alter arterial tone, venous capacitance and the amplitude of the pulse oximetry waveform, we analyse the effects of phenylephrine (PHE) on the dynamic preload indicators in a model of hemorrhage. Ten anesthetized and mechanically ventilated (VT:  $9 \pm 2$  ml/kg, PEEP: 5 cmH<sub>2</sub>O) rabbits were studied during normovolemia (BL) and after blood progressive withdrawal (20% of volemia, BW). Then, PHE infusion was titrated to achieve a MAP of  $\pm 10\%$  of BL and a third data set of data was obtained (BW+PHE). Central venous (CVP) and left ventricular (LV) pressures, and infra-diaphragmatic aortic blood flow (Transonic) and pressure (Statham) were measured. Pulse oximetry (LNOP newborn, Masimo Corp) was recorded. PPV and

SVV were obtained by the variation of beat-to-beat PP and SV, respectively. Non-invasive  $\Delta$ POP and PVI were also obtained. SV was estimated by the integral of aortic flow. The vasomotor tone and LV preload were assessed by total arterial peripheral resistance ( $TPR = \text{mean aortic pressure} / \text{mean aortic flow}$ ) and LV end-diastolic pressure (LVEDP), respectively. Data are expressed as mean  $\pm$  DS and presented in the table. Pearson product moment correlation and ANOVA were used ( $P < 0.05$ ). All dynamic preload indicators were significantly correlated with PPV during the different experimental conditions ( $R^2$  between 0.6 and 0.8). Mean doses of PHE infusion was  $15 \pm 2 \mu\text{g/kg/min}$ .

	BL	BW	BW+PHE
PPV, %	13 $\pm$ 3	31 $\pm$ 12*	13 $\pm$ 4†
SVV, %	12 $\pm$ 3	34 $\pm$ 19*	14 $\pm$ 3
$\Delta$ POP, %	8 $\pm$ 4	29 $\pm$ 9*	12 $\pm$ 3†
PVI, %	15 $\pm$ 2	28 $\pm$ 9*	13 $\pm$ 4†
PI, %	1.1 $\pm$ 1.4	1.1 $\pm$ 1.1	0.5 $\pm$ 0.4
HR, bpm	246 $\pm$ 17	262 $\pm$ 27	240 $\pm$ 30
MAP, mmHg	73 $\pm$ 13	70 $\pm$ 11	83 $\pm$ 5
SV, ml	0.36 $\pm$ 0.12	0.33 $\pm$ 0.11	0.27 $\pm$ 0.13
TPR	0.71 $\pm$ 0.25	0.79 $\pm$ 0.23	1.4 $\pm$ 0.5††
mmHg/ml/min LVEDP, mmHg	9 $\pm$ 6	6 $\pm$ 5	5 $\pm$ 3
CVP, mmHg	4 $\pm$ 2	3 $\pm$ 1	5 $\pm$ 4

\*p < 0.05 BW vs BL; †p < 0.05 BW+PHE vs BW; ††p < 0.05 BW+PHE vs BL. HR: heart rate; MAP: mean aortic pressure; PI: perfusion index.

All dynamic preload indicators were influenced by PHE during hemorrhage. True intravascular volume deficit have been masked by the vasomotor tone increase during PHE. We cannot rule out the increase of pulmonary arterial pressure produced by PHE concomitantly. The LVEDP maintenance can discard a significant shifting blood from unstressed to stressed volume.

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**Paper No: 1155.0**

## Simulator-based study of the dräger apollo low flow wizard: preliminary results

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**Introduction:** The Low Flow Wizard (LFW; Dräger, Lübeck, Germany) provides real time guidance for cost effective user optimization of fresh gas flow (FGF) range during general inhalational anesthesia. The LFW continuously informs users whether FGF is too high, appropriate or too low and its color-coded display (red: too low; green: appropriate; yellow: too high) responds in real-time to changes in FGF performed by users.

**Objectives:** The study objective is to determine if the Low Flow Wizard feature, as implemented in the Dräger Apollo workstation, reduces volatile anesthetic consumption.

**Methods:** Because a study during actual clinical use with patients involves many potentially confounding variables, we used a mannequin patient simulator (Human Patient Simulator, HPS, version B, CAE Healthcare/Medical Education Technologies, Inc., Sarasota, Florida, USA) that consumes and exhales volatile liquid anesthetic. The patient was a 64-years old, 70 kg male with a pancreatic head mass scheduled for a laparoscopic procedure. A multi-parameter physiological monitor (Merlin 6M1046, Philips Healthcare, Andover, MA, USA) placed on top of the Apollo displayed the ECG, heart rate, SpO<sub>2</sub> and first, noninvasive blood pressure and then invasive. In this within group study, each participant acted as his or her own control. Each participant was asked to anesthetize the same “patient”, as simulated by the HPS as they normally would, twice: first with the LFW disabled and subsequently with the LFW enabled. The volatile anesthetic was isoflurane. Both simulation runs were set up to have similar time durations for the different phases of anesthesia: induction and maintenance. We started a 10 minute timer whenever the clinician said that they were ready for surgical prep and ended the scenario after 10 minutes has elapsed. We announced first incision 4 minutes after prep accompanied by elevation of BP and HR which declined over the next 5 minutes. Emergence was not simulated. The isoflurane vaporizer was weighed before and after each simulation run on a digital scale (Model EK-12Ki, 12000gx1g, A&D Engineering, San Jose, CA, USA) to determine volatile liquid anesthetic consumption.

**Results:** The ratio of liquid isoflurane consumption in grams with, and without, the LFW for the first three participants were 7:11 (63%), 5:7 (71%) and 5:14 (36%).

**Conclusions:** While we still have more participants to run through this ongoing study, our preliminary data suggest that use of the LFW results in large reductions (average of 47% reduction) in volatile liquid anesthetic consumption.

**Paper No: 1223.0**

## The mirus\* inhalation anaesthesia system: preliminary results

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**Introduction:** Inhalation anaesthesia depends on a linear or circular breathing system including admission of fresh gas partially loaded with an inhalation anaesthetic agent (IA), using a dedicated vaporizer. With these systems, a fast wash-in depends on the delivery of high IA concentrations in the fresh gas flow, with significant waste of costly agents and environmental concerns. A new system (MIRUS\* PALL, D) was designed in order to combine fast induction and IA saving by introducing the IA directly into the systems' Y-piece rather than in the fresh gas flow. The IA delivery is sequential and targets only the alveolar part of the inspiration flow. A reflector allows for saving up to 70% of patient's expired IA for reuse within the next inspiration. The system has an inbuilt gas analyzer providing end tidal (ET) IA measurement and a servo control system to reach the targeted inspiratory and ET concentrations. The MIRUS\* is a stand alone system that operates with any type of existing anaesthesia system.

**Objectives:** We report the preliminary descriptive comparison of the MIRUS\* with a standard anaesthesia work station (Aisys\* GE, USA) in terms of a) speed of reaching a target ET IA, and b) IA consumption.

**Methods:** a) With IRB approval, 4 large white pigs ( $24 \pm 1$  Kg) were studied under standard general anaesthesia (ketamine, azaperone, propofol, pancuronium) and mechanical ventilation (minute volume  $5.5 \pm 0.5$  l/min). The Aisys\* was used with a fresh gas flow of 1.5 l/min. The MIRUS\* was used with a critical care ventilator (Centiva/5 Plus\* GE, USA). Each subject, acting as its own control, was successively connected to both the systems and time to reach 90% of the target ET Isoflurane ( $t_{90}$ ; 2.0 Vol%) was measured in duplicate. b) During laparoscopic OR training sessions in Large White pigs ( $28 \pm 1$  kg) the MIRUS\* was used ( $n = 4$ ) for induction and maintenance (7h) of isoflurane anaesthesia (2.0 Vol%). The total IA consumption was compared with the one usually observed with an Aisys\* system.

**Results:** a) The MIRUS\* provided a 3 times faster wash-in (Aisys\*  $t_{90} = 1450 \pm 50$ s, MIRUS\*  $t_{90} = 490 \pm 50$ s) and b) used approx. 1/2 of the Isoflurane (Aisys\* IA =  $12.8 \pm 0.5$  ml/h, MIRUS\* IA =  $6.9 \pm 2$  ml/h); when compared to the Aisys\* system.

**Conclusions:** In these preliminary observations, the MIRUS\* has shown significant speed and IA consumption benefits in comparison with a standard anaesthesia work station.

**Paper No: 1228.0**

## Bispectral index improving anaesthetic delivery in tci propofol-remifentanyl-based anaesthesia in schedule surgery

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**Introduction:** To achieve adequate depth of anaesthesia evaluating clinical signs, such as blood pressure and heart rate, can result in either an overdosage or underdosage of anaesthetic agents. The anaesthesia guided by BIS in TIVA with propofol and remifentanyl target controlled infusion (TCI) decrease the consumption of anaesthetic drugs in surgery patients.

**Methods:** Forty adult patients ASA (physical status) I or II were enrolled for laparoscopic cholecystectomy and TIVA using TCI of propofol and remifentanyl was evaluated. The muscle paralysis was facilitated with vecuronium (0.1 mg/kg). In the control group (I) the anaesthesia was guided by clinical signs ( $n = 20$ ). In group II ( $n = 20$ ), the depth of anaesthesia was guided by BIS to keep it within the recommended range (40 to 60). None of the patients received premedication. Standard clinical monitoring was performed with ECG-NIBP-SaO<sub>2</sub> and ETCO<sub>2</sub> and four electrodes of BIS in group

II. Blood samples were obtained at T1: orotracheal intubation; T2: 15 minutes after the beginning of surgery; and T3: extubation. Propofol plasma concentration was measured by HPLC and related to theoretical Cp obtained by computer-controlled infusion of propofol (Base Primea, Fresenius). Duration of surgery, anaesthesia and intraoperative propofol dosage were recorded.

**Results:** Intraoperative theoretical propofol Cp in BIS group was significantly lower than in the control group guided by clinical signs with less consumption of propofol ( $P = 0.036$ ). Plasma propofol values measured in II were lower at T2 and T3 compared to the control group (T2: 2.48 vs 4.13 ug/ml,  $p < 0.05$ ; T3: 0.94 vs 1.30 ug/ml,  $p < 0.05$ ). No significant differences were observed between measured and predicted propofol concentrations in group II, compared to the control group where propofol concentrations were underpredicted at T2 and T3 (T2: 3.00 vs 4.13 ug/ml,  $p < 0.05$ ; T3: 0.59 vs 1.45,  $p < 0.05$ )

**Discussion:** The causes of intraoperative awareness are yet unknown. In the same way, the reasons why some patients require a higher dose of anaesthetic than others remain unknown and may be of multifactorial causes.

Using BIS in propofol-based anaesthesia can help to decrease the risk of intraoperative awareness and delayed recovery. In the present study, we kept the BIS values of the patients in the subgroup BIS in the range 40–60 which was considered to be an ideal depth of hypnosis. These results suggested that BIS improves anaesthetic delivery with less consumption of propofol with lower propofol plasma levels in schedule surgery.

**Keywords:** BIS (Bispectral Index)



**Paper No: 1247.0****Universal anaesthesia machine(uam) â€” evaluation of a new anaesthesia workstation for use in the developing world****David de Beer**<sup>1</sup>, Isabeau Walker<sup>2</sup>, Graham Bell<sup>3</sup>, Aubrey Rapuleng<sup>4</sup> and Matthew Collins<sup>4</sup><sup>1</sup> partment of Anaesthesia, Great Ormond Street Hospital NHS Trust, London, <sup>2</sup> Department of Anaesthesia, Great Ormond Street, <sup>3</sup> Department of Anaesthesia, Royal Hospital for Sick and <sup>4</sup> Department of Biomedical Engineering, Great Ormond

**Introduction:** The provision of safe anaesthesia in many developing countries is compromised by a lack of appropriately designed anaesthesia equipment. Modern complex anaesthesia workstations are unsuitable for areas with challenging environmental conditions and where supplies of compressed oxygen and electricity are unreliable. The Universal Anaesthesia Machine (UAM) is a new CE marked anaesthesia workstation that uses a high-output oxygen concentrator to deliver continuous flow inhalational anaesthesia with alternative draw-over mode if the electricity supply fails. The workstation also functions using compressed oxygen when available [1].

**Objectives:** This study formally evaluates the UAM against manufacturerâ€™s specifications and draft ISO 8835-7: anaesthetic systems for use in areas with limited logistical supplies of electricity and anaesthetic gases.

**Methods:** The following aspects of the UAM will be tested. â€” Electricity supply â€” machine functions and delivers anaesthetic gases in the event of mains electricity supply failure or sudden change in voltage. â€” Means of gas delivery â€” oxygen concentrator is compliant with ISO 8359/ISO10083/ Test fittings for alternative oxygen sources including hierarchy of use and automatic use of room air entrainment inlet when alternative oxygen sources fail. â€” Means to prevent hypoxic gas mixtures of oxygen and nitrous oxide â€” hypoxic guard and accuracy of rotameter calibration including condensation check. Test integral fuel cell oxygen monitor and apnoea alarm. â€” Draw-over vaporiser (isoflurane) â€” test structural components (including calibration and internal resistance ISO/TS 18835) and function against ideal characteristics [2] and other commercially available draw-over vaporisers [3,4]. Test that the vapour concentration output accurately reflects dial settings, remains constant over time and does not differ across clinically relevant ranges of flow rates (especially low flow rates) and ambient temperature. â€” Means for delivering gas to the patient either by continuous flow breathing system (compliant with ISO 80601-2-13) or draw-over breathing system (compliant with ISO/TS 18835). Evaluation of the effects of Continuous Positive Airways Pressure (CPAP) on the system to determine whether flow reversal occurs and to quantify the reduction in gas flow occurring when using the Ayreâ€™s T-piece (static CPAP test). â€” Means for manual

ventilation of the patient â€” test efficiency of inflating bellows. â€” Test the negative and positive pressure relief valve unit, balloon inflating valve, pressure relief valve and gas scavenging.

**Results:** Testing is in progress and full results will be available for discussion at WCA 2012.

**Conclusions:** Formal independent testing of this novel anaesthesia workstation will provide important information for those working in challenging environments.

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**Paper No: 1250.0****The cardiopulmonary bypass increases the flow of the capillaries****Ivana Prestes**<sup>1</sup>, Juan Manuel Gomez<sup>1</sup>, Eduardo Kohn<sup>2</sup>, Juan Riva<sup>1</sup> and Juan Pablo Bouchacourt<sup>1</sup><sup>1</sup> Departamento y Ćtedra de AnestesiologĀa. Hospital de ClĀnicas. UDELAR. Montevideo, Uruguay. <sup>2</sup> Sanatorio Americano. FEMI. Montevideo, Uruguay.

**Introduction:** The cardiopulmonary bypass (CPB) has frequently determined a low systemic vascular resistance. These alterations do not reflect what happens at the microcirculation. At present, we have a non invasive device called the Side Stream Dark Field (SDF) to visualize what happens here, directly and at bedside.

**Goals:** We performed a prospective observational study to assess the outcomes at the microcirculation, immediately after the CPB.

**Patients and methods:** We evaluated 21 patients that underwent cardiac surgery with the SDF (Microscan, Micro Vision Medical). The images were obtained applying the device over the sublingual mucosa at a distance from the tongue ranging from 3 to 4 cm (centimeters). We measured the (MFI) microvascular flow index and the diversity of the flows previously and immediately after the CPB.

MFI was classified in 5 categories: 0- Flow zero: no flow at all 1- Flow one: intermittent flow 2- Flow two: slow flow 3- Flow three: normal flow 4- Flow four: fast flow

We determined the predominant flow in each image, calculating the average for each time of measurement. The heterogeneity of the flow was calculated subtracting the highest

flow from the lowest one and dividing it into the average one in each time of measurement. All these measurements were carried out in three capillaries sizes: small, medium and large ones. We measured the plasmatic lactate simultaneously. The results are expressed as mean  $\pm$  standard deviation; a two sided P value of less than 0.05 was considered statistically significant.

**Results:** There was an increase in the MFI after the CPB. In the small capillaries the MFI changed from 3.32  $\pm$  0.47 before CPB to 3.38  $\pm$  0.18 after CPB. In the medium sized capillaries, it changed from 3.1  $\pm$  0.32 to 3.53  $\pm$  0.33 ( $P=0.001$ ). In the large capillaries it went from 3.3  $\pm$  0.31 to 3.56  $\pm$  0.49; these changes were not significant. The heterogeneity index did not show any modifications. The lactate showed a significant increase after the CPB increased from 0.8  $\pm$  0.27 to 2  $\pm$  0.66 ( $P=0.000$ ).

**Conclusions:** After CPB, there is an alteration in the micro-vascular beds, characterized by an increase in the flow index, in the small and medium capillaries, as well as in the plasmatic lactate.

## Paper No: 1267.0

### Soft tissue injury during glidescope intubation

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**Introduction:** The GlideScope® videolaryngoscope has been reported to provide a comparable or superior laryngoscopic view compared with direct laryngoscopy and is commonly used in the predictable difficult tracheal intubation. Here we report an unusual complication of Glidescope® assisted intubation.

**Case Report:** The authors report a case of a 79 years-old female scheduled to a carotid endarterectomy. Past history included obesity, hypertension, diabetes, heart ischemic disease and multinodular goitre. The preoperative evaluation revealed a Mallampati Score III, limited neck mobility and a right tracheal deviation. Blood tests, electrocardiography and echocardiography didn't show relevant changes. After standard monitoring and placement of an arterial line, general anesthesia was induced with IV fentanyl, etomidate and succinylcholine. The GlideScope® was inserted, the uvula was identified and the epiglottis and vocal cords were displayed on the monitor (Cormack-Lehane grade II). Due to the difficulty of directing the endotracheal tube to the glottis, this maneuver was repeated twice. After advancing the tip of the endotracheal tube through the vocal folds, without any resistance, the stylet was withdrawn and the endotracheal tube passed through the trachea. The procedure continued uneventfully. At the end, as the anesthetist prepared for extubation, notice the presence of blood in

the oropharynx of the patient. When inserted the GlideScope®, he view that the endotracheal tube had pierced the right soft palate but without active bleeding. It was decided to take the patient, ventilated to the intensive care unit (ICU). After consulting with an otolaryngologist, it was decided to do a cervical CT scan before remove the tracheal tube. The scan showed no significant changes, identifying only a small thickening of the tissues surrounding the tube. During hospitalization in the ICU developed pneumonia but was extubated on the 4th day after surgery without any intercurrents. The patient went to the ward on the 6th day but die two days later from a hemorrhagic stroke.

**Conclusion:** The GlideScope® videolaryngoscopy is a useful tool when we predict a difficult airway. Nevertheless, it is not free of complications and strategies to minimize them must be considered. We think that is imperative to insert the tube trough the mouth with direct visualization until the tip is seen in the monitor. Moreover, the stylet tip must be inside the tube to minimize lacerations.

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## Paper No: 1278.0

### Evaluation of the laryngeal mask supreme, easytube, and the king laryngeal tube suction by inexperienced personnel using a human patient simulator

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**Introduction:** The Laryngeal Mask Airway (LMA) Supreme, the EasyTube (EzT), and Laryngeal Tube Suction (LTS) are all supraglottic airway devices (SADs) with the ability to ventilate the lungs and drain the stomach. The effectiveness of each of these devices has been studied in controlled operating room and emergency situations. These studies suggest that each of the devices show promise as effective emergency airway devices in the pre-hospital setting for inexperienced personnel and for situations not conducive to endotracheal intubation.

**Objective:** The study objective was to compare insertion times of the EzT, the LTS and the LMA Supreme on a simulated patient mannequin by inexperienced personnel.

**Methods:** Forty-four medical students were recruited for the study. After a brief instructional session on the three SADs, medical students used each of the devices on a mannequin. The following data were recorded: insertion time, achievement of effective airway, the number of attempts taken to

insert the SAD, and maneuvers required. The students were reassessed after an interval of at least 3 months to test retention of skills.

**Results:** A total of 34 students completed this study. Average insertion times for the EzT were 84 seconds the first session, 150 seconds in the follow-up, with a 66 second average difference. Times for the LTS were 44, 31 and -13 seconds respectively. Times for the Supreme were 23, 22 and -2 seconds respectively. Utilizing Tukey's HSD test to compare means we determined that the mean difference in insertion times (before and after) is statistically different between devices, with the EzT being statistically different from both Supreme and LTS groups, and no difference between Supreme and LTS groups ( $P < 0.004$ ). Likewise, also using Tukey's HSD test, the mean insertion time for each device during the first phase of the study showed that it took significantly longer to insert the EzT compared to both Supreme and LTS ( $p < 0.001$ ), but no significant differences between LTS and Supreme. The same results were observed in the second phase as well ( $p < 0.0001$ ).

**Conclusion:** The study suggests that in the hands of inexperienced personnel the LMA Supreme and LTS offer an advantage in insertion time over the EzT, even with minimal instruction.

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## Paper No: 1283.0

### Tracheal intubation by anesthesiology medical residentes comparing airtraq<sup>®</sup> with the macintosh laryngoscope - a prospective study on mannequins

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**Introduction:** The difficult or failed intubation (IT) results in high morbidity by direct injury to the airway or hypoxia, and even mortality. The new IT devices can minimize failures and complications. The Airtraq<sup>®</sup> is an optical device designed for airway management without oral, pharyngeal and tracheal alignment.

**Objectives:** The aim of this study is to compare the easiness of glottis visualization in a regular airway (RAS) and in a difficult airway scenarios (DAS) with the Macintosh laryngoscope and with the Airtraq<sup>®</sup>.

**Methods:** Eleven anesthesiology medical residents (MR) agreed to participate. After a brief explanation of the new device, each MR had time to train IT on a mannequin (SimMan, Laerdal, Kent, UK). Thereafter, they performed the simulation. The MR should intubate the mannequin with both devices in a RAS and in a DAS (tongue swelling and decreased cervical extension). The variables analyzed were: success of IT, time spent, number of attempts, need of additional measures, occurrence of tooth injury, glottis visualization (POGO) and difficulty of IT by a visual analog scale (VAS). We performed two rounds of simulation. The first round was for familiarization, so their data were not considered for analysis.

**Results:** In both scenarios, the success of IT was 100% for the two devices and there was no difference regarding the time spent. There was no need for additional measures when using the Airtraq<sup>®</sup>. Using the Macintosh, 3 MR needed repositioning of the mannequin in both scenarios, 2 MR needed to use the guide wire in the DAS and 1 MR requested external laryngeal pressure and positioning guide wire to the RAS. In both scenarios there were a higher incidence of tooth injury with Macintosh ( $p < 0.005$ ) and glottic view was better with Airtraq ( $p < 0.05$ ). There was no significant difference in the IT difficulty classification by VAS between two devices in both scenarios.

**Discussion:** The use of Airtraq<sup>®</sup> appears to be better than the conventional Macintosh laryngoscope concerning dental injury and glottic visualization. It was observed that despite instructor's orientation to perform the laryngoscopy as it was a real patient, most participants did not follow the correct IT technique, especially in the DAS, which resulted in a high incidence of tooth injury. This fact may be a possible

bias in the mannequin study, however, the optical device facilitated the glottic visualization without the risk of tooth injury.

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## Paper No: 1288.0

### Designing of the medication order entry screen of an anesthesia information management system: an experiment in clinician-computer interaction in anesthesia using a tablet computer device

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**Introduction:** Anesthesia information management system (AIMS) records should be designed and configured to facilitate the accurate and prompt recording of multiple drugs administered coincidentally or in rapid succession.

**Methods:** We proposed two touch-screen display formats for use with our department's new EPIC touch-screen AIMS. In one format, medication "buttons" were arranged in alphabetical order (i.e. A-C, D-H etc.). In the other, buttons were arranged in categories (Common, Fluids, Cardiovascular, Coagulation etc.). Both formats were modeled on an iPad screen to resemble the AIMS interface. A broad range of anesthesia providers (n = 60) were then asked to find and touch the correct buttons for a series of medications whose names were displayed to the side of the entry screen. The number of entries made within 2 minutes was recorded. This was done 3 times for each format, with the 1st format chosen randomly. Data were analyzed from the third trials with each format to minimize differences in learning.

**Results:** The categorical format had a mean of 32.4 drugs entered in the third trial compared to 26.8 drugs in the alphabetical format. The mean difference was 5.6 more drugs entered using the categorical method in two minutes than the alphabetical format (95% confidence interval [CI] 4.5 to 6.8,  $P < 0.0001$ ). The mean difference was the same regardless of the order of testing (i.e. alphabetical-categorical vs. categorical - alphabetical). The difference was the same when analyzed according to the subjects' years of clinical experience. There was no difference in error rates between the two formats ( $P = 0.53$ ).

**Conclusions:** Arrangement of drugs names in a categorical display format in the medication order-entry screen of an AIMS can result in faster data entry compared to an alphabetical arrangement of drugs.

**Results:** of this quality improvement project were used in our department's design of our final Intraoperative Electronic Anesthesia Record. This testing approach using cognitive and usability engineering methods can be used to objectively design and evaluate many aspects of the clinician-computer interaction in electronic health records.

## Paper No: 1290.0

### Lingual and inferior alveolar nerve injury following the use of an i-gel™ laryngeal mask

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**Introduction:** The i-gel™ laryngeal mask (i-gel™ LM) has a supraglottic airway non-inflatable cuff, which is designed to anatomically fit the pharyngeal, laryngeal and perilaryngeal structures(2). This characteristic prevents injuries by compression that can occur with supraglottic inflatable devices, such as the lingual, hypoglossal and recurrent laryngeal nerves(1). However, there are two published cases of lingual nerve injury with the i-gel™ LM (1) (2).

**Objectives:** We report a case of a patient who developed lingual and inferior alveolar nerve injury followed by the use of an i-gel™ laryngeal mask that was correctly and atraumatically inserted.

**Methods:** A female patient, 52 year old, 61 kg, physical state ASA 2, underwent elective knee arthroscopy under general anaesthesia. Monitorization was performed by the ASA standard recommendations. After induction of anaesthesia, we easily inserted a size 4 i-gel, following the manufacturer's recommendations. Volume controlled ventilation was not associated with an air leak. There were no adverse events during the maintenance and emergence of anaesthesia. The total operative time was approximately 52 minutes.

**Results:** In the recovery room, the patient noticed bilateral numbness in the anterior two-thirds of the tongue, lower lip, lower teeth, and loss of taste. On the examination the tongue appeared and moved normally and there were no visible stigmata of intra-oral trauma. The diagnosis of the Neurologist was a probable injury of the inferior alveolar and lingual nerves caused by the use of the i-gel™ LM. Conservative treatment was advised. After 12 weeks all symptoms resolved.

**Conclusions:** The lingual and inferior alveolar nerves go together between the medial and lateral pterygoid muscles along the internal face of the mandible branch until to the mandibular canal. At this level the nerves go by separate



ways(1)(2). At any point of this route nerve damage can occur by the compression of the laryngeal mask, although it is a rare situation(2). We believe that the injury to the nerves in this case was caused by direct compression of the buccal cavity stabiliser (rigid and wide structure that prevent the i-gel™ LM to move) at any point of the route described above. Theoretically, the i-gel™LM decreases the risk of nerve damage by compression because it hasn't an inflatable cuff, however this complication can still occur.

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## Paper No: 1293.0

### Prediction performance of a model of patient's lung and chest wall mechanics during mechanical ventilation

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**Introduction:** Simulating biological systems may improve the understanding of their behavior. Anesthesiologists and intensive care team deal constantly with patients on mechanical ventilation (MV). This work presents a model which can be simulated and used to help in training physicians and respiratory therapists to analyze the respiratory mechanics of patients.

**Objectives:** To create a simulation model of the patient system that distinguish patient's lung, chest wall and airway components that allows the interaction of the user with the ventilation settings and patient characteristics. The latter includes diagnosis categories such as normal lungs, Acute Respiratory Distress Syndrome (ARDS) increased intra-abdominal pressure as it is observed during abdominal laparoscopic surgery.

**Method:** The patient respiratory system behavior is defined by the airway resistance, the lung compliance and the chest wall compliance. The simulation can use either lineal or non-lineal lung compliance. Chest wall compliance and resistance have a more lineal behavior in patients during mechanical ventilation. Adjusting the equation proposed by Venegas et al. to the lung and assuming that chest wall and airway resistance are constant ARDS patients mechanics can be simulated. By making variations chest wall compliance the behavior of an intra-abdominal hypertension model can be mimicked. The behavior of the mathematical model was compared with an animal model ventilated with volume control ventilation (VCV), where flow, airway pressure, esophageal pressure were recorded. A normal lung ventilated pig model of intra-abdominal hypertension

was performed by increasing abdominal pressure in steps. Inspiratory and expiratory pause were generated to assess respiratory mechanics. The simulator was loaded with equivalent airway resistance and lung and chest wall compliance (Ccw). To emulate the animal model, Ccw was decreased in the simulator until similar airway plateau was achieved. We compare the resulting peak pressures and respiratory system dynamic and static compliance.

**Results:** The simulation and the animal model had similar performance. As expected with a chest wall compliance reduction, airway plateau and esophageal pressures were increased, while transpulmonary pressure remained unchanged. All measurements showed good correlation between the animal and the simulator model: Peak inspiratory ( $R^2 = 0.97$ ); respiratory system dynamic ( $R^2 = 0.82$ ) and static compliances ( $R^2 = 0.96$ ).

**Conclusion:** The simulation accurately reflected the animal model respiratory system mechanics behavior during intra-abdominal hypertension.

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## Paper No: 1299.0

### Comparison of invasive and noninvasive methods of measuring blood pressure in patients undergoing bariatric surgery

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**Introduction:** Intraoperative anesthetic approach depends mostly on the correct measurement of blood pressure (BP). The obese are a special group of patients where the measurement of BP requires specific care. Size and shape of the arm are possible causes of errors of noninvasive measurement of BP (NIBP), despite the use of appropriate equipment. Catheterization of the radial artery – a invasive method for measuring BP (IBP), is considered the gold standard for situations where the non-invasive technique is inaccurate or insufficient. There are no studies comparing the two techniques in bariatric surgery to determine the sufficiency of non-invasive technique in this circumstance.

**Objectives:** The aim of this study is to compare the values of BP with non-invasive methods by oscillometry (NIBP) and invasive techniques (IBP) in obese patients undergoing bariatric surgery, and correlate these measures with anthropometric data.

**Methods:** We evaluated 36 obese patients undergoing bariatric surgery with total intravenous anesthetic technique. Information was collected regarding gender, age, height, weight, BMI and proximal/distal arm circumference. BP was assessed by two methods - invasive (IBP) and non-invasive (NIBP) - from beginning to end of surgery, at constant intervals of 10 minutes, being recorded in a specific protocol designed for this purpose. Paired t test was used to analyze the difference between the means of the NIBPxIBP methods among all patients in each time of surgery. SPSS software was used for all statistical analysis.

**Results:** Kolmogorov-Smirnov normality test for quantitative variables (age, weight, height, BMI and P/D arm circumference) was normal for all variables studied ( $p > 0.05$ ). Data analysis by paired t test showed that the mean differences between NIBP and IBP methods were statistically significant at 10–160 min and 180–200 min of surgery ( $p < 0.05$ ). Although, in the remaining surgical times (0 min, 170 min and 210–250 min) mean differences between the two methods was not significant ( $p > 0.05$ ). There was no correlation between the variables weight, height, BMI and P/D circumference.

**Conclusions:** The measurement of BP by invasive technique (IBP) demonstrates to be more reliable than non-invasive method in the majority of surgical time. NIBP measurement can show significant difference in this particular group of patients, possibly because of variations/anatomical deformation resulting from obesity, factors which could interfere on intraoperative anesthetic approach. Anthropometric data showed no significant correlation with intraoperative BP. Our study suggests that BP measurement by invasive technique (IBP) is more reliable in obese patients undergoing

bariatric surgery, providing more accurate information and allowing a better management of intraoperative anesthesia.

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## Paper No: 1302.0

### High precision of data in an anesthesia information management system does not imply high accuracy

**John L. Walsh, Mark A. Meyer and Edward A. Bittner**

**Introduction:** When storing data in an Anesthesia Information Management System (AIMS), the precision of the data is determined by the data type definition in the database software. In the case of times entered for the delivery of drugs or the times entered to document anesthetic events, the precision is often in the milliseconds. When an event is recorded by a computer to that level of precision, the inference drawn may incorrectly be that the event must have happened very close to that finely defined time.

**Objective:** Our hypothesis was that the difference between the time an event occurred and the time it was documented to have occurred (a measure of the accuracy of documentation) was far greater than the precision of the documented time. We also wished to see how the accuracy varied with the delay between the event occurrence and event documentation.

**Methods:** Following IRB approval, we queried our AIMS database for cases in 2006 in which nitrous oxide was delivered. For each case, we determined: (1) the initial time at which inhaled nitrous oxide was detected to be above 5% by an agent analyzer (Time1), (2) the time at which nitrous oxide was documented by the clinician as having been initiated (Time2), and (3) the time of the physical documentation (Time3). Subtracting Time1 from Time3 yielded a measure of the delay between the initiation of nitrous oxide and the documentation thereof. Subtracting Time1 from Time2 yielded a measure of the error between the actual time of nitrous administration and the reported time.

**Results:** The Figure displays the error in the clinician-documented time as a function of the delay in documentation (we have omitted four points with negligible errors but delays off the scale). Although the etiology of the errors is educated guesswork, we suspect that the errors of around 720 minutes represent a slip in documenting PM for AM, errors along the line of unity result from a lapse in documentation of the initial flow (whether accidental or deliberate), and the residual variability represents the intrinsic error related to the documentation method in this AIMS.

**Conclusion:** Despite the precision of timestamps in our AIMS to the millisecond, the magnitude of the error in the documented time of the administration of nitrous oxide is as great as twelve hours. Readers of electronic anesthesia records should not confuse a high level of precision with a high degree of accuracy.

## Paper No: 1303.0

### Audit to assess regional differences in difficult airway equipment & training

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**Introduction:** The Difficult Airway Society(UK) and The South African Society of Anaesthesiologists Hodgson's(SA) recommend "Required airway management equipment be immediately available wherever anaesthesia is administered" Local guidelines for stocking difficult airway trolley" Training should be provided in use of this equipment

#### Objectives:

- (1) Assess adherence to the national recommendations(-DAS/SASA/Hodgson) for providing difficult airway equipment in two teaching hospitals in separate countries - Guy's and St Thomas' Hospital(GSTT, London) and Groote Schuur Hospital(GSH, Cape Town)
- (2) Evaluate the equipment available on airway trolley in -Theatres -Casualty
- (3) Identify presence of any local guidelines for difficult airway trolley equipment
- (4) Assess experience & training of the A&E clinicians in airway management

#### Methods: Snapshot assessment of

- (1) Equipment availability on difficult airway trolleys(GSTT- 2sites; GSH-1) using a difficult airway checklist1 proforma.
- (2) Casualty doctors in the 2 hospitals using a questionnaire- exposure to equipment and interventions

#### Results: LOCAL GUIDELINES

- (1) Both hospitals had local theatre and casualty guidelines for stocking airway trolley's, BUT none adhered to the national recommendations
- (2) Missing equipment Theatres GSTT- Facemask, Surgical Cricothyroidotomy, Bullard's Laryngoscope, Trachlight, Combitube GSH-Nasopharyngeal airway(only 2sizes), Bullard's Laryngoscope, Trachlight, Combitube Casualty GSTT- In addition to the ones in theatres, malleable stylet, ProsealLMA & Aintree catheter GSH- Same as theatre, but only had one size of supraglottic airway

- (3) None had difficult airway algorithm present on the trolley

#### CASUALTY QUESTIONNAIRE SURVEY

- (1) 1. Response rate was 100% at GSTT & 55% at GSH
- (2) Grade of clinicians completing survey GSTT GSH Consultant-13% 20% Registrar-40% 60% Other-46% 20%
- (3) Previous Anaesthetic experience- GSTT53% & GSH50%
- (4) Awareness of guidelines National- 60%GSTT; 50%GSH Local- 33%GSTT; 30%GSH
- (5) Correct answers to equipment was present on the trolley 85%GSTT; 68%GSH
- (6) Experience with use of airway equipment FM- GSTT100%; GSH100% LMA- GSTT87%; GSH90% ILMA- GSTT47%; GSH50% ETT- GSTT80%; GSH100% Fiberscope- GSTT20%; GSH10% Cricothyroidotomy- GSTT40%; GSH10%
- (7) Equipment confidence Facemask- GSTT80%; GSH90% LMA- GSTT67%; GSH70% ETT- GSTT53%; GSH100%
- (8) Intubations(last year) 0-5- GSTT73%; GSH50% 6-10- GSTT6%; GSH20% >10- GSTT20%; GSH30% Failed Intubations- GSTT20%; GSH30%
- (9) LMA Insertions 0-5- GSTT/GSH 60%/50% 6-10- GSTT/GSH 40%/50%

**Conclusions:** & Recommendations None of the institutions showed adherence to National recommendations, but had local guidelines Across the 2 countries it shows the value of experience with increasing intubations, increases confidence Developing exchange programs to improving training & experience Ready availability of specialized equipment, value of systems(guidelines & checklist), ensures preparedness for difficult airway

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## Paper No: 1308.0

### Scientific abstract of mac doshi laryngoscope

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**Introduction:** Mac Doshi laryngoscope blade is designed for -Irregular dentition -missing incisor tooth and -edentulous patient

**Utility:** While laryngoscopy in edentulous patient, need to lift up mandible and extension of neck and in case of missing incisor tooth we need to put gauze pieces in the gap of

missing tooth, inspite of this Trauma to adjacent maxillary tooth is common problem

**Modification:** There are two modifications in Macintosh laryngoscope blade rest of design and dimension are same

1. Flange width is reduced to 3 mm (from 10 mm)

Due to reduced flange width, blade can be placed in the gap of missing tooth or where inter tooth gap is more than 3 mm, without touching tooth on either side avoiding trauma to the adjacent tooth.

2. Web height is increased to 30 mm (from 23 mm).

Because of increase web height, we get wider opening of mouth with upper lip stretched (avoiding sagging of the

upper lip), better retraction of tongue and no need of hyper-extension neck which is common practice in edentulous patients while laryngoscopy.

**Contraindication:** Extra large protruding out maxillary teeth (buck teeth) NOTE : Size one blade is good for cleft palate intubation

A STUDY has been conducted over 300 patients comparing Macintosh and Mac Doshi laryngoscope blade on the same patients under the influence of scoline.

**Conclusion:** Mac Doshi blade reduces the intubation time with minimal efforts and atraumatic to the adjacent tooth.



## EXPERIMENTAL CIRCULATION

(The names of the authors presenting each paper are shown in bold type)

### Paper No: 398.00

#### Homocysteine induced cardiac dysfunction cannot be reversed with diet change in a rodent model of young versus aged animals

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**Introduction:** Anesthesiologists are managing patients with complex vascular diseases. Homocysteine (Hcy) is a sulfur containing amino acid produced in the metabolic pathway of Methionine (Met). Hyperhomocysteinemia (HHcy) has been identified as a nutritional risk factor for vascular disease, atrial fibrillation and thromboembolic events (1). Hcy levels increase with intake of Met-rich products ("Western diet"), sedentary lifestyle, and impaired renal function. Aging includes decrease in renal function and elevated risk for cardiovascular events. Measuring Hcy levels can be useful in patients who present with metabolic and vascular risk factors.

**Objectives:** To determine cardiac function in young and aged animals fed Hcy enriched diet and whether changing to a healthy diet at advanced age would lead to improved cardiac function.

**Methods:** C57BL6J male mice 12 weeks old were assigned to: (1) 12 weeks regular rodent food until 24 weeks old, (2) 12 weeks Hcy enriched diet until 24 weeks old, (3) 24 weeks regular rodent feed until 36 weeks old, (4) 12 weeks Hcy enriched diet with diet change to regular diet for 12 weeks until 36 weeks old (5 animals per group). 2D transthoracic echocardiography performed at 12 weeks, 24 weeks, and 36 weeks of age. Fractional shortening (FS), right ventricular inner diameter (RVID), left diastolic and systolic inner diameter (LVIDs, LVIDd) were assessed. ECG was monitored using an implanted telemetric device. Heart rate, PR interval, QRS interval and QT time were assessed over the last ten days of the study period.

**Results:** 24-week old animals fed Hcy diet had statistically significant enlarged LVIDd and RVID and significantly

reduced FS. Diet change did not improve cardiac function. Telemetric ECG showed significant prolongation in QRS interval and QT time in animals fed Hcy.

**Discussion:** Changing from a Hcy enriched diet to a healthy diet after having consumed a poor diet for a major portion of the animals' life did not lead to any improvement of cardiac function. Physiologic aging reduces cardiac function, however Hcy had a major influence on poor myocardial function in this model of aged animals.

**Conclusion:** Increased Hcy intake at young age leads to ventricular dysfunction. Hcy induced pathologic cardiac remodeling is unlikely to be reversed with simple diet change if Hcy was elevated for a significant lifespan. Aging related cardiac dysfunction seems to be accelerated with poor diet choices. Anesthesiologists might consider discussing perioperative complications in aged risk patients with a history of HHcy.

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### Paper No: 479.00

#### Temporary Total Cardiopulmonary Support for Refractory Cardiogenic Shock (Two Levitronix CentriMag as BiVAD and ECMO inserted in the RVAD circuit)

**Jitka Lomova**, Ivan Netuka, Tomas Kotulak,  
Hynek Riha and Jaroslav Masin

**Introduction:** At IKEM, we have used implantable ventricular assist devices (VAD) to treat end-stage heart failure since 2003. In 2009, we treated pandemic influenza (N1H1) patients with long-term extracorporeal membrane oxygenation (LT-ECMO) (1).

**Objectives:** A woman (28) underwent surgery for severe mitral and tricuspid regurgitation in another hospital (Day

0). On Day 6, progressive multiorgan failure and refractory shock state required a transfer to IKEM to implant total cardiopulmonary support combining BiVAD and LT-ECMO.

**Methods:** Day 7: Implanted two Levitronix CentriMag magnetically levitated pumps. LVAD (left atrium – ascending aorta; average flow 5.4 L/min) and RVAD (right atrium – pulmonary artery; flow 5.0 L/min). In the RVAD circuit we inserted oxygenator Quadrox PLS with highly resistant, extended-use polymethylpentene fibres. Previously inserted IABP and ECMO from femoral artery and vein were removed; applied continuous venovenous hemofiltration (CVVH). Day 10: Definitive suture of sternum. Day 14: Tracheostomy. The function of both heart ventricles and aeration of both lungs improved, catecholamine support weaned; ECMO sweep gas flow reduced to 20%. Day 17: BiVAD end ECMO explanted. Day 18: Definitive sternal closure. Sedation discontinued; weaning from mechanical ventilatory support started in daytime, continued for patient's psychological comfort at night. Day 40: Spontaneous diuresis started. Day 47: CVVH terminated.

**Results:** On Day 53, the patient sent to original hospital for after-treatment w/ normal renal and liver function & good laboratory inflammatory parameters and satisfactory pre-release echocardiography. Positive subsequent recovery enabled patient's discharge, later to marry and resume teaching.

**Discussion:** Mortality of LCO after ECC is usually 80%. The inotropic support with IABP is the first step after primary failed weaning from ECC; the implantation of ECMO would be the next. LVAD implantation instead of ECMO was described with good results. The preoperative prediction of RV function after LVAD implantation is crucial for device selection and patient's outcome (2,3). RVAD placement avoids RV ballooning and irreversible cardiomyocyte stretching (6). Low mortality rate of 21% for application of ECMO for extended use in young adults with severe hypoxemia was documented (1).

**Conclusion:** Early recognition of patients rapidly progressing to refractory cardiac failure requires their immediate transfer to a hospital experienced in mechanical circulatory support. This cardiogenic shock patient suffered pulmonary, renal and hepatic failure and was risking ICU death. Even though the mechanical support was implanted relatively late (Day 7), saving the patient imbued our professional confidence in being able to apply the related complex interventions.

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## Paper No: 521.00

### Sevoflurane reduces leukocyte and platelet adhesion following ischemia/reperfusion by protecting the endothelial glycocalyx

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**Introduction:** Adhesion of polymorphonuclear neutrophils and platelets to the vessel wall contributes to generating ischemia/reperfusion (I/R)-injury.<sup>1</sup> Endothelial adhesion molecules are normally harboured within the endothelial glycocalyx<sup>2</sup> which covers every healthy vascular endothelium. This structure is deteriorated by I/R exposing vascular adhesion molecules.<sup>3</sup> Pretreating the heart with volatile anesthetics reduces myocardial infarct size and protects against I/R-injury.<sup>4</sup>

**Objectives:** To analyse a possible protective effect of sevoflurane on the endothelial glycocalyx and implications for post-ischemic adhesion of leukocytes and platelets. **Methods:** Isolated guinea pig hearts were perfused with crystalloid buffer and subjected to 20 min global warm (37°C) ischemia and 10 min subsequent reperfusion. An intracoronary bolus of 3x10<sup>6</sup> polymorphonuclear neutrophils leukocytes or 1x10<sup>9</sup> platelets of human origin was applied after reperfusion, either with or without pre-treatment with 0.5 or 1 minimal alveolar concentration sevoflurane. The number of sequestered cells was calculated from the difference between coronary input and output. Coronary effluent was collected throughout reperfusion to measure shedding of the endothelial glycocalyx.

**Results:** I/R induced a significant increase in median (interquartile range) adhesion vs. control non-ischemic hearts of both leukocytes (38.9 (36.3-42.9) vs. 14.5 (13.1-16.0)%) and platelets (25.0 (22.5-27.1) vs. 9.4 (8.4-10.7)%). Shedding was evidenced by an approximately 8-fold increase in washout of syndecan-1 and heparan sulfate vs. basal. Sevoflurane reduced cell adhesion to near basal at 1 minimal alveolar concentration (leukocytes: 21.2 (19.2-23.9)%, platelets: 11.5 (10.4-12.0)%). Shedding measurements and electron microscopy demonstrated that sevoflurane treated hearts retained much of their 200 nm thick glycocalyx.

**Conclusions:** Sevoflurane reduces glycocalyx shedding in the postischemic coronary bed, maintaining the natural cover for endothelial adhesion molecules and, thus, reducing cell

adhesion. This may explain beneficial outcomes linked to clinical use of volatile anesthetics following I/R.

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## Paper No: 657.00

### Cellular mechanisms of cardiac dysfunction in endotoxemic mice

Ion Hobai<sup>1</sup>, Emmanuel Buys<sup>1</sup>, Antonis Armoundas<sup>1</sup>, Deborah Siwik<sup>2</sup> and Peter Brouckaert<sup>3</sup>

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**Introduction:** The pathology of cardiovascular dysfunction in sepsis and shock is incompletely understood. While nitric oxide (NO, released by the inducible NO synthase, NOS2) is known to play a pivotal role, its downstream effectors are still unclear. In principle, NO acts by activating the enzyme soluble guanylate cyclase (sGC) to synthesize cGMP, and also has cGMP-independent effects, including oxidative modifications of proteins.

**Objectives:** Here we aimed to differentiate the roles of cGMP and oxidative stress in the dysregulation of cardiac calcium (Ca<sup>2+</sup>) handling induced by endotoxemic shock in mice.

**Methods and Results:** Cardiac myocytes were isolated from C57BL/6 mice at baseline and 12h after administration of lipopolysaccharide (LPS, 25 mcg/g, ip). LPS induced a decrease in externally paced cellular Ca<sup>2+</sup> transients (measured with fura 2AM) and cell shortening to 78.25 ± 0.04 % and 59.94 ± 0.07 % of baseline, respectively (n > 8 mice). This was associated with a decrease in L-type Ca<sup>2+</sup> channels (LTCC) current (to 76 ± 4% of baseline, measured by patch clamp) and expression (to 39 ± 3% of baseline, by immunoblotting, n > 5 mice for either). Sarcoplasmic reticulum Ca<sup>2+</sup> pump (SERCA) activity was measured as the time constant of Ca<sup>2+</sup> decay, and found to be decreased to 89 ± 4% of baseline after LPS. SERCA and phospholamban (PLB) expression levels, as well as PLB phosphorylation (at both Ser16 and Thr17 sites) were unchanged after LPS (immunoblotting, n > 5 mice). All the above deficits were found to be similar or more pronounced in mice deficient in the

major isoform of sGC (sGCα1-/-), indicating they are independent of cGMP formation. Moreover, for SERCA, LPS induced a decrease in the degree of biotinylated iodoacetamide (BIAM) labeling (to 61 ± 6% of baseline, n > 6 mice), indicating the presence of oxidative modifications, that have been shown previously to exert an inhibitory effect.

**Conclusion:** In mice, administration of LPS induces a decrease in LTCC expression and an allosteric inhibition of SERCA, that both contribute to cardiac dysfunction. Both effects are independent on cGMP and may be secondary to NO-induced oxidative modifications of LTCC and SERCA.

## Paper No: 798.00

### Acute isovolemic anemia in sepsis : 6% hydroxyethyl starch versus 3% modified fluid gelatin

Natalia Magasich-Airola, Fouad Chaiiri, Fuhong Su, Jean-Louis Vincent and Philippe Van der Linden

**Background and Goal of Study:** Synthetic colloids are often used for fluid resuscitation during sepsis. Rheological properties of these colloids may affect tolerance to acute isovolemic anemia (AIA). This tolerance can be evaluated by the critical hemoglobin concentration (Hbcrit) defined as the hemoglobin (Hb) value below which O<sub>2</sub> consumption becomes delivery dependent. The aim of our study was to compare the effects of 6% hydroxyethyl starch 130/0.4 (HES) and 3% modified fluid gelatin (GEL) on Hbcrit in an experimental model of sepsis induced in anesthetized sheep.

**Materials and Methods:** Following institutional animal research committee approval, 17 sheep were invasively monitored, anaesthetized with fentanyl (10 µg/kg) and sevoflurane (2% = 1MAC end-tidal), paralyzed with cisatracurium (0.15 mg/kg) and mechanically ventilated (FiO<sub>2</sub>: 0.4). Sepsis was achieved by caecal ligation and perforation. Four hours after surgical preparation, animals were randomized to undergo progressive hemodilution using either HES (N=8) or GEL (N=9) as the substitution fluid (ratio 1:1). Each hemodilution step corresponds to a blood exchange of ± 500ml. For each sheep, Hbcrit was determined from a plot of O<sub>2</sub> consumption (VO<sub>2</sub>: indirect calorimetry) versus Hb (Co-oximeter measurement) and from a plot of blood lactate (Lac) versus Hb using a last-sum-of-squares technique (1). Hbcrit values were compared between the two groups using a Mann-Whitney U test. Data are presented as median [interquartiles].

**Results:** Group HES Group GEL p Hbcrit (VO<sub>2</sub>) (g/dl) 3.2 [2.5-4.0] 3.7 [3.3-4.4] NS Hbcrit (Lact) (g/dl) 3.3 [3.0-4.0] 3.3 [2.9-4.2] NS VO<sub>2</sub>crit (ml/min) 271 [236-315] 329 [254-400] NS Lacrit (mMol/l) 0.9 [0.4-1.1] 1.6 [1.6-2.2] <0.01

**Conclusion:** In this experimental model of sepsis, the type of synthetic colloid used does not affect tolerance to AIA.

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### Paper No: 918.00

#### Evaluation of the effect of three different inotropic support strategies in the normal and stunned newborn piglet heart on hemodynamics and myocardial metabolism

Janus Adler Hyldebrandt<sup>1</sup>, Line Kolstrup<sup>1</sup>, Pia Colding<sup>1</sup>, Susani Rothmann<sup>2</sup> and Johan Heiberg<sup>2</sup>

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**Introduction:** The myocardium of the newborn differs from the adult with regard to physiology, metabolism, and adrenoceptor density. A variety of inotropic strategies are used to treat low cardiac output in the newborn, all challenged by the low compliance of the myocardium and a high resting beta-adrenergic state.

**Objectives:** Aim of the present study was to evaluate the effect of three inotropic strategies on hemodynamics and metabolism in an in vivo neonatal piglet model with normal or stunned right ventricular myocardium.

**Methods:** Piglets were premedicated with midazolam and ketamine. Anesthesia was maintained with sevoflurane, and fentanyl infusion. Animals had pressure-volume catheters inserted in both the right and left ventricle. Microdialysis catheters were inserted in the left and right ventricle, and metabolites were measured in the dialysate. In half of the animals stunning of the right ventricle was induced by 10 cycles of 3 minutes of ischemia induced by a tourniquet around the right coronary artery, followed by 3 minutes of reperfusion. Animals followed a protocol with infusion for three hours with either: Dobutamin 8 µg/kg/min (DO); adrenaline 0.09 µg/kg/min and milrinone (loading dose of 50 µg/kg) 0.4 µg/kg/min (AM); dopamine 6 µg/kg/min and milrinone (loading dose of 50 µg/kg) 0.4 µg/kg/min (MD) or isotonic saline 2 ml/h.

**Results:** In the normal functioning hearts, heart rate increased significantly in all intervention groups, but no significant change was observed in CO. Contractility (dP/dt max) was significantly increased by AM(37%,  $p < 0.05$ ), and diastolic function (dP/dt min) was significantly improved by DO(32%,  $p < 0.05$ ) and AM(35%  $p < 0.05$ ). The lactate concentration increased significantly in both RV and LV microdialysate samples and plasma in the AM treated animals. In the animals with stunned right ventricle we found marked increase (197%,  $p < 0.05$ ) in lactate after ischemia-reperfusion. After 180 minutes blood lactate levels were significantly higher in the MA group, compared to all other groups. Preliminary results after 5 animals in each group stunning suggest DO treatment to have less effect on LV and RV contractility

compared to other treatment groups. Results from microdialysis and pre and afterload independent measurements of contractility are pending analysis. Conclusions: In the normal myocardium. The three inotropic strategies were comparable with respect to effect on hemodynamics, but MA had the most pronounced effect on contractility in terms of dP/dT. In the stunned myocardium, lactate remained high in the AM group after ischemia-reperfusion in contrast to the other intervention groups.

### Paper No: 1027.0

#### Involvement of high mobility group box-1 in vascular and systemic responses to sepsis in rats

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**Background:** High mobility group box-1 (HMGB1) is one of the delayed-type mediators released during sepsis that enhance inflammatory reactions in various organs. However, the role of HMGB1 in vascular responsiveness during sepsis is still unclear.

**Objectives:** To clarify the role of HMGB1 in vascular responsiveness and mortality. **METHODS:** Male SD rats ( $n=32$ , 200-250g in body weight) were used. CLP group rats ( $n=22$ ) were subjected to cecal ligation and puncture under general anesthesia. Then, 4 mg/kg of anti HMGB1 antibody (AB group,  $n=11$ ) or the same volume of normal saline (NS group,  $n=11$ ) was injected through the tail vein immediately and 4 hrs after the surgery. A group of sham-operated rats ( $n=10$ ) underwent laparotomy, and the cecum was manipulated but neither ligated nor punctured. The thoracic aorta was removed 12 hrs after the operation and phenylephrine (PE)-induced contraction was determined as the relative response to 40 mM KCl. Expression of HMGB1 was examined immunohistochemically or by Western blot analysis. In some rats (5 from each group), a transmitter was implanted in the abdomen to monitor heart rate and body temperature, and the femoral artery was catheterized to monitor arterial blood pressure for 16 hrs.

**Results:** In the first series of PE-induced contraction, the maximum responses were attenuated in the NS and AB groups compared to the sham group. In the second series, the responses were comparable to the first ones in the sham and AB groups, but were lower than the first ones in the NS group. In the NS group, HMGB1 was strongly expressed in the vascular endothelium compared to the sham group. Western blot analysis showed that HMGB1 expression was comparable in the sham and AB groups, but increased in the NS group in a time-dependent fashion. Arterial blood pressure was comparable in the AB and NS



groups, but it was significantly decreased compared to that in the sham group. Heart rate was also comparable in the AB and NS groups, but it was significantly increased compared to that in the sham group. Body temperature was comparable in the three groups.

**Conclusions:** These findings suggest that HMGB1 significantly suppress the vascular contractile response in sepsis. The eight mg/kg dose of anti HMGB1 antibody was not sufficient to suppress the systemic inflammatory responses induced by cecal ligation and puncture.

## EXPERIMENTAL NEUROSCIENCES

(The names of the authors presenting each paper are shown in bold type)

### Paper No: 16.00

#### **Volatile Anesthetic Preconditioning Present in the Invertebrate *Caenorhabditis elegans***

**Baosen Jia and Charlie Micheal Crowder**

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**Introduction:** Volatile anesthetics (VAs) have been found to induce a delayed protective response called preconditioning to subsequent hypoxic/ischemic injury. VA preconditioning has been primarily studied in canine and rodent heart. Objective: A more genetically tractable model of VA preconditioning would be extremely useful. Here, the authors report the development of the nematode *Caenorhabditis elegans* as a model of VA preconditioning.

**Methods:** Wild-type and mutant *C. elegans* were exposed to isoflurane, halothane, or air under otherwise identical conditions. After varying recovery periods, the animals were challenged with hypoxic, azide, or hyperthermic incubations. After recovery from these incubations, mortality was scored.

**Results:** Isoflurane- and halothane-preconditioned animal shad significantly reduced mortality to all three types of injuries compared with air controls. Concentrations as low as 1 vol% isoflurane (0.64 mM) and halothane (0.71 mM) induced significant protection. The onset and duration of protection after anesthetic were 6 and 9 h, respectively. A mutation that blocks inhibition of neurotransmitter release by isoflurane did not attenuate the preconditioning effect. A loss-of-function mutation of the Apaf-1 homolog CED-4 blocked the preconditioning effect of isoflurane, but mutation of the downstream caspase CED-3 did not.

**Conclusions:** Volatile anesthetic preconditioning extends beyond the vertebrate subphylum. This markedly broadens the scope of VA preconditioning and suggests that its mechanisms are widespread across species and is a

fundamental and evolutionarily conserved cellular response. *C. elegans* offers a means to dissect genetically the mechanism for VA preconditioning as illustrated by the novel finding of the requirement for the Apaf-1 homolog CED-4.

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### Paper No: 170.00

#### **Anntiallodynic effects of curcumin in inflammatory and postoperative pain in rats**

**Myung Ha Yoon, Jeong Il Choi and Yeo Ok Kim**

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**Introduction:** Although curcumin, the major component of turmeric, has recently been shown to have antinociceptive effect in some pain states, the effects on inflammatory and postoperative pain remains to be determined. Thus, in the present study, we investigated the effect of curcumin on such pain.

**Methods:** Inflammatory pain was induced by a subcutaneous injection of 100 µl of a 2% carrageenan solution into the left hindpaw. For postoperative pain, a 1-cm longitudinal incision was made on the plantar aspect of the left hindpaw of anesthetized rats and closed with 5-0 nylon. Withdrawal threshold to von Frey filament application near the injury site was determined before and after the drug administration. All drugs were injected intraperitoneally.

**Results:** After both carrageenan injection and plantar incision, the paw withdrawal threshold was significantly decreased in injured sites. Intraperitoneal administration of curcumin at doses from 10 to 100 mg produced antiallodynic effects in a dose-dependent manner in both pain states.

**Conclusions:** Intraperitoneal curcumin alleviated mechanical allodynia induced by paw carrageenan injection and plantar incision. Thus, systemic curcumin may be a useful in the management of inflammatory and postoperative pain.

## Paper No: 228.00

### Pharmacologic interaction between intrathecal cannabinoid and cox-2 inhibitor in bone tumor pain model of rats

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**Introduction:** We evaluated the efficacy of nonselective cannabinoid (CB) receptor agonist (WIN 55,212-2) and COX-2 inhibitor (DUP 697) on bone tumor pain in the spinal cord of rats, and also to examine the properties of drug interaction between two drugs, further to clarify the role of CB1 and CB2 receptors on the effect of WIN 55,212-2.

**Methods:** Bone tumor pain was induced by injection of MRMT-1 tumor cells (1 x 10<sup>5</sup>) into the tibia of female Sprague-Dawley rats under sevoflurane anesthesia. A polyethylene-10 catheter was inserted into the intrathecal space for drug administration. For pain assessment, a withdrawal threshold was measured using von Frey filament being applied to the tumor cell inoculation site. The effects of intrathecal WIN 55,212-2 and DUP 697 were investigated. Isobolographic analysis was used for evaluation of pharmacologic interaction. And then, the role of CB receptors on the antinociception of WIN 55,212-2 was determined with selective CB1 (AM 251) and CB2 receptor (AM 630) antagonists, and selective CB1 (ACEA) and CB2 receptor (AM 1241) agonists. The expression of CB receptors and COX-2 in the spinal cord was examined with RT-PCR and Western blot analysis.

**Results:** Intra-tibial injection of MRMT-1 tumor cells produced a bone tumor. Also, the paw withdrawal threshold was significantly decreased (mechanical allodynia) in tumor

developing site. Intrathecal WIN 55,212-2 and DUP 697 dose-dependently increased the withdrawal threshold. Isobolographic analysis revealed an additive interaction after intrathecal delivery of WIN 55,212-2 and DUP 697. The antinociceptive effect of WIN 55,212-2 was antagonized by both AM 251 and AM 630. Both intrathecal ACEA and AM 1241 increased the withdrawal threshold. RT-PCR showed that CB1, CB2 receptors and COX-2 mRNA were detected in the spinal cord of sham rats, while COX-2 mRNA, but not CB1, CB2 receptors mRNA, expression was increased in bone tumor rats. Western blot analysis indicated that CB1, 2 receptors and COX-2 protein were expressed in the spinal cord of sham and bone tumor rats, and no significant differences were seen in the expression level between sham and bone tumor rats.

**Conclusions:** Intrathecal WIN 55,212-2 and DUP 697 reduce bone tumor-related pain behavior, and interact additively with each other. The effect of WIN 55,212-2 is mediated through both CB1 and CB2 receptors in the spinal cord.

## Paper No: 251.00

### Ketamine induces apoptosis in human neurons differentiated from embryonic stem cells via reactive oxygen species

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**Introduction:** Ketamine has been shown to cause neurotoxicity in developing animal models (1-2), leading to a serious concern regarding the safety of pediatric anesthesia. Some epidemiological studies suggest that anesthesia administration early in life is associated with learning outcomes later in life (3-4), while others found no significant differences (5-6). Thus, it is imperative to find a good model to study anesthetic-induced developmental toxicity in human neurons.

**Objectives:** We investigated toxic effect of ketamine on neurons differentiated from human embryonic stem cells (hESCs). **Methods:** Differentiated neurons were identified by the expression of neuron-specific markers using immunofluorescence staining. Two-week-old neurons were then treated with different doses and durations of ketamine with or without reactive oxygen species (ROS) inhibitor Trolox. Cell viability, apoptosis, and ROS production were evaluated by MTT assay, activate caspase-3 analysis, and CM-H2DCFDA staining, respectively.

**Results:** Differentiated neurons expressed neuron-specific markers. Three millimolar ketamine time-dependently decreased cell viability after 6, 12, and 24 hr incubation. In addition, higher dosage of ketamine resulted in more cell death and ROS production as well as stronger caspase-3 activity. Furthermore, Trolox significantly prevented

ketamine-induced cell death and decreased caspase-3 activity and ROS formation in a dose-dependent manner.

**Conclusions:** This study illustrates for the first time that 1) Ketamine induces a time- and concentration-dependent induction of apoptosis in human neurons via ROS-mediated pathway; 2) Importantly, ketamine-induced neurotoxicity can be attenuated by Trolox; and 3) Neurons differentiated from hESCs might be a promising in vitro model for studying anesthetic-induced neurotoxicity and its underlying mechanisms.

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## Paper No: 285.00

### Isoflurane postconditioning in stroke: a possibility for patients?

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Strategies to limit lethal reperfusion and ischemic injury in patients with ischemic stroke are of major clinical interest. Halogenated anesthetics, have demonstrated a positive effect for treatment by preconditioning in brain ischemia and cardiac surgery. As a new idea, postconditioning in brain ischemia may be very attractive for clinical application, especially during re perfusion after stroke. In vitro studies demonstrated that isoflurane was strongly neuroprotective after oxygen-glucose-deprivation (OGD). We evaluated in vivo in a mouse stroke model the impact of isoflurane on infarct size and neurological outcome. Outbred CD1 mice were subjected to 30 min middle cerebral artery occlusion (MCAo). One group of mice (postconditioning group) received isoflurane at 1.0, 1.5 and

2.0 minimum alveolar concentrations (MAC), administered over 30 minutes in the re perfusion period immediately after occlusion. A second group (no postconditioning group) of

mice did not receive isoflurane and were woken in the first ten minutes after re-perfusion. The infarct volume and neurological deficit scores were evaluated at 48 hours. Lesion size at 48 h was significantly reduced in the postconditioning groups, from  $21.73 \pm 3.59$  mm<sup>3</sup> (n=6, no postconditioning group) to  $11.15 \pm 1.02$  mm<sup>3</sup> in the group treated with 2.0 MAC (n=6) (p=0.01),  $11.52 \pm 0.67$  mm<sup>3</sup> in the group treated with 1.0 MAC (n=6) (p=0.03) and  $11.88 \pm 1.46$  mm<sup>3</sup> in the group treated with 1.5 MAC (n=6) (p=0.044). Neurological scores were better in the 1.0 MAC group compared to the no postconditioning group (p=0.04). Together our results show that postconditioning with isoflurane (1.0 MAC, 1.5 MAC and 2.0 MAC) not only reduces infarct size but also results in a better neurological performance. This is an important result because it is the first time that protection by postconditioning using isoflurane is demonstrated in vivo. This will be relevant for clinical application in that isoflurane is widely available and commonly used in clinical practice with good tolerance and therefore clinical trials may be easily developed leading to improved patient treatment.

## Paper No: 410.00

### Propofol changes the pupil dilation response to noxious stimulation in humans

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**Introduction:** Pupil dilation is a potential biomarker for both analgesic effect and anesthetic depth, but it is not a simple sympathetic reflex. Event-related pupil dilation response (PDR) is a complex, cognitively-mediated response related to defense, and as such it may prove useful for assessing sedation level in conscious patients.

**Objectives:** The purpose of this study is to evaluate the PDR to noxious fingertip stimulation as an index of propofol sedation level.

**Methods:** We varied mixture target effect-site concentrations of propofol (0, 0.5, 1.0, 1.5 µg/mL), measuring Somatosensory Evoked Potential (SEP), PDR, and PR (Pain Report) responses to painful electrical fingertip stimulation at high and low intensities in 27 female volunteers. Results Mixed effect model statistical analyses revealed that:

- 1) Propofol significantly (p < 0.01) reduces the amplitude of SEP peaks related to attentional processes, N150 and P250, in a dose related fashion;
- 2) PDR amplitude significantly (p < 0.05) diminishes with increasing propofol sedation dose in a dose related fashion;
- 3) PR correlates positively with PDR and SEP amplitudes; and



- (4) The decrease in PDR to noxious stimulation during propofol sedation will correlate with sedation level, as gauged with the BIS and OAA/S, as well as blood concentration of propofol.

**Conclusions:** The PDR is a useful gauge for light sedation induced by propofol. Propofol may exert a mild analgesic effect.

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## Paper No: 951.00

### Effect of propofol on acetylcholine release evoked by veratridine in rat hippocampal synaptosomes

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**Introduction:** General anesthetics are widely used to induce general anesthesia but their molecular mechanisms of action remain obscure. Acetylcholine (ACh) is a common distributed excitatory neurotransmitter in mammals' brain, that is involved in the regulation of consciousness, awakening, cognitive, memory and sleep (Perry, 1999). Propofol is an intravenous anesthetic commonly used for induction and maintenance of anesthesia and for sedation in intensive care. This agent is capable to modify synaptic transmission by altering the release of neurotransmitters in the presynaptic region and also modulating the response in the region postsynaptic (Hui Zhang et al, 2009). In the present study we investigated the effect of propofol on the ACh release induced by veratridine, a voltage-dependent Na<sup>+</sup> channel opening agent, in rat hippocampal synaptosomes.

**Objectives:** Evaluate the effect of propofol on the release of ACh induced by veratridine in rat hippocampal synaptosomes.

**Methods:** Synaptosomes from Wistar rat cerebral hippocampus were prepared by sucrose gradient method as described previously by Westphalen and Hemmings (2003). The final pellet was incubated with [methyl-3H] choline chloride for 15 min at 37°C. Prelabeled synaptosomes were confined between Whatman GF/B filter discs and superfused using an apparatus set to collect 2-min fractions. The results were obtained and analyzed in DPM (decays per minute) of

[3H]-ACh release per fraction and represented the average of samples done in triplicate, repeated at least five times on different days. The results were analyzed by ANOVA followed by Newman-Keuls.  $p < 0.05$  was considered statistically different.

**Results:** Veratridine (10, 50 and 100  $\mu$ M) increased the [3H]-ACh release in rat hippocampal synaptosomes. The release of ACh induced by 50 and 100  $\mu$ M of veratridine was similar ( $p > 0.05$ ) and the release of ACh induced by veratridine 50  $\mu$ M was higher than the 10  $\mu$ M ( $p < 0.05$ ). Propofol (1, 3, 10, 30, 100 and 300  $\mu$ M) decreased the release of ACh evoked by 50  $\mu$ M veratridine.

**Discussion and Conclusion:** The results demonstrated that veratridine evoked ACh release in rat hippocampal synaptosomes. Propofol, at clinical and supraclinical concentrations, reduced veratridine-evoked ACh release in rat hippocampal synaptosomes in a dose dependent manner.

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## Paper No: 992.00

### Influence of ageing and male gonads in pain perception in rats

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**Introduction:** Pain is complex experience influenced by many factors. Among these factors, there are ageing process and gonadal hormones. The use of animal pain models allows the isolation of variables, facilitating the comprehension of the roles each factor has on pain.

**Objectives:** Two experimental pain models were used, pain induced by formalin paw injection and plantar incision, to study the influence of ageing and male gonads on pain perception. **Methods:** Adult rats (6 months), aged rats (22 months), young non orchietomized and orchietomized rats were evaluated for the number of flinches after paw formalin injection and mechanical withdrawal threshold after plantar incision.

**Results:** The results showed aged rats presented decreased number of flinches than adult rats during phase II of formalin induced behavior at 25, 30 and 35 minutes time points. Aged rats presented lower paw withdrawal threshold after mechanical stimulus in the plantar incision model, at 2nd, 3rd,

4th, 7th and 10th postoperative days, the return to baseline levels occurred after the 18th day in aged rats and after the 10th day in adult rats. Orchiectomized rats presented decreased number of flinches compared to non orchiectomized rats in the initial section of phase I, 5 minutes time point, and in phase II, at 25, 30, 35, 40, 45, 50, 55 and 60 minutes time points. In orchiectomized rats, paw withdrawal threshold was lower when compared to non orchiectomized rats on the 1st, 2nd, 4th and 7th postoperative days. Return to baseline values occurred after the 18th day in orchiectomized rats and after the 14th day in non orchiectomized rats.

**Conclusions:** Data showed that pain perception changes with the ageing process according to the type of stimulus and that male gonads present analgesic effect on both pain models evaluated.

## Paper No: 1162.0

### Influence of propofol on learning-memory and long-term potentiation at hippocampal slices in aged rats following chronic cerebral ischemia

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**Introduction:** Propofol is often administered in aged patients with chronic cerebral ischemia for sedation. So it is very impotents to understand the influence of propofol on cerebral function, such as learning-memory and so on.

**Objective:** To investigate the effects of propofol on learning-memory and long-term potentiation(LTP) at the CA1 region of rat hippocampal slices in aged rats following chronic cerebral ischemia.

**Methods:** Eighty aged SD rats were randomly allocated into 4 groups (n = 20 in each). Cerebral ischemia was induced in 60 rats by double carotid arteries occlusion, while other 20 rats received sham surgery as control (group C). The first 20 rats with cerebral ischemia (group I) received intraperitoneal NS 2.5 ml/12h from the 1st day to the 7th day following vessal occlusion. The second 20 rats with cerebral ischemia (group P1) received intraperitoneal propofol at dose of 10 mg/kg/12h instead of NS, while the last 20 rats (group P2) received propofol at 50 mg/kg/12h. The learning-memory function for all groups was assessed by the Morris Water Maze (MWM) test at the 3rd day (n = 10 in each group) and 30th day (n = 10 in each group) after the last injection respectively. The hippocampal slices were prepared in those rats after MWM test. LTP was induced and recorded from the CA1 region of rat hippocampal slices in each rat.

**Result:** The learning-memory deficits assessed by MWM test were found in group I at both time endpoints, compared

with group C ( $P < 0.05$ , receptively). Treatment with propofol at 10 mg/kg/12h for 7 days aggravated learning-memory deficits at 3rd day after the last drug injection, whereas it did not at 30th day. However, aggravated learning-memory deficits were found in the group with propofol at high dose at the both endpoints. LTP induction and maintenance in group I were inhibited compared with group C at both endpoints ( $P < 0.05$ , respectively). Propofol at both doses enhanced those inhibitions at 3rd day, but propofol at 10 mg/kg/12h did not do at the 30th day.

**Conclusions:** Propofol can aggravate cerebral ischemia-induced learning-memory impairment by inhibiting LTP production, and this effects would continue for long term when propofol is at higher dose.

## Paper No: 1190.0

### Sildenafil and morphine coadministration: analgesia enhancement and antiedematogenic effect

Daniel De Oliveira

Carolina Eto Taciane Stein Eduardo Souza-Silva Carlos Tonussi

**Introduction:** Drug combinations have been used to treat pain aiming to have satisfactory analgesia with few side-effects. Laboratory studies have shown that phosphodiesterase-5 inhibitors, like sildenafil, when combined with morphine are able to enhance analgesia (1,2) or influence in edematogenic events (3). However, no study has shown the phenomena simultaneously, making it impossible to plan a future clinical application.

**Objectives:** Our aim was to investigate the effects of sildenafil and morphine coadministration in a model of articular incapacitation, edema and plasma leakage induced by formalin in rat knee joints.

**Methods:** After the formalin injection (1.5%; i.art.) articular incapacitation was measured by counting the paw elevation time (PET; s) during 1 min period of forced walk, each 5 min throughout a 60-min experimental session. Edema was evaluated by the articular diameter (AD; cm) increase, and plasma leakage was measured by the amount of evans blue (25 mg/kg; i.v.; 30 min before the test) in synovial fluid (PL;  $\mu\text{g/mL}$ ) 1 hour after formalin injection. Under this protocol, sildenafil (1, 2.5, 5 mg/kg; i.p; 30 min before the test) and morphine (1, 2.5, 5 mg/kg; s.c; 30 min before the test) were performed, then the subeffective doses were coadministered (1/1 mg/kg; i.p./s.c; 30 min before the test).

**Results:** Sildenafil could not modify nociception or edema, although the higher dose increased the plasma leakage (5 mg/kg;  $p < 0.05$ ). Only the higher dose of morphine significantly reduced the formalin nociception (5 mg/kg;  $p < 0.05$ ) but there was no modification in edema or plasma

leakage. The coadministration of subeffective doses of sildenafil and morphine caused a stronger hyponociceptive effect ( $p < 0.01$ ) than morphine alone, and still reduced the plasma leakage ( $p < 0.05$ ).

**Conclusions:** These data support the notion that sildenafil can improve the analgesic morphine response with concomitant antiedematogenic effect. Probably, the NO/cGMP pathway is an important mediator in this event. We believe that this drug combination might be a useful implement to manage pain with potentially fewer undesirable reactions.

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## GERIATRIC ANAESTHESIA

(The names of the authors presenting each paper are shown in bold type)

### Paper No: 110.00

#### **A study of the rate of change in BIS values during the induction of anesthesia due to differences in propofol dosage and aging**

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**Background:** There are many reports on delayed emergence from anesthesia in the elderly due to propofol, but there are few reports that have considered the differences due to age at the time of induction. In this report, we conducted a study of the time taken to reach a hypnotic state subsequent to propofol bolus administration, after dividing the cases by dosage and age.

**Method:** Taking as subjects 100 patients from ASA Evaluation I-II, we conducted a study on the Propofol dosage for anesthesia induction and BIS values. We measured the time (t50, seconds) until the BIS value reached 50 subsequent to Propofol administration, divided the subjects into four groups: those 70 years of age or older with Propofol dosages of 2 mg/kg (I-P2) and 1.5mg/kg (I-P1.5), and those below 70 years of age with P dosages of 2 mg/kg (II-P2) and 1.5 mg/kg (II-P1.5), and we then performed a comparative study.

**Results:** In a comparison between I-P2 and II-P2, a significant difference ( $p < 0.0001$ ) in t50, at 64}10 versus 51}11 seconds, was observed. Moreover, in a comparison between I-P1.5 and II-P1.5, t50 was 63}17 versus 54}18 seconds ( $p = 0.2368$ ). For the correlation coefficient between age and BIS50, a significant correlation was observed at a P dosage of 2 mg/kg of 0.557 ( $p < 0.0001$ ), but no significant correlation was observed at 1.5 mg/kg of 0.217 ( $p = 0.3015$ ). Conclusions Regarding delays in the time for anesthesia induction due to propofol at an advanced age, we have already published with respect to the possibility of a drop in sensitivity to anesthetic drugs due to advancing age. In addition, from these results, the delay in the time for anesthesia induction at a Propofol dosage of 2 mg/kg is obvious, but at a Propofol dosage of 1.5 mg/kg, between the two groups, no significant difference was observed in t50. This is because a Propofol dosage of 1.5 mg/kg has a wide range of t50 values regardless of age, even with young subjects, many cases requiring time have been

observed. From the above, at a Propofol dosage of 1.5 mg/kg, the dosage was found to be too small to obtain an adequate level of hypnosis for young subjects.

### Paper No: 117.00

#### **Comparison of the effect of prophylactic ephedrine, ringer's lactate and colloid applied during spinal anesthesia on hemodynamic parameters in geriatric patients**

**Pelin Saritas and Birgul Yelken**

Eskisehir Osmangazi University Medical Eskisehir Osmangazi University Medical School, Dept of Anesthesiology and ICU

**Introduction:** Hypotension is the most complication during spinal anesthesia. Efforts to prevent hypotension have been attempted like preloading with crystalloids, colloids or use of vasopressors. The role of volume preloading to prevent hemodynamic changes associated with spinal anesthesia in elderly patients has been recently questioned.

**Objectives.** We planned to investigate the effects of prophylactic ephedrine, Ringer's lactate and colloid applied during spinal anesthesia on hemodynamic parameters in geriatric patients.

**Methods:** After our study was approved by faculty ethics committee, 60 years old or older 75 patients meet ASA I-II groups, planned urogenital tract surgery, without contraindications for spinal anesthesia were included the study. Patients were divided for 3 groups. Group R received 1000 ml Ringer's lactate, Group C received 500 ml HES solution with pump 20 min before surgery. Group E received 1000 ml Ringer's lactate+10 mg ephedrine (2 ml of volume) 20 min before surgery. Maintenance of patient was provided by Ringer's lactate for 5 ml/kg/h. The systolic blood pressure, diastolic blood pressure, mean arterial pressure, heart rate and peripheral oxygen saturation of patients were recorded at 5, 10, 15 and 20 min after start of pump infusion, before puncture and during operation. Based on the baseline values before fluid introduction, 30 % of decrease in systolic blood pressure were considered as hypotension and hypotension was interfered by 5 mg IV ephedrine.



**Results:** The findings revealed that the hemodynamic changes occurred in all patients. In all of groups, systolic and diastolic blood pressure and mean arterial pressure were slightly increased before puncture and intraoperative 5 min. They were also significantly higher than control values ( $p < 0.05$ ). But overall incidence of hypotension was lower with colloid group. Heart rates were nearly the same as the control values in Ringer's lactate, colloid and ephedrine groups.

**Conclusions:** We concluded that ephedrine, Ringer's lactate and colloid can be used safely in elderly population but hemodynamic parameters were more stable in patients introduced colloid infusion.

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## Paper No: 201.00

### The effect of anesthesia on the outcome of Obturator Hernia surgery in super aged

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**Introduction:** Recently, there are many studies about the effect of anesthesia on the postoperative patients' outcome. But there are few studies which paid special attention to geriatric patients. (Objectives) We studied about the association between the technique of anesthesia and postoperative outcomes of very advanced age patients, retrospectively.

**Methods:** Sixteen patients scheduled for obturator hernia repair were assigned to two groups. Anesthesia was performed with General anesthesia only (group GA;  $n = 6$ ) or Epidural anesthesia combined with general anesthesia (group EG;  $n = 10$ ). We compared length of postoperative hospital stay (representative to short-term outcome), age, ASA-PS, surgery time, total fluid and transfusion intake, WBC count and Lactate immediately before surgery between the two groups.

**Results:** The mean length of postoperative hospital stay was significantly shorter in group EG (11.5 days: 50 percentile) than in group GA (39.5 days: 50 percentile). Mean age was very advanced: 87.5 years old (group GA), @86.5 years old (group EG), respectively. Other parameters expected to affect outcome did not show significant difference between two groups. Mann-Whitney analysis was performed and Statistical differences were considered significant if the P values was less than 0.05.

**Conclusions:** Obturator hernia is rare disease, more common in older skinny female patients. Therefore there may be insufficient patient number to fulfill statistical analysis. Results of this study suggest that epidural anesthesia may improve outcome of the geriatric patients.

## Paper No: 205.00

### Remifentanyl as main anesthetic in cataract surgery

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Local anesthesia is currently used for many ophthalmic operations as it is associated with reduced morbidity and mortality when compared with general anesthesia. Unfortunately the concomitant administration of sedation may generate several problems such as confusion, disorientation and reduced cooperation which results in difficulties for the surgeon. Nevertheless because patients with cataract surgery tend to be old and may have serious co-morbidities such as Alzheimer's disease, mental retardation or blindness in the other eye, general anesthesia may be needed in this subgroup of patients. So this study was designed to evaluate the hypnotic effect of remifentanyl using cerebral state index in this group of patients. We also assessed whether significant implicit or explicit conceptual memory occurred in the period after emergence from anesthesia. Thirty six patients aged (60 to 82) participated in the study. The baseline BP, HR, and CSI were measured when the patients were stable before anesthesia. No patients received premed outside operation room. After injection of fentanyl  $1 \mu\text{g/kg/min}$ , propofol  $0.5\text{--}1\text{mg/kg}$  and lidocaine  $1\text{mg/kg}$  and atracurium  $0.5\text{mg/kg}$  LMA was inserted. Anesthesia was maintained with Remifentanyl  $0/1 \mu\text{g/kg/min}$  plus N<sub>2</sub>O/O<sub>2</sub> 50/50. Mean arterial pressure, heart rate and CSI were recorded every 3 min throughout remifentanyl infusion. Two words like (red-green) were presented to the patient via headphone and the patients were asked to remember the two items postoperatively. No report of explicit or implicit memory was noted. Future work will be needed to

address whether remifentanyl only anesthesia has sedative or hypnotic effect besides cardiovascular stability and easy awakening.

## Paper No: 412.00

### Effects of bispectral index monitoring during anaesthesia on isoflurane consumption, hemodynamic variables and recovery profiles in elderly Pakistani patients

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**Introduction:** With the advancement in medical sciences the number of elderly patients requiring anesthetic intervention has increased. Age related limited physiological reserves and associated comorbidities in these patients require careful titration of anaesthetic agents. The use of Bispectral index (BIS) monitoring may be helpful for the titration of anaesthetic agents, thus maintaining haemodynamic and recovery profiles in elderly patients. The objectives of this study were to evaluate the effect of BIS monitoring on isoflurane consumption and hemodynamic variables of these patients during maintenance and recovery profiles at the end of anaesthesia. It was a Quasi experimental study conducted over a one year period at the main operating rooms of Aga Khan University Hospital Karachi.

**Methods:** A total 60 patients aged 60 years and above were enrolled in either standard practice (SP) or (BIS) group. In SP group the anaesthesia depth was maintained as in routine clinical practice taking into consideration the patients' haemodynamic variables, while in the BIS group by keeping BIS score between 45 and 55. Standardized anaesthesia care was provided to all the patients. Data including demographics, isoflurane consumption, hemodynamic variables and recovery profiles were recorded in both groups.

**Results:** The mean Isoflurane consumption was lower ( $p = 0.001$ ) in BIS group. The time to eye opening, extubation and ready to shift was shorter ( $p = 0.0001$ ) in BIS group. The patients in BIS group had higher Post anaesthesia recovery score ( $p = 0.0001$ ) than the SP group.

**Conclusion:** The use of BIS in elderly Pakistani patients resulted in 40 % reduction of isoflurane usage. The patients having BIS monitoring awoke earlier and had better recovery profiles at the end of anaesthesia.

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## Paper No: 424.00

### Determinants of 30-day survival after emergency surgery in nonagenarians

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**Introduction:** Nonagenarians are the fastest growing segment of the population in many European countries, and they often need emergency surgery. Moreover, they are sometimes operated on in conditions where an elective procedure would be precluded. Yet little is known about the outcomes in terms of 30-day survival. As a result, we performed a descriptive observational study to determine the main factors associated with 30-day survival in nonagenarians undergoing emergency surgery.

**Methods:** We recruited all patients of 90 years and above who underwent emergency surgery in our tertiary care centre between July 2006 and 2011. The variables recorded included patient demographics, comorbidities, type of procedure, blood transfusion, postoperative complications, length of hospital stay, and mortality. We performed a univariate analysis using X2 to single out the factors that are associated with mortality. Then we used those variables to calculate Kaplan-Meier survival curves (KMsc). Finally, we performed a stepwise Cox regression analysis with those variables that were significant in KMsc.

**Results:** 135 patients were included. The overall 30-day mortality rate in the total population was 35.8%. The variables associated with a reduced 30-day survival, according to KMsc were preoperative neoplasm ( $p = 0.001$ ), thrombectomies ( $p = 0.031$ ), postoperative heart failure ( $p = 0.0179$ ), pulmonary aspiration ( $p = 0.001$ ), acute renal impairment ( $p < 0.001$ ), stroke ( $p = 0.05$ ), haemorrhage ( $p = 0.012$ ), abdominal complications ( $p = 0.001$ ), respiratory insufficiency ( $p = 0.001$ ), and sepsis ( $p < 0.001$ ). According to our Cox analysis, those factors that were independently associated with a shorter survival were 1 preoperative comorbidity: cancer; and 4 postoperative complications: heart failure, pulmonary aspiration, acute renal impairment and stroke.

**Conclusions:** There was just one preoperative comorbidity and 4 postoperative complications that proved relevant independent predictors of a short perioperative survival. As a result, these outcomes point in the direction of other studies,<sup>1</sup> where immediate postoperative complications were demonstrated to be an independent predictor of perioperative survival, irrespective of the patients' preoperative risk. Hence, the need for prevention of postoperative complications.

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## Paper No: 470.00

### Comparison of sevoflurane volatile induction and maintenance anesthesia and propofol-fentanyl total intravenous anesthesia during laparoscopic surgery in elderly

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**Introduction:** Anesthesia in laparoscopic surgery in elderly patients is associated with the high risk of cardiovascular complications due to a combination of anesthetic drugs, the effects of mechanical ventilation, and existing cardiovascular disease. Ensuring hemodynamic stability is one of the highest priorities in these patients.

**Objectives:** This study was designed to compare the efficacy and safety of propofol-fentanyl total intravenous anesthesia

and sevoflurane volatile induction and maintenance anesthesia laparoscopic surgery in elderly patients

**Methods:** 89 ASA III patients with acute cholecystitis undergoing laparoscopic cholecystectomy were randomly assigned to either propofol-fentanyl total intravenous anesthesia (TIVA group (45 patients)) or sevoflurane volatile induction and maintenance anesthesia (VIMA group (44 patients)). Average score on the Lee index was comparable in both groups and corresponded to moderate risk of developing cardiovascular complications. Comorbidity was presented with coronary heart disease, hypertension, or a combination thereof. Intraoperative parameters, complications, recovery, patient satisfaction, and cost were compared between both groups.

**Results:** Hypotension during the anesthesia requiring support with phenylephrine was recorded in 26 (57,7%) patients in TIVA group and in 9 (20,4%) patients in VIMA group (MAP reduction was 38% vs. 12%, ( $p < 0.05$ )). Most episodes of hypotension were observed in the induction period. At other times, no significant difference in hemodynamic parameters were noted. Induction time, as well as time to intubation was 1,3 times less in propofol anesthesia. Time of recovery of consciousness, time of extubation and time to full orientation were comparable between two groups. The incidence of PONV was 22,2 % in TIVA group and 25% in VIMA group. The difference in the overall patient satisfaction scores between both studied groups was not statistically significant (93,3% in TIVA group vs. 93,1% in VIMA group). The cost of the VIMA was 1,4 times lower ( $p < 0,05$ ) than that the TIVA. All patients were discharged after 48 hours without any serious cardiovascular events.

**Conclusion:** The method of volatile induction and maintenance anesthesia compared with propofol-fentanyl total intravenous anesthesia in patients at high risk of cardiovascular complications provides a more slowly but more stable hemodynamics in the stage of induction of anesthesia and tracheal intubation, with a comparable incidence of adverse effects. VIMA was associated with lower cost than TIVA.

## Paper No: 484.00

### Does low-dose intrathecal morphine cause postoperative hypotension in patients undergoing hip replacement?

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**Introduction:** Intrathecal morphine provides effective postoperative analgesia in patients undergoing hip replacement (1). At our institution, orthopedic surgeons have complained about severe cases of hypotension after hip arthroplasty in

patients receiving intrathecal morphine. This adverse effect has not been described in a recent metanalysis (2).

**Objectives:** The aims of this study were to 1) Determine the association between intrathecal morphine and postoperative hypotension in patients undergoing hip arthroplasty, 2) Assess the influence of intrathecal morphine dose on postoperative hypotension and 3) To assess the quality of analgesia at 24 hours post surgery in patients with and without intrathecal morphine.

**Methods:** After institutional approval, we retrospectively reviewed the medical records of all (220) patients that underwent hip replacement during the years 2009 and 2010. Criteria for hypotension were: 1) Systolic pressure 30% below the one registered in the preoperative consultation, 2) Need for evaluation by the resident in the surgical ward, 3) Any systolic pressure below 80 mmHg. The occurrence of postoperative hypotension was compared in patients with and without intrathecal morphine using survival analysis. The follow-up started immediately after leaving the operating room until 36 hours post-surgery.

**Results:** The median age was 70 years old, 67% were women, 70% ASA physical status II, 83.5% received spinal anesthesia. The median dose of intrathecal morphine was 100 µg (range 35-150 µg). 156 patients (72%) received intrathecal morphine and 62 (28%) did not. Both groups were comparable in terms of sex, age, ASA status, arterial hypertension prevalence and intraoperative transfusion requirements, however intraoperative fluid administration was significantly greater in the intrathecal Morphine group. The rate of postoperative hypotension was similar between these two groups (Logrank test  $p = 0.179$ ). The only risk factor for postoperative hypotension was age (in decades): Hazard ratio = 1.32; 95%CI = 1.05-1.67;  $p = 0.016$ . The intrathecal dose of Morphine was not related to the occurrence of hypotension (logrank  $p = 0.706$ ). The intrathecal Morphine group had significantly lower VAS score (Median = 0) than the patients without Morphine (VAS score median = 2)  $p = 0.017$ .

**Conclusions:** Age was the only risk factor for postoperative hypotension in patients undergoing hip arthroplasty; the older the patient, the greater the risk of hypotension.

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**Paper No: 512.00**

## The Incidence of Desaturation in Patients Undergoing Total Knee Arthroplasty During Anesthesia: A Comparison of General

## Anesthesia Combined with Epidural Anesthesia and General Anesthesia Alone

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**Introduction:** Desaturation often occurs during general anesthesia for total knee arthroplasty, because these surgical patients are more likely to be elderly and obese, as well as suffer from pulmonary embolism after the deflation of a tourniquet (1-3). While, there are conflicting results whether combined epidural anesthesia improves or worsens arterial oxygenation during general anesthesia (4-6).

**Objectives:** To confirm the beneficial effect of epidural anesthesia upon oxygenation, we compared the incidence of desaturation between general anesthesia with and without epidural anesthesia in spontaneously breathing patients undergoing total knee arthroplasty.

**Methods:** After obtaining IRB approval and informed consent, 338 patients, aged 65-89 yr (a mean of 75.5 yr), undergoing total knee arthroplasty under general anesthesia with or without epidural anesthesia were enrolled in this study. The patients receiving general anesthesia alone for surgery had the following reasons; patient refusal, cutaneous disorders at the insertion site, and preoperative impaired coagulation status. In these patients ( $n = 125$ ) after general anesthesia induction with fentanyl 1-2 µg/kg, propofol 1.5-2 mg/kg and 5% sevoflurane, a laryngeal mask airway was inserted, and anesthesia was maintained with 1% sevoflurane and 50% N<sub>2</sub>O in oxygen, along with intermittent injection of fentanyl 0.5-1 µg/kg. In the remaining patients ( $n = 213$ ) 2% lidocaine 3-7 mL was injected intermittently through the epidural catheter at L2/L3, while general anesthesia was induced similarly and was maintained with 1% sevoflurane and 50% N<sub>2</sub>O in oxygen without supplemental fentanyl after insertion of a laryngeal mask airway. Several minutes after anesthesia induction, spontaneous breathing resumed in all patients. Hemodynamic and respiratory variables were recorded at 1-5 minute intervals. Ephedrine 5-10 mg, nicardipine 0.5-1 mg, atropine 0.3-0.5 mg or landiolol 20-80 µg/kg/min were given as rescue drugs for the treatment of hypotension, hypertension, bradycardia or tachycardia, respectively. Desaturation was defined as SpO<sub>2</sub> (measured by a pulse oximeter) of less than 95% for > 5 min during general anesthesia. Data were analyzed by analysis of variance, Scheffé's F test or a chi-square test for comparisons between groups or within each group, with  $P < 0.05$  being significant.

**Results:** There were no differences in any baseline data between groups. The incidence of desaturation was significantly lower ( $P < 0.001$ ) in patients receiving epidural



anesthesia (9 patients of 213 patients; 4.2%) than patients receiving general anesthesia alone (37 patients of 125 patients; 29.6%).

**Conclusion:** The combined use of epidural anesthesia with general anesthesia decreased the intraoperative occurrence of desaturation in spontaneously breathing patients undergoing total knee arthroplasty.

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## Paper No: 655.00

### Delirium during cataract surgery with monitored anesthesia care

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**Introduction:** Delirium is an altered state of consciousness with different manifestations, most common being disorientation, agitation and overactivity. Previous studies investigated postoperative delirium in patients who had cataract surgery under general anesthesia or under a block with or without monitored anesthesia care (MAC), but none focused on the intraoperative period. 1,2 Because of improved surgical techniques, most cataract surgeries are currently performed with topical anesthesia and MAC. During the critical periods of surgery, delirium with sudden movements can result in serious consequences.

**Objectives:** Objectives of the current study were to determine the incidence of delirium, to identify the preoperative risk factors, and to examine the intraoperative use of drugs that may contribute to the delirium in patients undergoing cataract surgery.

**Methods:** After IRB approval, we prospectively analyzed specially designed anesthetic records of 1233 patients who had undergone cataract surgeries during a one-year period (from February 2010 until January 2011). Restlessness, sudden movements and incoherence were considered indicative of delirium.

**Results:** The incidence of delirium was 4.62% (57/1233), and the mean duration of delirium in those 57 patients was 10.7 minutes. There were no differences between the delirious and non-delirious patients with respect to age or gender. However, a higher percentage of patients with delirium compared with those without delirium (11.3% vs. 2.9%, respectively) had a history of senile dementia, Alzheimer's disease, bipolar disorder or depression. Patients with delirium received

higher doses of midazolam and fentanyl than patients without delirium. In patients who had delirium, even small doses of propofol worsened the condition.

**Conclusions:** We identified certain neurological impairments as preoperative risk factors, whereas the use of high doses of sedative and opioid drugs as intraoperative risk factors in patients who developed delirium. Based on our findings, we suggest that prior to surgery, the patient and the family should be carefully questioned regarding the patient's neurologic function and, if a significant impairment is identified, general anesthesia should be considered. For those patients who are having surgery under MAC, sedatives and/or opioids should be given in smaller doses and titrated to effect, and whenever possible should be limited to one drug. Also, once delirium is detected, propofol should be avoided.

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## Paper No: 771.00

### The association between difficult mask ventilation and neck circumference in the elderly during anaesthesia

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**Introduction:** The elderly are a vulnerable group prone to develop complications such as hypoxia from difficult mask ventilation during anaesthesia. The relationship between the neck circumference and severity of obstructive sleep apnea has been demonstrated in previous studies.

**Objectives:** To determine the association between difficult mask ventilation and neck circumference in the elderly after induction of anaesthesia

**Methods:** After approved from the institutional ethical committee, the study was conducted in 282 elderly patients (age < 65 years) undergoing general anaesthesia for elective surgeries. All data including neck circumference, thyromental distance, Mallampati score, mandible protrusion test and body mass index, history of snoring and presence or absence of teeth were recorded prior to induction of anaesthesia. The mask ventilation was performed by experienced anaesthesiologists unaware of the recorded data. Preplanned analysis of the collected data was conducted by using SPSS, version 12. The univariable and multivariable (multiple logistic regression) analyses were performed. A  $p < 0.05$  was considered to be statistically significant.

**Results:** Difficult mask ventilation occurred in 38 patients (13.5%) and was significantly associated with neck circumference, body mass index, edentulous, negative mandible

protrusion test and history of snoring ( $p < 0.05$ , multiple logistic regression analysis). From the ROC curve, the sensitivity and specificity of the neck circumference  $>37$  cm. in predicting difficult mask ventilation were 84.2 and 91.8%, respectively. After controlling for sex, BMI, edentulous, history of snoring, negative mandible protrusion test, there was an association between the risk of difficult mask ventilation and neck circumference  $>37$  cm. with the Odds ratio (95% CI) of 17.5 (3.1, 99.8). **Conclusions:** Neck circumference could be one of the independent variables associated with the increased risk of difficult mask ventilation in the elderly undergoing anaesthesia. Further utility study regarding this measurable variable should be considered.

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## Paper No: 790.00

### Anesthesia of patients over age 90: a 9-year hospital based review

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**Introduction:** There is a continuous increase in the proportion of elderly patients undergoing surgical procedures. The incidence of serious adverse events in the perioperative period was significantly higher among elderly patients. In many studies, older age is a significant predictor of perioperative morbidity and mortality<sup>1</sup>. But the perioperative risk has been reduced due to progress in the field of surgical techniques and anesthesia safety, and the number of elderly patients who are undergoing surgery is growing from year to year. **Objectives:** the aim of this study was to retrospectively review our own experience with anesthesia of patient over age 90.

**Methods:** A consecutive series of 309 patients over age 90 underwent surgery between January 2002 and December 2010 at our hospital, were retrospectively reviewed. To fit lines which show trends over time we applied a linear regression model.

**Results:** The patients were predominantly female (M:F 119:190). 135 surgeries were done under general anesthesia, and 36 surgeries were done under regional anesthesia, 138 surgeries were done under local anesthesia. There was significant increase in the annual surgery (slope = 2.8,  $p = 0.008$ ) and surgery under general anesthesia (slope = 1.6,  $p = 0.036$ ). The most common surgery department was

orthopedics and the second most common surgery department was ophthalmology.

**Conclusions:** Over the past nine years the absolute number of surgery of patient over age 90 showed a tendency to increase.

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## Paper No: 845.00

### Is postoperative cognitive dysfunction a risk factor for dementia?

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**Introduction:** Postoperative cognitive dysfunction (POCD) is a common complication among the elderly following major surgery (1). An association between POCD and the development of dementia has been suspected (2).

**Objective:** To assess if POCD was a risk factor for the occurrence of dementia.

**Methods:** Danish patients enrolled between November 1994 and October 2000 in the two International Studies of Postoperative Cognitive Dysfunction (ISPOCD 1 & 2) were followed until July 1st 2011. Cognitive performance was assessed at three time points: preoperatively, at one week and at three months after surgery using a neuropsychological test battery. A patient was considered to have POCD if the Z-score of the difference with the preoperative cognitive assessment, using the mean and standard deviation from a non-surgery control group, was larger than 2, as previously described (1). The time of (first) occurrence of dementia after surgery was assessed using the National Patient Register and the Psychiatric Central Research Register. Recorded dementia diagnoses (ICD-8 and ICD-10) were: Alzheimers disease, vascular dementia, frontotemporal dementia, or dementia without specification. The risk of dementia according to POCD was assessed in Cox regression models.

**Results:** 701 patients with a median age of 67 years were followed for a median of 11.1 (IQR 5.2–12.6) years. POCD was found in 118 (19.7%) and 57 (9.8%) after one week and three months, respectively. Only 32 patients developed dementia during follow-up. The hazard ratio (95% CI) for any dementia diagnoses in patients with POCD at one week and POCD at three months after surgery compared to patients without POCD was 1.13 (0.47 – 2.71);  $P = 0.78$  and 1.53 (0.52 – 4.55);  $P = 0.44$ , respectively.

**Conclusion:** POCD was not associated with a significant increase in the dementia incidence.

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### Paper No: 857.00

#### Preoperative risk factor associated with postoperative delirium after trauma and orthopedic surgery

Genaro Maggi, Erika Calderon, Nicolas Brogly, Renaro Schiraldi and Emilia Guasch

**Introduction:** Post-operative delirium (POD) is an adverse event usually associated with age, and its incidence was reported between 19 and 60% in orthopedic surgery. Identifying risk factors and initiating early treatment could reduce its incidence 1.

**Objectives:** To determine the incidence of POD in Post Anesthesia Care Unit (PACU) after major trauma and orthopedic surgery and identify associated pre-operative risk factors in a tertiary university hospital.

**Methods:** We designed a prospective, observational study including consenting patients scheduled to stay in PACU overnight (>12hs) between April and August of 2011. Inclusion criteria were total or partial hip or knee replacement and hip fracture reduction. Emergency interventions were excluded. Delirium was diagnosed by the Confusion Assessment Method (CAM)3 and/or using data from medical record. Anova was employed for quantitative variables and Chi-2 for qualitative variables.  $p < 0,05$  was considered significant.

**Results:** 115 consecutive patients were analyzed. 30 (26%) were submitted to hip fracture reduction, 27(23,5%) to total hip replacement, 54 (46,9%) to total knee replacement, 4(3,5%) to partial knee replacement. 23 patients (20%) presented at least one episode of POD, with a higher incidence of POD in patients operated for hip fracture (OR = 7,38;  $p < 0,001$ ). Patients who presented an episode of POD were older (POD: 85,8 $\pm$ 5,8 yrs; No POD: 72,2 $\pm$ 12 yrs;  $p < 0,001$ ), were more subjects to previous cognitive impairment (CI) (2/92 (2,1%) patients with no CI presented POD vs. 4/19 (21%) patients with CI; OR = 9.47;  $p = 0.003$ ). POD was more frequent in patients with ASA score  $\geq 3$  (6/69 (8,7%) ASA 1-2 patients presented POD vs. 17/23 (73,9%) ASA 3-4 patients; OR = 8,5;  $p < 0.001$ ), depression (OR = 3,55;  $p = 0,014$ ), chronic renal failure (OR = 19,6;  $p < 0,001$ ) and diabetes (OR = 3,2;  $p = 0,02$ ). Visual impairment was associated to POD (OR = 2,7) even though difference was no statistically significant ( $p = 0,07$ ). Preoperative hospital stay was higher in patients with POD (POD: 82,8 $\pm$ 9,8 hrs; No POD: 28,2 $\pm$ 4,0

hrs;  $p = 0.001$ ). Hip fracture reduction (OR = 4,78;  $p = 0,015$ ) and chronic renal failure (OR = 14,3;  $p = 0,012$ ) were identified as independent risk factors of POD in a multivariate analysis.

**Conclusion:** Elderly patients with long preoperative hospital stay, ASA  $< 2$ , operated for hip fracture, with cognitive impairment and depression, diabetes mellitus and chronic renal failure are likely to suffer from POD. Trying to equilibrate and treat these risk factors might permit to decrease POD incidence and therefore morbi-mortality and health cost.

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### Paper No: 860.00

#### Assessment of relationship between quality of life and residency of elderly people in Sari, Iran and complication during anesthesia for them

Jabbar Haydari, Hedayat Jafari and Ebrahim Nasiri

**Introduction and Objective:** As life expectancy increases, the importance of quality of life of the elderly people becomes more evident day by day. Many factors such as retirement, reduced income and reduced physical ability are associated with quality of life of elderly people. This Study has been performed to determine the relationship between Location of elderly people (at personal home or nursing home) with their quality of life in Sari during 2010.complications assessed through literature for elderly patients.

**Methods:** This is a historical cohort study. 220 eligible elderly people were selected and divided into two groups (150 elderly from personal home, and 70 from nursing home). Type of sampling method in the nursing home was as census-based and in home was based on making of goal. After matching the confounding variables (economic dependency and marital status) with the case group and dividing the city into three areas, 50 samples were obtained in each region and finally it was conducted on 150 people. SF36 questionnaire was used for data collection. The questionnaires were completed through interviews. The obtained data were analyzed using t-test,  $\chi^2$  and Relative Risk.complications assessed by key words of Geriatric and complication and anesthesia in pub med.

**Results:** The mean and standard deviation of quality of life of residents in nursing and personal home were 374.72, 68.72,

and 415.61, 90.61. T-test showed significant differences in quality of life between the two groups ( $P < 0.0001$ ). Statistical analysis showed that there was a significant relationship between the level of quality of life and age, marital status, educational level, employment status and residency ( $P < 0.05$ ). Cardiovascular, breathing system problem and consumption of other drugs and co-existing disease showed in articles for elderly patients.

**Conclusion:** There was a relationship between age, marital status, educational level, previous employment and location (personal home and nursing home ( $P = 0.0001$ )). But relationships such as sex, family composition and the elderly residency did not exist in variables. Considering the underlying factors affecting the quality of life of elderly people is potentially important; So that plan to increase community participation, improving medical services and health in the elderly must be carried out and special importance must be given to these factors, Listen Read phonetically. Anesthesiologists should be attention to each elderly patient and closely monitored before anesthesia.

**Paper No: 973.00**

## Maxilofacial commando surgery in older patients

**Gabriela Avila**

Hospital INSSJP Cesar Milstein C.A.B.A ARGENTINA

**Introduction:** Intraoral cancer is the sixth cause of cancer in the world. The main risk factors are nicotine, alcoholism, and immunologic disturbances. The "Commando Surgery" involves the removal of the lower jaw bone, the floor of the mouth, usually part of the tongue, the front part of the neck and the lymph nodes contained in these structures.

**Objectives:** To review the anesthesia management and complications in commando surgery in elders patients.

**Material and Methods.** Bibliography search in Pubmed, OVID, using maxillofacial-anesthesia-comorbidity/ anesthetic management in older patient, since 2005 to present.

**Results:** Adequate perioperative anesthesiological management, interrelated the surgery's requirement and physiologic changes, time under general anesthesia, and achieve a multidisciplinary medical team are connect with a lower complication rate.

### Discucion.

- (1) Probability of the difficult airway due to tumors size, position, and /or invasion also preoperative radiotherapy treatment.
- (2) Standard monitoring and additional invasive monitors.
- (3) Longer surgery's required prophylactic with low molecular weight Heparine to avoid deep venous thrombosis.

- (4) Not allow the core temperature to go lower more than 0,5 to 1°C to basal line.
- (5) Avoid the low blood volume with hypothermia because its can developed peripheral vasoconstriction.
- (6) Must optimize the flap's blood flow with: Hyperdynamic circulation, appropriate fluidoterapy, and normothermia maintenance, also moderate haemodilution to maintain Hto. 30-35 %
- (7) Adequate measuring fluids whether for the surgery's complexity and for the age of the patients.
- (8) To manage the optimal surgical field without bleeding although allowed an adequate perfusion to the flap.
- (9) Controlled Hypotension can be used in some patients and in a specific time in the surgery.
- (10) Older patients have neuronal changes in central and peripheral level such as barorreceptors, plexual nervous, and conduction system heart. Moreover, have changes in their body composition like as fat and muscle mass percentage it has an influence on the distribution and elimination of the anesthetic drugs.

**Conclusion.** The anesthesiologist has to assess and treat the pre-existing medical disorders in the perioperative period with a possible optimization of the therapy of the co morbidities the intra and postoperative management in these high risk patients and surgery. Time under general anesthesia showed a statistically significant relationship with complication rate and hospital length of stay in multivariate analyses. Patient's age alone is not a prognostic indicator of surgical outcome for major head and neck procedures. Consequently, prevention of complications should focus on optimizing preoperative co morbid conditions.

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**Paper No: 976.00**

## A single centre study of outcomes from fractured neck of femur – a 5 year audit

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**Purpose of study.** Fractured neck of femur (FNOF) is associated with significant morbidity and mortality. Only limited data are available regarding intraoperative events for those that go on to have surgical fixation of the fracture.<sup>1,2</sup> The aim of this audit was to review surgical and anaesthetic interventions and their potential impact on time in the operating theatre and mortality.

**Methods:** Formal ethics committee approval was not deemed necessary as it was part of an approved Quality Assurance activity. 1428 entries of single event of unilateral fracture of the neck of femur, between 2004 and 2009, were identified in the hospital database. A randomised sample of 709 was taken. Patient records (electronic and paper) for each patient in the latter group were then obtained and extensively reviewed. Demographic, service and outcome data for those that met the inclusion criteria were recorded in an Excel 2003 database. Statistical analysis was carried out using SAS 9.1 software.

**Results:** More than three quarters of patients had an ASA score of 3 or greater and 90% were 70 or older. 97% went on to have surgery to repair the fracture, with 35% and 74% operated within 24 and 48 hours respectively. Fixation with a dynamic hip screw was associated with the highest mortality rate of 16% at 12 months, whereas hemiarthroplasty was associated with the highest 30-day mortality rate of 5%. Almost 60% of operations involved general anaesthesia. Addition of peripheral nerve blockade to the general anaesthetic was associated with an increase in mortality from 2% to 4% at 30 days and from 7% to 11% at one year. Median time in the operating theatre was 120 min. There was no difference in median theatre time between general anaesthesia alone and general anaesthesia+peripheral nerve blockade (110 min). However the median time increased to 160 min in cases where both subarachnoid and general anaesthesia techniques were utilised. The mortality rate was 11% at 30 days and 32% at 12 months for the group overall, this decreased for those who received surgery, to 9% and 30% respectively.

**Conclusions:** Patients presenting for FNOF are high risk, are often delayed and have extended times in the operating theatre. Operative and anaesthetic techniques contribute directly to the latter. The procedure is associated with a high immediate and delayed mortality rate, which may be related to time in the operating theatre as well as the surgical and anaesthetic choices.

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## Paper No: 1170.0

### Audit of patients undergoing cemented hemiarthroplasty for fracture neck of femur

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An audit previously undertaken at Medway Maritime Hospital revealed overall mortality in cemented hemiarthroplasty at 11% vs a 15% mortality for uncemented hemiarthroplasty. It was noted that there was an increased incidence of peri-operative deaths following cemented hemiarthroplasty in our sick fracture neck of femur (# NOF) patients. There is currently very minimal evidence available on mortality of cemented procedures in sick # NOF patients

**Objectives:** To find out the patient characteristics and any pre-operative factors which can influence the mortality in this group of patients ii.To find out the mortality rate iii.To compare mortality rates of uncemented hemiarthroplasty from previous audits iv.To establish any relationship between cementing and other causes of mortality (eg-comorbidities)

**Methods:** Prospectively audited 28 patients undergoing cemented hemiarthroplasty. Data was collected by anaesthetists doing the theatre list which includes demographics, comorbidities, surgical variables and patient variables on a pre-designed proforma.

**Results:** All patients were operated within 48 hours from time of admission. The overall 30 day mortality is 7.14% which is increased to 22% in patients with 3 or more than 3 comorbidities (i.e. mortality of 14.5% in patients with 3 comorbidities and 50% in patients with more than 3 comorbidities) The preoperative abnormalities noted were

- (1) FBC (23%)
- (2) U&E(62.5%)
- (3) Spo2 (28%)
- (4) EKG (50%) of patients. Common techniques of Anaesthesia includes GA+Nerve block (45%), Spinal+/- sedation (39.28%). The intraoperative problems include Hypotension (42%) with an average blood loss of 300 ml during operation. The common post-operative complications include UTI(21%), Low Spo2 (10.7%), Pneumonia (7.14%) and Low Haemoglobin (21%). The post operative Haemoglobin dropped by 19.8% and Urea and creatinine were raised by 5.41% and (3.77%) respectively when compared to preoperative values.

### Conclusions.

- Our audit findings showed no increased mortality in stable patients ?correlate with current available evidence.

- However it did show an increased mortality in patients with 3 or more comorbidities. This needs further evaluation and we need to wait till further literature or evidence is available for routine use. Until then, the use of cementing in patients with 3 or more comorbidities needs a cautious approach on a case to case basis. A comprehensive assessment of risks versus benefits of the surgical procedure needs to be done by Consultant surgeon and Consultant Anaesthetist together until further evidence available.
- The preoperative care should be aimed to correct or reduce the above said perioperative complications
- Implement NICE Guideline 124 (June 2011): The management of hip fracture in adults

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## Paper No: 1176.0

### A study of effect of incentive spirometry before and after major abdominal surgery in the aged for preventing pulmonary complications and requirement of intensive care units

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**Introduction:** Major abdominal surgeries in aged patients may cause a delay in the restoration of pulmonary function. The respiratory system is often affected during and after major abdominal surgery. In high-risk patients, this may result in the development of postoperative pulmonary complications.

**Objectives:** This study was carried out to assess the effect of incentive spirometry (IS), postoperative pulmonary complications and morbidity in aged patients admitted for major upper abdominal surgery.

**Methods:** 100 patients, from both male and female sex and >60 years of age undergoing major abdominal surgical procedure were selected randomly for this study. Patient had to apply Incentive Spirometry twice a day from three days prior to operation irrespective of any symptoms. Data were

collected for same parameters peri-operatively. Incentive Spirometry was started from two hours after extubation or as soon as patient becomes pain-free. PFT and other respiratory parameters were recorded. Requirement of ICU related support had also been noted.

**Results:** All the collected data were placed in tables and statistical analysis were done with unpaired 'T' test.  $P < 0.005$  was considered as significant.

**Conclusion:** Patients who used incentive spirometry before and after major abdominal surgery had significant improvement of pulmonary function test result in spite of age related problems. Requirement of ICU for post-operative ventilator was also diminished.

## Paper No: 1212.0

### A patient with restrictive cardiomyopathy scheduled for peritoneal dialysis catheter placement

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**Introduction:** Restrictive cardiomyopathy is a disease of the myocardium that results in an altered diastolic function with impaired ventricular filling. These hemodynamic changes are of special importance in a patient under general anesthesia and positive pressure ventilation. We present the case of a patient diagnosed with restrictive cardiomyopathy who came to the operating room for a peritoneal dialysis catheter placement.

**Case description.** The patient was a 64 year old male, former smoker, with a history of hypertension, gout, chronic atrial fibrillation, chronic kidney failure, and restrictive cardiomyopathy diagnosed twenty years ago, with multiple hospitalizations for decompensated heart failure in the last year. His medication included oral anticoagulants, diuretics, allopurinol and carvedilol. On Doppler echocardiography he had severely dilated atria, severe tricuspid regurgitation, pulmonary hypertension, and severe mitral regurgitation, dilated right ventricle with systolic dysfunction. He had refractory ascites of approximately 12 litres. Before induction of anesthesia, a large bore intravenous line was started, the right radial artery was cannulated, and baseline ionogram and arterial blood gases were obtained. Anesthesia was induced with fentanyl 250 mcg, propofol 50 mg, and atracurium 50 mg. The trachea was intubated with a number 8 cuffed orotracheal tube and a central line was placed for central venous pressure monitoring. After induction and connection to mechanical ventilation, the patient developed a sustained episode of hypotension with little response to vasopressors and good response to volume expansion and Trendelenburg position. A noradrenaline infusion was started at 0.2 mcg.

kg-1.min-1 with good response. After the procedure, extubation was attempted. The PaO<sub>2</sub>/FiO<sub>2</sub> ratio was 150 in the supine Trendelenburg position. A Fowler position was attempted to aid his ventilation but with hemodynamic impairment that made extubation impossible. He was transferred to the intensive care unit where he was extubated eight hours later. Three days later he was discharged.

**Discussion.** This case depicts the profound hemodynamic changes that general anesthesia and positive pressure ventilation impose on a restrictive heart. The acute vasodilation that occurs with anesthetics combined with the diminished venous return due to ascites and positive pressure ventilation determine a dramatic decrease in preload that negatively affects cardiac output. This case also shows the ventilation/perfusion mismatches that normally occur in anesthetized paralyzed patients in the supine position and how they can be magnified by changes in abdominal pressure that can alter the usual course of a planned extubation.

## Paper No: 1256.0

### Recovery of Heart Rate Variability after General Anesthesia in Elderly Patients

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**Introduction:** Heart rate variability (HRV) is a physiological phenomenon where the time interval between heart beats varies. Many previous reports have found that HRV is decreased in patients with comorbidities such as diabetes, congestive heart failure, myocardial infarction, hypertension, aging, and autonomic nervous dysfunction (1). Previous reports have also found that general anesthesia dramatically decreases HRV (2). Surgery on elderly patients under general anesthesia is sometimes associated with respiratory, cardiovascular, and central nervous system complications in the postoperative period. These complications may result from the vulnerability to and delayed recovery from general anesthesia of elderly patients.

**Objective:** The objective of this study was to investigate if the recovery of HRV after general anesthesia is delayed in elderly patients.

**Methods:** After institutional approval and written informed consent from all patients were obtained, twenty patients (male 13, ASA-PS 1-3, 18-85 years old) undergoing lumbar spine surgery under general anesthesia participated in this study. Without premedication anesthesia was induced and maintained with propofol (TCI, 2-3mcg/ml), sevoflurane (0.5-1.0%), fentanyl (TCI, 1.0-2.0mcg/ml), remifentanyl (0.05-0.25mcg/kg/min), and rocuronium. In the postoperative period fentanyl was administered intravenously and continuously (0.5mcg/kg/hr) for 30hr after surgery. ECG

signal was digitally transferred from ECG monitor to personal computer and the analysis of HRV was performed. After emergence from general anesthesia they were transferred to post-anesthesia care unit (PACU) and stayed there until next morning. Frequency domain analysis of HRV was made by evaluating the magnitude of low frequency (LF: 0.04-0.15Hz), high frequency (HF: 0.15-0.4Hz), and total frequency (TF: 0.04-0.15Hz) component of HRV. Non-linear analysis of HRV was evaluated by ultra short-term entropy (UsEn). The analysis of HRV was continued up to 10hr after general anesthesia. According to the median of participants' age, they were divided into two groups (Old; 76}7 year old, Young; 43}13 year old). Each index of HRV was averaged every hour and compared between the groups.

**Results:** In older patients, frequency domain indices of HRV remained comparable to that on emergence from general anesthesia even at 8-10hr after general anesthesia, whereas they recovered to preoperative value 4-8 hr after general anesthesia in younger patients. In contrast, the recovery of UsEn was comparable between the two groups.

**Conclusion:** The recovery of HRV after general anesthesia is delayed in elderly patients.

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## Paper No: 1259.0

### Aortic valve replacement in octogenarian patients

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**Introduction:** As a result of increased life expectancy, elderly patients over 80 years of age undergo surgery, making necessary comorbidity assessment, type of surgery and anesthetic technique in this population.

**Objective:** The aim of this work was to analyze the results of aortic valve replacement due to severe aortic stenosis in octogenarian patients.

**Material and methods.** One hundred and fifteen octogenarian patients, 64 of which had diagnosis of pure severe aortic stenosis, were retrospectively analyzed in the period comprised between February 2005 and November 2010, using the cardiac surgery data base. Aortic valve replacement was performed at 28-30° C, with antegrade/ retrograde cold blood cardioplegia for myocardial protection and invasive intraoperative monitoring. The anesthetic technique was as follows: combination of previously tritrated benzodiazepines, propofol and fentanyl citrate in anesthesia induction, and non-depolarizing muscle relaxants, and maintenance with 1% isoflurane, remifentanyl 0.1 to 0.2 µg/kg/

min. During extracorporeal circulation, propofol (0.04 to 0.06 mg/kg/min) was added to remifentanyl, discontinuing inhalatory anesthesia. Preoperative, intraoperative and postoperative variables were analyzed. Data are expressed as mean  $\pm$  SD.

**Results:** Patient age was  $82 \pm 2$  years (80-87). Sixty two percent of the patients were female (40 pts). Eighty four percent of the patients (56 pts) had a history of arterial hypertension, 51% (34 pts) dyslipidemia, 33% (22 pts) history of smoking, 15% (10 pts) chronic renal failure, 24% (16 pts) congestive heart failure, 6% (4 pts) diabetes. Fifty percent of the patients (33 pts) in functional class II and 32% (21 pts) in class III. Operative risk assessment by Parsonnet score was  $11.3 \pm 2.3$  and by logistic Euroscore  $10 \pm 5$ . Eighty three percent of the patients (55 pts) underwent elective surgery and 17% (11 pts) urgent surgery. Pumping time was  $97 \pm 30$  min, aortic cross-clamping time:  $72.3 \pm 16.2$  min, units of transfusion were: red blood cells ( $3.1 \pm 2.6$ ), plasma ( $1.4 \pm 2.1$ ) and platelets ( $3 \pm 6.1$ ). Postoperative complications: 84.8% of the patients required short term, 6.1% long term ( $>24$  h) and 6.1% very long term ( $>72$  h) mechanical ventilation and 10% (7 pts) intraaortic balloon pump counterpulsation. Fifty six percent of the patients (37 pts) had atrial fibrillation, 39% (26 pts) low blood volume syndrome, 23% (15 pts) acute renal failure, 17% (11 pts) atrioventricular block, 6% (4 pts) complete left bundle branch block, 4% (3 pts) stroke, 3% (2 pt) perioperative myocardial infarction, 3% (2 pt) reexploration surgery for excessive bleeding, 12% (8 pts) developed sepsis and 1% (1 pt) received definitive myocardial pacemaker. Cardiovascular intensive care stay was  $4.4 \pm 7$  days and hospital stay  $10.1 \pm 8.1$  days. Hospital and 30-day mortality were 7.5% and 6%, respectively.

**Conclusion:** Aortic valve replacement surgery can be performed with good outcome in octogenarian patients.

## Paper No: 1300.0

### Lower educational level is a possible risk factor for postoperative cognitive dysfunction after surgery under general anesthesia

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**Introduction:** Elderly patients with postoperative cognitive dysfunction (POCD) have an increased risk of mortality, especially after major surgery<sup>1</sup>. High educational level is regarded as a protective factor for developing dementia, especially Alzheimer's disease<sup>2</sup>, but little is known about educational level in the development of POCD.

**Objective:** This study aims evaluating the influence of the level of education in the incidence of POCD in elderly patients undergoing surgery under general anesthesia.

**Methods:** Seventy one patients older than 60 years old undergoing surgery under general anesthesia were evaluated before surgery and on 7th postoperative (P.O.) day by TICS (Telephone Interview for Cognitive- Standardized, instrument that assesses by telephone the skills of spatial and temporal orientation and memory, requiring only the ability to verbal understanding). Low educational level (LEL) was defined as 4 or less years of formal education and high educational level (HEL) was defined as 8 or more years of formal education. Statistical analysis was performed with SPSS 17.0, using nonparametric analysis of ordinal data with repeated measurements. P values inferior to 0,05 were considered significant.

**Results:** HEL and LEL groups presented different TICS values since preoperative period ( $P = 0.032$ ). For comparison between pre and postoperative period, the HEL group presented TICS values of  $29.8 \pm 5.9$  before surgery and  $29.0 \pm 7.3$  at 7th P.O. and for LEL group the TICS values were  $17.6 \pm 3.1$  and  $16.7 \pm 2.6$ , respectively, without difference between groups ( $P = 0.07$ ).

**Conclusions:** The differences in the TICS values observed since the preoperative period are normal for the educational levels evaluated<sup>3</sup>. Although the decreasing of mean TICS value of the LEL group (5.11%) was greater than the HEL group (2.68%), the sample size analyzed wasn't enough to prove that low educational level is a risk factor for POCD.

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## Paper No: 1312.0

### Outcomes in 615 Spinal Stenosis Patients Treated With Epidural Steroids

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**Introduction:** Spinal stenosis is common in geriatric patients, resulting in pain and disability. The treatment options for



spinal stenosis include medications, epidural steroid injections, and spinal surgery. Due to age and co-morbidities, epidural steroid injections may be preferred to surgery. Despite the widespread adoption of treating spinal stenosis with epidural steroid injections, the therapy remains largely based on small reviews.

**Objective:** The aim of this study was to answer the question: Are epidural steroid injections effective in relieving the pain and disability associated with spinal stenosis?

**Methods:** The study design was a retrospective case review with follow-up survey. Patient inclusion consisted of all patients treated for lumbar spinal stenosis in the pain clinic over 8 years. The follow-up survey was a questionnaire regarding perceived efficacy, increased function, and avoidance of surgery.

**Results:** There were 1,336 patients who had epidural steroid injections for spinal stenosis at Mayo Clinic Arizona between January 1997 and March 2005. There were 604 (45%) patients who returned the questionnaires.

The duration between injection and the survey ranged from 2 months to 8 years (mean 2.4 years). 380 (51%) respondents were women. 465/594 (78%) responders had received more than one injection. 64% felt the injections were effective in controlling pain. 62% felt that the injections increased their ability to perform activities of daily living. 48% were able to participate in activities that they could not have done without receiving the injections. The injections did not have an effect on patient's perception of the need for spinal surgery.

**Conclusion:** Reports of epidural steroids in managing symptoms of spinal stenosis are not clear. Snyder(1) felt epidural

steroids were of no benefit. Fukusaki(2) found epidural steroids not to be helpful in managing symptoms of neurogenic claudication.

Delpont(3) found epidural steroids to be helpful in pain management in 140 patients with spinal stenosis. Abdi(4) et al showed epidural steroids showed good evidence for short term benefit and limited evidence for long term benefit. Ciocon(5) found epidural steroids to be beneficial in their group of 30 patients with symptomatic spinal stenosis. However, only Delpont had large numbers of subjects.

Our study shows epidural steroids to be useful in managing patients with spinal stenosis. However, the injections did not change ultimate decisions regarding surgery.

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## HISTORY AND EDUCATION

*(The names of the authors presenting each paper are shown in bold type)*

### Paper No: 5.00

#### **The first labor epidural at Magee Womens Hospital in Pittsburgh, PA**

**Anthony Silipo**

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The First Labor Epidural at Magee Womens Hospital in Pittsburgh, PA. The 1970's brought many new ideas ranging from music, fashion, religion and oddly enough, anesthetic care of the laboring parturient. At Magee Womens Hospital in 1972, a young woman made history when she utilized that institution's first labor epidural. Although this was not the first labor epidural in the country, it was the first epidural at this major women's hospital in Pittsburgh, Pennsylvania. This epidural was performed by an anesthesiologist who just happened to be the husband of the patient. The remainder of the patient's labor proceeded in comfort and her delivery was uncomplicated, yielding a beautiful baby girl. The actual epidural was performed by staff anesthesiologist Dr. Ezzat Abouleish. According to Dr. Abouleish, the initial doubt, skepticism and fear surrounding this technique was mitigated by performing the first epidural on his own wife. This fact had a major impact on the growth of this modality within the institution. It garnered respect from the obstetricians, nurses and Dr. Abouleish's own anesthesia colleagues. From that point on, increasing numbers of women received epidurals for labor paving the way for us to reach the current rate of 90% placement of labor epidurals at Magee Women's Hospital. Dr. Abouleish went on to teach the technique to not only the residents, but also his peers. He pioneered this technique at this institution, and Dr. Ezzat Abouleish eventually became one of the first to introduce the CSE into regular practice. Dr. Abouleish, originally born in Egypt, and came to the United States in 1968. After a two year tenure at Case Western University Hospital, he joined the staff of Magee Womens Hospital in Pittsburgh. He served 12 years in Pittsburgh, eventually reaching full Professor status. His list of

accomplishments and publications is quite vast, including winning the Gerti Marx award in 1999. He authored several books which included Pain Control in Obstetrics as well as a book entitled Childbirth...A Joy Not A Suffering. His CV is quite impressive, and cannot be fully summarized for this abstract, but will be explored during the presentation. Prior to the common use of epidurals at Magee, the most frequent anesthesia methods included: obstetrician administered caudals, sub-arachnoid blocks and IV sedation. During our interview, Dr. Abouleish described the "double catheter technique" where a caudal and epidural catheter were placed at the same time. The catheters were then activated according to the stage of labor, with the caudal catheter being used for the latter stage and delivery. This presentation will highlight the events and the accomplishment as well the physician who brought this technique to Pittsburgh. The landscape of obstetrical anesthesia at Magee Womens Hospital would not be the same without this landmark event.

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### Paper No: 35.00

#### **A bioethical glance to the practice of the professional anesthesiologist**

**Julio Rotondo**

Values and principles are essential to all human life is especially important in the healthcare environment. The health care should be conducted by professionals with comprehensive training, including the human aspects. However, only the current education into account. Without doubt, this is one of the major unfinished business of our health system now spreads much discouragement in a negligible percentage of health professionals.

To this end, medicine requires professionals conducting a series of reflections Ethics Seal, compared to the situations faced daily, so as not to violate moral rules, ethical and legal. However, our values education is almost nil. In the case of physicians, including anesthesiologists, are usually trained in the proper handling of the so-called "Clinical Facts", but are not trained in conflict resolution between values. This is due to the widespread belief that they can play no role in the Hospital. However, it is an issue that has a significant influence on the quality of healthcare.

In the health field often conflicting values of life with health and other economic, religious, cultural, and so on. Many doctors do not know how to manage such conflicts, resulting in a higher prevalence of stress. This is where comes in. Bioethics, which provides guidance for such situations.

For Bioethics considers the set of rules governing human activities related to the biological world, with living things and their components, from the molecule and cell to the people and the general ecological system. Why is it important Bioethics? As science became inseparable in the field of health discussions for the advancement of anesthesiology and research skills necessary to make that area of specialty practice.

There are several philosophical movements in the fundamentals underpinning bioethics, however, the analysis model commonly used is the "principal" of Beauchamp and Childress described in 1979 and is based on four principles: Charity, Non-maleficence or safety, Justice and Empowerment.

Good training in bioethics will avoid potentially difficult situations the anesthesiologist in clinical practice. Undoubtedly the best way to raise their level of satisfaction and, consequently, improve the quality of care. Therefore, it is now essential to take into account the values to make good decisions.

Understandably, more and more anesthesiologists recognize ethical dilemmas in their practice: situations that warrant transfusion in Jehovah's Witnesses, in patients with complicated pregnancies Jehovah's Witnesses, Do Not Resuscitate Orders, Vital Wills, etc. In this bibliographic report we review and define bioethical concepts in which the anesthesiologist is involved. Particularly, it is suggested an encouragement in the participation of the anesthesiologist in the casuistry for the evaluation of the cases and ethical-medical dilemmas

**Keywords:** Bioethics; Bioethical Principles; Doctor-Patient Relationship; Anesthesiology

**Paper No: 60.00**

## A comparison of knowledge retention between online and in-class problem-based learning

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**Introduction:** Through student empowerment, problem-based learning (PBL) has a strong reputation for enhancing student motivation towards learning tasks and providing an unconstrained environment. The method promotes the learner's role as the decision-maker and planner. The researchers play the role of a 'good friend', facilitating learning and stimulating referral to databases, while fostering a context conducive to learning. In addition, the online learning method is increasing in popularity.

**Objective:** To compare knowledge retention of the two learning methods: online (OPBL) and in-class problem-based learning (IPBL).

**Methods:** A pre and post-test study design of the three-week research project was performed in volunteered students from two-academic year. After completing the pretest, the IPBL group performed an activity test. Then the instructor held an open discussion for further explanation and clarification. Afterwards, students performed a diagnostic test to earn their achievement score. The 3-hour activities in each learning specification part took place exactly a week apart. The contrary, the OPBL group performed all tests by log on to the website. The online program not only established their weaknesses and urged them to explore for core knowledge, but also recorded students' profiles. After three weeks, the post-test was arranged for both groups. Four week later, the final test was managed without prior notice. The pretest, post-test and final test forms were parallel under the same table of specifications.

**Results:** The pretest, post-test and final test score of the IPBL group and the OPBL group were 4. 57 2. 92, 23.74 7.58, and 12. 70 5. 19; 4. 94 6.31, 31.67 7.07, and 25. 77 5. 9 respectively. The growth of knowledge after the post-test and after the final test as well as the retention of knowledge of the IPBL group and the OPBL group were 54. 32%, 22. 64%, and 68.32%; 76.01%, 59.63%, and 83.64% respectively.

**Conclusion:** The OPBL yielded the better of knowledge retention. The key success factors might depend on students' achievement motive and a sense of self-actualization.

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## Paper No: 75.00

### Review of medical students information about anesthesiology

**Farhad Safari**, Kamran Mottaghi, Alireza Salimi, Saeed Malek and Mohamadreza Hashemian

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**Objectives.** To analyze the knowledge of anesthesiology possessed by a group of medical students representative of medically trained individuals who have worked in a hospital.

**Material and Method:** Students in their sixth and seventh year of medical studies at the main Universities of Iran were invited to voluntarily and anonymously answer a questionnaire with dichotomous and multiple choice responses covering general and specific aspects of anesthesiology. The survey also collected personal and epidemiological data. One hundred eighty-three questionnaires were returned.

**Results:** The results obtained were analyzed for correlations with epidemiological and personal data (sex, information received, prior anesthesia); no significant correlations were found between these data and correct response. The main factor for choosing anesthesiology was income.

**Conclusion:** In comparison with the general population, medical students' training has left them with inadequate understanding of anesthesiology.

## Paper No: 216.00

### Tracheal intubation of rabbits (*Oryctolagus cuniculus*): comparison with and without laryngoscope

**Antonio Bedin**

**Introduction:** Rabbits (*Oryctolagus cuniculus*), mainly from New Zealand, many currently used for experimental research and demonstration procedures. However, maintenance of the airway is a major problem for the anesthesia of the animals.

**Objectives:** This study aims to compare the intubation using the laryngoscope and blindly in rabbits submitted to laparotomy demonstration.

**Methods:** After approval by the ethics committee of animal research institution rabbits were divided into two groups. Group L consisted of forty-three rabbits were intubated with the use of laryngoscope blade straight number one and group C consisting of forty rabbits intubated blindly

and supine. After weighing the animal, it was identified with a bandage on the front foot with your number and corresponding weight. As a pre-anesthetic was used acepromazine 1 mg/kg combined with dexamethasone 0.2 mg/kg ketamine and 15 mg/kg subcutaneously fifteen minutes before the shaving. The monitoring was using esophageal stethoscope and clinical parameters. After venous catheterization in the marginal ear vein, 24 G catheter was administered sodium chloride 0.9% 10 ml/kg. Ketamine for anesthesia was used from 50 to 10 mg/kg intravenously. Cannula number 2 without balloon was used for the intubation. If there was difficulty in intubation option would be for maintenance of anesthesia under mask. Anesthesia consisted of inhaled 1% isoflurane and oxygen three liters per minute in face mask system (Mapleson D). The variables evaluated were: number of attempts, number of failures and number of intraoperative deaths.

**Results:** A total of 83 rabbits, 43 in group C and 40 in group L. Regarding the number of attempts we got a mode, an average of 4.22 with a standard deviation of 4.11 in group C, and mode 2, an average of 4.41 with a standard deviation of 3.51 in the group L. Regarding the number of failures obtained in tracheal intubation in group C 6.9% and 7.5% in group L. With the number of intraoperative deaths obtained 4.6% in group C and 5% in L.

**Conclusions:** This study demonstrated that the use of the laryngoscope does not improve the efficiency of tracheal intubation compared with intubation blindly in New Zealand rabbits used for demonstrative surgeries.

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## Paper No: 308.00

### Anaesthesia in the History during the Medieval Ages

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**Introduction:** The medieval age's civilization has made a great contribution to the progress of various fields of science and medicine. The achievement made in anaesthesia has laid down the foundation of modern practice of this field.

**Description:** There is evidence that trainers during medieval ages used to administer sedatives and analgesic mixtures before surgical operations. A quotation from AVICENNA reads: (A patient who wants to have an amputation of one of his organs, must have a drink prepared from a mixture of mandagora and other sleeping drugs) They are also credited for the introduction of inhalational anaesthesia by using



the then called: “Anaesthetic Sponge”, a quotation from SIGRID HUNKE reads: (The science of medicine has gained an extremely important discovery that is the use of general anaesthesia for surgical operations). Then in another statement: (The art of using the anaesthetic sponge is a pure Islamic technique which was not known before). Alcohol was distilled by El-Kindi and sulfuric acid by El-Razi, considering that, diethyl ether can be produced by extraction of water out of alcohol; it becomes likely that, they were the first to lay down the basis of the synthesis of this essential anaesthetic substance. In the field of resuscitation, the use of bellows for respiratory resuscitation is credited to (Society of resuscitation of drowned persons) in Amsterdam 1767, however, there is evidence from well documented sources that Muslims are pioneers in using bellows for that purpose; when SALEH BIN BAHLA used bellows to resuscitate a cousin of AL – RASHID in BAGDAD, 900 years before that reported date.

**Conclusion:** Science has no native home of its own and every person has the right to ask for it. When the talents and circumstances exist, new horizons can be discovered. In the field of anaesthesia and resuscitation, the contribution during the medieval age's period is enormous and the discoveries made have laid down the foundation of modern practice.

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**Paper No: 335.00**

## Intraoperative Acceleromyography Monitoring Reduces Symptoms of Muscle Weakness and Improves Quality of Recovery in the Early Postoperative Period

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**Introduction:** Awake volunteer studies have demonstrated that small degrees of residual blockade are associated with a number of unpleasant symptoms of muscle weakness.<sup>1</sup> The subjective experience of residual paresis after emergence from anesthesia has not been examined systematically during postanesthesia care unit (PACU) admission.

**Objectives:** We hypothesized that acceleromyography monitoring, by reducing the percentage of patients with train-of-four (TOF) ratios  $<0.9$  in the PACU, would also diminish unpleasant symptoms of residual paresis during recovery from anesthesia.

**Methods:** 155 patients were randomized to receive intraoperative acceleromyography monitoring (acceleromyography group) or conventional qualitative TOF monitoring (control group). Neuromuscular management was standardized and extubation was performed when defined criteria were achieved. Immediately upon arrival to the PACU, TOF ratios were measured using acceleromyography and a standardized examination was used to assess 16 symptoms and 11 signs of residual paresis. This examination was repeated 20, 40, and 60 minutes after PACU admission. Generalized weakness was quantified on a 0-10 scale at these times. Quality of recovery was assessed using a 100 mm visual analogue scale (VAS) at PACU discharge.

**Results:** The incidence of residual blockade (TOF ratios  $<0.9$ ) was reduced in the acceleromyography group (14. 5% vs. 50.0% control group,  $P<0.0001$ ). Generalized linear models revealed the acceleromyography group had less overall weakness (graded on a 0-10 scale) and fewer symptoms of muscle weakness across all time points ( $P<0.0001$ ). Median overall weakness (0 to 10 scale) in the acceleromyography group on PACU admission was 4 and decreased to 2 in one hour while in the control group it was 6 on PACU admission and decreased to 4 in one hour. The median number of symptoms of muscle weakness in the acceleromyography group on PACU admission was 2 and decreased to 0 in one hour while in the control group it was 5 on PACU admission and decreased to 1 in one hour. The median number of signs of muscle weakness was 0 in both groups at all times assessed. Global quality of recovery measured on a 0 to 100 VAS was improved in the acceleromyography group (85 (50 to 100) vs. 70 (0 to 100) control group,  $P<0.0001$ ).

**Conclusions:** Acceleromyography monitoring reduces the incidence of residual blockade and associated unpleasant symptoms of muscle weakness in the PACU, and improves overall quality of recovery.

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**Paper No: 352.00**

## Historical review of anaesthesia & intensive care in Trinidad & Tobago

Deryk Chen and Seetharaman Hariharan

**Introduction:** The evolution of Anaesthesia & Intensive Care Services is unique to every country and region. Although the first surgery in Trinidad & Tobago dates back to 1871, there have been anecdotal reports prior to this. Like many other countries, anaesthesia services in these islands commenced

with surgeons self-administering local anaesthesia, later seeking the assistance of junior officers to administer ether/chloroform without appropriate patient monitoring. This study determines the historical development of such services in Trinidad & Tobago.

**Objectives:** To study the developments of Anaesthesia & Intensive Care Services in Trinidad & Tobago and examine the influence of the University of the West Indies

**Methods:** Local, regional and international literature including scientific publications and newspaper archives were searched. Information was also derived from personal interviews with surviving colleagues in Surgery and Anaesthesia. Additional information was obtained from the "History Section" of various Continuous Medical Education seminars.

**Results:** Anaesthesia in Trinidad & Tobago dates back to an eye operation performed in 1871. The first operating list under ether or chloroform was done in 1878 in Elliot Hospital, now the Port-of-Spain General Hospital. Tobago, the sister island, had the first anaesthesia in 1887. The San Fernando General Hospital was established in 1860 and where the first anaesthetic machine from the United Kingdom was used. Before 1950, there were no qualified anaesthetists. The establishment of the University of the West Indies and the development of the postgraduate specialty programmes changed the scenario. Teaching anaesthesia to undergraduates started in 1975, the first ICU was established in 1976. The postgraduate training programme was commenced in 1984. Currently there are over 40 qualified anaesthetists, 52% being locally trained. Presently, state-of-the-art technical equipment, drugs and qualified human resources are available to ensure a smooth and safe delivery of perioperative and intensive care. Establishing our local Association in 1985 with affiliation to the World Federation of Societies of Anaesthesiologists (1988) provided further potential opportunities for growth.

**Conclusion:** The specialty of Anaesthesia & Intensive Care has evolved exponentially within half a century in Trinidad & Tobago.

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**Paper No: 432.00**

## Impact of transesophageal echocardiography simulation-based

## training on learning basic cardiac structures recognition and navigation between the twenty standar views

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**Introduction:** Perioperative use of transesophageal echocardiography (TEE) has evolved as an indispensable tool for anesthesiologists in cardiac surgery and recently also in high risk non-cardiac surgeries. TEE training is challenging for anaesthesiologists and the availability of fellowships or elective rotations in some countries is limited. Moreover, until TEE simulator was not made commercially available for TEE training, there was no formal hands on training technique for TEE. The aim of our study is to determine the impact of the use of the TEE simulator in the learning curve of intracardiac structures identification and navigation between the 20 standard diagnostic views.

**Methodology:** 14 cardiac and non cardiac anaesthesiologists were recruited to assess the educational benefit of TEE Heart work® simulator. A 20 multiple choice test was completed by the participants before and after 1 hour simulation-based teaching session in a controlled environment. The test was written and validated by four experienced anaesthesiologists. It was divided in two parts, ten questions to assess the structures identification knowledge and ten questions focused on how to get the standard views. Values are expressed as mean and standard deviation. The Mann-Whitney U test and T student test were used for comparisons.

**Results:** There was a statistically significant improvement between the scores of pre and post simulation session test: Averaged presimulator score was 40%+/-22 and postsimulator was 77%+/-13 ( $p < 0,05$ ). There were not statistically significant differences between the improvement of the scores of structure identification part (pretest: 50%+/-20 and post-test 80+/-12) and navigation in the standard views part (pretest 39%+/-21 and post-test 75%+/- 18).

**Conclusion:** The use of the simulation-based training during 1 hour significantly and equally improves the knowledge of intracardiac structures identification as well as navigation between the 20 standard TEE views. Simulation-based training, although an expensive tool may significantly decrease the amount of time needed to practice on real patients when learning basic TEE. Simulation-based learning could be very useful in countries where fellowship programs are not easily available, and widespread and cardiac and non cardiac anaesthesiologists or intensivists have limited opportunities to learn.

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## Paper No: 440.00

### Feedback on clinical and educational performance needed by u.s. academic anesthesiologists for practice-based improvement and promotion

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**Introduction:** Formative feedback and reflective practice are vital for the academic anesthesiologist. American Board of Anesthesiology Maintenance of Certification (MOCA) process includes a practice improvement project involving collection of practice data, comparison against benchmarks, implementation of an improvement plan and reevaluation of outcomes.<sup>1</sup> Limited performance feedback may help to explain why clinician-educators are promoted at a lower rate than researchers.<sup>2</sup>

**Objectives:** Aims were to clarify the self-perceived ability of anesthesiologists to comply with MOCA requirements, and to identify the challenges educators experience in documenting their educational activities for promotion.

**Methods:** IRB-approved survey was distributed in paper format to 2010 Society for Education in Anesthesia (SEA) national meeting attendees, and in electronic format to SEA members who did not attend (overall response rate 31%). Categorical variables were compared using Pearson chi-square tests. Open-ended questions were analyzed for content and systematically coded and categorized. Themes were identified. Respondents were compared on gender, rank, age and regional location to US academic anesthesiologists, using AAMC data.<sup>3</sup>

**Results:** With 75% of SEA respondents participating in the MOCA process, only 48% had ready access to their practice outcome data, less than 35% routinely received evaluation of clinical performance, and only a third felt their present feedback system was adequate to complete the practice improvement project. Evaluations by chairs, students, and residents were the main sources of feedback on clinical practice (65%, 25% and 48%) and teaching (56%, 60% and 91%). Peer feedback was available to only 22% for clinical practice and 8% for teaching, while multisource feedback was available 17% and 6%, respectively. Top concerns about completing MOCA related to collecting, evaluating, and presenting individual practice data. Although about half of respondents reported faculty development programs, 25% of junior faculty and nearly 20% of clinical faculty did not feel they had an adequate understanding of the promotions process. Maintenance of an academic portfolio was highly correlated to availability of institutional tools for this purpose ( $r=0.55$ ,

$p<0.001$ ). Fewer than 12% received feedback from mentors. Top concerns about promotion included uncertainty about effective presentation of clinical and educational performance data, and lack of time for research.

**Conclusions:** Our survey results suggest that adequate feedback is not occurring in academic anesthesia departments and that better guidance in the promotions process is needed. A majority of respondents desired a better organizational structure for presenting their achievements in education and clinical arenas to promotions committees.

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## Paper No: 473.00

### History of trauma anesthesia and resuscitation

Anthony Kovac

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**Introduction:** History of trauma anesthesia and resuscitation includes management of airway, pain, shock, triage, transport, anesthesia and surgery.

**Discussion:** Greek and Roman Eras: Hippocrates described trauma and types of head injuries. Pain relief with opium, hemlock, and mandrake. Ascepiades 1st described tracheostomy; Celsus, treated abdominal trauma, head injuries, fractures; Galen had methods to close wounds and treat bleeding. Middle Ages: pain control via “drugged” wine and “soporific” plants. Wounded were treated in monasteries. Renaissance: Wounds were cauterized with boiling oil. Analgesia was opium and direct nerve compression. 17th Century: Serverino used snow and ice for analgesia. Harvey described circulation of blood. Major 1st used IV fluid therapy; Monel tourniquets to control bleeding. 18th Century: Hale was 1st to measure blood pressure. Pugh used air pipes for newborn resuscitation. Hunter, air bellows with valves. Nairn 1st used electricity for cardiac defibrillation. 19th Century: Larrey was 1st modern military surgeon to use horse drawn “flying ambulances” for wounded rescue at start of battle and introduced triage and “First Aid.” Forence Nightengale improved sanitation of hospitals. Lister introduced germ therapy. Cocaine used for local and regional anesthesia. Ether introduced by Long and Morton, N2O by

Wells. Esmarch introduced his chloroform mask; first aid and rubber bandages to exsanguinate limbs. Bier described IV regional block. 20th Century, WWI: Crile developed anoci-association theory with N<sub>2</sub>O balanced anesthesia in WW1. Lansteiner classified blood into 4 groups; Robertson and Cannon developed the 1st blood bank. Guedel described stages of anesthesia. Need for specially trained anesthesia providers recognized. Uncuffed endotracheal tubes were developed by Magill and Rowbotham followed by Guedel and Waters who added cuffs. WWII: At Pearl Harbor, pentothal effects in hypovolemic patients was recognized. Henry Beecher researched shock and resuscitation. Post WWII: New anesthetics were curare, succinylcholine, lidocaine, halothane, ketamine and opioids. Miller and MacIntosh laryngoscope blades introduced. Anesthesia develops into specialty with formal training, certification and organization. Korean War: Helicopter evacuation and Mobile Army Surgical Hospital (MASH) units decreased mortality. Viet Nam War: Triage and resuscitation started in field with helicopter evacuation to MASH units. "Da Nang Lung" and ARDS recognized. Persian Gulf, Iraq and Afghanistan to present: Anesthesia was TIVA, propofol, inhalation draw-over vaporizers, regional, and ketamine used alone. Care of wounded brought to front line with Mobile Forward Surgical Teams (MFST).

**Conclusion:** War involves trauma and over the ages has contributed to and been the benefit of advancements in anesthesia, critical care and resuscitation.

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**Paper No: 474.00**

## Comparison of american anesthesia gas machines used at the start of the 20th century

**Anthony Kovac**

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**Research Problem:** What were similarities and differences common among anesthesia gas machines at the start of the 20th Century and how did they impact anesthesia care?

**Sources:** National WW 1 Museum, Kansas City, MO; Wood Library and Museum, Park Ridge, IL; Google internet search.

**Methods:** Approach: archival, library, museum and internet web research.

**Results:** In the 1860s, problems of nitrous oxide (N<sub>2</sub>O) and oxygen (O<sub>2</sub>) storage and delivery were solved by use of high-pressure metal tanks. In the early 1900s, the invention of pressure reducing valves decreased tank pressures delivered to the patient. Newer gas machines were developed that allowed addition of chloroform or ether to mixtures of N<sub>2</sub>O and O<sub>2</sub> and provided a continuous, steady flow of gas at uniform pressure. The technique of N<sub>2</sub>O/O<sub>2</sub> anesthesia was popularized by the Anoci-Association theory of Dr George Crile during World War One to decrease morbidity and mortality associated with using chloroform or ether during surgical shock. Crile's N<sub>2</sub>O/O<sub>2</sub> balanced regional anesthesia technique decreased mortality as a lighter depth of anesthesia was needed for surgery compared to using chloroform or ether. N<sub>2</sub>O/O<sub>2</sub> was used more consistently in place of chloroform. Newly developed gas machines included the Gwathmey, Connell, Heidbrink, Teter and Ohio Monovalve. Factors common to these early machines were electric warmers, vaporizers, rebreathing bags, and pressure reducing and control valves, allowing the simultaneous or single administration of N<sub>2</sub>O or O<sub>2</sub>. The Heidbrink (1911) and Teter (1912) incorporated reducing valves and rebreathing bags which provided a definite flow and mixture of N<sub>2</sub>O and O<sub>2</sub> for continuous breathing. The Ohio Monovalve (1912) passed gas through regulators and automatic valves to reduce gas pressure. The Gwathmey (1912) was simple to use and eliminated need for diaphragm valves. A visible sight feed allowed for economy of gas consumption and eliminated irregularity of gas flow, leakage and freezing of valves. The Connell (1913) had flow meters which allowed accurate gas delivery with quantitative dosing of N<sub>2</sub>O and O<sub>2</sub>.

**Conclusions:** New N<sub>2</sub>O/O<sub>2</sub> gas machines were developed at the start of the 20th century. These machines had: (1) N<sub>2</sub>O/O<sub>2</sub>; (2) reducing and control valves; (3) rebreathing bags; (4) electric source to warm gases; (5) vaporizers for ether and chloroform. Advantages were even, continuous gas flow with no valve freezing, allowing the use of a minimum quantity of gas given alone or in combination. Choice of machine appeared to depend on individual preference.

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**Paper No: 475.00****Comparison of united states (us) versus german anesthesia during world war one****Anthony Kovac, Horst Stoeckel and Ronnie Strauch**

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**Research Problem:** What were influences, similarities and differences between US and German anesthesia methods used during WW I?

**Methods:** Archival, library, museum, internet web research. Anesthesia techniques used by US vs German armies were compared in areas of: (1) surgeons and anesthetists; (2) drop mask methods; (3) apparatus; (4) gas agents and machines; (5) premedication; (6) regional anesthesia and local anesthetics.

**Results:** Surgeons (US=Crile, Cushing, Mayo. German=von Esmarch, Schimmelbusch, Bier, Braun, Kuhn) and anesthetists (US=Guedel, Gwathmey, Hodgins. German=Kapeller, Dumont, Braun, W. B. Mueller (textbooks)) in each country influenced the type of anesthesia. Drop mask methods were used at front line casualty stations, field, evacuation and base hospitals for both countries. Yaunker and Gwathmey masks were used by US. While Schimmelbusch mask was used by both countries, Germany also used Julliard, von Esmarch, and Sudeck masks. While the Shipway anesthesia apparatus was used by US, Germany used the Ombrédanne and H. Braun. Gas machines were used at evacuation and base hospitals. The Roth-Draeger and Georg Haertel gas machines with compressed O<sub>2</sub> were used by Germany. N<sub>2</sub>O was not used by Germany during WWI. Whereas in 1910 the first N<sub>2</sub>O-O<sub>2</sub> machine (Rota-M. Neu) and then in 1926 the Draeger-Model A came on the market in Germany, they were not used for military purposes. Ohio Monovalve, Heidbrink, Connell, Gwathmey, and Teter machines were used by the US. As N<sub>2</sub>O was a key component of Crile's Anoci-Association balanced anesthesia technique, Crile supported using the Ohio Monovalve machine. Intramuscular morphine and scopolamine or atropine were used as premedication by both US and Germany. Oral Veronal, Luminal and Pantopon were used by Germany. Regional anesthesia was used by both countries, with Novocain the most popular local anesthetic. Stovain (from France) was used by the US. Germany used Tropacocain. Germany added Suprarenin (adrenalin) to Novocain.

**Conclusions:** At front line casualty stations, field, evacuation and base hospitals, the drop mask methods used by both armies were similar. A major difference of anesthesia administration was type of gas apparatus and machine. There was an increased emphasis on N<sub>2</sub>O as well as variety of different gas machines used by the US. Regional anesthesia/local anesthetics were used by both countries, with the exception that Stovain (from France) was used for spinal anesthesia by the US. In Germany, regional techniques were highly accepted and used in up to 60% of all anesthetics.

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**Paper No: 526.00****A Summary of Novel Simulation and Educational Tools for Anesthesiology Residents and Medical Students****Edward Kosik and Michael McGaughlin**

University of Oklahoma Health Sciences Center

**Introduction:** In the past, anesthesiologists have had a significant impact on creating new ideas in medical simulation and education. Recently, anesthesiologists' use of simulation in anesthesia education has become evermore popular and globally prevalent. We describe several new learning tools that are currently used in our teaching institution to enhance the simulation experience. Furthermore, we show the diverse range of simulation techniques and share some scenarios that have been developed to specifically address some of our problems in anesthesia education. Additionally, we show how our anesthesia simulation curriculum is integrated into a Web 2.0 internet application. Finally, we show anesthesia related learning tools available at free or little cost.

**Objectives:** 1) Show unique anesthesia learning tools that were developed and/or utilized at our anesthesia training program. 2) Show how a anesthesia simulation program is integrated into our academic institution's anesthesia residency program and how it helps to meet the ACGME requirements. 3) Illustrate how our anesthesia simulation curriculum is integrated into a Web 2.0 internet application. 4) Summarize anesthesia related learning tools available at little or no cost.

**Methods:** n/a

**Results:** The integration of a simulation program into the larger anesthesia training program curriculum cannot be overstated. Tools used to enhance the simulation experience have been developed by our institution. These include state of the art checklists, digital worksheets, DVDs and integration of our simulation program into a Web 2.0 application. While relatively new, we believe that our utilization of technology helps to enrich our simulation program to aide the learners' experiences to create a higher impact learning experience. In addition, we list a thorough list of freely available or low cost educational material that will enhance the anesthesia student's education.

**Conclusion:** The use of technology in medical education is continually expanding. It is imperative for physician educators to be aware of the different types of technology and how they can enhance the education of anesthesia residents or students. This abstract focuses on innovative approaches in anesthesia education and simulation.

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## Paper No: 560.00

### Introducing clinical governance to a tertiary trauma hospital – experience from Saigon, Vietnam

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**Introduction:** As a volunteer for the charity HVO (health volunteer organisation), I visited Ho Chi Minh Trauma Centre (HCMTC) during my out of program year. Under the supervision of the head of anaesthesia, I carried out the department's first survey of current practice in regional anaesthesia and introduced the concept of clinical governance into the residents' everyday anaesthetic practice.

**Objectives:** To create a system where clinicians feel accountable for continuously improving the quality of their services and safeguarding high standards of care. To demonstrate how a departmental survey helps to identify areas for improvement and generate discussions to resolve issues surrounding equipment, patient consent, uniformity in clinical practice & training needs.

**Methods:** Prospective survey questionnaire sent out to members of the anaesthetic department (nurses & doctors), covering a range of topics: types of block performed; block technique & assessment; rescue techniques & drug preferences.

## Results:

**Upper Limb:** Interscalene(30.6);Supraclavicular(10.5);Axillary(48.4);Radial(3.2);Ulnar(3.2);Median(3.2);Flexor tendon (0.8)  
**-Lower limb:** Femoral(37.2);Tibial(11.6);Popliteal(4.7);Ankle(4.7);Other(41.9) ? Consent: 100% of practitioners consent their patients ? Discussions in consent(%):Numbness(75);Tingling(35);Pain(50);Nerve Damage-reversible(15); irreversible(0);Urinary retention(5);Stuffy nose(5);Difficulty speech / swallow(5);Not stated(5) ? Use of nerve stimulator(%):Always(0);Sometimes(80);Rarely(10);Never(10) ? Why not stimulator(%):Training(10);Confidence(20);Time(60);Access(40);Others(15) ? Use of ultrasound(%):Always(0);Sometimes(10);Rarely(25);Never(65) ? Why not ultrasound(%):Training(45);Confidence(20);Time(30);Access(55);Others(15) ? Success indicator(%):Numbness/parasthesia(85);Tingling(25);Pain(5);Pain on injection(10);Aspiration of blood(10);Other(15) ? Reasons for general anaesthesia (GA) conversion(%):Patient complaint(70);HR/RR(45);Prevents surgery(70);Surgeon complaint(40);Others(10) ? % GA conversion last week(%):0(40);1-5(20);6-10(10);11-20(25);21-30(10);>30(0) ? If RA fail, what strategies?(%):GA(80);Add opioids(30);Add Benzodiazepine(BDZ)(10);Add BDZ+Opioids(5);Rescue block(20) ? Rescue drug preference(%):Propofol(60);Ketamine(5);Propofol & ketamine(20);BDZ(30);Fentanyl(10)

**Conclusions:** This survey has highlighted the importance of a formalised log: currently, there are no theatre logs or formal documentation of the workload at the HCMTC and consequently, funding & procurement of new equipment can be difficult to justify. A wide variety of regional anaesthetic practices exist within the department. The standardisation of clinical care would benefit the patient, in particular, patient consent and the timing and type of rescue technique when stand-alone regional anaesthesia fails. Further discussion is required to formalise strategies and consensus including identifying training needs. A re-audit by another volunteer from HVO or a member of staff from the department is expected.

## Paper No: 563.00

### Combined use of sugammadex and neostigmine reverses rocuronium-induced profound neuromuscular blockade faster than that of sugammadex alone

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**Introduction:** Sugammadex is a new reversal agent for profound neuromuscular blockade. However, it is more than thirty times as expensive as the traditional reversal agent, neostigmine (sugammadex 200mg costs 9477 yen, and neostigmine 2.0mg costs 267 yen in Japan) (1). Sugammadex

0.25% w/ C	0.5% w/C
p value	
ISB (250)	18.6
SD 4.4 (488)	20.2
SD 5.0	<0.05
AX (72)	17.5
SD 4.2 (654)	19.1
SD 5.3	<0.05

and neostigmine have different mechanisms of action and their pharmacological interaction has not been studied yet.

**Objectives:** We hypothesized that we could reverse rocuronium-induced profound neuromuscular blockade by partially substituting sugammadex with neostigmine.

**Methods:** After institutional ethics committee's approval and written informed consent, twenty-six healthy adult surgical patients were randomly allocated to Group S (n=13) or Group SN (n=13). Anesthesia was induced with propofol and was maintained with continuous infusion of propofol and remifentanyl. The patients were intubated without neuromuscular blocking agents and mechanically ventilated during the study. Neuromuscular blockade monitoring was performed using TOF Watch SX® acceleromyography. After control stabilization, rocuronium (0.6mg/kg) was administered to patients in both groups. The patients in Group S received sugammadex 1.0mg/kg five minutes after rocuronium administration. Those in Group SN received sugammadex 0.5mg/kg and neostigmine 0.04mg/kg five minutes after rocuronium administration. The recovery time was started at the administration of reversal agents. The degree of recovery was evaluated by T1/control and TOF ratios. They were measured and recorded every thirty seconds for forty minutes after the administration of reversal agents. The results are expressed as mean  $\pm$  SD. Statistical analysis was done using analysis of variance (ANOVA) and the unpaired t-test with Bonferroni's adjustment. A p-value less than 0.05 was considered to be statistically significant.

**Results:** The T1/control ratios were significantly higher in Group SN at 5, 10, 15 and 20 minutes after administration of reversal agents (Group NS vs. N;  $0.23 \pm 0.26$  vs.  $0.06 \pm 0.12$ ,  $0.53 \pm 0.34$  vs.  $0.21 \pm 0.19$ ,  $0.69 \pm 0.28$  vs.  $0.43 \pm 0.25$ ,  $0.80 \pm 0.20$  vs.  $0.63 \pm 0.19$ , respectively.  $p < 0.05$ ). The TOF ratios were significantly higher in Group SN at 10, 15, and 20 minutes after administration of reversal agents (Group NS vs. N;  $0.42 \pm 0.35$  vs.  $0.17 \pm 0.29$ ,  $0.63 \pm 0.36$  vs.  $0.35 \pm 0.26$ ,  $0.77 \pm 0.31$  vs.  $0.57 \pm 0.27$ , respectively.  $p < 0.05$ ).

**Discussion:** These results demonstrate that combined use of sugammadex and neostigmine can reverse rocuronium-induced profound neuromuscular blockade faster than that of sugammadex alone.

**Conclusions:** We can partially substitute sugammadex with neostigmine for the reversal of profound neuromuscular blockade.

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## Paper No: 649.00

### Rapid sequence induction/intubation and nasogastric tubes: historical perspective, current concepts, and proposal of an algorithm

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**Introduction:** Rapid sequence induction and intubation (RSII) is a commonly chosen anesthetic technique for patients at risk of aspiration of gastric contents. Because of their clinical condition, some patients may have a nasogastric tube (NGT) placed preoperatively. There are no accepted guidelines regarding which patients should have a NGT preoperatively. Furthermore, there is no agreement whether to keep the NGT in place, or to withdraw the NGT partially or completely before anesthetic induction.

**Objective:** This study was designed to examine the history of the use of NGT's during RSII. An algorithm governing this use of NGT's when RSII is contemplated is proposed.

**Methods:** Manuscripts addressing RSII and NGT's since 1951 were reviewed.

**Results:** RSII (with a 40° head-up tilt) was described by Snow and Nunn in 1959 .1 The lack of complications with this technique was attributed to the use of NGTs. Cricoid pressure (CP), introduced by Sellick in 1961,2 seemed to have overcome the disadvantages of the head-up tilt. Sellick hypothesized that NGTs can increase the risk of regurgitation by "tripping the upper and lower esophageal sphincters" and by interfering with the effectiveness of CP. In a second publication,3 he modified his views regarding the withdrawal of NGTs before anesthetic induction. Studies in cadavers in the 1970's and 1980's demonstrated the effectiveness of CP in obliterating the esophagus around the NGT.4 In 1993, Vanner & Pryle5 provided additional evidence regarding the efficacy of CP in the presence of a NGT. In the 1990s, some clinicians recommended complete or partial withdrawal of a NGT to the mid-esophagus before anesthetic induction.6

**Discussion:** An algorithm is proposed regarding the use of NGTs when RSII is contemplated. It is based on historical and clinical evidence, as well as, additional factors: the type and severity of the esophageal, gastric or intestinal pathology; age; predictability of difficult intubation or mask ventilation; whether or not a NGT is in place; associated medical conditions; and the presence of possible contraindications to the use of RSII or CP.

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**Paper No: 675.00****Influence of drug-administration sequence of target-controlled propofol and remifentanyl on the onset of rocuronium**

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**Introduction:** Target-controlled infusion of propofol and remifentanyl is commonly used. There were two reports about administration sequence of propofol and remifentanyl. Starting propofol infusion prior to remifentanyl was effective to suppress remifentanyl-induced cough [1]. Another study [2] reported that early administration of remifentanyl reduced injection pain of propofol. However, prolonged infusion of remifentanyl during induction may delay onset of neuromuscular blockade because it depends on the blood flow to neuromuscular junction.

**Objectives:** We investigated whether drug-administration sequence influenced the onset of rocuronium and hemodynamic variation during induction of anaesthesia with target-controlled propofol and remifentanyl.

**Methods:** One-hundred thirty-four, ASA I-II patients scheduled for elective surgery under general anaesthesia were included in this double-blind, randomized, and controlled study. Anaesthesia was given with a target-controlled infusion of propofol and remifentanyl. Patients are randomly allocated into one of two groups according to drug administration sequence. In group R, remifentanyl was infused first and propofol followed after achieving target concentration of remifentanyl (4 ng/ml). In group P, propofol started first and remifentanyl was given after rocuronium injection. Rocuronium (0.6 mg/kg) was administered after loss of consciousness by propofol in both groups. The onset of rocuronium was recorded and arterial pressure and cardiac output was measured before anaesthesia, at injection of rocuronium, before and after intubation. Remifentanyl-related cough and propofol-infusion pain were assessed.

**Results:** The onset time of rocuronium was prolonged significantly by early administration of remifentanyl in group R (130 [90-240] vs. 90 [50-180] sec,  $P < 0.001$ ). Cardiac output during induction was lower in group R compared with group P ( $4.8 \pm 1.7$  vs.  $6.1 \pm 1.8$  L/min,  $P = 0.001$ ). Remifentanyl-induced cough occurred more frequently in group R (42% vs. 9%,  $P < 0.001$ ), while incidence of propofol-infusion pain was lower (23% vs. 55%,  $P < 0.001$ ).

**Conclusions:** During induction with target-controlled propofol and remifentanyl, remifentanyl is recommended to be administered after rocuronium, so as not to delay onset of neuromuscular blockade and it is also helpful to keep patients haemodynamically stable.

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**Paper No: 683.00****Ropivacaine-induced neuromuscular blockade in rat phrenic nerve-hemidiaphragm**

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**Introduction:** Feldman said that the effects of nondepolarizers are likely to be potentiated and their action prolonged by large doses of local anesthetics. But there are no reports that ropivacaine at what concentration would produce neuromuscular (NM) blockade, and enhance the effect of a nondepolarizing NM blocker.

**Objectives:** To demonstrate whether ropivacaine may block NM conduction, and when alone or together with gentamicin, potentiate a NM blockade caused by rocuronium in rat phrenic nerve-hemidiaphragm.

**Methods:** Twenty eight left phrenic nerve-hemidiaphragms (Male Sprague-Dawley rats, 150–250 g) were hung in a 20-ml organ bath filled with Krebs solution. Three consecutive single twitches (ST, 0.1 Hz) and one tetanic tension (50 Hz for 1.9 s) were obtained before the application of drug tested and at each change of drug concentration. The ST and tetanic tension were measured 20 min after each cumulative change in drug concentration. The concentrations of ropivacaine in Krebs solution ( $n=5$ ) were cumulatively increased by the way of 10<sup>-8</sup>, 10<sup>-7</sup>, 5 $\times$ 10<sup>-7</sup>, 0.1 $\times$ 10<sup>-6</sup>, 5 $\times$ 10<sup>-6</sup> and (1 $\times$ 10<sup>-6</sup>, 1.1 $\times$ 10<sup>-6</sup>, 1.2 $\times$ 10<sup>-6</sup>, 1.3 $\times$ 10<sup>-6</sup>, 1.4 $\times$ 10<sup>-6</sup> and 1.5 $\times$ 10<sup>-6</sup> M. After a Krebs solution was pre-mixed with ropivacaine 0 ( $n=5$ ), 0.1 ( $n=4$ ), and 1 ( $n=3$ )  $\mu$ M or pre-mixed with concentration sets of ropivacaine and gentamicin being as follows: 0.1, and 10 ( $n=4$ ); 0.5, and 10 ( $n=2$ ); 1, and 10 ( $n=5$ )  $\mu$ M, the concentrations of rocuronium were cumulatively increased by the way of 1, 3, 5, 7, 9, 10, 12, 14, 16, 18, 20  $\mu$ M until an 80–90% reduction of single twitch was attained. The effective concentrations (EC) for each experiment were determined by the probit model. The EC50's of rocuronium were compared using a Student's t-test with a Bonferroni's correction of the significance level. Differences were considered significant when  $p < 0.05$ .

**Results:** The potencies, and EC25 of ropivacaine for tetanic fade (TF) were 12.1 (b 4.1), and 3.6 (b 1.0)  $\mu$ M, respectively. An EC of ropivacaine, or rocuronium for TF was much lower than that for ST. Ropivacaine one  $\mu$ M significantly facilitated the NM blockade by rocuronium. The combination of



ropivacaine one  $\mu\text{M}$  and gentamicin ten  $\mu\text{M}$  shifted the concentration-response curve of rocuronium to the left.

**Conclusions:** Based on TF, a ropivacaine of clinical serum concentration has NM blocking action, and assessment by ST of NM blockade may underestimate a ropivacaine- or rocuronium-induced NM blockade. Ropivacaine alone and the combination between ropivacaine and gentamicin under their clinical concentration amplifies the rocuronium-induced NM blockade.

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## Paper No: 702.00

### The influence of anaesthetic factors on the well-being of the fetus during birth: preliminary study

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**Background and goal of the study:** The acid base state of the fetus is an important component in establishment of a connection between the labor events and the neonatal conditions and development, and therefore, it's the marker of fetal well-being. We are searching a multivariant model of the pH of a newborn according in patients who have been subjected to obstetric analgesia for labor.

**Material and methods:** After the ethical committee approval, we carried out a randomised clinical double blind trial on consecutive women. They were on spontaneous labour, ASA I-II, 18-36 years, first, second or third pregnancy, 3-5 cms dilation. The method of randomisation was closed. Three hydration groups were established with Ringer lactate : Group I 500 ml, Group II 700 ml and Group III 1.200 ml . Patient laying on his left side . Weiss puncture 18G, L3-L4, Test dose: Lidocaine 1,5%+epinephrine 1:200.000 3 ml. Continuous epidural infusion at 10 ml/h with bupivacaine 0.0625%+Fentanyl 2  $\mu\text{g}/\text{ml}$ +epinephrine 1:200000. Monitoring: electrocardiogram, pulse oximetry and non invasive blood pressure ( NIBP) . The following variables were observed: age, corporal mass index, dilation, number of previous pregnancies, length of labor, blood pressure, oxytocin units, instrumentation, total volume infused and umbilical arterial samples for pH determination . The

analysis was carried out with the intention of treatment . The calculation software used was SPSS 18.0.

**Results:** A total of 56 patients were included in the study: 17, 23 and 16 in group I, II and III respectively. There were no differences of age, mass corporal index or number of pregnancy, instrumentation, cervical dilation and parity between the groups. The mean of newborn pH was 7,247 (Group I), 7,233 (Group II) and 7,281 (Group III) without statistical significance difference ( ANOVA  $p=0,559$ ) We've made a predictive model of newborn pH with the studied variables using a lineal regression model: Newborn pH= 7,239- (0,002 x age)+(0,032 x cervical dilation) -(0,105 x parity) -(0,189 x instrumentation)+( 0,0001 x total volume) -(0,056 x oxytocin units) -(0,097 x hypotension) We've not found statistical significance in any of this variables.

**Conclusions:** Although we've not found likely an appropriate predicting model based on small current sample size, it can be said that the influence of the fluid therapy in the improvement of the newborn is low, because of the low intensity of the lineal regression model coefficient that we appreciate when compare this with others variables like instrumentation and number of previous pregnancies.

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## Paper No: 724.00

### Impact of 15 years of benin-belgium cooperation on anesthesiologists' demography in West Africa

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**Introduction:** According to the WFSA Sub-Saharan Africa was in 1992 the only region in the world where the number of anesthesiologists was decreasing instead of rising. In many countries our specialty was extinct or nearly so, impeding teaching for anesthesia nurses or technicians (1,2). In 1994 Belgian universities decided to support the University of Abomey-Calavi (Benin) to start an anesthesiology 'CES' (Certificat d'Etudes Supérieures) program to teach and train future specialists from all French-speaking African countries, following CAMES specifications.

**Materials and Methods:** Belgian Cooperation grants (CGRI, CIUF-CUD, CTB, WBI) supported the project for a total ?106 €, representing the largest part of the CES budget. 10 Belgian Hospitals and 3 Universities (UCL, ULB, ULg) also provided 21 scholarships. Individuals sponsors and industry participated occasionally. Future professors got scholarships.

**Results:** The program enrolled 96 candidates from 14 countries and delivered 50 diplomas to candidates from 11 countries (Benin, Congo-Brazza, Burkina-Faso, Central-Africa, Chad, Djibouti, Gabon, Guinea-Konakry, Mali, Niger, Togo, [Morocco]); 8 left Africa, 1 is ill and 1 died; 84% of living graduates work in Africa, increasing the total of specialists practicing in the sub-region from 44 in 1999 (date of first diplomas) to 84 (+91%); 68% assume teaching duties. The average duration of training has been 5.3 years; 33 candidates did rotations in Belgium; 46 are still in training, + those enrolled in 2011. This should provide a regional workforce of 99 anesthesiologists by 2015 taking into account observed rates for brain-drain, drop-outs, mortality. A 2½ year course for nurse anesthetists started in Cotonou in 2002 and already graduated >150, multiplying the impact of the program. Alumni worked in Darfour, Haiti and Porga crises. Two professors got CAMES certified; another one is preparing his doctorate.

**Discussion:** With limited financial means and deliberately avoiding any direct humanitarian action this project succeeded in reversing the negative demographic trend of our specialty in French-speaking West Africa and restored adequate conditions for knowledge transmission to the next generation of specialists. However, the future still depends on a dangerously small number of individuals; brain drain remains a threat. Efforts are made to respect the 4 year-training schedule. African Governments' policies vary toward graduates, some countries providing better reinsertion conditions. The next priority is to open more CES programs in the region and more schools for nurse anesthetists, which implies training former and future graduates in teaching and management skills.

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## Paper No: 766.00

### Electronic e-learning learning prior to undergraduate simulation and crisis management-development of an online educational tool

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Canadian Simulation Centre for Human Performance Canadian Simulation Centre for Human Performance

The face of Undergraduate medical student education is constantly changing. Currently the challenge is to meet the needs of our Generation Y or Millennial students. Characterized as having low attention spans, their learning styles are visual and kinaesthetic with a preference for multi-media technology.

At the University of Toronto, we have developed an online e-learning module as part of the Blended learning approach. Blended learning combines e-modules with face-to-face teaching.(1,2) The e-module is standardized in content and delivery allowing for flexible, repetitive viewing. E-learning has been shown to improve satisfaction among students through being interactive and engaging(3,4) likely translating into improved performance.(5) Students complete the e-module prior to hands on Simulation as part of the core curriculum, facilitating student focused-learning and optimizing face-to-face instruction time with Faculty.

The web based e-module is accessible to computers and hand held devices via a learning management system compatible with various internet browsers. Learning objectives are i) Airway in Crisis, ii) Formalization of the CanMEDS roles(6) exemplified by team training and iii) Introduction to ACLS guidelines as a roadmap to resuscitation. Content is fully narrated for the multi-tasking Millennial learner and is delivered using specialized features including i) animated annotations that highlight learning objectives, ii) still images and high resolution video, iii) multi-level navigation and branching, iv) embedded live web pages and v) interactive “clickable” slides to facilitate active learning. Prior to each video, objectives are posed with questions following to allow self assessment. There is an embedded end of module quiz with instant feedback.

Senior medical students and 1st year Anesthesia residents have praised the content and multimedia delivery of this module as being easily accessible and instructional prior to their hands on Simulation training. Specific comments included the video breakdown of necessary components for a successful team after viewing 2 scenarios and interactive slides with labelled equipment and patient's vital signs.

In conclusion, the authors believe that the e-module is an important educational tool directed at the student to focus learning prior to hands-on Simulation. Our goal is to extend accessibility of this tool to include other interprofessional teams.

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## Paper No: 803.00

### A pilot project of anesthesia education by video-conferencing between Uganda and the United States

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**Introduction:** Annually many anesthesiologists from high resource countries volunteer to teach and provide anesthesia care in low resource areas. With recent wide accessibility of improved global communication networks, this education effort could be supplemented by video-conferencing by satellite, IP, ISDN, or 3G mobile phone communication.

**Objectives:** To evaluate the ability to use free Skype video-conferencing to provide anesthesia education between an American metropolitan tertiary referral hospital and a Ugandan rural secondary referral hospital.

**Methods:** We used Skype to video-conference between Massachusetts General Hospital (MGH), Boston, USA and Mbarara Regional Referral Hospital (MBRR), Mbarara, Uganda, on eight days. We used three lectures formats: 1. small group discussion 2. department case presentation conferences 3. department Grand Rounds. Department presentation streaming was encrypted. One to two lectures were broadcast during two hour sessions. Lecture materials were emailed in advance. We selected topics based on request from Uganda and the pre-existing lecture program at the MGH. We requested feedback from lectures and students about the convenience of time slots, quality of the internet connection, audibility of the presentations, format of lectures, clinical relevance of the topic presentations and future possibilities of the project.

**Results:** The 7 a.m. start of protected academic time at MGH coincided with the 2 p.m. slowing of clinical load at MRRH. Internet connection was achieved on six of eight days, lack of a modem in Uganda being the issue on two days. Bilateral sound transmission was excellent. Video transmission was good and could be improved by greater lighting in Uganda. Small group discussions were felt by students to be most useful as they involved interaction with lecturers and sharing of experiences. Topics felt by students to be of most relevance were those requested by students, although MGH department presentations were also of interest and educational benefit. Lecturers enjoyed interacting with international students, as well as having their lectures streamed

internationally. A formal lecture syllabus and time slot schedule would be useful. The lecturers and students felt the program should be continued and expanded.

**Conclusions:** Scheduled video-conferencing is an effective, inexpensive way to provide long-distance anesthesia education. It can supplement local academic programs, enhance international anesthesia outreach programs, and build relationships between academic centers in different parts of the world.

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## Paper No: 813.00

### Does residual neuromuscular blockade affect postoperative pulmonary functions?

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Residual neuromuscular blockade (RNMB) is a common problem in the postoperative period following muscle relaxant based general anaesthesia despite the use of reversal agents.<sup>1</sup> The respiratory muscle weakness due to RNMB can result in restrictive breathing and reductions in peak expiratory flow (PEF), forced vital capacity (FVC) and forced expiratory volume (FEV1).<sup>2</sup> Few studies are available, hence we studied the incidence of RNMB produced by different muscle relaxants, as assessed by TOF and post-operative pulmonary respiratory functions.

**Methods:** After obtaining Ethical clearance from our Institutional Review board, 150 patients of ASA grade 1 & 2, undergoing various surgical procedures of 2–4 hours duration, were randomly allocated into three groups receiving Vecuronium (Group V), Atracurium (Group A) or Rocuronium (Group R) as muscle relaxants. No attempt was made to standardize anaesthetic technique, which was left to the choice of Anaesthesiologists concerned. At the end of surgery, neuromuscular blockade was reversed with Neostigmine and Glycopyrrolate. TOF and pulmonary function test (PFT) were

measured preoperatively and on arrival at PACU by TOF watch (Organon Ltd) and Spirometry (Micro plus). RNMB was defined as  $\text{TOF} < 0.9$ . Age, Sex, Height, Weight and BMI were noted. Parameters recorded were Duration of Surgery, Duration of last dose to reversal, time to achieve from reversal, to extubation,  $\text{TOF} > 0.7$  and  $\text{TOF} > 0.9$  were recorded. PEF, FEV1, FVC, FEV1/FVC ratio, were recorded post operatively, every 5 min. The best of three readings was considered for the analysis. Data was analyzed by using ANOVA, Student's t-test, Kruskal Wallis test and Chi-square test or Fischer's exact test.

**Results:** Average duration of first PFT measurements was  $16.7 \pm 13.8$  min and  $9.5 \pm 12.4$  min after reversal and first TOF measurement respectively. RNMB ( $\text{TOF} < 0.9$ ) was present in 86 patients and absent in 64 patients, significantly more in females (64%,  $P=0.001$ ). Incidence of RNMB ( $\text{TOF} < 0.9$ ) was significantly lower in Rocuronium group (44%) as compared to Vecuronium group (68%) and Atracurium group (60%) ( $P=0.047$ ). The postoperative PFT for groups with 'RNMB-absent' and 'RNMB-present' were; PEF 49% and 41% ( $P=0.007$ ), FEV1 58% and 53.5% ( $P=0.060$ ) and FVC 61% and 55% ( $P=0.033$ ) of the preoperative values respectively indicating restrictive pulmonary function. The postoperative PEF, FEV1 and FVC values in 'RNMB-Present' patients were 84%, 92% and 90% respectively as compared to fully recovered (RNMB absent) patients.

**Conclusion:** We conclude that in clinical practice, the incidence of RNMB was significantly lower with Rocuronium and higher in females. Patients with RNMB had significantly low PFT values and may be more prone to critical respiratory events in PACU.

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## Paper No: 914.00

### A pilot project for training operative department practitioners to improve team performance with a two stage process of screen based simulation followed by simulation on airway training head

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**Introduction:** In United Kingdom, Operating Department Practitioner (ODP) provides dedicated and skilled assistance to an anesthesiologist within the operating theatre. It is important for an ODP to provide skilled assistance for a successful outcome if a critical incident occurs. Maintaining and securing airway is fundamental to anaesthetic practice. Failed intubation and ventilation, which although not very common, is a potentially life threatening situation if immediate steps are not taken. Newly qualified ODPs may not have

enough experience to help anesthesiologists in managing this situation effectively to avoid a fatal outcome.

**Objectives:** We describe a pilot project of training newly qualified ODPs with an aim to improve team performance during failed intubation /ventilation scenario, using a two stage process to enhance cognitive retention and performance.

**Methods:** We used screen based simulation (SBS) for "can't intubate, can't ventilate" scenario for a group of seven newly qualified ODPs. The focus was on developing situational awareness, learn management protocol, increase the knowledge base and emphasize concept of team working in a crisis situation. This was followed by repeating the scenario with an airway training head in the operating theatre. We observed their knowledge and skills in handling the situation, and non-technical skills such as anticipation, planning and preparation, communication, use of available resources, calling for help early and appropriately, setting priorities and avoiding fixation errors. This was followed by feedback and debriefing.

**Results:** ODPs demonstrated their knowledge about steps to be taken in the above situation with good knowledge retention from the previous screen based simulation and had a systemic approach to anticipate and use the management protocol. Several shortcomings were also highlighted e.g. lack of knowledge and experience in handling specialist airway equipment, difficult airway trolley and availability of specific drugs in theatre. Structured debriefing increased their knowledge and confidence.

**Discussion:** The two stage process of teaching a "can't intubate, can't ventilate" scenario is useful in bringing together the skills of being a team player with good communication skills, being prepared to work under pressure and learn to be meticulous in preparation and checking of equipment and drugs. Repeating the simulated scenario in a theatre environment after screen based simulation helps in building their knowledge, understanding and skills thereby promoting and helping in their spiral learning.

**Conclusions:** Screen based simulation followed by airway simulation in theatre environment is effective experiential learning tool for difficult intubation scenario for newly qualified ODPs.

## Paper No: 920.00

### Flat screen cardiovascular physiology instruction: is one large group session just as effective as multiple small group sessions?

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**Introduction:** Since 1995, second year medical students have learned the theory of pulmonary artery catheterization (PAC, “Swan-Ganz”) and the interpretation of hemodynamic data during problem based learning (PBL) sessions during the cardiology block[1]. In parallel, to make the “theory come alive,” we have provided hands-on simulation experiences[2]. The students, in small groups (6-8 per group) interactively experience the hemodynamic data generated in real time by a physiologically based full human simulator[3]. Students highly value these sessions, and are requesting more simulation sessions. However, due to the high time requirement (20 hours of faculty/instructor time), we are not able to expand the number of small group simulation experiences.

**Objectives:** Our objectives included exploring differences in learning and perceptions after two methods of simulation instruction: control (small groups: mannequin based simulation), experimental (one large group=half the class, using a lecture with screen-based simulation.)

**Methods:** Following ethical approval, volunteering second year medical students were assigned to either control group (one-hour small group simulation sessions) using a physiologically based mannequin (METI HPS, Medical Educational Technologies, Inc., Sarasota, FL) or experimental group (one-hour large group session, using a PowerPoint lecture based on the current small group session, with concurrent screen-based simulation.) A second presenter projected a computer based (“flat screen”) simulation (Hemodynamics Simulator, Version 1.0, Anesoft Corporation, Issaquah, WA). Interactive questions were integrated into the lecture using an audience response system. Both groups completed a 5 point knowledge questionnaire (pre- and post session), a subjective questionnaire exploring their perceptions (0=bad, 10=good) after the sessions, as well as a questionnaire based on acquisition of Bloom’s levels of knowledge. Free text comments (large group versus no simulation) were also elicited. Two sample t-tests were used to compare the groups. A p value of 0.05 was considered significant.

**Results:** 52 students participated in small group sessions and 52 in the large group session. Pre- to post differences in knowledge scores (large group- $1.06 \pm 1.19$ , small groups- $1.25 \pm 1.28$ ) were not significantly different ( $p=0.4$ ). 71% (large group) and 86% (small groups) indicated an increased understanding ( $p<0.01$ ). On all Bloom’s domains[4] (Gain new facts, Understand issues, Apply knowledge, Analyze monitors’ data, Use to diagnose and plan therapy, Evaluate/compare therapies), the small group participants’ ratings were higher than the large group ( $p<0.04$ ).

**Discussion:** Small group simulation sessions are preferred by the students. However, given the choice of large group simulation[5,6] versus no simulation, they indicated a preference the large group simulation.

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## Paper No: 949.00

### The trainee and trainer perspective of postgraduate medical education and training in the United Kingdom (UK)

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**Introduction:** In recent years postgraduate medical training in the UK has undergone a significant overhaul. The Postgraduate Medical Education and Training Board (PMETB) merged with the General Medical Council (GMC) on the 1st April 2010 (1).

PMETB was a non-government organisation responsible for postgraduate medical training and education in the UK. It was an independent body, but was accountable to Parliament. Today the GMC sets the standards and outcomes for postgraduate medical training and education in the UK (2).

**Objectives:** We were keen to find what trainees/trainers thought of current postgraduate medical education and training programmes in the UK and whether opinions correlated or differed. We also wanted to know whether there were any identifiable factors within the hospital that had a significant impact upon the delivery of good postgraduate medical training.

**Methods:** Multiple choice questionnaires were sent out to trainers/trainees in the UK. Questionnaires collected demographic data and trainer/trainee’s views and experiences of current postgraduate medical education and training in the UK.

**Results:** Responses were received from a good spread of medical specialties. Participants were asked what criteria they considered made (a) a good doctor and (b) a good postgraduate training programme. Over 70% stated that patient safety was important as a doctor, but not essential within a good training programme (10%). Support and supervision scored highly in both categories. Competency at procedures and good theoretical/practical knowledge were deemed to be extremely important qualities as a clinician (over 80%) and competent trainers, organised teaching and the ability

to attend these teaching sessions was considered necessary within a good training programme.

Constantly changing supervisors and time pressures, particularly emphasised by trainers, had the biggest impact on inability to complete work based assessments (WBAs). Fifty-five percent of trainees were able to attend 50-80% of their scheduled teaching and attendance was generally prevented by either roster or service commitments.

**Discussion:** The majority of trainees feel that the training they received last year was average to excellent. However, it is clear that despite the GMC's efforts to ensure a national standard for postgraduate medical training, both trainees and in particular trainers rate service provision, rosters and time pressures were considered the most significant obstacle in providing good postgraduate training.

**Conclusion:** There needs to be a greater understanding from the GMC and NHS that extra resources and time are required to ensure that 'Tomorrow's Doctors' are trained to a safe and competent standard.

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## Paper No: 980.00

### 2011 Prevalence Of Burnout In Residents Of The Course Of Studies Specialist Physician In Anaesthesiology Of The AAARBA [Reanimation, Analgesia and Anesthesia Association of Buenos Aires City]

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**Introduction:** The Burnout is a syndrome of chronic distress of those service professions distinguished by an intense and continued attention to people that are in a situation of need or dependency. Nowadays, it is one of the main reasons that cause inability to work or absenteeism. The syndrome shows three main aspects: emotional exhaustion, depersonalization and lack of personal accomplishment.

**Objetives:** Calculate the prevalence of the Burnout syndrome in residents of the course of studies specialist physician in anesthesiology of Buenos Aires city. Secondary goals: Describe the distribution of the Burnout syndrome in the different subgroups (year of residency, sex, age, previous residencies, capital-province) and calculate the different subscales of the syndrome.

**Methods and Materials:** Multicentric, observational descriptive cross-sectional study, applying the Maslach Questionnaire to the target population under intentional consecutive sampling. The Chi-square test is applied for

proportions comparison, considering significant a  $p < 0.05$  and Pearson parametric correlation to relate age and prevalence of Burnout ( $r > 0.6$ ).

**Results:** 191 residents are surveyed over a total of 281, obtaining that 6.3% of them experience the Burnout Syndrome. The three subscales are qualified that give the following proportions: 45% show emotional exhaustion, 38.2% depersonalization and 12% does not reach personal accomplishment. There are no significant differences according to sex ( $p = 0.32$ ) or between capital and province ( $p = 0.85$ ). Burnout prevalence between physicians that went through prior residencies (18.8%) is significantly higher than the ones who did not (4.2%) ( $p = 0.036$ ). The distribution of the syndrome according to ages shows a direct positive correlation for Pearson coefficient ( $r = 0.72$ ).

**Discussion:** The comparison of our results with those of other countries shows that anesthesiology residents of the AAARBA present a high rate of emotional exhaustion (45%) similar to the one of our colleagues in Belgica (40.4%) and clearly superior to the one detected in Mexico's hospitals (17%), Australia (20%), North America (22, 2%) and Spain (19, 5%). However, the coexistence of the three subscales of the Burnout Syndrome in the residents of the AAARBA (6.3%) have considerably lower values in comparison to the ones of Australia (20%) and Spain (12,1%), approaching these last international prevalence values to the ones of second year residents of the AAARBA (14%).

**Conclusion:** Although a small proportion present the syndrome; we consider it is a cause of concern that by analyzing separately the different spheres that compose it, there are high rates of emotional exhaustion or depersonalization.

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**Paper No: 989.00****The use of a computerized haptic simulation model to track angles of epidural needle insertion by anesthesiology residents**

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**Introduction:** Presently, while lacking suitable simulation models for training, residents essentially learn epidural needle placement skills on patients. We evaluated haptic (force feedback) devices to teach skills of small angle changes of epidural needles.

**Objectives.** The objective was to test the value of haptic devices which simulated advancement of an epidural needle. Specifically, we wished to train the residents to make smaller angle adjustments of the epidural needle after encountering ("hitting") bony obstructions.

**Methods:** Following ethical approval, we developed a Virtual Reality epidural simulator based on a haptic device (Phantom Omni, Sensable Technologies, Woburn, MA, USA). A 22 mm diameter round object (coin) was programmed at a depth of 40 mm.

Part A (baseline measurements): Anesthesia residents advanced the simulated epidural needle straight ahead (horizontal) to encounter the object. They were then requested to repeatedly retract and advance while changing the angle with the aim of finding ("walking off") the edge of the object. They were asked to establish, from the angle of insertion, the size of the object. During this phase, the screen of the computer was turned away.

Part B: (practicing): While viewing the computer screen, residents practiced advancing the needle while making only necessary (small) angle changes to find the edge of the object.

Part C: (testing): With the screen turned away, residents attempted finding the edge of the object as before. Comments were elicited from residents as to the value of the training and suggested changes. The computer program measured the angle of each insertion attempt and calculated distances from the center of the object. We calculated the variation (standard deviation) of each resident's attempts. We calculated the average of the group's variations for Part A and Part C. We used Fisher's Exact Probability Test to compare Part A and B. P-values of  $<0.05$  were considered significant.

**Results:** For Part A, the 16 volunteers had an average variation of 11.4 mm (minimum 5, maximum 17.) For Part C the average variation was 13.3 mm (minimum 4, maximum 21.) Differences were not significantly different. The residents indicated that this was a useful device to use for training. However, the simulated needle had to be placed in the "home" position prior to each insertion,

and the residents had difficulty in remembering the prior angle of insertion.

**Conclusion:** Based on our results, we believe this is a valuable training device for residents, and further development would be deemed worthwhile.

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**Paper No: 1014.0****Efficacy of Extra cranial Trigeminal Nerve Block for Controlling trigeminal neuralgia - A 2 years study**

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 Tahereh Parsa

**Introduction:** Trigeminal Neuralgia is a chronic neuropathic disorder which presents by severe and recurrent lancinating pain felt within the trigeminal nerve pathway. trauma is among the several etiologic causes of the disease.

**Objectives:** Many medical and interventional modalities suggested for controlling trigeminal neuralgia. About 50% of patients become refractory to medical treatment. nerne block seems to be effective in controlling the pain.

**Methods:** 43 patients with severe pain of trigeminal neuralgia lasting more than 6 months and no dramatic response to medical treatment introduced to the study. mean age of the patients were between 40 to 50 years with no meaningful differences in sex ( male to female ratio 1.3 to 1). Extra cranial trigeminal nerve block was done by injecting of 1.5ml of 0.25% bupivacain plus 40 mg methyl prednisolon acetate at 3 one months interval.

**Results:** 88.3% of patients showed excellent results after first injection and 72% of them VAS between 2 - 4 after 6 months.

39.5% of patients need to rehabilitation maneuvers during course of treatment.

**Conclusion:** It seems that nerve block can control severe pain of trigeminal neuralgia in most patients.

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## Paper No: 1077.0

### Workplace-based assessment tools in Canada: a comprehensive, cross-sectional survey of anaesthesiology resident coordinators

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**Introduction:** Medical education has undergone a paradigm shift from time and process based to competency based and has changed the way we assess learning progress (1,2). Workplace-based assessment (WBA) is defined as the evaluation of demonstrated professional practice in a real work setting by an assessor. WBA includes various tools: portfolios, case-based discussions, the mini-clinical evaluation exercise (mini-CEX) and the direct observation of procedural skills (DOPS) (3). As such, WBA is considered a cornerstone of the theory of competency-based education because it can assess knowledge, skills and attitude at once in an authentic context. It is not currently known how widely WBA tools have been adopted in Canadian anaesthesiology programs. Faculty development is key to the successful use of WBA tools and there is no published literature on whether Canadian anaesthesiology faculty are routinely trained in the use of assessments. This study aimed to evaluate the use of WBA tools in Canadian anaesthesiology resident programs and to identify the current state of faculty development with respect to these tools.

**Methods:** After Research Ethics Board approval, anaesthesia Residency Program Coordinators of all 17 University Departments of Anaesthesia in Canada were included for an online nationwide survey investigated the implementation of WBA in postgraduate anaesthesia programs.

**Results:** Response rate was high with 68% (44 of 64 Resident Program Coordinators) representing 88% of the University Departments of Anaesthesia (15 of 17). The most widely used tools were locally designed assessment tools (25/64), DOPS (direct observation of procedural skills, 28/64), multi-source feedback (20/64) and case-based discussions 24/64).

Both oral and written feedback is indicated in 88.6% of responses. When given, feedback happens immediately after the assessment in 61.8%. In most cases (65.5%), the Resident Coordinator gives delayed feedback (mid-rotation or end-rotation) and 31.8% feedback is given directly by the daily supervisor. The large majority of assessors (88.7%) did not receive training before the use of WBA tools.

**Conclusion:** WBA tools are widely implemented in all Canadian postgraduate Anaesthesia Programs. However, WBA tools used vary among teaching hospitals. Locally designed WBA tools are predominantly used raising the question of whether validity has been established. Feedback practice is not commonly performed according to educational principals as feedback is delayed in a third of all cases. Faculty development appears to be underdeveloped and improvement may increase the educational benefit of WBA.

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## Paper No: 1083.0

### George Leininger, M.D.: The World's First "Professor of Anaesthesia" to Dedicate Undivided Academic Attention to "Professing Anaesthesia"

George Bause

**Introduction:** For the last decade, historians have believed that the world's two earliest anesthesia professors were H.I. Dorr, a multidisciplinary "Professor of the Practice of Dentistry, Anaesthetics and Anaesthesia" at a dental school, and T.D. Buchanan, a unidisciplinary "Professor of Anaesthesia" at a medical school.(1,2) Could another "Professor of Anaesthesia" have been overlooked?

**Objective:** To uncover the earliest unidisciplinary "Professor of Anaesthesia".

**Methods:** This study collected two major types of data. First, over the last 6 years, the author conducted a systematic survey for names of early anesthesia professors in medical or dental literature (books, periodicals, ephemera, etc.) published in the English language. Then, in September of 2011, the author requested names of early anesthesia professors from the staffs of the world's largest dental and anesthesia libraries, the American Dental Association Library and the



American Society of Anesthesiologists' Wood Library-Museum of Anesthesiology.

**Results:** Interviews of 5 library staff at the 2 institutional libraries underscored staff awareness of the landmark professorships of Drs. Dorr and Buchanan. Internet search engines and systematic on-site literature surveys uncovered no interdisciplinary "Professor of Anaesthesia" prior to a George Leininger, M.D., who taught from 1892–98(3,4).

**Discussion:** Henry Isaiah Dorr, M.D., D.D.S. was a dentist-physician with a dental school professorship by 1889 that was titled "Professor of Practice of Dentistry, Anaesthetics and Anaesthesia" at the Philadelphia College of Dentistry. In contrast, in 1904 Thomas Drysdale Buchanan, M.D. was a physician with a medical school professorship as the interdisciplinary "Professor of Anaesthesia" at the New York Homeopathic Medical College. This study searched for the earliest professorship appointed timewise between these two—an earlier interdisciplinary "Professor of Anaesthesia." The earliest found, George Leininger (1856–1935) was born and publicly schooled in Archbold, Ohio. He received his M.D. in 1881 from the College of Wooster, Ohio. By 1886 he had moved to Chicago to practice medicine. There Leininger would serve as a "Professor of Anaesthesia" for a total of 6 years at: 1) the American College of Dental Surgery (1892–96) and then 2) the Northwestern University Dental School (1896–98). Unlike dentist-physician Dorr who taught practical dentistry part-time, physician Leininger gave his undivided academic attention to "professing" anesthesia at each of his successive dental schools.(4) Leininger finally forsook teaching to pursue opportunities in industry, public service, and the private practice of medicine.

**Conclusion:** This study uncovered no earlier interdisciplinary "Professor of Anaesthesia" than George Leininger, M.D.

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## Paper No: 1168.0

### Continuous updating in anesthesia and related sciences: an internet free project

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Anesthesiología y Medicina del Dolor

**Introduction:** The cost and logarithmic growth of medical information are obstacles to stay updated. The Internet facilitates the acquisition of information, but takes time and computer skills to achieve an efficient search. In January 2010 Anestesiología y Medicina del Dolor embark on the Alpha Project sending daily emails characterized by full articles in PDF/HTML, and made free access educational changes in our website [www.anestesia-dolor.org](http://www.anestesia-dolor.org). Objectives. To facilitate and promote Internet update in anesthesia.

**Material and methods:** We created an email list and use an online email marketing service to submit daily emails. This list grew by email invitation and continuous addition by the authors. The articles were selected from Internet free access sources, dividing the subjects into 17 areas of interest in anesthesia and related sciences. The original website was modified allowing for consulting and educational sections. We monitored intermittently the outcome of the project.

**Results:** From January 1, 2010 to August 15, 2011 the Alpha Project has sent 2,696,362 emails containing 1 to 6 full articles in PDF/HTML in each email. The 29.10% (740,490) were opened, 19% (140,603) clicked on them, 5. 5% (149,588) of the sent mails bounced for diverse reasons, and 0.1% (417) was forwarded to non subscribed physicians. The website had 33,844 visits made by 21,703 people from 102 countries/territories on five continents. The most frequent countries that generated the website visits were: Mexico (19,387) Peru (2930), Spain (1686), Venezuela (1456), Argentina (1376), Colombia (1362), Ecuador (1136), United States (738), Chile (492) and Bolivia (352). The website sections with the largest number of visits were: events (5478), continuing education (4181), journals (3165), books (3064) and informatic repository (2006).

**Conclusions:** The Alpha Project was satisfactory in both parts; mailings full articles in PDF/HTML, as well as the website visitors. The total number of sent emails was prominent due to the fast growing of the mailing list. This continued growth was the most important reason for an increased percentage of opening emails. The highest percentage of visitors to the website comes from Latin America countries, but visitors from non-Spanish speaking geographical areas have increased. Most visits were in the educational sections, but it was a high consultation of the academic events listed. We conclude that the free Internet education with daily shipments of full articles and the availability of a related website is a valuable form of continuous updating in anesthesia and related specialties.

## Paper No: 1241.0

### Teaching communication skills and professionalism to anesthesia trainees: the program to enhance relational and communication skills

## Norma Sandrock<sup>1</sup>, David Weisel<sup>2</sup>, Robert Pascucci<sup>2</sup>, Preetam Cholli<sup>3</sup> and Robert Truog<sup>2</sup>

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Importance of physician-patient communication in improving patient safety, outcomes and satisfaction is well-established, but only recently has the importance of teaching communication and relational skills been recognized. The ACGME designated "Interpersonal & Communication Skills" and "Professionalism" core competencies, yet few evidence-based methods exist to teach these. We describe the development, implementation and preliminary evaluation of an evidence-based, simulation-enhanced program for anesthesiology trainees dedicated to cultivating these skills.

Anesthesiologists have an extraordinarily brief period of time in which to both evaluate and gain the confidence of patients, so communicative skill is essential. Much of the discussion during these brief patient interactions involves not only establishing trust and explaining the anesthetic, but also obtaining informed consent. With no legal standard for what information must be disclosed, studies have reported a full spectrum of patient preferences for information and decision-making. Therefore, our Program to Enhance Relational and Communication Skills (PERCS-Anesthesia) focused on the informed consent discussion in the context of patient-centered communication.

PERCS-Anesthesia was designed based on the perspectives and self-identified educational needs of trainees through rigorous qualitative analysis of narratives obtained during early development of the program. Trainees identified ethical, practical and relational challenges associated with informed consent; each of these challenges was then addressed in the final simulated case scenarios. Ethical challenges included circumstances such as patient's wishes not being honored and conflicts between patient's wishes and those of his family or the judgment of his providers. Practical challenges represented the trainee's uncertainty about how much information to provide, communication barriers, and time limitations. Relational challenges included issues of mistrust and previous negative experiences.

The workshops incorporate didactic presentations, simulated informed consent discussions with professional actors, feedback, and discussion. The program combines experienced anesthesia and psychology faculty to model and to teach communication and relational skills in realistic case scenarios. To date, twenty CA-1 trainees have been enrolled and 19/20 (95%) have completed pre-post evaluation questionnaires. The clinical realism and usefulness of the case scenarios was highly rated as 4.7 and 4.5, respectively, on five-point Likert scales; additionally, 100% of residents would recommend the program to other trainees. The final version of this abstract will include increased sample size and qualitative analysis of the communication and relational skills that trainees intend to incorporate into their clinical practice.

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## Paper No: 1254.0

### Tomás Moreno y Maíz and the First Evidence of the Local Anaesthetic Properties of Cocaine

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**Introduction:** Moreno received the Ph degree in Medicine from the Faculté de Medecine de Paris (1868). His thesis can be considered a model of basic physiology research. Moreno is widely cited in all bibliographies of the world, but He is a stranger. His book doesn't seem to have been read.

**Objetives:** To make a biography of Moreno and to explain his experimental medicine.

**Methods:** Review Peruvian and French libraries.

**Results:** Moreno injected cocaine into the left limb (LLL) of a frog with isolated right lower limb (RLL) and observed complete paralysis in the LLL but normal response to painful stimulation in the isolated RLL. The spinal cord galvanic stimulation was normal. He concluded that spinal cord remained intact when systemic effects could alter sensitivity. To differentiate between the local and systemic effects He applied the Bernard's model to study curare. (ligation of the iliac artery to protect one leg by vascular ligation. He

injected cocaine in the LLL of a frog with isolated heart (large vessels) and isolated RLL. He observed complete paralysis of the LLL after injection. The frog didn't removed his left leg after a painful stimulus applied locally or on the right protected leg. He concluded "Therefore, the cocaine acetate acts upon the peripheral sensitivity ITS LOCAL EFFECT IS EVIDENT AND COULD BE USED AS ANAESTHETIC. Nonetheless this needs to be solved by others with proper and necessary experiments". Moreno(1830.1881) graduated in the College of Medicine of San Fernando(Lima). He joined the army (1855) and He traveled to Europe (1861). His thesis obtained a golden award (School of Medicine of Paris) and was published in Paris (1868). He continued as Military Surgeon and seeing his family business in Lima (1869). In 1879 He gets involved in the Pacific War, and He died of natural causes in 1881.

**Conclusions:** In the literature of Von Anrep figure repeatedly Moreno. In the literature of Köller figure repeatedly Von Anrep. Was there a rational development of the local anaesthesia?. Moreno, Anrep, Köller and Halsted were surgeons and tried to use the local anaesthesia for surgery but they were limited by the systemic toxicity or addiction. There were no solutions till 1892(Reclus and Schleich). That makes even more valuable the caution of Moreno and Von Anrep who knew such effects because they had experimented in themselves. Both should be considered scientific discoverers and not visionaries nor precursors.

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## Paper No: 1292.0

### Digitizing Our Past: The Wood Library-Museum of Anesthesiology and The Ether Controversy Experience

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**Introduction:** The Wood Library-Museum (WLM) of Anesthesiology Rare Book Collection is housed in the K. Garth Huston, Sr. Rare Book Room at the American Society of Anesthesiologists headquarters in Park Ridge, Illinois. This comprehensive collection includes 2,242 rare literatures describing the discovery of anesthesia and its introduction to surgery—the largest collection of anesthesia rare books in the world.

**Objectives:** The WLM Trustees and staff have long recognized the importance of preserving our Rare Books and sharing them with our colleagues and scholars.

**Methods:** We had dialogues with other major libraries and made site visits to the National Library of Medicine (NLM) and the Countway Library at Harvard Medical School. In April 2007, I visited the NLM in Bethesda, Maryland and met three key professionals who directed the “Turning the Pages” project or “TTP. This is an electronic format created by the British Library that which allows visitors to touch and turn the pages of virtual books on the screen. In July 2008, we sent six pamphlets from “Ether Controversy” collection for a “trial digitization” to Northern Micrographics in La Crosse, Wisconsin. Their digitization process uses multiple scanners and book cradles to allow scanning without unbinding the book. The digitized product is a searchable portable document (PDF) and a digital versatile disc (DVD).

**Results:** We catalogued and digitized subsets of rare books in a systematic fashion. The Ether Controversy was the first collection completed and contains books and pamphlets that are unique or have special significance. There are now 48 titles in this digital folder and a few representative items

are listed here: Morton's Letheon, WTG Morton, 1847. Some account of the Letheon: or, who is the discoverer? Edward Warren, 1847 Protest of Dr. Charles T. Jackson, the bill providing for the recompense of the discoverer of practical anaesthesia. Charles T. Jackson, 1854 These rare books can be viewed electronically via the following URL: <http://woodlibrarymuseum.org/library/rarebooks>

**Discussion:** The WLM's philosophy and approach towards its digitization effort has evolved over the past three years. Initially we focused on unique books that might be overlooked by larger electronic databases.

**Conclusion:** The Ether Controversy Collection digitization project caused us to reflect upon the future of medical libraries and the role of the WLM. As of August 2011 there are 225 books and pamphlets are preserved electronically. Anyone can access these collections: ASA members, scholars, students and the general public. Digitization has allowed us to preserve and share our anesthesia heritage.

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## Paper No: 1306.0

### Gas Man Version 4. 1 Teaches Inhalation Kinetics

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**Introduction:** Gas Man<sup>®</sup> version 4. 1 computer simulation of inhalation anesthesia uptake and distribution was completed in 2011 after 27 years of evolution (1,2). Inhaled anesthetics are part of most anesthetics given around the world, and their evolving use makes understanding this subject important to all anesthesiologists.

**Objectives:** We sought to determine if Gas Man Version 4.1 teaches relevant aspects of inhalation kinetics.

**Methods:** We reviewed the Gas Man Workbook and Program that teaches inhalation anesthesia kinetics. Gas Man program runs on all modern Microsoft and Apple operating systems and conforms to the latest graphical user interface customs. The C++ program is compiled to platform-specific software using QT (Nokia, Finland). It is written in English and

has been translated into Chinese and an earlier version was translated into French.

**Results:** Earlier versions of Gas Man that were shown to be accurate(3), educationally valid(4), and able to teach important clinical subjects(5). The Gas Man Workbook of version 4. 1 is a course in inhalation anesthesia kinetics that guides the user through exercises that demonstrate aspects of inhalation anesthesia kinetics through interaction and visualization. Beginning Workbook chapters teach single-compartment wash-in and the alveolar tension curve including initial rise, plateau, knee and tail. Later chapters teach routine and advanced clinical techniques. Vaporizer overpressure and brief high fresh gas flow quickly change anesthetic depth. Multiple agents interact with concentration effect and second-gas effect.. Open, semi-closed, closed, and ideal breathing circuits perform differently. Low fresh gas flow can reduce cost. Displaying quantity of drug delivered from vaporizer and taken up by patient demonstrates efficiency and waste. Changing body weight shows kinetic differences between children and adults.

Users can demonstrate many interactions. Vital Capacity Induction can be achieved in less than one minute using a breathing circuit primed with anesthetic agent. Hyperventilation and reduced cardiac output increases anesthesia depth and causes overdose with soluble agents. Hypoventilation after emergence leads to reanesthetization if muscle tissue has achieved 1 MAC anesthetic tension.

**Discussion:** Gas Man version 4. 1 appears to be capable of teaching inhalation anesthesia kinetics and is appropriate for use in developing and developed countries. Creating a group of teachers who can teach other teachers appears warranted.

**Conclusion:** Gas Man Version 4. 1 functions effectively as an educational tool on all modern computer platforms and can be used to teach or learn inhalation anesthesia kinetics, identifying expired and brain anesthetic agent tensions. Potential Conflicts: Gas Man and Med Man Simulations, Inc., is a nonprofit charitable organization as 501(c)(3) certified by the US Government. James H Philip is the author of the program and workbook.

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## OBSTETRIC ANAESTHESIA

(The names of the authors presenting each paper are shown in bold type)

### Paper No: 9.00

#### Desflurane vs. Sevoflurane for cesarean section with 1 MAC. Neonatal effects

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**Introduction:** The obstetric population has a high incidence of awareness and recall during general anaesthesia for caesarean section. Desflurane, a volatile anesthetic agent with a low blood/gas solubility, has been thoroughly studied but its use (with 1 MAC) in obstetrics has not been adequately evaluated, the same occurs with Sevoflurane.

**Objectives:** This prospective study was undertaken to evaluate the neonatal effects of Desflurane versus Sevoflurane in elective cesarean delivery.

**Methods:** The study was performed from January 2010 to July 2010. Eighty healthy parturients ASA I, aged 22–37 at 38–41 weeks of pregnancy, were randomly allocated in two groups. The first group (group D) received 6% Desflurane and the second group (group S) 2% Sevoflurane, plus 50:50 O<sub>2</sub>/air mixture. All patients were in the supine position with a left tilt and preoxygenated. They all underwent a rapid sequence induction of anesthesia with Thiopental 5mg/Kg followed by Succinylcholine 1mg/kg for tracheal intubation. Anaesthesia was maintained immediately with a concentration of Desflurane 1 MAC (group D) and Sevoflurane 1 MAC (group S) with 50% O<sub>2</sub> and 50% air. Induction delivery time (ID-time) was defined from induction of anaesthesia to umbilical cord clamping. Neonatal outcome was evaluated by vital signs, acid–base status, PO<sub>2</sub>, PCO<sub>2</sub> at birth (blood from umbilical vein), and after 60 min from heel capillary blood, and Apgar score at 1' and 5' min. The patients were interviewed about intraoperative awareness 24 and 48 h after operation. Finally we measured the intraoperative satisfaction of surgeons and parturients. Statistical analysis was performed with SPSS software version 17.

**Results:** Patients in both groups developed transient hypertension and tachycardia during induction of anaesthesia (plus 20–24% from baseline) which returned to baseline

values in approximately 5 min. Maternal blood loss did not differ significantly between the two groups and none of the patients developed intraoperative awareness ( $p=0.14$ ,  $p=0.23$ ). Mean ID-time was equal between groups ( $3.23 \pm 0.14$  min group D vs.  $3.51 \pm 0.32$  min group S). Neonatal outcome was good in both groups. Mean values of PH, PO<sub>2</sub> and PCO<sub>2</sub> did not differ significantly between groups. More neonates (36/40) in the Desflurane group had transient increased cardiac pulses (up to 130 beats) versus the Sevoflurane group (12/40) ( $P<0.05$ ). Satisfaction of surgeons and parturients was equal between groups.

**Conclusions:** The similarity of Acid-base variables, PO<sub>2</sub>, PCO<sub>2</sub>, Apgar score at 1' & 5' between groups indicates that both inhalational anaesthetic agents are safe for mother and newborn when administered at 1 MAC in elective cesareans sections.

### Paper No: 61.00

#### Prophylactic iliac artery balloons in the management of placenta percreta

**Fuhazia Arif** and **James Wilson**

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Uterine artery embolisation can be used to treat life threatening uterine haemorrhage. Here we discuss a case where prophylactic iliac artery balloons led to safe management of a case of placenta percreta.

**Background:** 39 years G3P2, her previous deliveries were by Caesarean, one in Nigeria due to PET. She was known to have uterine fibroids.

**Presentation:** She initially presented at 28 +4/40 with antepartum haemorrhage. Ultrasound showed large fibroids and low-lying placenta. A further scan at 32/40 showed disruption of the myometrium by placenta, thus confirming placenta percreta.

**Operative Management:** Admitted for elective Caesarian-Section at 34 weeks. Pre-operative intravenous and arterial access and an epidural catheter was inserted. Prophylactic iliac artery balloons were inserted via 8-french introducers under local anaesthetic. Balloon inflation confirmed a significant reduction in uterine blood-flow. C-Section was performed under epidural anaesthesia. Iliac artery balloons

were inflated pre-surgical incision. Surgery was technically difficult with dense adhesions and a large fibroid. Estimated blood loss intra-operatively was ~1.3L and 440ml was returned by a cell saver. She was haemodynamically stable intraoperatively and after balloon deflation. A liveborn healthy baby boy was delivered.

**Post-operative haemorrhage:** 5 hours post delivery, haemorrhage occurred refractory to conservative management with oxytocin, hameobate and misoprostil. Inflation of the iliac balloons significantly reduced the bleed. 8 units of red cells, 3 units of FFP & 2 pools of platelets were given.

**Interventional Radiology:** She was transferred to the radiology department. Bilateral uterine artery embolisation was performed rapidly via the iliac catheters.

**Further Care:** She remained stable on HDU post embolisation with no further bleeding.

Due to coagulopathy, the femoral artery sheaths were left in-situ for 48 hours. She was discharged home on day 9.

## Paper No: 92.00

### A review of blood transfusion associated with peripartum hysterectomy: a ten-year review

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**Introduction:** Emergency peripartum hysterectomy (PH) is a rare but potentially lifesaving procedure in the setting of massive maternal haemorrhage. Studies have demonstrated that planned or anticipated PH in selected patients is associated with shorter hospital stay, lower blood loss, less blood products requirement and lower hospital costs compared to unanticipated PH. However, there is little information regarding the comparable morbidities between planned/anticipated and unanticipated PH.

**Objective:** To evaluate blood transfusion and risks factors associated with peripartum hysterectomy.

**Methods:** A retrospective chart review of all patients who had PH from 2000 to 2009 at the Rotunda Hospital, Dublin Ireland.

**Results:** During the 10-year study period there were a total of 73,329 deliveries. Thirty-one PH were performed giving an incidence of 0.42% per 1000 deliveries. Twelve (39 %) women had anticipated PH while 19 (61%) patients PH was unanticipated. Morbidly adherent placenta accreta (67.7 %) and uterine atony (38.7%) were the most common indications for PH. Average estimated blood loss was  $3,237 \pm 2.6$  mls, and  $5,301 \pm 4.5$  mls for anticipated and unanticipated PH respectively. Among the 12 anticipated PH, 41.7% did not receive blood transfusion while 100% of the unanticipated

PH had blood transfusion. Severe maternal morbidity including re-exploration for persistent haemorrhage 41.9%, admission to intensive care unit (ICU) 32.2% and transfusion >10 units of red blood cells 41.9% were greater in unanticipated PH. There was one mortality in the unanticipated group.

**Conclusion:** Unanticipated PH is associated with significant blood loss, need for massive blood transfusion and post-operative morbidity and mortality. Repeat caesarean sections, placenta accreta and multiparity significantly increased the risk of intraoperative uncontrollable hemorrhage resulting in PH and massive blood transfusion.

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## Paper No: 97.00

### Observational study to assess postoperative pain management strategy in elective caesarean section patients

**Samina Ismail**, Khurram Shahzad and Faraz Shafiq

**Background:** With the dramatic rise in the rate of caesarean deliveries in the last two decades (1-3), postoperative pain management of these patients has become a major medical and nursing challenge. Pain should be properly assessed and addressed in the postoperative period (4).

**Objective:** The aim of our study was to observe the pain management strategy used in our hospital for elective caesarean section patients. In our observations, we reviewed broad areas of outcome, such as effectiveness, safety and tolerability. Effectiveness was inferred from visual pain scores and satisfaction. Safety and tolerability was assessed by the occurrence of side effects.

**Material and method:** We reviewed all patients who underwent elective caesarean section from December 2008- May 2009. On the day of surgery data collected included patient's demographics, type of intra-operative anaesthesia and analgesia, postoperative pain orders. On the 1st postoperative day, anaesthesia team determined verbal pain score (VAS), any complications and patient satisfaction with pain management strategy.

**Results:** Total 263 patients were reviewed. Postoperative analgesia regime was started by obstetric team in 81% of patients and in 19% by anaesthesia team. The most common modality of pain management was intravenous opioid infusion (94%) of pethidine, tramadol and morphine with co-analgesia (99%) in the form of NSAIDs. The analysis

of pain by verbal pain scoring showed mild pain in 89% of patients, moderate pain in 9% of patients and severe pain in 0.8% of patients during resting stage. The Dynamic pain score was mild in 60%, moderate in 33% and severe in 6.8% of patients. Opinion regarding their pain management was satisfactory in 91.6% of patients, while 8.4% of patients were not satisfied with their pain management. Overall 9% of patients (n=24) complained of different complications. None of the complications were severe and responded to treatments.

**Discussion:** Although the postoperative pain management was adequate in terms of patients' safety, it was not effective according to the goal set by Joint Commission on Accreditation (5) of uniformly low pain score of no more than 3 out of 10 both at rest and with movement.

**Conclusion:** In order to reach the international proposed standard, we need to expand the coverage of acute pain service to develop a nurse based, anaesthesiologist supervised pain service for caesarean section patient. This service would assess and treat pain to a degree that facilitates function and quality of life.

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**Paper No: 98.00**

## Postoperative analgesia for caesarean section: comparison of patient controlled analgesia with continuous infusion using pethidine

**Samina Ismail, Gauhar Afshan, Abdul Monem and Aliya Ahmed**

**Introduction:** Management of postoperative pain after caesarean section (C/S) requires a balance between pain relief & undesirable side effects of drugs and technique. Various studies (1,2) using continuous opioid infusion could not identify ideal dose to provide adequate analgesia without supplemental bolus doses or side effects to maintain an adequate

level of analgesia during rest and activity (3). PCA devices are now widely used in clinical practice, and are among the most recommended techniques for the control of moderate to severe postoperative pain (4). We hypothesized that PCA could result in lower pain scores, less side effects, more patient satisfaction and reduction in breakthrough pain requiring rescue analgesia.

**Objectives:** In order to improve conventional postoperative pain management after caesarean section, which in our hospital setting is continuous narcotic infusion, we compared it with patient controlled analgesia (PCA).

**Method:** 120 patients after written informed consent were enrolled in the study after an uneventful elective caesarean section under spinal anaesthesia. All patients at 120 minutes after institution of spinal anaesthesia received 0.5mg/kg bolus of pethidine. Depending upon the randomization by sealed envelope method, group P received PCIA with 0.15mg/kg bolus pethidine with 10-minute lockout & group C received continuous pethidine infusion at a rate of 0.15mg/kg /hr. All patients received tablet paracetamol 1 gram three times a day and diclofenac suppository 100mg twice a day during the study period.

**Results:** The verbal pain score, need for rescue analgesia, incidence of nausea and vomiting was significantly lower (p value <0.001) in PCA group as compared to continuous infusion group at 6, 12 and 24hrs in the postoperative period. Ninety eight percent of the patients were satisfied with pain management and wanted the same form of analgesia for future surgeries in the PCA group as compared to 70% (p <0.001) in Group C.

**Discussion:** PCA enables patient's participant in pain relief and usually results in improved analgesia (4). However these devices are expensive and material costs per patients are usually higher compared with conventional analgesia (5). In our study we observed better pain control, less need for rescue analgesia for breakthrough pain, less incidence of nausea and vomiting and greater patient satisfaction.

**Conclusion:** Since in our part of the world we do not have pre-servative free narcotic to use by intrathecal route, we as care giver can improve postoperative pain management by using PCA instead of continuous narcotic infusion in patients undergoing caesarean section.

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## Paper No: 99.00

### Technique of anaesthesia for different grades of caesarean section: a cross sectional study

Samina Ismail, Faraz Shafiq and Aliya Malik

**Introduction:** Regional anaesthesia (RA) for caesarean section (CS) is the preferred option when balancing risks and benefits to the mother and her foetus. The Royal College of Anaesthetists audit guidelines suggest that 85% of emergency CS should be conducted under RA and the conversion to general anaesthesia (GA) should be less than 3 % for emergency, and less than 1% for elective surgery (1).

**Objective:** The percentage use of regional anaesthesia (RA) and failure rate of RA for different grades of caesarean section (CS) has become a marker of quality for obstetric anaesthesia service(2). The objective of our prospective observational study is to find out the technique of anaesthesia used in different grades of CS, reasons for choosing general anaesthesia (GA) and failure rate of RA in our hospital setting.

**Methods:** This prospective cross sectional study was carried in the obstetric unit of Aga Khan University Hospital from 1st January 2010 to 31st May 2011. The anaesthetist performing the procedure filled out the data collection proforma. Suggested Indicators were percentages of Grade 1-4 CS done under RA and GA, % of failed regional, % of failed regional in different grades of CS.

**Results:** Total of 407 patients having CS was reviewed for five months of study period. The technique chosen was GA in 49% (n=201) and RA in 51 % (n=206) of patients. There was no significant difference between the use of GA and RA for grade 2-4 CS with a slight increase margin of difference for grade1 CS (63% GA vs 37% RA). Another finding was a high rate (44%) of elective CS done under GA. Patient preference (45%) was the most common reason for choosing GA. Fourteen patients (6.7%) required conversion from regional technique to GA; eleven patients had grade 1-3 CS and three patients had grade 4 CS.

**Discussion:** Our rate of regional technique for CS ranges from 37 % -49% for grade 1-3 CS and 45% for elective Grade 4 CS, which is very low compared to the recommended international standard (1).

**Conclusion:** In order to meet the international standards for best practice, guidelines should be made in consultation with

the obstetrician and nursing staff regarding use RA for different grades CS. Patient education regarding the use and benefits of RA needs to be enforced.

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## Paper No: 124.00

### Neonatal effects of bolus administration of ephedrine and phenylephrine during neuraxial anesthesia for emergency caesarean section: a retrospective study

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**Introduction:** Both ephedrine and phenylephrine are used as the pressor agent in caesarean section (CS) under neuraxial anesthesia. Ephedrine might be worse for neonatal acid-base balance. However, most of the researches have been investigated in elective CS and little is known in the emergency situation.

**Objectives:** The aim of this study is to investigate the effects of ephedrine and phenylephrine on the neonatal conditions during the emergency CS under neuraxial anesthesia.

**Methods:** We retrospectively studied the emergency caesarean deliveries under neuraxial anesthesia in the period from Jan 2009 to May 2011. Umbilical arterial pH, base excess, and Apgar score at 1 and 5 min were compared between the cases given ephedrine (group E) and phenylephrine (group P).

**Results:** There have been 277 emergency CS in this period. Of these we have 229 babies with the records. 111 babies (48%) were from the mother received no vasopressors, 7 babies (3%) were from those received both ephedrine and phenylephrine, 61 babies (27%) in group E, and 50 babies (22%) in group P. The mean dose of ephedrine used was 9.4±5.4 mg and of phenylephrine was 155.0±74.4 microg. Median umbilical arterial pH and base excess were 7.33 and -2.5 for group E, and 7.32 and -3.3 for group P. (P=0.11, P=0.33, respectively: group E versus group P) Apgar scores at 1 and 5min were 9 and 10 for all groups. (P=0.62, P=0.82, respectively: group E versus group P)

**Conclusions:** Umbilical arterial pH and base excess were similar between the study groups. Clinical neonatal outcome was also similar. Thus in emergency caesarean delivery, ephedrine and phenylephrine are both suitable, which is



different from the situations of elective cesarean delivery and is consistent with other studies of high risk one. It is partly because ephedrine usage in our cases is relatively smaller than those of previous studies of low-risk caesarean delivery.

## Paper No: 166.00

### Prevention of hypotension during cesarean section under spinal anesthesia: incremental administration of 0.2% bupivacaine

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**Introduction & Objectives:** Patients undergoing spinal anesthesia for cesarean section are at greater risk of supine hypotension than those not undergoing cesarean section. In addition to aortocaval compression and the extent of sympathetic blockade produced by spinal anesthesia, the total amount of local anesthetic used may play a role in determining the magnitude of arterial hypotension. In this study, incidence and magnitude of hypotension during cesarean section under spinal anesthesia was determined by using incremental doses of 0.2% bupivacaine, totaling 6 mg.

**Methods:** Hyperbaric bupivacaine 0.5% solution (4 ml, 20 mg) was diluted with normal saline (6 ml) to produce 0.2%. Forty-three non-hypertensive patients undergoing cesarean section were studied. A combined spinal/epidural needle was inserted at the L3-L4 interspace with the patient lying on her right side. Bupivacaine solution (1 ml, 2 mg) was injected incrementally at intervals of 2 minutes to a total of 3 ml (6 mg). A blood pressure decrease of greater than 20% in baseline pressure or below 90 mmHg was treated with phenylephrine.

**Results:** The anesthetic level at proceeding to surgery was T5-T3. Only 3 of the 43 patients needed vasopressor treatment.

**Conclusions:** Despite left uterine displacement and intravascular volume expansion, as many as 50% of patients will still manifest significant hypotension. The reported dose of bupivacaine of spinal anesthesia for cesarean section is typically 12 to 15 mg. Although increasing the dose of spinal anesthetic increases block height, doses above 15 mg significantly increase the risk of complications.<sup>(1)</sup> This study shows that when 0.2% bupivacaine is given in incremental doses, 1 ml (2 mg) by 1 ml (2 mg), a total of 6 mg is sufficient to produce satisfactory anesthesia for cesarean section. This lower dose minimizes the incidence and magnitude of spinal anesthesia for cesarean section (only 3/43=7%). Prolonged surgery and post-operative pain can be controlled by the combined spinal/epidural anesthesia.

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## Paper No: 181.00

### Maternal and neonatal outcome following caesarean section under spinal versus general anesthesia in kenyatta national hospital maternity theatre

Rosemary Mukunzi

**Introduction:** The risk of maternal death with caesarean section is four times that associated with all types of vaginal Birth. Poor maternal and neonatal outcome are more commonly associated with general anesthesia for c/s as compared to spinal anesthesia. This study compared the safety and the effectiveness of the two techniques for maternal and neonatal outcome for all the indications for caesarean section.

**Objective:** To determine the preferred technique of anesthesia in relation to the indications for caesarean section. To compare the effects of spinal anesthesia with those of general anesthesia on the maternal outcome of caesarean section. To compare the neonatal outcome with the effects of spinal anesthesia and general anesthesia. To determine, what type of anesthesia is more efficacious in order to minimize maternal and neonatal morbidity and mortality rates

**Methodology:** A Prospective Observational Descriptive study carried out in KNH maternity theater. A total of 196 patients were recruited in this study and they all completed the study.

**Results** In this study, of 196 patients, 43.9% c/s were performed under GA. The rest were under SA regardless of the indication for the c/s ( $p=0.032$ ). From the data, SA was performed in 40.8%, whilst GA 59.2% in a group of patients with immediate indications for c/s. For patients who had urgent indications for c/s, SA was performed in 60.8% out of 102 cases.. Out of 35 elective cases, 24 cases were performed under SA and 11 cases under GA. Intra-operatively the commonest maternal side effect observed in the two groups was: Hypotension in the SA group ( $p<0.001$ ). Hypotension in the SA group was 52cases (47.3%) and in the GA group, 12cases(14%). Neonatal outcome as per the stratified indications for c/s: There was higher neonatal Apgar score in the SA group. Significantly neonatal admissions to NBU in the time defined were associated with GA; there were 22 admissions of which 77.3% were due to respiratory distress. In SA 8 admissions were observed and respiratory distress accounted for 6 neonates out of 8 admissions. From this data analysis, it was observed that GA was highly associated with poor neonatal Apgar score and morbidity as compared to SA.

**Discussion:** In this prospective descriptive, observational study; there was a fairly equal age distribution of patients

in the two groups of anesthetic technique used. The mean age for both techniques was 28.09 years with a standard deviation of 5.4. Age did not correlate with the type of anesthesia for C/S. In the study, Our finding is in agreement with other studies that; hypotension is the most common adverse event when spinal anesthesia is used for caesarean section. In our study, it's the absolute systolic pressure that was defined. We considered the lowest recordings in systolic BP of  $\bar{u}$  90mmHg intra-operatively. Comparative studies have been done comparing the neonatal outcome for the two anesthetic techniques and our findings are in agreement with other international findings.

**Conclusions:** Spinal anesthesia and General anesthesia are both effective for c/s, but with significant differences in maternal and neonatal outcome.

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## Paper No: 192.00

### Routine use of Remifentanyl-PCA in labour in Switzerland combined with web based continuous quality control

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**Introduction:** Due to its profile of action the strong opioid Remifentanyl qualifies as an ideal analgesic drug during labour. Applied as patient controlled analgesia (PCA) this method offers optimal safety and comfort for the parturient and child. Although frequently used in other countries, its routine use has only been established in a few hospitals in Switzerland yet.

**Objectives:** Our objectives were to establish and spread a standardized routine use of Remifentanyl-PCA in labour in Swiss hospitals. This includes a web based data collection of every application in order to ensure safety and quality control right from the beginning.

**Methods:** Initiated from Salem Hospital in Berne, a website was created to implement this method in Switzerland. The website contains a concise direction for professionals and a questionnaire, collecting a database for each application.

This database comprises the course, the complications for mother and child as well as the satisfaction of all parties. In order to provide high safety we used fixed boli of 20 mcg and continuous pulse oxymetry. No additional analgesia were used.

**Results:** After implementation of the method for routine use in labour in 2008 more than 1000 women (>40% of all births in our hospital) delivered with the support of a Remifentanyl-PCA. Five other hospitals started to participate in our data recording system. The safety for mother and child as well as the satisfaction of all parties were excellent. 95% of parturients and midwives would choose this method again or recommend it for child birth.

**Conclusion:** Despite reassuring results large numbers are often needed to detect rare complications or side effects. With the registration of every application of all participating hospitals via this website ([www.remipca.org](http://www.remipca.org)) the datapool grows continuously in a short time. This allows constant adjustment of the procedure as well as a quick feedback in case of adverse effects. The routine use of Remifentanyl-PCA in labour is a safe method with excellent acceptance of parturients, midwives, obstetricians and anaesthetists. With the help of the webbased data collection we offer a nationwide launch and regular audits which provides excellent quality management and safety especially valuable for hospitals with small obstetric departments.

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## Paper No: 200.00

### Anaesthesia for caesarean section in morbidly obese parturients – a seven year retrospective audit

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**Introduction:** Morbidly obese parturients at the time of caesarean section, defined as those with a pre-delivery BMI of more than 45 kg.m<sup>-2</sup>, are believed to have a greater anaesthetic risk and associated with greater anaesthetic difficulties and problems.

**Objectives:** To determine anaesthetic choices and doses used in elective and emergency caesarean section, anaesthetic difficulties and problems during anaesthesia

establishment and surgery, and anaesthetic and surgical complications over this seven year period.

**Methods:** A retrospective audit of anaesthesia for this group was done for seven years from June 2004 to May 2011, since the time we began data collection.

**Results:** A total of 54 anaesthetics in 48 parturients were given in this period. The majority were in Malay parturients (37, 68.5%), followed by Indian (10, 18.5%) and Chinese (7, 13.0%). Median weight was 118.0 kg, median BMI 48.26, median gravidity 3, median gestation 38.0 weeks, and mean age was 31.2 years. Antenatal medical and obstetric problems were present in 13 (24.1%) and 19 parturients (35.2%) respectively. The median number of previous caesarean sections was 1.26 (48.1%) anaesthetics were given for elective surgery. The most common indication was previous caesarean section in 26 (48.1%) anaesthetics. Regional anaesthesia comprised 48 (88.9%) anaesthetics, of which 28 (51.9%) were single shot spinal anaesthesia. The regional anaesthetic procedure was successful in all despite requiring more than one attempt 37.5% of the time. Success of regional anaesthesia induction and success for surgery was 95.9% and 89.5% respectively. General anaesthesia conversion was required only thrice (5.6%). There was complicated regional anaesthetic placement in 11 (20.3%) anaesthetics. Doses for spinal, combined spinal-epidural and epidural top-up anaesthesia and block height obtained were similar to non-obese parturients. Epidural space from skin and length of epidural catheter left in-situ for epidural anaesthesia ranged from 6.0 to 9.0 cm and 3.5 to 6.0 cm respectively. General anaesthesia was uneventful in those that had general anaesthesia and general anaesthesia conversion. Only one parturient had backache following anaesthesia. Mean duration of surgery was 51.6 minutes and surgical complications were present in 7 (12.9%) parturients and both these were not related to seniority of the main surgeon. 7 (12.9%) parturients had longer hospital stay of 4-6 days. Neonatal complications unrelated to surgery were present in only two cases.

**Conclusions:** The majority are performed successfully under regional anaesthesia. Doses used are similar to non-obese parturients. Anaesthetic and surgical problems are also minimal.

## Paper No: 217.00

### Ultrasound guided Transverses Abdominis Plane block – An underused option for postoperative analgesia after caesarean section.

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**Introduction:** Post operative pain is a major factor limiting mobilization and interferes with breast feeding and maternal infant bonding in patient who had caesarean section.

Advances in ultrasound guided nerve blocks makes it possible to provide better quality of analgesia with fewer adverse effects.

**Objectives:** We hypothesized that if TAP blocks were effective then requirements of systemic analgesics would be significantly less in these patients with reduction in pain scores.

**Methods:** 40 patients undergoing Caesarean section with Pfannenstiel incision under spinal anaesthesia belonging to ASA I & II categories were randomized in two groups of 20 each after written informed consent. First group received ultrasound guided TAP block at the end of the procedure with 20ml 0.25% Bupivacaine on each side and the second group was kept as control. Both groups postoperatively received PCA Fentanyl at the rate of 0.3mcg/kg with lockout interval of 15min. All patients also received Inj. Diclofenac 75mg twice daily and Inj. Paracetamol 1gm thrice daily. PCA Fentanyl was continued 24hrs postoperatively and the patients were assessed at intervals of 4hrs for the next 24hrs. Patients were encouraged to use the PCA to keep their VAS scores less than 4. We looked at the analgesic requirement of both these groups, pain scores and adverse events. Fentanyl requirement was analysed in both the groups using Wilcoxon rank sum test.

**Results:** No significant difference was found in either group in terms of ASA status, age and weight. Fentanyl requirement and VAS score were analysed over five different at T1(0-4Hrs), T2(4-8hrs), T3(8-12hrs), T4(12-24hrs), T5(Total in 24 hrs).

Control Group	TAP Group	p Value
T1 150+74.27	22.75+18.95	<0.0001
T2 131.25+44.86	32.5+20.55	<0.0001
T3 96.5+35.51	34.5+22.35	<0.0001
T4 169.75+69.71	54.75+45.98	<0.0001
T5 515.5+196.22	145.5+80.83	<0.0001

(Fentanyl dose in mcg – mean+SD) Average VAS scores for the patients in the control group was 2.1 and for those in the TAP group was 1.1. No complication were observed.

**Discussion:** TAP block as a part of multimodal pain management improves post operative analgesia in the first 24hrs(1,2) after caesarean section and this is essential for early ambulation, infant care and preventing postoperative morbidity(2). TAP block can be performed relatively easily and precisely using ultrasound as it allows observation of the needle passage through the tissues and allows us to visualize the spread of the injectate in the neurovascular plane(3). It also reduces the theoretical complications of a blind TAP block namely peritoneal and bowel perforation. In our patients who received USG guided TAP block the requirements of Fentanyl at each point of time was significantly less than the group which did not receive TAP block. These patients also had lower VAS score but the sample size was inadequate to establish significance.

**Conclusions:** USG guided TAP block is safe and an effective component of multimodal postoperative analgesia in patients undergoing Caesarean section. It significantly reduces the opioid requirement but larger studies are required to show the reduction of opioid related side effects and reduction in VAS score.

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## Paper No: 304.00

### Study of postoperative analgesia after the cervical cerclage

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**Introduction:** Cervical cerclage might be undergone for the cervical incompetence in pregnant women. Pain subsides within about 24 hours after surgery. However, abdominal pain and/or surgical pain may also strengthen the tension of uterus. With that in mind, suppression of the postoperative pain is reasonable procedure for these women. We compared the intensity of postoperative pain among three types of anesthesia methods.

**Method:** Anesthesia was performed following three ways. 1. Spinal anesthesia with local anesthetic. 2. Spinal anesthesia added morphine. 3. Combined spinal epidural anesthesia (CSE) followed by patient controlled epidural anesthesia (PCEA) with 0.1% ropivacaine. Postoperative pain intensity was inferred from consumption of analgesics and from the medical records. Side effects, especially nausea and vomiting were also examined.

**Results:** Between Jan 2009 and Jul 2011, forty-four pregnant women underwent for cervical cerclage. We examined these cases retrospectively on the medical records. Spinal anesthesia was performed for 15 pregnant women. One had no pain at all after the surgery. Three had severe pain and five had moderate pain. Six felt nausea and two women vomited once and several times. Six women were performed surgery under the spinal anesthesia added with small amount of morphine (0.2mg). All were not used additional analgesics after the surgery. But four women vomited several times and another one woman felt nausea for more than ten hours. CSE anesthesia was performed for 23 women. Eight women did not feel any pain after the surgery. Nine felt light pain, but were well controlled with using PCEA. Four felt severe pain and used other analgesics

twice or more times. Two felt nausea but any person did not vomit.

**Conclusion:** In Japan, cervical cerclage were mainly performed under the spinal anesthesia. But many women felt severe post operative pain after spinal anesthesia. Addition of morphine to the spinal anesthesia was one of resolution for postoperative pain, but many were suffered from severe nausea and vomiting. Combined spinal epidural anesthesia is complicated procedure when compared with spinal anesthesia. However, considering the postoperative pain, patients who underwent the surgery under CSE may suffer less pain. In addition these patients often felt less nausea and vomiting. We concluded that CSE anesthesia followed by PCEA was the most comfortable method of postoperative analgesia for pregnant woman who had undergone cervical cerclage.

## Paper No: 330.00

### Peri-partum anesthetic management of patients on buprenorphine maintenance therapy: preliminary results of an ongoing retrospective analysis

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**Introduction:** Buprenorphine maintenance therapy (BMT) is FDA-approved for community-based treatment of opioid dependence, [1] but not during pregnancy. However, women may choose to continue BMT during pregnancy if they are stable in treatment [2]. Buprenorphine has high affinity for mu receptors, but only activates them partially. Therefore peri-partum pain management which includes concomitant neuraxial opioids becomes challenging and unpredictable in patients on BMT.

**Objectives:** The goal of this retrospective analysis was to compare adequacy of peri-partum pain management with and without neuraxial opioids in patients on BMT.

**Methods:** After institutional IRB approval, 14 charts of pregnant patients (2007- 2010), who were on BMT and admitted for labor, were reviewed. The following peri-partum anesthesia/analgesia data were obtained from charts: daily home dose of buprenorphine, total equianalgesic parenteral dose of hydromorphone, total equianalgesic dose of fentanyl and morphine (epidural or intrathecal), and total oral dose of ibuprofen and acetaminophen received. The obtained data were analyzed using one-way-ANOVA analysis.

**Results:** Ten out of fourteen patients received neuraxial opioids: five patients received epidural fentanyl for labor only; three patients received intrathecal morphine for elective cesarean section (CS); one patient received epidural fentanyl for labor as well as for post-partum analgesia after emergent CS and one patient received epidural fentanyl



only for postpartum analgesia after elective CS. Four patients (two patients in labor and two elective CS patients) received neuraxial analgesia/anesthesia without opioids. The total amounts of peri-partum rescue analgesics (an indicator of adequacy of peri-partum pain relief) with vs without neuraxial opioids were equianalgesic doses of parenteral hydromorphone [ $33.8 \pm 42.804$  mg vs  $11.375 \pm 5.347$  mg,  $P=0.3279$ ] ibuprofen [ $3.72 \pm 2.06$  g vs  $3.45 \pm 1.473$  g,  $P=0.8170$ ], and acetaminophen [ $2.128 \pm 2.074$  g vs  $0.25 \pm 0.5$  g,  $P=0.1057$ ]. Even though statistically insignificant ( $P>0.05$ ), total doses of peri-partum analgesics were higher in patients who received neuraxial opioids; these differences may not have reached level of statistical significance because very few pregnant women (fourteen in four years) chose to continue BMT during pregnancy. The presented analysis is ongoing.

**Conclusion:** Based on preliminary results, we have found no statistically significant differences in “rescue” analgesic doses patients on BMT whether they received or did not receive peri-partum neuraxial opioids.

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## Paper No: 332.00

### Effect of Intrathecal Midazolam in the Severity of Pain in Cesarean Section: A Randomized Controlled Trial

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**Introduction:** The benzodiazepines are used primarily for anxiolysis, amnesia and sedation. However, recent investigations have shown that some forms of this group of drugs have also direct effect on pain.

**Objectives:** This study aims to determine the effect of Midazolam in reducing the severity of pain in women scheduled for elective cesarean section.

**Methods:** This was a prospective, randomized double blind, two group parallel study, conducted in Imam Reza hospital, an affiliate of Kermanshah University of Medical Sciences. Parturient women who met study inclusion criteria were consecutively assigned into either experimental ( $n=62$ ) or control groups ( $n=62$ ). Women in the experimental group received Bupivacaine (10 mg) plus Intrathecal Midazolam (2 mg) (BM) and those in the control group received

Bupivacaine plus Normal saline (BNS). The study main outcome pain severity was measured by Verbal Numerical Rating Scale. The study protocol was approved by the ethic committee of Kermanshah University of Medical Sciences and patients signed consent forms. The preservative-free midazolam was approved for spinal use.

**Results:** In compare with the BNS group, mothers in the BM group reported significantly better relief in pain 15-min ( $p=0.006$ ) and 120-min ( $p=0.007$ ) after the surgery. There were no statistically significant differences between the groups in regard to the intensity of pain 5, 30, 60, 240 min after the surgery. The average time until the first dose of additional analgesic, per mother's request, was  $142/18 \pm 55/19$  min in the BM vs.  $178/06 \pm 77/33$  min in the BNS group ( $p = <0.021$ ).

**Conclusion:** Combination of Bupivacaine plus Intrathecal Midazolam was an effective anesthetic technique to provide improvement in pain. The onset of sedation was faster in the BM group compared with the BNS group. The duration of effective analgesia, and the time for regression of sensory analgesia was the same in both groups in our study. However, incidence of nausea and vomiting was higher in the experimental group.

## Paper No: 342.00

### Tranexamic acid reduces blood loss in post-partum haemorrhage by reducing hyperfibrinolysis

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**Background:** Post-partum haemorrhage (PPH) is a leading cause of maternal death. Given the beneficial effects of tranexamic acid (TXA) in elective surgery and bleeding trauma, we hypothesized that TXA can reduce blood loss in PPH.

**Methods:** In this French randomized controlled trial, women with PPH  $>800$  mL following vaginal delivery were assigned to receive TXA (loading dose 4 g/1 hour, then infusion of 1g/hour over 6 hours), or not. At 4 time-points (T1=inclusion, T2=T1+30 min and T3=T1+2 hours, T4=T1+6 hours), the volume of blood loss, and the use of packed red blood cells (PRBC) and of colloids were recorded. Procoagulant treatments (fresh frozen plasma, platelets, fibrinogen) or invasive procedures could be used after T3, or at any time in case of intractable bleeding. Primary objective was to assess the efficacy of TXA in the reduction of blood loss. Secondary objectives were the effects of TXA on 1) bleeding duration,

2) anaemia, 3) transfusion requirement, 4) need for invasive procedures and 5) biological data.

**Results:** 144 women (72 TXA and 72 controls) fully completed the protocol. Blood loss between T1 and T4 was lower in the TXA group (median 173 [1st-3rd quartiles 59-377] mL) than in controls (221 [105-564] mL,  $p=0.040$ ). In the TXA group, bleeding duration was shorter, and progression to severe PPH and PRBC transfusion were less frequent than in controls ( $p<0.03$ ). Invasive procedures were performed in 4 women in the TXA group and in 7 controls ( $p=NS$ ). PPH stopped after only uterotonics and PRBC in 93% of women in the TXA group vs 79% of controls ( $p=0.016$ ). Mild transient adverse manifestations (vomiting, blurred vision) occurred more often in the TXA group ( $p=0.002$ ). The major biological effect was the drastic reduction of D Dimers in TXA group ( $p=0.002$ ).

**Conclusion:** This study brings the first demonstration that TXA reduces blood loss and maternal morbidity in PPH. Adverse effects were mild and transient. A larger study should be performed to investigate whether TXA could reduce maternal morbidity worldwide.

## Paper No: 343.00

### ROTEM in obstetric: Near patient-test as predictor of post-partum hemorrhage

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Post partum hemorrhage (PPH) remains a major cause of maternal morbidity and mortality related to childbirth; Charbit and al (1) have shown decrease of fibrinogen to be an early predictor of the severity of PPH. We hypothesized that ROTEM<sup>®</sup> (pentapharm, Germany), a near-patient test of perioperative hemostasis, could detect hemostatic alterations in the early stage of PPH.

**Patients and methods:** PPH was defined as uterine bleeding >800 ml occurring at delivery, persisting after manual exploration of uterine cavity. No coagulant treatment was administered during the first two hours. A15 FIBTEM (FIBTEM amplitude at 15 min) and fibrinogen level (Clauss) were measured in 23 PPH women at the time of PPH diagnosis (T1) and two hours later (T2) and were compared with the values obtained one hour after normal delivery in 31 women without PPH.

#### Results:

A15 FIBTEM Fibrinogen (g/L) Control group  $n=31$  23,8  $\pm$  1,02 4,58  $\pm$  0,19  
 PPH Group T1 ( $n=23$ ) 20,2  $\pm$  1,0\* 4,2  $\pm$  0,2  
 PPH Group T2 ( $n=23$ ) 16,06  $\pm$  1,13\*\* 3,4  $\pm$  0,2\*\*

Mann-whitney haemorrhage group versus control; \*  $p=0,01$ ; \*\*  $p<0,001$ ,

At T1, A15 FIBTEM was significantly different between patients who developed PPH and those who did not. At T2, A15 FIBTEM and fibrinogen were significantly reduced in the PPH group. We defined severe PPH according to our criteria (decrease of hemoglobin >4 g/dl, transfusions, hemostatic procedures). The T2 hemorrhage volume for the six severe PPH differed significantly compared to the 17 mild PPH (2066  $\pm$  274 ml; 1267  $\pm$  76 ml,  $p=0,003$ ). Severe PPH presented lower T2 A15 FIBTEM and lower T2 fibrinogen compared with mild PPH ( $p=0,02$  and  $0,01$  respectively).

**Conclusion:** At the time of PPH diagnosis, A15 FIBTEM suggests a coagulopathy which is confirmed two hours later by a decrease of fibrinogen. A15 FIBTEM could be used to identify hemostatic abnormality presents at the time of PPH and may help to guide the management of severe PPH.

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## Paper No: 344.00

### Post-partum haemorrhage induced hypofibrinogenemia and fibrinogen concentrates administration: observationnal data of the post-authorization study of Clottafact<sup>®</sup> (LFB Les Ulis France)

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**Objectives:** Observationnal safety study of fibrinogen concentrate administration in post-partum haemorrhage (PPH) management in 12 French centers.

**Méthod:** Post authorization study of fibrinogen concentrate Clottafact<sup>®</sup> (LFB les Ulis France). Out of 150 cases of acquired hypofibrinogenemia collected over 6 Months, 59 were related to PPH. Safety and clinical practice as well as biological data were collected at 4 times: Inclusion=H0, H1, H24, H72. Each observation was validated by an expert committee.

**Résultats:** Safety was good to excellent for all cases. PPH was qualified as severe in 59% of the cases (median bleeding : 2230 ml [450-8000]) and 5 CGUA [0-24] Packed Red Blood Cell were given to 47 (75%). The median dose of clottafact

used was 3g [1.5-4.5]. Clinically efficiency was qualified as mild (n=3), good (n=36) and excellent and related to the treatment (n=4). However Most of the PPH were treated simultaneously regarding PPH management guidelines with uterotonics (n=22) or embolization-surgical ligature (n=40) or other procoagulant drugs as tranexamic acid (n=14), fresh frozen plasma (n=37), platelets (n=20) or rVIIa factor (n=8). Biological data showed a correction of fibrinogen plasma level from initial value at H0 :1.7±0.8 [1 à 2] g/l to 2.1±0.8 g/l at H1. The fibrinogen plasma level at H24 (3.7±1.3 g/l) and at H72 (5±2 g/l) were correlated to the total dose administered (p= 0.04 p= 0.01).

**Discussion Conclusion:** The decrease of fibrinogen is a known predictor of PPH severity(1). However the efficacy of fibrinogen concentrates administration is poorly documented by clinical cases (2) or substudies (3). This observational study present a cohort of 59 PPH managed according to French guidelines and receiveing simultaneously a median dose of 3g fibrinogen concentrates Clottafact®. Safety and biological correction of hypofibrinogenemia are observed. These results support the need of a randomised double blind study to evaluate the contribution to the PPH associated coagulopathy's treatment.

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## Paper No: 345.00

### Point-of-care prothrombin time testing as an early predictor of severe post partum hemorrhage

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Post partum hemorrhage is a major source of maternal morbidity and is poorly predictable. The demonstration of a relationship between fibrinogen decrease and outcome suggests that a near testing of coagulation might improve prediction of outcome. The aim of our study was to test the reliability of the point-of-care prothrombin time testing compared with laboratory results in post-partum and to evaluate its role in prediction of severe post partum hemorrhage (PPH). After local ethic committee approval and informed consent, 95 patients (62 without PPH and 33 with PPH) patients were enrolled for one blood sample 30 minutes after delivery or at the beginning of immediate post-partum haemorrhage

before use of any uterotonics (T1). POC prothrombin time was measured by CoaguChek XS Plus (Roche Diagnostics, Germany). POC-prothrombin time (PT) and prothrombin time ratio (PT ratio) were compared with central laboratory values and with fibrinogen concentrations. The volume of blood loss was recorded at T2 (T2= T1+2hours). The severity of the PPH was defined according to the outcome of the first 24 hours. POC and laboratory PT and PT ratio were correlated (r=0.95 and 0.71 respectively; p<0.0001) and Bland and Altman mean bias and accuracy respectively of 1.17 and 4.97 for PT and 0 and 0.2 for PT ratio. POC-PT ratio was related with fibrinogen concentration (r=-0.4; p<0.001) and with blood loss at T2 (r=0.5; p<0.0001). Among women with PPH, POC-PT ratio was significantly increased in severe ones (0.9[09-1] vs 1[1-1.2]) p=0.05). Considering the occurrence of severe PPH, the area under the ROC curve was 0.81 (IC95% [0.68-0.93]; p<0.0001) for POC PT ratio values. The cutoff value for POC PT ratio of 1.15 had the best prediction specificity (100%). These findings suggest that a simple POC measurement could contribute to anticipate the risk of severe bleeding in PPH.

## Paper No: 346.00

### Impact of perinatal care network on post-partum hemorrhage-related morbidity

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Background and goal of study Post-partum haemorrhage (PPH) remains the leading cause of maternal morbidity and mortality in France and worldwide. PPH can occur in any parturient. Perinatal care network is defined as a practitioners' and women's hospitals' association organizing mother and child management around the birth period. The goal of our medical practice improvement program (MPIP) was to standardize the management of PPH in every women hospital of the network according to the French guidelines (1). The aim of the study was to measure the impact of the MPIP on the maternal morbidity due to PPH (2). Materials and methods The MPIP realized a synthesis and the edition of the management guidelines, the critical care chart and the educational material of the training team in common between the 11 low risk women's hospitals. Midwives, paramedics and medical doctors were trained to evaluate the practice comparing the results obtained in 2006 after MPIP to 2004 before MPIP. Collected data were the delay and the protocol of management and their impact on the maternal morbidity due to PPH.

**Results:** Out of 20 619 deliveries 259 PPH were detected in 2006 vs 189 out of 21 373. No hysterectomy or death related to PPH occurred. Thirteen parturients vs 16 were transferred to the obstetrics ICU. Transfer delay was significantly shorter. None of these 13 parturients had haemorrhagic shock vs 5 in 2004. Transfusion was performed in two vs 5, procoagulant complementary treatment to 4 vs 9 and uterine arteries embolization in 2/13 vs 7/16 parturients. Quite all the parturients (12/13) transferred in 2006 were discharged from obstetrics ICU after 12 hours vs 11/16 in 2004.

**Discussion Conclusion:** Despite the limited number of cases, it can be observed a trend to a better detection of HPP and to a better and more rapid management of PPH in the primary care units. This better primary management could explain the reduction of transfusion, procoagulant treatment and embolization needed in the tertiary care leading to quicker discharge from obstetrics ICU and less maternal morbidity. Improving the obstetrics care at the nearest of the patient could be the new challenge for maternal risk management as suspected in ICM and FIGO joint guidelines (3) and in the 6 French perinatal networks preliminary analysis (4). The perinatal care network Medical Practice Improvement Program leading to an initial aggressive management of PPH could avoid the evolution to severe maternal morbidity.

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## Paper No: 347.00

### Preeclampsia as a risk factor for Postnatal Pulmonary Embolism

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**Objective:** Pulmonary embolism (PE) remains the cause of 10% of maternal mortality in France. Out of a 10 years survey of thrombo-embolic events in a French tertiary care obstetric unit in a population of 44 198 pregnancies preventively managed according national and international guidelines, risk factors for post-partum pulmonary embolism were identified.

**Study design:** In this 1999-2009 register-based observational study, Deep Vein Thrombosis (DVT) and EP were analyzed in order to assess the thromboprophylaxis protocol: Each pregnant woman was checked for her familial and personal

thrombosis risk factors. In the high risk group, LMWH were prescribed ante and postnatally whereas only postnatally in the moderate risk group (1,2). Pulmonary embolism was clinically detected and confirmed by angioscanner.

**Résultats:** Out of a population of 44198 deliveries, 1353 preeclampsia and 1284 patients with thrombotic risk factors, 108 thromboembolic events were noted. (0.244% [95% CI 0.198-0.290]): DVT (n=67) and PE (n=41). Out of the 49 DVT and 29 antenatal EP, none occurred in high risk patients under adequate LMWH, except for 4 out of the 16 patients with AT deficiency. Postnatal PE occurred in 12 patients (0.027% [95% CI 0.012-0.043]). Six of them occurred in preeclamptic patients (0.443% [95% CI 0.16-0.96]). The relative risk of PE in preeclampsia was 31.67 [95% CI 10.23-98.06]). Associated risk factors of PE in preeclampsia were caesarean section (CS)(n=4), older age and multiparity (n=3), obesity (n=1) and thrombophilia (n=1). The 4 EP after CS occurred under low dose LMWH.

**Discussion and Conclusion:** Preeclampsia is a known thrombosis risk factor (3,4), probably induced by the hypercoagulable state. The risk of pulmonary embolism after preeclampsia appears to be more than ten times higher than after a normal delivery following a normal pregnancy in our population. Non-adapted doses of LMWH did not prevent PE in these patients. Biological efficacy of LMWH and/or thrombin generation monitoring may be useful in these patients to guide the clinicians.

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## Paper No: 354.00

### Spinal anesthesia for cesarean section. Comparative study between ropivacaine/fentanyl and bupivacaine/fentanyl

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**Introduction:** Ropivacaine is along-acting, local anesthetic, less cardioneurotoxic than bupivacaine, with similar duration of action. Compared to bupivacaine, ropivacaine, at equipotent doses, provide effective spinal anesthesia with shorter duration of motor block.

**Objective:** To evaluate the latency and duration of the sensitive (T6) and motor block, hemodynamic variables and adverse effects in patients receiving spinal anesthesia for cesarean section, comparing 75% isobaric ropivacaine 15 mg



plus fentanyl 25 ug/ml and 0.5% hyperbaric bupivacaine 10mg plus fentanyl 25 ug/ml intrathecally.

**Methods:** Ethics Committee approved, prospective, aleatorized, simple blind study.

**Patients:** 40 full-term women without analgesia in course, ASA I and II, elective or urgency (not emergency) cesarean section under spinal anesthesia. After informed consent, patients were randomly allocated to receive intrathecally: 75% isobaric ropivacaine 15 mg plus fentanyl 25 ug/ml (group RF), or 0.5% hyperbaric bupivacaine 10mg plus fentanyl 25 ug/ml (group BF). Sensitive blockage was evaluated by the pinprick and Hollmen tests, and the motor block by the Bromage scale. Maternal side effects were also recorded.

**Monitoring:** Heart rate, systolic and diastolic arterial pressure, recorded every 2 min up to min 20. When blood pressure decreased 20% from the baseline value, patients received IV ephedrine (5 mg) boluses. Data is presented as mean  $\pm$  standard deviation or as percentages when appropriate. Comparisons between groups were performed by using the Mann-Whitney U-test, the Pearson  $\chi^2$  test or the Irwin-Fisher test. The significance level was set at 0.05.

**Results:** There were no statistical differences in demographic data between groups: Age, weight, height, number of previous cesarean deliveries, percentage of scheduled surgeries, percentage of ASA I patients, and surgical procedure duration (min.): RF:  $39.4 \pm 8.1$ , BF:  $35.3 \pm 6.6$ ;  $p=0.07$ . Anesthesia was satisfactory in all patients. Latency to T6 level (min.) was lower in RF ( $2.5 \pm 0.5$ , BF:  $3.8 \pm 1$ ;  $p<0.001$ ). Maximal sensory block: 85% T4/15% T5 in both groups,  $p=0.67$ . Sensorial block duration (min) RF:  $155.8 \pm 21.2$ , BF:  $159.5 \pm 20.8$ ;  $p=0.56$ . Motor blockade was complete in all patients, duration up to Bromage I (min.): RF:  $105 \pm 19.8$ , BF:  $116.5 \pm 9.6$ ;  $p=0.08$ . Lower frequency of hypotension in Group RF 3/20, BF: 9/20;  $p=0.04$ , with similar ephedrine requirements: 5 to 10 mg,  $p=0.54$ . No patient required atropine. Incidence of pruritus: RF 6/20; BF 8/20;  $p=0.51$ , with a case of nausea in the BF group. No local or systemic toxicity was observed.

**Conclusions:** Treatments offered comparable sensitive and motor blockage. Clinical advantages of ropivacaine/fentanyl result from the shorter latency and lower incidence of hypotension.

**Paper No: 369.00**

### Anaesthesia for Cesarean section in a patient with overlap syndrome: a case report

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**Introduction:** Primary biliary cirrhosis is rare during pregnancy. There are few case reports in the literature that

describe primary biliary cirrhosis in pregnancy that either first presented during pregnancy or was diagnosed prior to pregnancy. We describe a 45-years-old para 1 patient who was diagnosed with an overlap syndrome of autoimmune hepatitis and primary biliary cirrhosis.

**Objectives:** To Describe the presentation and anaesthesia for Cesarean Section in a patient with an overlap syndrome

**Methods (case presentation):** A 45 years old para1 patient presented to the antenatal clinic at 32 weeks gestation with increased pruritis, nausea and lower limb oedema. Her past medical history included cholecystectomy and a diagnosis of an overlap syndrome 18 months ago based on a positive antimitochondria antibody (AMA) and liver biopsy she has been started on ursodeoxycholic acid 250 mg three times daily and was under regular follow up by the hepatologist. She remained stable throughout pregnancy up to this presentation where she was found to have pancytopenia due to hypersplenism. Her Hb, WBC, and platelets were 7.8g/dl, 3.4, and 60 respectively. Her liver function tests revealed a raised bilirubin (119) with a mildly deranged liver enzymes, albumin 22 and INR 1.54. Abdominal USS revealed liver cirrhosis, hepatosplenomegaly with dilated splenic vein but no ascites. In addition, there were decreased fetal movement. Initially she was managed conservatively with piriton, albumin replacement, vitamin K, RCC and platelet transfusion. Her ursodeoxycholic acid dose was increased to 500mg three times daily. 2 weeks after admission a repeat abdominal USS revealed absent diastolic flow and therefore decision for cesarean section was made. As she remained coagulopathic a decision was made for a general anaesthetic with rapid sequence induction after antacid prophylaxis and transfusion with RCC, FFP, and platelets. The surgery was uneventful and a live baby girl was delivered weighing 1.96kg with an Apgar score of 7 and 8. The patient was kept in high dependency unit for 48 hours post-operatively where she made full recovered. She eventually was discharged from the hospital one week later after improvement in pruritis, LFTs, and coagulation with follow up by the hepatologist.

**Conclusion:** Patients with overlap syndrome rarely present during pregnancy and therefore experience in dealing with them may be limited. General anaesthesia is more common for these patients as they are often coagulopathic. However GA carries many risks including clinical decompensation in patients with cirrhosis and this has to be monitored and managed appropriately.

**Paper No: 387.00**

### Effective dose of oxytocin in caesarean delivery

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**Introduction:** Patients undergoing caesarean delivery are at increased risk of obstetric haemorrhage. Uterine atony has been shown to be most common aetiology (30%) for post partum haemorrhage (PPH) in patients undergoing caesarean delivery. Use of uterotonic agents decreases the incidence of PPH by approximately 40% when compared with placebo. Oxytocin is the most frequently used uterotonic agent because of less side-effects compared with all other available agents. Despite widespread use, there are limited data to guide optimal oxytocin dosing for patients undergoing elective caesarean delivery for achieving adequate uterine tone with minimal side effects. Objectives The study was conducted to evaluate three doses of oxytocin required to produce adequate uterine tone in primigravidas undergoing elective caesarean delivery.

**Methods:** This randomized double blind study was conducted in ninety primigravidas undergoing elective caesarean delivery under spinal anaesthesia. All patients received intravenous bolus of either 0.5, 1, or 2 IU oxytocin followed by infusion of 10 IU hr<sup>-1</sup>. Uterine tone was assessed by a blinded obstetrician using a five-point scale, where 1=atonic, 2=partial but inadequate contraction, 3=adequate contraction, 4=well contracted and 5=very well contracted at 2, 3, 6, and 9 min after oxytocin administration. The effect of oxytocin doses was analysed. Oxytocin related side-effects were recorded. All the data was compiled and analysed statistically using Analysis of Variance (ANOVA) test for haematocrit, need for additional uterotonic agents and the amount of blood loss. Chi-square test was used to analyse heart rate, non invasive blood pressure and the side effects of oxytocin. A p value of <0.05 considered significant, <0.01 considered highly significant and >0.05 was taken non significant.

**Results:** There were no significant differences in the prevalence of adequate uterine tone among the study groups at 2 min (86%, 90% and 93% for, 0.5, 1 and 2 IU oxytocin, respectively)( $p>0.05$ ). The estimated blood loss & difference in preoperative and postoperative haematocrit values were also non significant( $p>0.05$ ). No hypotension and tachycardia was observed in any group at any time. The prevalence of nausea and vomiting was significantly higher after 2 IU oxytocin vs 0.5 IU at 1 min (13% vs 3%;  $p<0.05\%$ ).

**Conclusion:** Small bolus doses of oxytocin (0.5-2 IU) result in adequate uterine tone in primigravida women undergoing elective caesarean delivery with minimal effects on haemodynamic parameters. However use of 2 IU oxytocin is associated with more incidence of nausea and vomiting.

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## Paper No: 418.00

### Hemodynamic effects of a right lumbar–pelvic wedge during spinal anesthesia for cesarean section

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**Background:** Aortocaval compression is a major cause of maternal hypotension. A randomized controlled trial was designed to determine the effectiveness of a mechanical intervention using a right lumbar–pelvic wedge in preventing hypotension after spinal anesthesia for cesarean delivery.

**Methods:** Eighty healthy women undergoing elective cesarean section were randomly allocated immediately after spinal blockade to either a lumbar–pelvic wedge positioned under the right posterior–superior iliac crest (Wedge group,  $n=40$ ) or the complete supine position (Supine group,  $n=40$ ). Hemodynamic values, vasopressor consumption and adverse effects were collected during the surgical procedure. Hypotension was defined as a reduction in systolic blood pressure of 25% from baseline. Patient allocation, management and data collection were performed by a single unblinded anesthetist.

**Results:** There was no difference in the incidence of hypotension between the two groups (42.5% vs. 50%,  $P=0.51$ ). During the first 5 min, blood pressure decreased less in the Wedge group. There were significant differences in median [interquartile range] vasopressor requirements between the Wedge group and the Supine group (1 [0–2] vs. 3 [1–4] mg,  $P<0.01$ ) and in nausea during the procedure (6 vs. 22 patients,  $P<0.01$ ).

**Conclusion:** In our study population the use of right lumbar–pelvic wedge was not effective in reducing the incidence of hypotension during spinal anesthesia for cesarean section. Patients in whom the wedge was used had higher systolic blood pressure values during the first 5 min of anesthesia and fewer episodes of nausea. The risk of hypotension remains substantial.

## Paper No: 457.00

### Systemic versus intrathecal morphine on postoperative analgesia in Caesarea. Randomized Trial study in two centers from Cordoba, Argentina

Roberto Guillermo Santiago

**Introduction:** Postoperative analgesia in cesarean section, relegated to consideration by the anesthesiologist, is not a standard practice. The low-dose intrathecal morphine is an effective analgesic method, which records in Argentina didn't know. This research was developed compared with systemic regulated administration.

**Objectives:** Demonstrate that low-dose intrathecal morphine offers better quality analgesia with minimal adverse reactions.

**Materials and Methods:** Experimental randomized double-blind trial with ASA 1 and 2 patients under spinal anesthesia, MIT Group: 0.5% hyperbaric bupivacaine 10 mg plus 100 mcg intrathecal morphine; MEV Group: 0.5% hyperbaric bupivacaine 10 mg plus intravenous morphine regulated. We evaluated analgesics parameters, adverse reactions and fetal well-being up to 24 hours. We used Student T-test unpaired, U Mann-Whitney test, chi-square, setting an alpha error of 0.05 and a power of 80%.

**Results:** Recruited 263 patients, Groups: MEV: 133 patients and MIT: 130 patients, found similar anthropometric characteristics, surgical and anesthesia times, hemodynamic variables and fetal wellbeing. We didn't record respiratory depression or sedation. MIT VNS (Verbal Numeric Scale) median and range() was lower at time 0 hs. 0(0) vs. MEV 0(6) p:0.002; 3hs. MIT 0(9) vs. MEV 1(10) p:0.000; 6hs. MIT 0(9) vs. MEV 1(10) p: 0.000; 9 hs. MIT 0(7) vs. MEV 1(8) p: 0.000; 12 hs. MIT 0(8) vs MEV 0(9) p: 0.000; 24hs. MIT 0(8) vs. MEV 0(10) p: 0.032. At MIT group found lower rescue morphine dose 0.72 mg. DS 1.75 p: 0.000, Relative Risk Reduction of VNS > 3: 0.65 IC95 (0.475-0.778) p < 0.001 and NNT of 3.2 with greater maternal satisfaction MIT 67% vs. MEV 52% p= 0.006. MIT itching occurred in 23% but only 9.1% required treatment versus 0.8% in MEV p= 0.000. MIT nausea and vomiting developed in 13.08%, but the 7.08% required treatment, while MEV presented in 7.5% p=0.075.

**Discussion:** Intrathecal morphine demonstrated superior quality analgesia at the expense of an increase in adverse reactions, which were mostly mild and tolerable, as expressed in the greater maternal satisfaction in this group. Significantly, there was no increased sedation or respiratory depression. These findings are similar to the literature. Both techniques were safe for the baby, which is related to morphine and its pharmacokinetics.

**Conclusions:** The results of this study give the low-dose intrathecal morphine (mini-dose) higher quality analgesia with acceptable side effects, making it a recommended technique.

**Keywords:** Intrathecal morphine; Systemic morphine; Cesarean; Postoperative analgesia; Adverse Reactions

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**Paper No: 491.00**

## Supplementary oxygen during elective caesarean section under spinal anaesthesia

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**Introduction:** During spinal anaesthesia for Caesarean section (CS), there are reductions in maternal peak expiratory flow rate, forced vital capacity, and forced expiratory volume.[1] Oxygen supplementation is commonly provided, even though maternal oxygen saturation is well maintained despite these respiratory changes. The benefit of oxygen supplementation is controversial, as increase in markers of free radical activity had been shown in the neonates born to mothers breathing oxygen enriched air [2].

**Objectives:** This prospective randomized double-blinded study was carried out to compare the effects of oxygen supplementation on neonatal outcome (Apgar scores at 1 minute and 5 minutes, umbilical artery and vein pH) in elective CS under spinal anaesthesia. The neonatal outcomes in patients with prolonged skin incision-delivery (I-D) and uterine incision-delivery (U-D) intervals were also compared with those of their counterparts.

**Methods:** Eighty two ASA I or II patients scheduled for elective CS under spinal anaesthesia were recruited. Following subarachnoid blocks using standard protocol, they were randomized into Group A (n=40) breathing room air, and Group B (n=42) breathing 6 L/min of oxygen via Hudson mask. Maternal haemodynamic parameters and oxygen saturation were closely monitored. Patients in Group A who developed SpO<sub>2</sub> < 97% would be given oxygen supplementation and excluded from the study. The times of skin incision, uterine incision and delivery were recorded. Apgar scores at 1 minute and 5 minute were assessed by paediatric medical officer or staff nurse blinded to the patient's group allocation. Blood samples from umbilical artery and umbilical vein were collected and analyzed.

**Results:** No statistically significant differences were observed in maternal oxygen saturation, Apgar scores, as well as umbilical artery and vein pH between the two groups. The patients were sub-divided into short (< 10 minutes) and long (>10 minutes) I-D intervals, as well as short (<3 minutes) and long (>3 minutes) U-D intervals. No significant

differences in umbilical artery and vein pH were observed in these sub-groups.

**Conclusions:** In patients undergoing elective CS and in the absence of fetal compromise, no differences in maternal oxygenation and neonatal outcome could be demonstrated whether or not oxygen supplementation was administered intraoperatively.

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## Paper No: 500.00

### Uterotonic efficacy of oxytocin 2.5 versus 10 units during caesarean section at mulago hospital: a double blinded placebo controlled randomised clinical trial

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**Introduction:** Oxytocin is routinely administered during Caesarean section Delivery (C/S) to initiate and maintain adequate uterine tone (UT) and reduce blood loss after placenta delivery. Oxytocin is however associated with unwanted effects namely; tachycardia, hypotension, ECG changes, chest pain, nausea and vomiting. The magnitudes of these changes are dose dependant. In Uganda, 10 units of Oxytocin is still being used, yet smaller doses have been shown to be effective at achieving adequate uterine tone and reducing blood loss with fewer side effects.

**Objective:** To determine whether 2.5 I.U of Oxytocin gives adequate uterine tone and is safe as compared to 10 I.U of Oxytocin following caesarean section delivery at Mulago hospital.

**Methods:** After obtaining institutional approval, 380 Mothers undergoing both emergency and elective caesarean section delivery(C/S) in obstetric theatres of Mulago hospital that fit the inclusion criteria were randomized to receive either 2.5 units or 10 units of Oxytocin after clamping of the umbilical cord. The primary outcome was adequacy of uterine tone (UT). Others were heart rate (HR), BP, Blood Loss, as well as requirement of additional uterotonics.

**Results:** 94.71% had adequate Uterine tone in 2.5 unit group compared 88.89% in the 10 unit group at 2 minutes. There was no statistically significant difference in requirement for additional uterotonics in both groups (p- value 0.119), blood loss, frequency of vomiting (p=0.653), nausea (p=0.398),

haemodynamic changes and chest pain (p=0.738) between the two treatment groups.

**Conclusion:** 2.5 I.U of Oxytocin gives adequate uterine tone and is safe when compared to 10 IU of Oxytocin following caesarean section delivery at Mulago hospital. Recommendation: The routine use of 10 IU of oxytocin during both elective and emergency caesarean section delivery should be revised since adequate uterine tone can be achieved with 2.5 units

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## Paper No: 541.00

### Gestational trophoblastic disease: a review of the anesthetic management of 181 clinical cases of molar pregnancy

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**Introduction:** Molar pregnancy is associated with significant morbidity (1,2). The anesthetic management is predominantly expert opinion based.

**Objectives:** To (i) ascertain the number of cases of molar pregnancies surgically managed at the 3 major academic hospitals of the University of Witwatersrand, South Africa from 1 January 2007 to 31 March 2011, (ii) describe their anesthetic management, (iii) determine the associated complications.

**Methods:** A retrospective record review following approval from the University research ethics committee. Data captured included demographic factors, clinical presentation, investigations, anesthetic management, complications and hospital stay. The cases were divided into 2 groups. Group I: <20 weeks uterus size and Group II: >20 weeks uterus size.

**Results:** One hundred and eighty case records were retrieved of the 200 cases managed during the study period. The mean age was  $27.7 \pm 7.4$  years. There were 143 and 38 cases in Group I and Group II respectively. In Group I the incidence of biochemical and clinical hyperthyroidism was 19.6% (23/117) and 7.7% (9/117) respectively. Blood transfusion was indicated in 15.1% (21/139). 1.04% (2/142) had sepsis. General anesthesia (GA) was administered in 92.3% (127/143) of cases. 35% (45/127) of the GA cases had a definitive airway (endotracheal tube) secured. 84.4% (38/45) of these were performed under a rapid sequence induction (RSI). 64.6% of the GA cases had supraglottic airways placed. 7.7% (11/143) of cases had neuraxial anesthesia. The complication rate was 14%. Three cases required high care and 1 case required intensive care post operation. In Group II the incidence of biochemical and clinical hyperthyroidism was 38.2% (13/34) and 23.5% (8/34) respectively. Blood transfusion was indicated in 40.5% (15/37). 78.9% (n=38) had a GA. 41.7% (15/36) of the GA cases had a definitive airway secured. 38.9% of these were performed under a RSI. 38.9% (14/36) of the GA cases had supraglottic airways placed. 18.4% (6/38) cases had neuraxial anesthesia with 2 having sedation. The complication rate was 31.6%. Four cases required high care and 1 case required intensive care post operation. The mean hospital stay was  $4.7 \pm 7.4$  days and  $4.8 \pm 3.8$  days for Groups I and II respectively.

**Conclusion:** The occurrence of anemia and hyperthyroidism is high in this patient group. The associated complications are substantial. Research Agenda: Anesthetic management for molar gestations needs to be standardized.

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## Paper No: 556.00

### Pain after cesarean section - a significant clinical problem?

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**Introduction:** Pain is an often-underestimated negative outcome after cesarean section (CS). Several randomized controlled trials investigated different analgesic regimens after CS. Unfortunately, however, RCTs rarely do present the typical course in acute postsurgical pain of patients with comorbidities or chronic preoperative pain conditions and other typical RCTs exclusion criteria. In this study the relevance of acute pain after CS is analyzed.

**Methods:** We compared pain intensities after CS with postoperative pain intensities of patients after 179 different operative procedures including all common surgical procedures in all surgical fields. Patients were investigated on the first postoperative day using a validated 15-item questionnaire. In addition, important anesthesiological, surgical, and pain therapy-related variables were recorded. These data were collected in surgical departments of 105 hospitals within the framework of the German QUIPS project (Quality Improvement in Postoperative Pain Therapy, [www.quips-project.de](http://www.quips-project.de)).

**Results:** We compared the quality of postoperative pain therapy of 824 patients after CS from 35 different hospitals with that of patients after 179 different operative procedures (n=49699). The worst pain intensity during the first 24 hours after CS was 6.2 (SD 2.3) on a numeric rating scale (NRS 0–10). Pain after CS ranked no. 6 compared with all 179 procedures. The intensity of pain during movement was NRS 5.2 (SD 2.2) and ranked 8th position. 19.3% of the patients had received a patient-controlled intravenous analgesia (PCIA). Pain ratings were not significantly lower in the PCIA group. The question if patients would have liked to have additional analgesics during the last 24 hours was answered in the affirmative by 14.2% of the patients (62nd position) (all 179 operative procedures 12.4%, range 0%–33.3%). The overall satisfaction with pain therapy was rated as NRS 12.4 (SD 2.5) on a NRS from 0 to 15.

**Conclusions:** Our data analysis suggests that CS is one of the most painful surgical procedures necessitating the attention of the whole medical team. Patients' satisfaction with regard to pain management has to be improved. We did not examine the multiple causes of the severity of post-CS pain. The data clearly show that neither PCA, systemic analgesics nor peridural analgesia have been employed

optimally for postoperative care in CS patients. Interestingly, patients with a PCIA device did not have lower pain ratings. This may be due to underutilizing. The well-known risk factors 'younger age' and 'female gender' may contribute to the high pain ranking. Apart from surgical factors the reason for severe pain after CS could be due to the lack of knowledge of the health personal or a mother's conflict with breastfeeding.

**Paper No: 569.00**

### Maternal position during caesarean section for preventing maternal hypotension: a survey of our practice

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**Background:** Many anaesthesiologists believe that adjusting the position of the woman during caesarean section may improve the outcome for both the mother and baby. The theory behind this is based on beliefs that tilting the table laterally may prevent aortocaval compression. The common recommendation is a 15° lateral tilt. Other practitioners believe that there is no difference and that tilting the table makes the surgery more difficult. The aim of this study was to record the angle of table tilt used in our institution during elective Caesarean section in non complicated, singleton pregnancies.

**Methods:** The measurements were randomly distributed in time to avoid a change in practice. One anaesthesiologist of our team initiated spinal anaesthesia (8-10 mg bupivacaine + 5 µg sufentanil + 100 µg morphine) and gave routine prophylactic treatment of hypotension in use in our institution (500 mL of lactated Ringer's solution + ephedrine 3 mg/mL + phénylèphrine 50 µg/mL. Vasopressors were administered by an infusion pump at a rate of 20 to 50 mL/h to maintain arterial pressure >80% baseline measurements). A second anaesthesiologist, not involved in anaesthesia, recorded the blood pressure, needs for vasopressors and recorded the angle of tilt. The angle was measured with an iPhone application (Clinometer®). Results are expressed as mean ± S.D.

**Results:** fifty two women were enrolled in this study. Age was 32 ± 5 yr, weight 71 ± 12 kg and height 161 ± 7 cm. Twenty patients received 8 mg of bupivacaine, 6 received 9 mg and 26 received 10 mg. The mean volume of vasopressors administered before delivery was 12 ± 4 mL. The mean angle of table tilt was 6.2 ± 4.3°. The angle was <5° in 26 patients, ranged from 6 to 10° in 16 patients, from 11° to 12° in 7 patients and was between 13°-15° in only 3 patients. No significant correlation was found between the dose of vasopressors needed and the angle of table tilt.

**Conclusion:** Recommendation for 15° tilt during Caesarean section is of little use in our institution. This survey is in accordance with recent Cochrane Library Review who concluded that tilting the patient has no proven effect on maternal hemodynamic (1).

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**Paper No: 571.00**

### Mallampati score during pregnancy

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A previous study demonstrated that airway edema can increase during the course of pregnancy resulting in an increased Mallampati score (1). Recently, a study showed that labor and delivery are associated with further airway changes compared with prelabor (2). Acoustic reflectometry showed that these changes were accompanied in changes in oral and pharyngeal volumes. The aim of this study was to evaluate intrapartum changes in MS in pregnant patients.

**Methods:** After obtaining IRB and written informed consent, we studied airway changes in 24 healthy pregnant women who were admitted to the labor and delivery suite. Initial airway examination was graded during the 32-34th week of pregnancy (T1) according to the Samssoon modification of the Mallampati classification (SMM). The SMM was further measured before 4 cm of cervical dilation (T2), at the end of the second stage of labor (T3) and 12-24h after delivery (T4). Airway photographs were obtained using a Canon® camera with parturient in the sitting position. A senior anesthesiologist, who was blinded to the origin of the photographs, analyzed and graded the airway into four classes. Parturient characteristics and fluids administered during labor were recorded. Data were analyzed by using a Chi-square test. Results are presented in table 1 (number patients). Mean age (SD) was 29 ± 4 yr and weight 74 ± 10 kg. Volume of fluids administered during labor was 554 ± 341 mL. Cervical dilation was 3 ± 0.7 cm at T2 and 9.3 ± 0.8 cm at T3. There was a significant increase in SMM

SMM	12	34
T1222	0	0
T21	2102	0
T36	126	0
T48	115	0

between T1 and labor ( $P < 0.02$ ) but there were no further significant changes during labor and delivery.

**Conclusion:** Our finding showed that Mallampati score increases at the end of pregnancy but no further changes were noted during labor. This is in contrast with the study of Kodali et al. (2) who observed a change in SMM during labor. The most likely explanation for this difference seems to lie in different amounts of fluid given during labor (554 versus 2500 mL in Kodali study). A low fluid regimen policy might provide better Mallampati scores during labor probably by reducing neck edema.

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## Paper No: 573.00

### Neck ultrasonography and mallampati scores in pregnant patients

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Although many factors contribute to potential difficulties when intubating parturients, whether or not the maternal airway is more difficult anatomically continues to be debatable. A previous study demonstrated that airway edema can increase during the course of pregnancy and resulted in an increase in Mallampati score (MS) (1). Acoustic reflectometry showed that these changes were accompanied in changes in oral and pharyngeal volumes (2). Ultrasonography has been evaluated for airway management in children but has never been used in obstetric (3). The aim of this study was to evaluate intrapartum changes in MS and in neck structures by ultrasound in pregnant patients.

**Methods:** After getting IRB and written informed consent, neck sonographic evaluation (Sonosite MicroMax, Sonosite, Bothell, WA, with a linear 5–10 MHz probe) was carried out on 24 pregnant patients. Initial airway examination was graded at admission in the labor room (T1) according to the Samsoon modification of the Mallampati classification (SMM: grade 1–4). The MS was further measured at the end of the second stage of labor (T2) and 12–24h after delivery (T3). Ultrasonographic measurements (USM) were performed at the same time. Three distances were measured: skin-vocal cords (SVC), skin-thyroid isthm (STI) and skin-tongue base (STB). Parturient characteristics and fluids administered during labor were recorded. Data were analyzed by using a ANOVA test.

**Results:** Mean age (SD) was  $29 \pm 4$  yr and weight  $74 \pm 10$  kg. Volume of fluids administered during labor was  $554 \pm 341$  mL. Cervical dilation was  $3 \pm 0.7$  cm at T1 and

Table 1

	T1	T2	T3
STB (mm)	$1,77 \pm 0,68$	$1,80 \pm 0,60$	$1,89 \pm 0,79$
SVC (mm)	$1,07 \pm 0,34$	$1,09 \pm 0,43$	$1,06 \pm 0,34$
STI (mm)	$1,09 \pm 0,34$	$1,07 \pm 0,36$	$0,99 \pm 0,24$
MS 1-2 (n)	22	18	19
MS 3-4 (n)	2	6	5

$9.3 \pm 0.8$  cm at T2. Labor and delivery have no significant effect on MS and on sonographic measurements (table 1).

**Conclusion:** Our finding showed that Mallampati scores and USM did not change during labor. This is in contrast with the study of Kodali et al. (2) who observed a change in MS during labor. The difference between the 2 studies in the total amount of fluid given during labor seems to lie the most likely explanation for our finding (554 versus 2500 mL in Kodali study). A low fluid regimen policy might reduce neck edema. Ultrasonography warrants further evaluation as an adjunct to assessing the anatomy of the airway in pregnant women.

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## Paper No: 613.00

### Comparison of intrathecal labor analgesia using clinical doses of ropivacaine and levobupivacaine

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**Introduction:** Intrathecal labor analgesia using newer local anesthetics such as ropivacaine or levobupivacaine becomes more popular due to their virtues of safety and less motor weakness.

**Objectives:** To clarify efficacy differences of the clinical intrathecal doses of ropivacaine and levobupivacaine.

**Methods:** Sixty full-term parturients randomly received 3 mg of intrathecal ropivacaine or levobupivacaine mixed with 20 mcg of fentanyl in their early active labor (30 patients in each group), a part of combined spinal-epidural technique. The associated block parameters, such as pain scores, duration of analgesia, and level of motor weakness, were investigated and compared between two groups. The primary and secondary outcomes were duration of analgesia and incidence of complete analgesia, respectively.

**Results:** Intrathecal ropivacaine offered shorter analgesia ( $P = 0.02$ ) with lower (sensory height  $P = 0.007$ ) and it also showed lower incidence of complete analgesia ( $P = 0.026$ ) than levobupivacaine. However, motor weakness on lower

extremities was comparable in both groups, but significantly weak anal squeezing was noticed in the levobupivacaine group ( $P=0.03$ ).

**Conclusion:** Ropivacaine and levobupivacaine, 3 mg intrathecally administered with fentanyl, were both effective in early labor analgesia. Levobupivacaine was more effective in analgesic potency, but accompanied by a little motor weakness.

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## Paper No: 665.00

### The quality of cpr deteriorates during transport in simulated maternal arrests

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**Introduction:** The American Heart Association recommends delivery within 5 minutes during an ongoing maternal cardiac arrest (1,2). Many clinicians may transport arrested patients to the operating room in order to perform a perimortem cesarean delivery. The study objectives were to compare the quality of cardiopulmonary resuscitation (CPR) rendered by teams during transport versus while stationary.

**Methods:** We randomized 26 teams composed of two staff (obstetricians, nurses, or anesthesiologists) to perform CPR during transport or while stationary. We used a mannequin (Laerdal Skills Reporter) designed to measure compressions (rate, depth) and ventilations (rate, volume). Participants practiced on the mannequin to perfect these skills prior to the drill. Each drill was comprised of three phases: 4 min while stationary, 2 min randomized to either remaining stationary or to transport, and 4 min while stationary. Transport involved pushing the gurney with the manikin from the labor room to the operating room. The primary outcome was percent of correctly delivered compressions (based on correct hand placement, depth > 1.5 inches, correct body position of the provider and proper release). Secondary outcomes included several compression variables (rate, interruptions, technique) and ventilation variables (tidal volume, percent delivered correctly).

**Results:** The percent of compressions rendered correctly was 32% in the transport group and 93% in the stationary group ( $P<0.001$ ). The median (IQR) compression rates were 124 (110-140) and 123 (115-132) per minute in the transport and stationary group respectively ( $P=0.703$ ). Median (IQR)

tidal volume was 270 (166-430) ml in the transport group and 390 (232-513) ml in the stationary group ( $P=0.031$ ). The percent of ventilations rendered correctly was 0% in the transport group and 8% in the stationary group ( $P=0.048$ ).

**Conclusion:** The quality of compressions and ventilations decreased significantly during transport during simulated obstetric cardiac arrest. Correct ventilations based on flow rate and adequate (> 500 ml) volumes were challenging for both groups perhaps because mask ventilation is more technical, and the compliance of the mannequin was poor. Our data suggests that in the event of a maternal arrest, transport negatively impacts the quality of resuscitation. Previously we showed that transport significantly delays perimortem cesarean delivery. The current findings further strengthen recommendations that perimortem cesarean delivery should be performed at the site of arrest.

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## Paper No: 674.00

### Spinal anesthesia for caesarean delivery in preeclampsia

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**Introduction:** It's a complex hypertensive disorder of pregnancy affecting multiple systems. Preeclampsia has been classically described as the triad of new-onset hypertension, new-onset proteinuria > 0.3 g/day and new-onset nondependent edema during pregnancy, usually after 20 weeks of gestation. Many preeclamptic patients require cesarean delivery. Spinal anaesthesia is often the preferred technique of anaesthesia for cesarean delivery. Although there is some controversy, it has been reported that it is suitable for use in preeclamptic patients, even in cases with a nonreassuring fetal heart rate pattern. Because of hazards related to management of the difficult airway and to the haemodynamic consequences of laryngoscopy and tracheal intubation.

**Objectives:** To know the haemodynamic changes and safety of spinal anaesthesia in preeclamptic parturients during caesarean delivery.

**Methods:** A retrospective study was carried out in 124 patients with Preeclampsia underwent cesarean delivery among 3023 Caesarean Delivery in Paropakar Maternity and Womens Hospital (PMWH), Kathmandu, Nepal in Fiscal Year 2064-2065 B.S. (July 17, 2007 to July 16, 2008). Previous clinical records from patients undergoing



Caesarean Delivery were studied and analyzed. Patients of age 17 years to 39 years and ASA I and II were included in the study.

**Results:** Among studied 124 preeclamptic undergoing cesarean delivery 105 received spinal anesthesia and 19 (15%) received general anesthesia with endotracheal intubation. Of the total 105 patients who received spinal anesthesia only 17 (14%) patients needed vasopressor support. There was decrease in systolic blood pressure 49.8 from baseline 178  $\pm$  22.6, lowest recorded 112  $\pm$  22.2. There was decrease in Diastolic pressure lowest after spinal anesthesia was 69  $\pm$  12.8 decrease from base line 28  $\pm$  12.8. Mean blood pressure baseline was 110  $\pm$  16.6 and decrease from baseline was 33.4  $\pm$  12.2 and lowest recorded was 98.3  $\pm$  16.8.

**Conclusion:** Most of the preeclamptic parturient underwent cesarean deliveries under spinal anesthesia. This study shows that the incidence of significant hypotension leading to significant hemodynamic changes and vasopressor support needed was less in patients with preeclampsia for cesarean delivery under spinal anesthesia.

**Discussion:** Preeclampsia is one of the leading causes of maternal morbidity and mortality and anesthesia for Cesarean delivery in patients with preeclampsia has been debated for spinal anesthesia against general. Previously epidural anesthesia was the choice of technique. In recent studies and in our study showing that there were no significant decrease of blood pressure and heart rate and mean arterial pressure which supported by studies of Kanayama N et al, Hood and Boese, Chan et al, Dyer et al, Aya AGM et al.

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**Paper No: 689.00**

## Anaesthetic management of a parturient with mediastinal mass for caesarean section

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**Introduction:** Patients with mediastinal masses are at risk for cardiopulmonary complications, particularly under general anaesthesia. The narrowed airway and obstruction to the great vessels in the neck and thorax pose particular dangers in the management of airway and the cardiovascular system.

**Case Report:** A 24 year old primigravida at 34 weeks gestation was admitted to our Medical Centre with anterior cervical mass and shortness of breath. She was referred to the anaesthesiologist and planned for urgent Caesarean section. Magnetic resonance imaging (MRI) examination revealed a soft tissue mass with intrathoracic extension from the neck to the level of trachea and carina, with evidence of airway compression. The patient was admitted to the Intensive Care Unit (ICU) one day prior to surgery. Her condition was stable with oxygen supplementation via nasal cannula at 3 L/min, and she was nursed propped up in bed.

We opted for low-dose sequential combined spinal-epidural (CSE) anaesthesia as we considered it to be the safest anaesthetic technique. The otorhinolaryngologists were on standby at the operating theatre in case emergency airway management became necessary. The CSE block was performed at L3–4 with the patient in the sitting position. Intrathecal injection consisted of 1.2 ml of 0.5% hyperbaric bupivacaine (6 mg) and 15  $\mu$ g fentanyl. A rapid bolus of 7 ml of saline was injected via the epidural needle as per epidural volume expansion technique. The epidural catheter was inserted to a depth of 5 cm in the epidural space and secured in place. The patient was placed supine with 15° left lateral tilt and 30° head elevation. Sensory loss to pinprick at T4 was achieved. Surgery was allowed to commence. The patient required an epidural top up with 2% lignocaine 5 ml during peritoneal incision. After 15 minutes a baby with Apgar score 8/9 was delivered, and a slow intravenous bolus of oxytocin 5 units was administered. Intraoperatively, her haemodynamic and respiratory parameters remained stable throughout.

Multimodal postoperative analgesia was provided using rectal diclofenac, epidural infusion of 0.1% levobupivacaine with 2  $\mu$ g/ml fentanyl, and oral etoricoxib on resumption of oral intake. Epidural morphine was not used to avoid the remote possibility of respiratory depression. The patient was observed overnight in the ICU and discharged well to

the Medical High Dependency Ward the next morning for further management.

**Conclusion:** Low-dose sequential CSE, with epidural volume expansion, was successfully employed in a parturient with mediastinal mass for Caesarean section.

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## Paper No: 719.00

### What is the real anesthetic cost for a Cesian section in a Province hospital from CHILE

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**Introduction:** Nowadays costs have become important in administration of hospitals in all the country. Selfadministration is new for province public hospitals.

**Objectives:** calculate the real anesthesia cost for a C section Last year our maternaty had 668 C-sections.

**Materials and Methods:** a prospective study for 50 C-section done starting from June 15 year 2011 was done. All C-section were included; elective and emergency. Participants were the three anesthesiologist that work in this hospital. Costs were done for all variable anesthesia supplies and drugs for each individual case.

**Results:** THE AVERAGE COST for the fifty cases was equivalent to 12 US dollars

**Discusion:** FIFTY PERCENT of the anesthetic cost is only by the hyperbaric .75 buvivacaine and the spinal trocar.

**Conclusions:** costs for C-section anesthesia change depending of the number of bupivacaine vial and number of spinal trocar. It is posible to improve anesthesia cost administration for the maternity.

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## Paper No: 720.00

### Anesthesia in pregnan myasthenic

Idoris Cordero

**Introduction:** Myasthenia gravis (MG) is an autoimmune disease characterized by circulating antibodies of the type of immunoglobulin G (IgG), which interact with cholinergic receptors and interfere with the mechanism of neuromuscular transmission.

**Objectives:** To describe the behavior of pregnant women perioperative with myasthenia gravis. Features of pregnancy: The course of MG during pregnancy is unpredictable. The worsening picture can occur between the first and third quarter. When a myasthenic, are pregnant should consult your obstetrician and inform your base doctor as soon as is confirmed. In these patients, premature birth is common. Anticholinesterases can cause uterine contractions. Stress implies increased myasthenic crisis. The occurrence of pre-eclampsia associated MG is uncommon, but when occurs can be catastrophic for both mother and fetus.

**Perioperative Practice:** These patients may present greater interference in labor and the postpartum period, so it requires a real team.

**Anesthetic Considerations:** Monitoring should be complete including neuromuscular function. It attaches great importance to the mode of delivery, but it is widely accepted that the myasthenic they should perform elective caesarean section and only when there are obstetric reasons only. Some prefer regional anesthesia (epidural), but others prefer general anesthesia.

**Medical Treatment:** The anticholinesterases, are the treatment of choice, as well as steroids and immunosuppressive drugs. Plasmapheresis is deprecated. Hyperimmune globulin intravenous (Intacglobin) has been used successfully. Should not be given magnesium sulfate.

**Considerations:** Breastfeeding your child for a myasthenic woman is always possible to take into account the severity of symptoms.

**Peculiarities of the newborn:** Some newborns may have neonatal myasthenia, temporary condition of general weakness in the newborn whose mother has MG. Its incidence ranges from 12 to 20 % and not all children of the same mother, presented a neonatal MG.

**Conclusions:** Myasthenia gravis is associated with increased complications. There is an increased risk of preterm labor, premature rupture of membranes, the greater potential of interventions and perinatal morbidity and mortality, so that the conduct of anesthesia should be accurate to prevent morbidity and mortality from this cause.

## Paper No: 788.00

### Labor epidural analgesia in an operated patient of syringomyelia with arnold chiari type 1 malformation: a rare case report

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**Introduction:** Arnold Chiari1 malformation consists of elongation of the cerebellar tonsils with their displacement below the foramen magnum. Syringomyelia is an associated cystic formation in the spinal cord due to disturbed mechanism of cerebrospinal fluid flow, resulting in a degenerative neuropathy. In a labouring woman this condition poses concern because of the potential risk of neurological deterioration as a result of the physiological changes and the interventions during labour and delivery.

Epidural analgesia could be beneficial in abolishing pain and thereby the increase in intracranial pressure but at the same time the procedure in itself could aggravate the neurological symptoms. We report the successful management of a normal vaginal delivery under epidural analgesia in a woman with a surgically corrected Arnold Chiari type 1 malformation with syringomyelia and scoliosis. Case Report 26 year old primiparous woman presented in early labour. She had undergone a therapeutic subdural shunt surgery for AC1 malformation with cervicothoracic (up to T11) syringomyelia six years previously. She had minimal residual neurological symptoms like reduced sensation to pain and temperature from T12-L2 and occasional paresthesia of upper limbs. The symptoms were more pronounced on the right side but no aggravation during the pregnancy. She had an associated thoracic scoliosis and right upper limb atrophy. X-ray was done post delivery showing scoliosis with intra thecal shunt at thoracic vertebra level. Upon request from the patient for pain relief Epidural analgesia was planned after detailed discussion with the neurologist and obstetrician. Epidural catheter was placed in L-3-4.....level under aseptic precautions. Analgesia was initiated with a titrated bolus dose of 10 ml of 0.0625% bupivacaine +50 µg fentanyl and was continued until delivery with 6ml /hour of 0.125% bupivacaine +2 µ/ml fentanyl. She had an uneventful vacuum assisted vaginal delivery. The patient was reviewed 2 weeks latter by the neurologist with a MRI spine and a detailed examination revealed the same neurological findings before going for the labour epidural. MRI: shows right syngo-hydromyelia along the cervical and upper dorsal spinal cord.

**Discussion:** Syringomyelia is a rare progressive degenerative neuropathy characterised by cystic formation within the spinal cord with accumulation of cerebrospinal fluid that can impinge on nerve fibres resulting in neurological manifestations. The congenital form commonly is associated with Arnold-Chiari 1 malformation and occurs in the cervicothoracic level.

The preferred mode of delivery and anaesthesia in a parturient with syringomyelia is controversial. The prime concern is avoidance of straining and thus fluctuation in the intracranial pressure during the labour and delivery. Only few reports of successful vaginal delivery under epidural analgesia are present.

The major concerns during epidural anaesthesia in such patients are: 1) Further neurological deterioration 2) Technical difficulties especially due to the presence of spine abnormalities like scoliosis 3) Increased risk of dural puncture

4) Abnormalities of autonomic nervous system can cause exaggerated cardiovascular instability 5) Unpredictability of the level of sensory blockade.

**Conclusion:** The use of Epidural analgesia for parturient with Neurological conditions like Arnold chiari malformation with syringomyelia is controversial; we would like to highlight that a meticulously done low dose epidural analgesia is still an option considering the benefits in such patients.

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## Paper No: 797.00

### Risk factors for massive hemorrhage during cesarean section in patients with placenta previa

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**Introduction:** Placenta previa (PP) is one of the major causes of massive obstetric hemorrhage. Well known risk factors for bleeding in PP are old age, previous cesarean section (CS), increased BMI, increased neonatal weight, complete previa and especially the presence of placental accrete. In addition, it has been reported that general anesthesia (GA) is an independent risk factor for massive bleeding (MB) in PP patients. Objectives The purpose of this study was to elucidate the risk factors contributing to the incidence of MB in PP patients. We also investigated the factors associated with the choice of anesthetic method.

**Methods:** We retrospectively reviewed all women with PP who underwent CS during September 2006 to August 2011 at Kyushu University Hospital. The following factors were extracted from medical records: age, BMI, gestation, number of previous CS, emergency or elective, the anesthetic technique used (GA/RA) and the estimated blood loss (EBL) during surgery. Ultrasound findings within a week before CS were available in most patients; type of PP (marginal/complete), placental location (anterior/posterior) and the

presence of placental accrete were also included in the analysis. Multivariate logistic regression was performed to determine independent risk factors for MB ( $\geq 2500\text{ml}$ ) and to investigate factors associated with the choice of anesthetic method. For statistical tests,  $P < 0.05$  was considered significant.

**Results:** Among 109 patients, median EBL was 1,340ml (range 270–11,348). There were 16 cases of MB. Emergency surgery (OR; 3.8, 95%CI; 1.1–13.0) and anterior placental location (OR; 4.2, 1.2–15.3) were found to be independent risk factors for MB. Overall, regional anesthesia was employed for most cases, 89% (97/109). Two of these women were later converted to GA because of the excessive hemorrhage. Anesthesiologists employed GA when a patient had a history of CS (OR; 7.1, 1.1–43.8) and in case of emergency (OR; 14.9, 2.1–108.5). Median EBL during surgery with RA and GA were 1,292ml (270–10,800) and 2,795 ml (429–11,348), respectively ( $P < 0.05$ ).

**Conclusions:** Emergency surgery and location of placenta are risk factors for MB during CS in cases of PP regardless of whether placental accrete is present. Anesthesiologists seemed to choose GA depending on a history of CS, which was associated with MB well. Additional information of sonographic exam on the placental position before the uterine incision may help anesthesiologists to develop a strategy to manage patients with PP.

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## Paper No: 804.00

### Quality assesement of the practice of obstetrical anaesthesia at muhima district hospital

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**Objectives:** The quality of anesthesia is a main determinant of maternal and neonatal outcomes in obstetrics (1). We set out to describe the quality of obstetrical anesthesia at

Muhima district hospital in Rwanda and its possible effects on maternal outcomes.

**Methods:** This was a prospective observational study of consecutive caesarean sections performed at Muhima District Hospital in Kigali, Rwanda over a period of 4-months, from February 1st to May 31st, 2009. Muhima is a single-specialty hospital dedicated to obstetrics and gynecology. The data was collected from a 6 category-item survey questionnaire: admission parameters, labor progress record, anesthesia record, postoperative record, discharge criteria and neonatal status. The data were analyzed with descriptive and inferential statistics and regression analysis at the 95% confidence level.

**Results:** Data from 602 consecutive patients were analyzed. According to the admitting physicians's classification, 17.4% were emergent, 2.2 % urgent, 74.1% semi-urgent and 6.3% were scheduled. Preanesthetic assessment was not done in 95% of patients. Thirteen patients (2.2%) had general anesthesia as the primary anesthetic, 11 of whom (84%) were not intubated. The decision to delivery Interval (DDI) was consistently greater than 30 minutes in all groups. Mothers in the urgent group had a higher frequency of complications and were more likely to receive general anesthesia. Their DDIs were the shortest among the groups. There was a high incidence of failed spinals (7.2%) all of which were converted to general anesthesia without intubation. Post-operative analgesia consisted solely of diclofenac. Overall mortality for caesarean sections was 500/100,000.

**Conclusion:** Our findings point to substandard anesthetic management of caesarean sections (2). Namely, the absence of pre-anesthetic evaluation (3), prolonged DDI (4), a predominance of general anesthesia without a protected airway (3), and a high incidence of failed regional anesthesia. The most alarming finding is that of a maternal mortality of 500/100,000 compared with 2/million in the United States (1), a differential of 2,500 times. The latter is far greater than that for combined modes of delivery of 100-200 times (5). Further studies are needed to explore the causes of such a high differential.

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**Paper No: 825.00****Anaesthetic Management for Successive Spinal Cord Surgeries During Pregnancy and Postpartum****Demet Coskun**, Ahmet Mahli, Ulku Emik, Rabia Ozdemir and Hakan Emmez

Gazi University Faculty of Medicine / Department of Anaesthesiology and Reanimation

**Objectives:** Treatment strategy of spinal cord lesions requires consideration of multiple factors including location of the spinal cord compression, presence of spinal deformity, speed of neurologic decline, stage of pregnancy and potential risks to the foetus. Since the anaesthetic management of these patients according to stage of pregnancy is important, we present the anaesthetic management of a parturient with spinal tumour.

**Case Report:** A 25-year old woman, gravida 1, para 0, at 28 weeks? gestation with a 4-day history of bilateral lower limb weakness and altered sensation was admitted to our institution. Emergency magnetic resonance imaging (MRI) of the dorsal spine was requested. The MRI results revealed a lesion at the entire of T8-9 thoracic vertebra with involvement of the posterior elements, osseous extension into the extradural space and paravertebral soft tissue. She was urgently admitted to the neurosurgery department to undergo laminectomy and decompression by the 303 weeks of her gestation. After invasive blood pressure, peripheral oxygen saturation and fetal heart rate (FHR) monitorization, anaesthesia was induced using propofol, rocuronium bromide followed by total intravenous anaesthesia with propofol and remifentanyl. During the operation, haemodynamics, central venous pressure, peripheral oxygen saturation, acid base status and FHR were stable. After skin incision; total laminectomy of T8-T9, posterior decompression and subtotal excision of the lesion were performed. Following extubation, she was taken to post anaesthesia care unit and then obstetric ward. Two weeks after her operation, at 32 weeks? gestation, she underwent caesarean section under general anaesthesia. Four weeks later, the patient was electively prepared for a total neurosurgical excision of the lesion.

**Conclusion:** The etiopathogenesis, clinical and radiological features, and treatment modalities of an uncommon cause of thoracic spinal cord compression associated with pregnancy were addressed in this case report. Physiologic changes during pregnancy may lead to acute spinal cord compression due to tumour growth and expansion. Failure to recognize the lesion and delayed treatment can lead to potentially serious complications. We believe that our anaesthetic management allows us to perform this surgical procedure with maximal maternal and fetal safety.

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**Paper No: 854.00****Loss of resistance to air versus saline technique in epidural anesthesia for labor: a randomized, prospective study****Genaro Maggi**, Nicolas Brogly, Renato Schiraldi, Laura Puertas and Emilia Guasch

**Introduction:** Loss to air technique in epidural analgesia for labor is a controversial approach due to increased rates of failures and complications, when compared to loss to saline technique (1-3). In this randomized, prospective study we compared the efficacy and the rate of complications employing the two techniques.

**Materials and Methods:** After obtaining Ethical Committee approval and written consent from patients, 400 parturient were allocated, using sealed envelopes, to receive epidural analgesia either using the loss to air (group 1) or the loss to saline (group 2) technique. Level of efficacy of the analgesia was monitored after 30 minutes and during expulsion of the fetus by an appropriate scale ranking 0-3 (0=no pain; 3=total failure of analgesia). 24 hours after delivery, pain in the site of epidural puncture and maternal satisfaction were evaluated, using a 0-10 scale. There were 177 patients in each group, considering a difference of 20% in the block efficacy ( $\alpha=0,05$ ,  $\hat{\alpha}=0,1$ ). ANOVA was employed for parametric data and Chi-2 for non-parametric data. A p value  $<0,05$  was considered significant.

**Results:** 11 patients in each group were excluded from the study for protocol violation. No difference in analgesia efficacy was reported at 30 minutes ( $1,03 \pm 0,65$  in group 1 vs.  $1,03 \pm 0,66$  in group 2;  $p=1,00$ ), nor during fetus expulsion ( $0,72 \pm 0,71$  vs.  $0,69 \pm 0,63$ ;  $p=0,67$ ). Complications during technique were reported in 38 patients in group 1 (20,6%) vs. 39 patients in group 2 (21,1%;  $p=0,50$ ). Dural puncture was recorded in 2 patients in group 1. During labor, lateralization of analgesia was reported in 26 patients in group 1 (13,7%) vs. 16 patients in group 2 (8,5%;  $p=0,08$ ). Inefficacy of analgesia needing a new epidural puncture was reported in 16 patients in group 1 (8,5%) vs. 7 patients in group 2 (3,7%;  $p=0,03$ ). 24 hours after delivery, 84 patients in group 1 (44,4%) referred pain in the site of the epidural puncture, vs. 65 patients in group 2 (34,4%;  $p=0,02$ ). On the other hand, there was no difference between groups about maternal satisfaction ( $8,35 \pm 2,66$  vs.  $8,58 \pm 2,68$ ;  $p=0,42$ ).

**Conclusions:** In the present study, epidural puncture technique didn't seem to compromise analgesia efficacy or to induce more complications. However, when loss of resistance to air technique was employed, lateralization of the

analgesic block and re-puncture were more frequent. Moreover, this technique was associated to an increased rate of pain in the site of the epidural puncture, although maternal satisfaction was not impaired.

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## Paper No: 898.00

### Needs assessment to achieve Millennium Development Goal 5 defined by staff at Mbarara University Hospital Uganda

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**Introduction:** The aim of MDG5 is to reduce the 1990 maternal mortality ratio (MMR) by three-quarters in 2015 (1). Maternal deaths are largely avoidable with appropriate antenatal and peripartum care. Interventions to reduce maternal deaths are well described, but there has been limited progress in sub-Saharan Africa in recent years (2). The Uganda Ministry of Health reported a MMR of 430 per 100 000 live births in 2008, equivalent to 1 in 25 lifetime risk of maternal death (3).

Quality improvement methods may be effective in low-income settings (4,5). A preliminary needs assessment involving key stakeholders is required and may point to factors that can be generalized to similar settings.

**Objectives:** To perform structured interviews to ascertain opinions of healthcare workers regarding provision of obstetric care in a regional referral hospital, changes required and barriers to improvement.

**Methods:** Structured interviews were conducted with obstetricians, anaesthetists, clinical officers, and midwives at Mbarara Regional Referral Hospital, Uganda during one week in June 2010. Ethics approval was obtained. Open questions were asked and answers were not prompted. An independent anaesthetist reviewed interview transcripts for recurring themes.

**Results:** Interviews were conducted with nine members of staff, each lasting between 20–40 minutes. Representatives of all grades of anaesthetist, obstetrician and midwife were interviewed. Three recurring themes emerged:

- (1) Lack of nursing staff (9/9 interviewees) “In the daytime there are enough staff, but at night we have only two nurses for up to 90 patients” Senior midwife “There have been patients who have deteriorated and no one knew.” Obstetric intern.
- (2) Lack of material resources (7/9 interviewees) “When the budget runs out we have to send patient relatives out to buy sutures, cannulae, giving sets” Obstetric consultant “We could not operate for a whole month because we didn’t have gloves or oxygen” Obstetric consultant
- (3) Lack of training courses (6/9 interviewees) “We have not received any training in how to recognize a critically ill mother. I would like us to have this instead of finding them when they are too ill to save” Obstetric intern

**Conclusions:** These interviews have identified factors that need to be addressed to improve maternal outcomes in this setting – support for nursing staff, particularly at night, improved resources, and improved training, particularly in recognition of the critically ill mother. They reflect findings previously identified in this setting (6) and will be used to direct a quality improvement programme in the hospital.

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## Paper No: 900.00

### Anaesthesia for Caesarean Section in Palestine

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**Introduction:** Spinal anaesthesia is now considered the method of choice for both urgent and elective Caesarean

section 1 The use of general anesthesia has fallen dramatically in the past few decades and accounts for only 5% of Caesarean sections in the United States<sup>2</sup>. In our hospital, the Al-Makassed Islamic Charitable hospital, a teaching and tertiary referral hospital for Palestine, the proportions are almost completely reversed. This reflects practice in the other Palestinian hospitals of the West Bank.

**Objectives:** The aim of this study was to review anesthesia practice for Caesarean section in the Makassed hospital. We sought to establish the data for the incidence of general anaesthesia and spinal or epidural anaesthesia for Caesarean section in 2010. In addition we sought an explanation for this incidence. And finally we wanted to know whether there were reasons to change the contemporary practice of anaesthesia for Caesarean section in Palestine.

**Methods:** This is a retrospective observational study. We reviewed the files of all patients who underwent Caesarean delivery in the period from 1st of Jan - 31st Dec 2010 at the Al-Makassed hospital. Both Emergency and Elective cases were included. We recorded the following: age and parity of the mother, type of anaesthesia given, indication for the caesarean, 1-minute and 5-minutes APGAR scores of the baby, regional block proceduralist. SPSS software was used to analyze the data.

**Results:** In 2010 we found that there were 647 cases of Caesarean deliveries out of 2764 total deliveries 23.4 %. Of the caesareans: 50.5% were emergency cases and 49.5% were elective cases. Of the emergency cases: 78 % given general anaesthesia, 16.5% were spinal, 3.4% epidural and 2.1% failed spinal converted to general anaesthesia. Whereas for the elective cases : 71.6% given general anaesthesia, 24.4% spinal, 0.6% epidural, 3.1% failed spinal, 0.3% combined spinal epidural. Totally 2.6% of the spinal anaesthesia failed and were converted to GA. There were no other significant complications attributed to spinal anaesthesia. There was no incidence of airway difficulty or aspiration following general anaesthesia. There is single case who died 3 hours post caesarean with a clinical diagnosis of massive Pulmonary embolism.

**Conclusions:** Although our numbers are relatively small, general anaesthesia appears to be safe in our hands. Any change in obstetric anaesthesia practice in Palestine would have to confront deeply held historical Obstetric beliefs and well entrenched cultural traditions in our patient population. With maternal mortality associated with general anaesthesia at 6.5 per million and that of regional anaesthesia at 3.8 per million in the US<sup>2</sup>, would a change in practice make any significant difference to anaesthetic morbidity and mortality in Palestine? What are the implications for other low and middle income countries in "Anaesthetic transition"?

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## Paper No: 930.00

### Relationship between the administration of preincisional intravenous fentanyl in patients under cesarean section with epidural anesthesia and the apgar score of newborns. hospital nacional Daniel A. Carrión – 2011

Freddy Espinoza

**Introduction:** Although the sedoanalgesia is used in the operating room to relieve the stress of the patient undergoing surgery under regional anesthesia, many anesthesiologists are reluctant to use it in cesarean section by fear of the potential effects that drugs can have on the fetus.<sup>(1)</sup> Even though there is evidence that fentanyl is safe in pregnant women when it is used for labor analgesia, studies are inconclusive when it is used as an adjunct to cesarean section under regional anesthesia <sup>(2)</sup>.

**Objectives:** Determine if exists relationship between the pre-incisional intravenous fentanyl administered to patients under cesarean section with epidural anesthesia and the Apgar scores of newborns.

**Material and methods:** Observational, analytical, prospective and longitudinal study in pregnant women undergoing cesarean section at Hospital Nacional Daniel A. Carrión in 2011. 64 patients were included, 32 receiving, at the judgment of the responsible anesthesiologist, intravenous fentanyl before surgical incision (GF) and 32 who did not receive any sedoanalgesia (GC). We recorded the Apgar score of the newborn at one minute and 5 minutes. For the analysis of the data was used the Mann Whitney test.

**Results:** The dose of fentanyl administered was  $1.48 \pm 0.04$  ?g.kg-1. There was no statistically significant difference between groups in the Apgar score at one minute (GF 8.81 [8-9], GC 8.81 [7-9],  $p=0.886$ ) or 5 minutes (8.97 GF [8-9], GC 9.6 [9 - 10],  $p=0.085$ ).

**Discussion:** The possibility of side effects of fentanyl on the product is in relation to the amount that crosses the placental barrier and reaches the fetal circulation, with an estimated minimal plasma concentration to produce respiratory depression in the neonate of about 2 ng.m-1.<sup>(3,4)</sup> Experimental and clinical evidence indicate that very little amount passes from mother to fetus and that the relationship between maternal and fetal plasma levels is greater than 2.5.<sup>(5-7)</sup> Although maternal plasma concentration was not measured in this study allowing

calculation the fetal concentration, studies using fentanyl macrodosis for major surgery in neonates showed that it requires 25 to 50  $\mu\text{g.kg}^{-1}$  to achieve plasma concentrations of 3.8  $\text{ng.ml}^{-1}$ .<sup>(8)</sup> It could be argued that the dose of 1.48  $\mu\text{g.kg}^{-1}$  used in this study as sedoanalgesia would be insufficient to reach toxic levels for the newborn.

**Conclusions:** We found no evidence that fentanyl intravenous at doses of 1.48  $\text{mg.kg}^{-1}$  administered before the surgical incision in caesarean section have deleterious effects on the newborn.

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## Paper No: 998.00

### Development of a 'lay mews' for patient attendants in the obstetric wards in Mbarara Regional Referral Hospital Uganda

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**Introduction:** Common causes of maternal death are haemorrhage, sepsis, eclampsia and obstructed labour. Maternal collapse usually precedes cardiac arrest and outcomes are improved by recognising the sick mother (1). The Modified Early Warning Score (MEWS) has been validated as a predictor of mortality (2,3,4). The eighth report of the UK Confidential Enquiries into Maternal Deaths recommended routine use of an obstetric MEWS to help in the recognition,

treatment and referral of women who have developed or are developing critical illness (5).

Uganda has shown slow progress towards achieving MDG 5, in common with many countries in sub-Saharan Africa. There are around 8,000 deliveries pa at Mbarara University Hospital, and in 2009 there were >50 maternal deaths. A needs assessment identified a severe shortage of nursing staff on the wards as one of the factors to be addressed. At night, two nurses look after labour, antenatal and post-natal wards, making it difficult to undertake routine observations to identify deteriorating patients. However, every patient receives basic care from an attendant, usually a family member, who may be an underutilized resource.

**Objectives:** To develop an objective tool for use by patient attendants to alert nurses to a deteriorating patient requiring formal assessment.

**Methods:** Consensus views of five UK consultant obstetric anaesthetists identified key warning signs relating to the deteriorating mother. An obstetrician and six senior midwives in Mbarara were interviewed to assess the feasibility of a 'lay MEWS'. The educational background of patients was assessed. Patient attendants in Mbarara were interviewed to assess their understanding (data collection on-going).

**Results:** Consensus views identified five key warning signs:

- Bleeding
- Fast breathing
- Behaving strangely or having a fit
- Headache
- Patient feeling cold

One in four patients in Mbarara are peasant farmers, there is a low rate of literacy, and a written instruction chart was not deemed feasible. A pictorial chart was developed and translated into local languages, Lugandan and Runyankol. The final lay MEWS is shown (Figure).

**Conclusions:** In Mbarara University Hospital Obstetrics Department, the patient attendant may be an underutilized resource and may compensate for nursing shortages. Based on expert advice and consensus, we have devised a pictorial chart with local language translation as a novel and feasible method for training attendants to identify five clinical signs of deterioration. This chart may have wider applications in other resource-limited settings. Impact on patient outcomes in Mbarara will be assessed after implementation.

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## Paper No: 1012.0

### Post cesarean section pain in the west bank

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**Introduction:** In December 2007, the Center for Disease Control and Prevention (CDC) reported that caesarean section (CS) rate in the developed world varied between 33.3% in Italy and 12.9% in the Netherlands (1). In Rafidia Surgical Hospital in Nablus, the CS rate was about 11% in the 1970s and increased to 14% in the 1990s. During the Al Aqsa uprising in 2000–2004 this percentage remained the same until the incursion of Nablus city in 2002, after which the CS rate increased to 21%. The explanation for this sudden change was that parturients at term demanded caesarean delivery because they were very concerned about inevitable delays at check points in the West Bank.

**Objectives:** The main objective of this study was to evaluate several factors influencing the intensity of postoperative pain in women undergoing CS. These factors included family issues, nursing staff behaviours, length of procedure, socio-economic status of the patients, anti-natal care, previous experience of surgical pain and post-operative complications.

**Methods:** This study was conducted during the period from February – March 2011 and carried out in 3 government hospitals in the cities of Nablus, Jenin and Ramallah. A patient questionnaire was generated and a survey was conducted, using face to face interviews and additional information was obtained from the patients' files.

**Results:** Three hundred and twenty eight women undergoing general anesthesia for CS agreed to participate in this prospective, multicenter, survey. Patients were interviewed pre-operatively on the day of surgery and informed consent was obtained at that time. The questionnaire was completed 8 hours following CS by each patient when patients had fully recovered from general anesthesia. The response rate was 93%. The data were completely collected during the hospital stay. Pain intensity following CS was significantly influenced by the following variables: patient education, previous CS, duration of surgery, type of sutures used, nurses' attitude towards pain, method of expressing pain, ambulation post CS and complications directly related to CS. (Probability values equal to or less than 0.05 were considered significant.)

**Conclusions:** A number of factors influence the intensity of post-operative pain following CS. Most of these factors cannot be easily controlled and involve patient factors, environmental issues and health care providers. Education of patients, nurses and physicians about the concepts of acute pain management would be an important first step towards improving pain control following CS. The most effective way to address the educational issues raised would

be to introduce a team approach to the management of postoperative pain.

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## Paper No: 1024.0

### Effectiveness of intra-operative ondansetron in reducing post-operative intrathecal morphine-induced pruritus in patients undergoing caesarean section

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**Introduction:** The addition of preservative-free morphine to intrathecally injected local anaesthetics during spinal anaesthesia provides prolonged and effective analgesia following caesarean section thus enabling patients to be mobilized earlier. Nevertheless, up to 80% of patients experience pruritus due to the intrathecal opioids which is believed to have a direct irritation effect on neuraxial serotonin type 3 receptors. Ondansetron, a specific 5-hydroxytryptamine-3 (5-HT<sub>3</sub>) receptor antagonist may have a role in reducing or abolishing this disturbing symptom of itchiness.

**Objectives:** This prospective, randomized, double-blinded, placebo-controlled clinical study evaluated the effectiveness of 4 mg intravenous ondansetron in reducing the incidence and severity of 0.15 mg intrathecal morphine-induced pruritus in patients undergoing caesarean section.

**Methods:** Sixty two ASA I or II patients, aged 18 years and above who met the criteria were randomized into two groups. All parturients received an intrathecal injection of 0.5% heavy bupivacaine 1.6 – 2.0 ml, fentanyl 25 µg and preservative-free morphine 0.15 mg. Immediately after the delivery of the baby, Group A patients received 4 mg of intravenous ondansetron while Group B patients were given 2 mls of normal saline injection. Pruritus rating (none, mild, moderate or severe) was done at the recovery room, 6 hours, 12 hours and 24 hours postoperatively.

**Results:** The incidence of pruritus at the recovery room, 6 hours, 12 hours and 24 hours postoperatively for Group A (ondansetron group) was 64.5%, 72.4%, 41.9% and 29.0% and Group B (placebo group) 37.8%, 67.7%, 45.2% and 25.8% respectively. Although the incidence of pruritus was higher in the ondansetron group in the recovery room and at 6 hours postoperatively, it was not statistically significant. The incidence of pruritus was highest at 6 hours postoperatively. None of the patients had severe pruritus that required rescue medication at all intervals.

**Conclusions:** This study showed that intra-operative 4 mg intravenous ondansetron was not effective in reducing the

incidence and severity of 0.15 mg intrathecal morphine-induced pruritus in patients undergoing caesarean section.

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## Paper No: 1035.0

### Prevention of oxytocin-induced hypotension in caesarean delivery by co-administration of phenylephrine with oxytocin

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**Introduction:** The value of routine oxytocin in caesarean delivery is well established. However, oxytocin may cause dose related adverse, even fatal (1), cardiovascular effects (2) including hypotension and tachycardia as well as myocardial ischemia (3,4). In this prospective, randomized double-blind control study, we investigated the effects of co-administration of intravenous bolus of oxytocin with phenylephrine on haemodynamic changes caused by oxytocin. We hypothesize that this co-administration will reduce the incidence of oxytocin-induced hypotension after caesarean delivery. We also aim to find out whether 100 or 200 microgram of phenylephrine is the optimal dose to prevent oxytocin-induced hypotension.

**Objectives:** To observe and compare the changes in BP, heart rate and emetic effects after bolus dose of oxytocin with or without co-administration of different doses of phenylephrine after delivery in elective caesarean section.

**Methods:** Ninety healthy parturient undergoing elective caesarean section were received 10 IU of oxytocin IV bolus after

delivery of the baby over a time period of 5 to 10 seconds. They were randomized to co-administer either placebo (Group-A) or 100 microgram (Group-B) or 200 microgram (Group-C) of phenylephrine along with oxytocin IV bolus dose. Non-Invasive Blood Pressure and Heart Rate were recorded at 1 minute intervals from the time of oxytocin administration to next 5 min, and thereafter at 5 minute interval till the end of surgery. The last measurement of Non-Invasive Blood Pressure and heart rate before oxytocin administration was considered as the baseline for subsequent changes. Hypotension was defined as a blood pressure of less than 20% of the baseline. Tachycardia was defined as a maternal heart rate of more than 20% of baseline.

**Results:** Incidence of systolic hypotension at 1 min after oxytocin bolus was 40% in group A, 20% in group B and 10% in group C which was statistically significant ( $p=0.02$ ). At 2 min, it was 6.7% in group A, 3.3% in group B and 0% in group C which was not significant ( $p=0.35$ ). Incidence of reduction in mean blood pressure at 1 min was 53.3% in group A, 26.7% in group B and 10% in group C which was highly significant (0.001). Incidence of tachycardia, nausea and vomiting between the groups were not significant.

**Conclusion:** Co-administration of 200 microgram phenylephrine with oxytocin is more effective than 100 microgram of phenylephrine in prevention of oxytocin induced hypotension in caesarean section without any increase in untoward effects.

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## Paper No: 1044.0

### Introducing monitoring of vital signs and the who checklist at mbarara university teaching hospital, uganda: an observational study

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**Introduction:** Maternal mortality remains high in sub-Saharan Africa, and many countries are not on track to achieve UN Millennium Development Goal 5 by 2015 (1). Mbarara University Teaching Hospital undertakes approximately 8000 deliveries per annum (28% caesarean section rate, MMR 500:100 000 births). Common causes of maternal death are haemorrhage, sepsis, eclampsia and obstructed labour. Early recognition of abnormal vital signs and the use of a surgical checklist have been identified as potential ways to improve outcomes (2,3).

**Objectives:** The key objectives of this study were to introduce routine monitoring of vital signs and the WHO surgical safety checklist for mothers undergoing caesarean section.

**Methods:** Ethical approval was obtained. A baseline audit in August 2010 measured the percentage of mothers with vital signs recorded pre- and postoperatively. A visiting anaesthetist coordinated training from September 2010 to January 2011. Changes were introduced into practice using PDSA cycles (plan-do-study-act) to improve target outcomes. Lack of equipment was identified as a barrier and 4 mobile monitors were introduced with training targeted at admission triage. A MEOWS chart and checklist were formally launched in January 2011. Data was collected by weekly chart review by trained data abstractors. Results were plotted as percentages on weekly run-charts and presented at monthly obstetric meetings.

**Results:** Data was obtained for 86 caesarean sections in the baseline audit and 964 caesarean sections January - June 2011 (83% emergencies). Preoperative and postoperative blood pressure was recorded in 2/86 (2.3%) and 1/86 (1%) of patients at baseline. Preoperative blood pressure was recorded in 100% patients at the end of the study period, a sustained change in practice. Postoperative observations improved although the effect was not as marked. The use of the checklist continued but was not sustained after the visiting anaesthetist left. Retained surgical swabs were detected on two occasions as a result of using the checklist. There were 9 maternal deaths from 1st January to 30th June (36 deaths in 2010).

**Conclusions:** We have shown that in resource limited settings it is possible to improve basic care processes such as routine blood pressure monitoring through local leadership, training and introduction of suitable equipment. Regular audits help change practice and improve patient care. Improvements in the uptake of the checklist were not sustained, despite demonstration of utility. Introducing the WHO checklist is a complex process in any setting and requires local champions and multidisciplinary team involvement to identify local barriers (4).

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## Paper No: 1052.0

### Anaphylaxis shock probably induced by Seprafilm (sodium hyaluronate-based bioresorbable membrane)

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**Introduction:** Seprafilm bioresorbable membrane has been approved for use in any open abdominal or pelvic surgery to prevent post operative peritoneal adhesions. We experienced anaphylaxis shock probably induced by seprafilm in the caesarean section.

**Case:** Patient was 29 year-old female and scheduled for repeat caesarian section. Her pregnant term was 37months and she was suffered from severe atopic dermatitis for over 20 years. Brown pigmentation was recognized on her all extremities and back skin. For the first caesarean section, seprafilm was not used during operation. Anesthesia was maintained mainly by spinal anesthesia and propofol was started for sedation shortly after the baby delivery. Circulatory condition was checked every 5minute under spontaneous respiration and her circulatory and respiratory conditions were steadily maintained. But at the time of skin suturing, her respiratory rate was increased and she moved her upper extremities. Her pulse rate was increased to 140/minute and blood pressure was depressed to 50mmHg. Amniotic fluid embolism was first suspected, but arterial blood analysis showed no respiratory distress data, PaO2 395mmHg and PaCO2 30mmHg. Blood bleeding into abdominal space was also suspected, but echo examination revealed no bleeding around the uterus. Latex catheter was removed from the bladder for Latex anaphylaxis, but no recovery was noticed. Her peripheral blood examination showed concentrated blood, Hb increased from preoperative 10g/dl to 14.5g/dl. Dramatic circulatory recovery was obtained by the administration of adrenalin 0.05mg and Hydrocortizone 500mg.

**Discussion:** Amniotic fluid anaphylaxis was also the possible cause for this patient. But the time of the occurrence of the shock was the key point. Shock occurrence time was just after the application of seprafilm.

**Conclusion:** Widely and commonly used seprafilm can be the cause of anaphylaxis shock.

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## Paper No: 1088.0

### Incidence of difficult & failed intubations during obstetric general anaesthesia in a tertiary referral centre

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**Objective:** To determine the incidence of difficult and failed intubation during general anaesthesia (GA) for cesarean sections (CS) & pregnancy-related surgery in a tertiary teaching institution.

**Methods:** With IRB approval, data on cesarean deliveries & pregnancy-related surgery performed over 8 years from 1 Jan 2004– 31 Dec 2011 were extracted from departmental audit, critical incident database and clinical notes. We determined total number of deliveries, cesarean, GA rates and reviewed charts of all patients with difficult ( ? Grade 3 larynx) or failed intubation (failure to intubate the trachea), recording parturient demographics, indications for elective/emergency CS, and for GA, and details of airway management (preoperative airway assessment, anaesthetist seniority, adherence to failed intubation protocol, airway adjuncts used, airway complications).

**Results:** This study took place in our country's largest and busiest tertiary maternity teaching centre which delivers approx. > 12,000 babies annually. Final results will contain additional 6 mths data until 31 Dec 2011. Preliminary data (1 Jan 2004– 31 July 2011) is presented: 93,401 deliveries occurred; 26,584 via cesarean section (average CS rate of 30%). Of these, 10.4% were performed under general anaesthesia. There were 2772 rapid sequence GAs for cesarean deliveries and 5065 obstetric GAs (for CS and non-CS) administered over 7.5 years. 14 difficult intubations (grade ? 3 larynx) occurred in the GA -CS series=1:198 incidence. 50% cases were emergency CS after hours. There were 6 failed intubations=1:462 incidence. 6 unanticipated and 7 anticipated difficult airways were identified on preoperative assessment. 8 of 14 cases were obese (BMI > 30). Only 2 patients had severe preeclampsia. All 14 difficult intubations were handled by anaesthetic consultants or specialist registrars. The failed intubation protocol was followed in all 14

cases, commonest adjuncts used were bougie and McCoy laryngoscope. Five cases were rescued with a LMA Proseal, one patient was awoken, and spinal performed. There was no pulmonary aspiration, maternal awareness, or dental damage. Minor airway complications: 6 transient desaturation, 2 sore throat, 1 fiberoptic bronchoscopic suction with post-op ICU monitoring overnight.

**Conclusion:** We found a difficult intubation incidence of 1:198 and failed intubation 1:462. We attribute this low incidence of 1:462 to the round-the-clock specialist staffing of our busy obstetric anaesthesia unit, familiarity with GA with adequate opportunities for training in obstetric intubations and low maternal morbidity due to the use of the Proseal LMA, the availability of videolaryngoscopy, and ongoing multidisciplinary simulation training in high risk obstetric scenarios and failed intubation drills.

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## Paper No: 1128.0

### Influence of enoxaparine on serum endotoxin concentration in puerpera after abdominal delivery

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**Introduction:** Increase of endotoxin concentration was noticed in patients with severe pre-eclampsia, massive hemorrhage, sepsis, small pelvis inflammatory diseases [1–4]. Low-molecular weight heparins (LMWH) are direct anticoagulants, but also they have anti-inflammatory and endothelial-protective properties [5,6].

**Objectives:** Determination of serum endotoxin level in puerperas with risk factors of thrombotic complications after abdominal delivery.

**Methods:** After Ethic Committee approval and obtaining of informed consent, 72 patients after abdominal delivery were included in randomized prospective trial. All patients were randomized into two groups (randomization was performed according to the day of the week). Study group included 38 women, who obtained daily sodium enoxaparine 40 mg subcutaneously, started 12 hrs after delivery during 3 days. Control group included 34 patients after



abdominal delivery. Inclusion criteria: presence of one or several risk factors (arterial hypertension, combination of hereditary thrombophilia gene mutation, varix veins, diabetes mellitus, BMI > 25, age > 35 years). Exclusion criteria: different inflammation diseases during III trimester, pre-eclampsia, blood loss during delivery > 1000 ml, administration of LMWH before or 24 hours after delivery, contraindications for use of LMWH. Groups were comparable by age, gestational age, indications to delivery, BMI, concomitant diseases, obstetric history. Duration of cesarean section was  $54,3 \pm 4,21$  and  $53,2 \pm 3,75$  min, respectively, blood loss -  $894,8 \pm 76,78$  and  $877,9 \pm 69,92$  ml in study and control group respectively. Before intervention all patients obtained prophylactic antibiotic dose. Eight women were excluded from the study due to demand in LMWH and/or antibacterial treatment after delivery. Studies of endotoxin serum level were performed on days 1, 3 and 5 after delivery with use of HbtLAL method (quantitative analysis of endotoxin level in culture media). Limit of assay sensitivity - 1,

	Day 1	Day 3	Day 5
Study, n=38	$88,4 \pm 7,34$	$133,4 \pm 9,76$	$179,6 \pm 15,23$
Control, n=26	$87 \pm 7,65$	$135,4 \pm 9,91$	$209,8 \pm 19,73$
** p < 0,05			

4 pg/ml, range of measurable concentrations - 1 - 1000,0 pg/ml.

**Results:** Endotoxin levels 3 days after delivery in both groups were increased in both groups. On 5th post-op day there was marked increase of endotoxin level in the control group in comparison with the study group (see table).

Group, n Endotoxin level, EU/ml  $\times 10^{-3}$

**Conclusions:** 1. In presence of thrombotic complications risk factors in patients after abdominal delivery endotoxin levels are elevating from 3 day after delivery. 2. Use of enoxaparine after abdominal delivery in patients with thrombotic complications risk factors led to statistically confident decrease of serum endotoxine on the 5th day after delivery.

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## Paper No: 1157.0

### Comparison of different doses of oxytocin post cord clamping in cesarean section surgery

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**Introduction:** The optimal dose of oxytocin to use in the cesarean is not established yet. Different studies, that, on the other hand, present little sample sizes, recommend varied oxytocin doses.

**Objectives:** To determine oxytocin dose in post umbilical cord clamping cesareans in order to achieve an adequate uterine contraction, thus minimizing blood loss and the appearance of side effects.

**Methods:** A double-blind randomized controlled clinical trial was performed. 200 patients who underwent a cesarean (programmed (P) or emergency (E)) were recruited (C). They were randomized into three groups: 3, 5 and 7 u of oxytocin, administrated in slow bolus IV after umbilical cord clamping. Uterine contraction (UC) was evaluated after 2, 4, 6, 10 and 20 minutes since oxytocin initial bolus, classified as good-regular-bad, side effects (SE) (tachycardia, hypotension and nausea), the need of additional rescues (oxytocin 2u) and the use of Carbetocin. The Chi-square test was applied for proportions comparison, considering significant a  $p < 0,05$ .

**Results:** As regards heart rate increase, it was greater according to increasing doses of oxytocin ( $u=14$  beats  $+2,3$ ;  $5u=17$   $+2,5$ ;  $7=26$   $+2,1$ ) ( $p=0,03$ ). In respect to medium blood pressure, there was a major decline in the 7u group:  $18$   $+1,9$  mmHg,  $13$   $+1,4$  mmHg in 5u, and  $8$   $+1,2$  mmHg in 3u ( $p=0,032$ ). There were no significant differences in the appearance of nausea. As regards UC: the group 3 u.  $n=69$ : 32 E and 37P, the CU was good in 54C (21E and 33P), 15C needing rescues (11E y 4P) ( $p=0,018$ ), and in 1 (E) carbetocin was used; in the group 5u.  $n=66$ : 32E and 34P, the UC was good in 54C (23E y 31 P), 12C needing rescues (9E y 3P) ( $p=0,04$ ). and carbetocin was used in 3C (2E and 1P); in the group 7u.  $n=65$ : (29E y 36P), good UC in 54C was observed (21E y 33P), from the 11C that required rescues (8E y 3P) ( $p=0,03$ ), and 1C(E) required the use of carbetocin.

**Conclusions:** The group of 5u. of oxytocin was the one who got the best result as regards a UC and lesser SE. The emergency cesarean contributed to the use of rescues and the eventual use of carbetocin. Another related factor was the presence of previous pregnancy, it was a post hoc. observation and it will be aim of future trials.

## Paper No: 1158.0

### Early Epidural Labour Analgesia: Does It Increase the Chances of Operative Delivery?

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Epidural analgesia is commonly employed for labour analgesia. Epidural analgesia has been shown to cause prolong labour and increase in the incidence of operative delivery.<sup>1</sup> Recent observations have not shown any such association.<sup>2</sup> Conventionally epidural labour analgesia is administered during the active phase of labour when cervical dilatation (CD) is 4cms. Administration of epidural analgesia early in labour (CD  $\geq$  2cms) provides good analgesia but its effect on the progress of labour is not widely studied. Early labour analgesia may, increase the duration of labour, and may increase the risk of operative delivery, increase the risk of oxytocin, malposition of foetus and foetal bradycardia due to maternal hypotension. We compared the efficacy of early ( $\geq$ 2cm cervical dilatation with  $>50\%$  effacement) versus late ( $>2$ cm cervical dilatation with  $>50\%$  effacement) epidural analgesia in labouring women and its relation to duration of labour and mode of delivery.

**Methods:** 120 term nulliparous primigravidae were administered epidural analgesia randomly either early (CD  $\geq$  2cms) or late (CD  $>2$ cms). Patients with medical and obstetric contraindications for vaginal delivery were excluded. A bolus of 8 ml of 0.25 % bupivacaine followed by Infusion of 8 ml per hr of 0.125 % bupivacaine with fentanyl (2.5  $\mu$ g/ml) per hour was given till delivery. Parameters studied were Intensity of labour Pain, as assessed by visual analogue scale (VAS), hemodynamics (such as blood pressure, pulse rate and oxygen saturation) degree of sensory level and motor block (Bromage scale), was assessed every 30min. Further progress of labour, mode of delivery (spontaneous/instrumental/caesarian), APGAR scores and side-effects of epidural analgesia, if any, were monitored and noted every two hours. If pain relief was inadequate (VAS  $>4$ ) 2 ml of additional bolus infusion was given. Data was analyzed by using ANOVA, Student's t-test and Chi-square test or Fischer's exact test.

**Results:** Patients in the early epidural group had pain relief throughout the course of labour where as patients who received epidural analgesia later in labour experienced pain for a variable period of time prior to receiving epidural analgesia. There were no significant changes in the hemodynamics between the two groups. The total duration of labour was not prolonged in early epidural group as compared to the late epidural group (476.1  $\pm$  46 minutes vs 471.4  $\pm$  62.5 minutes) (p=0.726). The timing of epidural analgesia did not affect the mode of delivery (p=0.428). Incidence of Caesarean section was similar (13/60 in early group vs 14/60 in late epidural group). Maternal satisfaction was better with early epidural (76.7% vs 65%) which however was not statistically significant. There was no significant difference between the APGAR scores at 1 min and 5 min (Scores 8 Vs 9). Side effects such as nausea, vomiting, motor block were minimal and similar between the groups. 1 patient in early epidural group had motor block and 2 patients in late epidural group had vomiting.

**Conclusion:** We could conclude that early epidural placement provides pain relief throughout the course of labour without prolonging the duration or increasing the chances of operative delivery and side effects.

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## Paper No: 1264.0

### Postpartum plasma exchange for a severe pregnancy related microangiopathy

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**Introduction:** The differential diagnoses of life-threatening microangiopathic disorders in a postpartum female includes severe preeclampsia-eclampsia, hemolysis, elevated liver function tests, low platelets syndrome (HELLP) and thrombotic thrombocytopenic purpura (TTP). There is a considerable overlapping in the clinical and laboratory findings between these conditions, and hence an exact diagnosis may not always be possible.<sup>1</sup> We present the case of a woman in the postpartum period, showing signs and symptoms of a severe microangiopathy, refractory to the supportive therapy she underwent, and that the hemolysis was resolved through plasma exchange therapy (PET).

**Clinical Case:** A healthy 20 year old, primigravida (25 weeks gestation) was admitted to the emergency service for headache and generalized edema. Upon physical examination, blood pressure was 143/89mmHg, and edema on the extremities. Analytically: Anemia (9.9 g/dl), thrombocytopenia (10.000/mm<sup>3</sup>), elevated liver enzymes (LDH: 3026, Total

Bilirubin: 1.28mg/dL) and proteinuria + + + +. For suspicion of severe HELLP syndrome, 4 pool platelets were administered and the patient was submitted to a cesarean section, without complications. The patient was transferred to the Post Anesthesia Care Unit, but due to worsening of clinical symptoms had to be transferred to the Surgical Intensive Care Unit, 24 hours after the cesarean section. At this time the patient underwent an antihypertensive triple treatment (Captopril, Indapamide and Nifedipine), Dexamethasone 5 mg every 6 hours, the dose being progressively increased to 20 mg every 6 hours, fluid and blood component therapy to correct anemia, low platelets and low urinary output. Due to the persistence of the severe microangiopathy, with worsening indicators of hemolysis, indication is given to being PET on the 7th day, revealing improvement of the analytical parameters from the first session. The patient held a total of nine sessions. The patient was discharged on the 19th day with: Hb:10.6g/dl,

platelets:248000/mm<sup>3</sup>, total bilirubin:0.20, LDH:678, without proteinuria.

**Discussion:** The HELLP syndrome is usually associated with hypertension and proteinuria and differential diagnoses includes TTP and differentiation between the two is sometimes difficult, as occurred in the clinical case shown above. Also, the patient did not respond according to expectancy for 72 hours. In spite of this, we decided to advance with a PET and the patient responded effectively, with resolution of hemolysis and reversal of organ dysfunction.

**Conclusion** The distinction between HELLP and TTP may not always be possible. The PET should be considered in persistent, life-threatening microangiopathy that is refractory to conservative measures.

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