Comparison of normal saline and balanced crystalloid intravenous therapy during neurosurgery

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2 in 9, with reminder having a score of 1. The Mallampati scores of the difficult to intubate patients where 3 in the patients from the SDI group and 3 in the non SDI. The first EtCO2 measurement following intubation was <40 mmHg in 3 patients from the SDI group (42.8%) and 15 from the non-SDI group (48.4%), 40-45 mmHg in 1 from the SDI group (14.3%) and 5 from the non-SDI group (16.1%), and ≥46 in 3 from the SDI group (42.8%) and 4 from the non-SDI group (12.9%).
Conclusion(s): According to this sample the incidence of suspected difficult intubation was 22.6% and incidence of reported difficult intubation was 9.7%. If EtCO2 values ≥46 are considered as indicatior for difficulties in airway management the incidence is 22.6%. Clinical evaluation or Mallampati score were not good predictors for airway difficulties.

06AP06-8
Comparison of normal saline and balanced crystalloid intravenous therapy during neurosurgery

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Background and Goal of Study: Normal saline or 0.9% NaCl solution is the most commonly used intravenous fluid worldwide and it contains 154 mmol/L Na+ and 154 mmol Cl-/L with osmolarity of 308 mOsmol/L. But plasma contains sodium 137-146 mmol/L and chloride 98-106 mmol/L, with osmolality of 280-295 mOsmol/kg. There are detrimental effects of chloride rich fluids on renal blood flow and glomerular filtration rate, diuresis and acute kidney injury. An alternative is a buffered, balanced, crystalloid solution with an electrolyte composition similar to plasma and osmolarity between 286-295 mOsmol/L. Someone could indicate that such balanced solutions are not suitable for neurosurgical patients because of a possible impact on the brain oedema development.
Materials and Methods: We analyzed thirty patients who underwent neurosurgical procedure because of brain tumor. Patients were divided into two groups according to the type of intraoperative intravenous fluid therapy, normal saline vs. balanced crystalloid solution, which were administered by attending anaesthesiologist. Acid base and electrolyte parameters were obtained after anesthesia induction. Ventilation, hemodymanic parameters and diuresis were recorded, too. After each 500 ml of intravenous fluid the acid base and electrolyte status were repeated.
Results and Discussion: There were no differences in patient preoperative electrolyte values and kidney function parameters. There were no differences between groups of patients in acid base balance, arterial lactate, potassium and sodium. The significant differences in chloride plasma concentration were found in normal saline group of patients during operation, and between groups (Table 1.).
Table 1. Differences between groups

	Normal saline group	Plasma-Lyte 148 group	p
Diuresis	500.0±178.0	1677.7±1103.4	<0.05
Plasma osmolality	285.8±6.6	286.3±6.7	0.90
Plasma Cl^-	113.2±4.6	104.3±1.4	<0.05

Conclusion: The balanced crystalloid intravenous therapy during neurosurgery provides better chloride level balance as well as diuresis. There were no changes in plasma osmolality and sodium concentration; therefore the balanced crystalloid fluids are safe to use in intraoperative fluid maintenance during neurosurgery.

06AP06-9
Implementation of robot-assisted stereoelectroencephalography for resective epilepsy surgery

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Background and Goal of Study: Robotic surgery is a field in continuous progression at European hospitals and it could bring several advantages including accuracy, potential reduction of surgical time and reduction of complications. Robotic stereoelectroencephalography (SEEG) is a method that allows getting precise information from deep cortical areas through the implantation of deep electrodes, avoiding the need of craniotomies. It has a clear application in patients with drug-resistant focal epilepsy, as it defines anatomically the epileptogenic zone. Objective: to analyse the current perioperative management and the incidence of complications during this procedure.
Materials and Methods: We collected retrospectively 30 cases of patients with medically refractory focal epilepsy who underwent robotic stereotactic placement of deep electrodes between January 2013 and March 2016.
Results and Discussion: The mean age was 37,9. Nineteen patients had no other pathologies but epilepsy. The average surgical time was 163 minutes and the average number of electrodes placed was 10,5. Twenty-three cases were maintained with balanced general anaesthesia with sevoflurane, while the remaining seven were anesthetized with total intravenous anaesthesia. We used standard monitorization for all cases, and in fourteen of them invasive blood pressure was measured too. There were no severe complications during the surgery, just two to remark: arterial bleeding with the placement of an electrode and short delay on awakening. Both cases were solved without consequences. The average time in recovery area was 203 minutes. As soon as it was possible the patients were discharged in order to record seizures and functional brain mapping. Recent meta-analysis estimates a 1-4% incidence of complications during SEEG. We registered three severe complications: an acute subdural hematoma that required craniotomy, an intraparenchymal hematoma that cursed with mild aphasia and a brain abscess that required drainage.
Conclusion: SEEG is an accurate technique and useful to delimit the epileptogenic zone with a promising future. However, we must not underestimate the possible complications. Establishing protocols can help us in the handling of these patients. In our particular experience, after observing these results we changed our protocol in two main factors: decreasing the number of electrodes and performing a brain CT before awakening the patient.

06AP06-10
The recovery time of muscle relaxation from rocuronium using sugammadex was significantly prolonged in the most severe CKD group of hypoalbuminemia under sevoflurane anaesthesia

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Background and Goal of Study: It is well known that renal dysfunction, estimated by plasma creatinine concentrations, increased the risk of residual neuromuscular block (RNMB)induced by rocuronium and that there are possibly no relationships between the dose of sugammadex (SGDX) and recovery from neuromuscular block under renal dysfunctions under various degrees. However, there are no reports, based on the renal function estimated by Glomerular Filtrating Ratio(eGFR), on the relationship between RNMB, serum albumin, renal dysfunction and during of sevoflurane (SEV) anaesthesia. Therefore, based on the chronic kidney disease (CKD) severity classification by eGFR, we examined the influence of albumin to effect of the SGDX towards the rocuronium under SEV anaesthesia. We evaluated the recovery time in two groups of albumin value between Post tetanic count (PTC)1 and Train of four (TOF) ratio 100% using TOF monitoring.
Materials and Methods: We got the approval on the ethical review board of our hospital and the written consent of patients. Twenty-four adults severe CKD haemodialysis patients of eGFR<15 who underwent surgery under general anaesthesia at our hospital were included in this study. We divided the patients into two groups: the L group, serum albumin≦3. 0g/dl(n=13):and the N group, serum albumin >3. 0g/dl (n=11). Anaesthesia was induced in both groups with 2mg/kg propofol and 0. 8mg/kg rocuronium for tracheal intubation and maintained with SEV anaesthesia. PTC1 state was sustained by administration of an appropriate dosage of rocuronium. After confirming the PTC1 value at the end of the surgery, pure oxygen was administered, and 4mg/kg SGDX was then intravenously injected over 5 seconds. The time interval between PTC1 and TOF ratio 100% was measured. We used the TOF- watch (T. X) SX (Organon Ltd., Ireland). The results were expressed as mean(±SD). Data were analysed with one-way ANOVA. A p value of <0. 05 was considered statistically significant.
Results and Discussion: Following SGDX administration, the mean(±SD) time to recovery of PTC1 to TOF ratio 100% was increased to 795±448s in the L group compared with 390±250s in the N group; this difference was statistically significant (p=0. 012).
Conclusion: The muscle relaxation recovery time from PTC1 to TOF ratio 100% was prolonged in hypoalbuminemia CKD patients. We recommend that more careful muscle relaxation monitoring management is necessary for CKD patients with hypoalbuminemia.

06AP06-11
Prevention of bite injuries with novel mouthpiece during intraoperative transcranial electric motor-evoked potential monitoring in spinal surgery

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Background and Goal of Study: Transcranial motor-evoked potential monitoring (Tc-MEP) causes bite injuries to the oral cavity including the endotracheal tube. We developed a mouthpiece to prevent these injuries, and reported its efficacy and safety [1]. After a pilot study, we started to use the mouthpiece routinely for elective cases. The purpose of this study was to examine the efficacy of the mouthpiece in clinical setting.
Materials and Methods: After obtaining approval from our institutional review board, patients undergoing spinal surgery under Tc-MEP in our institute during 2013-2016 were enrolled. Patients were fitted with a bespoke vinyl-silicone mouthpieces by dentists before surgery. On induction of general anesthesia, the mouthpiece was attached to the upper and lower dental arches. A lateral cervical X-ray was taken at the end of surgery to examine the condition of the endotracheal tube. Deformation of endotracheal tube was defined as the ratio of inside diameters of the most stenosed and normal part of endotracheal tube less than 90%. The incidence of endotracheal tube deformation was compared with the patients in whom a conventional gauze bite block were used.
Results and Discussion: Of the 279 patients, 108 were excluded due to the X-ray imaging failure. Of the remaining 171 patients, 140 patients used the mouthpiece while 31 patients used a conventional gauze bite block. The incidence of tube deformation in the patients with the mouthpiece (2 of 140 patients, 1.4 %) was significantly lower than in those with the gauze bite block (6 of 31 patients, 45.0 %; p < 0.001). Conventional gauze bite block were used in toothless cases and emergency cases. According to the present results, we should prepare the mouthpieces for those cases.
Conclusion(s): The incidence of damage to the endotracheal tube caused by intraoperative transcranial motor-evoked potential monitoring was reduced by a novel mouthpiece.
References:
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06AP06-12
Evaluation of dexmedetomidine sedation for implantation of deep brain stimulators in parkinson's desease

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Background and Goal of Study: The potential role of dexmedetomidine can be postulated on the basis of awake craniotomies since the sedative drug should provide adequate sedation and analgesia with minimal interference in patient cooperation and neuronal electrical discharge. The purpose of this study is to summarize our experience with dexmedetomidine sedation and to compare it with other drugs used for the same procedures.
Materials and Methods: Descriptive cross-sectional study,24 patients suffering from Parkinson's disease that underwent deep brain stimulator implantation. Two groups to compare, depending on the drug used for sedation during the surgery: a group that received only dexmedetomidine (5patients) and the other group(19patients) that received midazolam or propofol plus an opioid in some cases.
Results and Discussion: There is no difference in the anthropometric or hemodynamic variables between groups. The unique intraoperative complication was bradycardia in both groups, 20% in DG and 5.3% in Non-DG. No hypotensive treatment was needed in the DG, while 36% of the patients of Non-DG received hypotensive drugs but there were not significant differences. ICU stay time was 4 hours and the total days of admission was between 6-8 days. Statistical differences were found when comparing surgery legth,150 minutes less in the dexmedetomidine group. No difference was found when comparing the degree of satisfaction in patients between groups. Safety is an important concern when choosing sedation for neurosurgery; systemic hypertension is a risk factor for intracraneal hemorrhage. No differences were found regarding complications or hemodynamic tendencies, the use of dexmedetomidine in these surgeries seems reliable. The duration of surgery in DG was shorter. An increase of surgery length in any procedure may result in complications during the perioperative period-Dexmedetomidine is at the same satisfaction patient level as traditional drugs for sedations.
Conclusion: Current evidence and our study results suggest that the use of dexmedetomidine for patients undergoing Deep Brain Stimulators can provide patient comfort and hemodynamic stability with minimal adverse effects as bradycardia. Nevertheless, the randomized trials we found at the bibliography have small sample size since it is difficult to collect surgeries of this type.

Cardiac, Thoracic and Vascular Anaesthesiology

07AP01-1
A Simple Prediction Model of Hypoxemia During One-Lung Ventilation

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Background: One-lung ventilation (OLV) is widely utilized in thoracic surgeries performed under general anesthesia. However, transpulmonary shunting can potentially cause severe hypoxemia during OLV. Although several predictors of hypoxemia during OLV have been proposed, no single factor can independently predict hypoxemia accurately. Therefore, we made a simple prediction model of hypoxemia during OLV with multiple predictors.
Methods: A single-center retrospective review was performed of consecutive patients who underwent lung resection surgery between January 2014 and December 2016. We defined hypoxemia during OLV as a SpO_2 lower than 91% with a FiO_2 of 1.0, as when either lung oxygen insufflation or continuous positive airway pressure were required to a non-dependent lung, or as when intermittent two lung ventilation was required. Patients were randomized into a derivation group (75% of patients) and a validation group (25% of patients). A prediction model for hypoxemia during OLV was developed by using a regression coefficient-based scoring method. The discriminatory power of the resulting score was assessed by calculating the cross-validated C statistic.
Results: A total of 763 patients underwent lung resection surgery for lung cancer during the study period. Among them, 256 patients were excluded because of missing data and 27 patients were excluded because of tube malposition during OLV. In the derivation group, backward multivariable logistic regression analysis identified three covariates that were significant independent predictors, and we used for our hypoxemia prediction score. (Table) The discriminatory power of this model was fair, with a cross-validated C statistic of 0.81 in the derivation group and 0.87 in the validation group.
Conclusion: This simple prediction model identifies the preoperative risk of hypoxemia during OLV. This score has the potential to easily identify patients who may need a more intensive ventilation strategy for OLV.

Table: Prediction score for hypoxemia druing OLV

Attribute	Points
Preoperative PaO_2 at room air	
< 75mmHg	2
< 90mmHg	1
Previous lung resection to dependent lung	2
Right-side operative side	2

07AP01-2
The application of a new rapid method of ion mobility spectrometry to measure blood propofol concentrations in video assisted thoracic surgery

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Background and Goal of Study: Monitoring of the intravenous anesthetics is complicated, time consuming and strenuous. Ion mobility spectrometry (IMS) is a widely known apparatus for analysis of gas phase ions, and it has been proved to be an effective method for measuring propofol in blood (measurement within 1 minute without any pre-treatment)[1]. we aimed to measure blood propofol concentrations by IMS in video assisted thoracic surgery.
Materials and Methods: Fourteen patients scheduled for video assisted thoracic surgery (VATS) under total intravenous anesthesia were enrolled in our study. Propofol and remifentanil were infused to achieve target effect compartment concentrations of 6 μg ml^{-1} (Schnider model) and 5 ng ml^{-1} (Minto model) respectively. General anesthesia was maintained with propofol and remifentanil at 3.5 ug ml^{-1} and 3.5 ng ml^{-1} respectively. 0.5 ml of artery blood was collected from nondominant arm with the patient positioned in 1,3,5 minutes after infusion started; 15,30,60 minutes after commencing one-lung ventilation; 5,10,15 minutes after discontinuation of the infusion of propofol. Plasma propofol concentrations were