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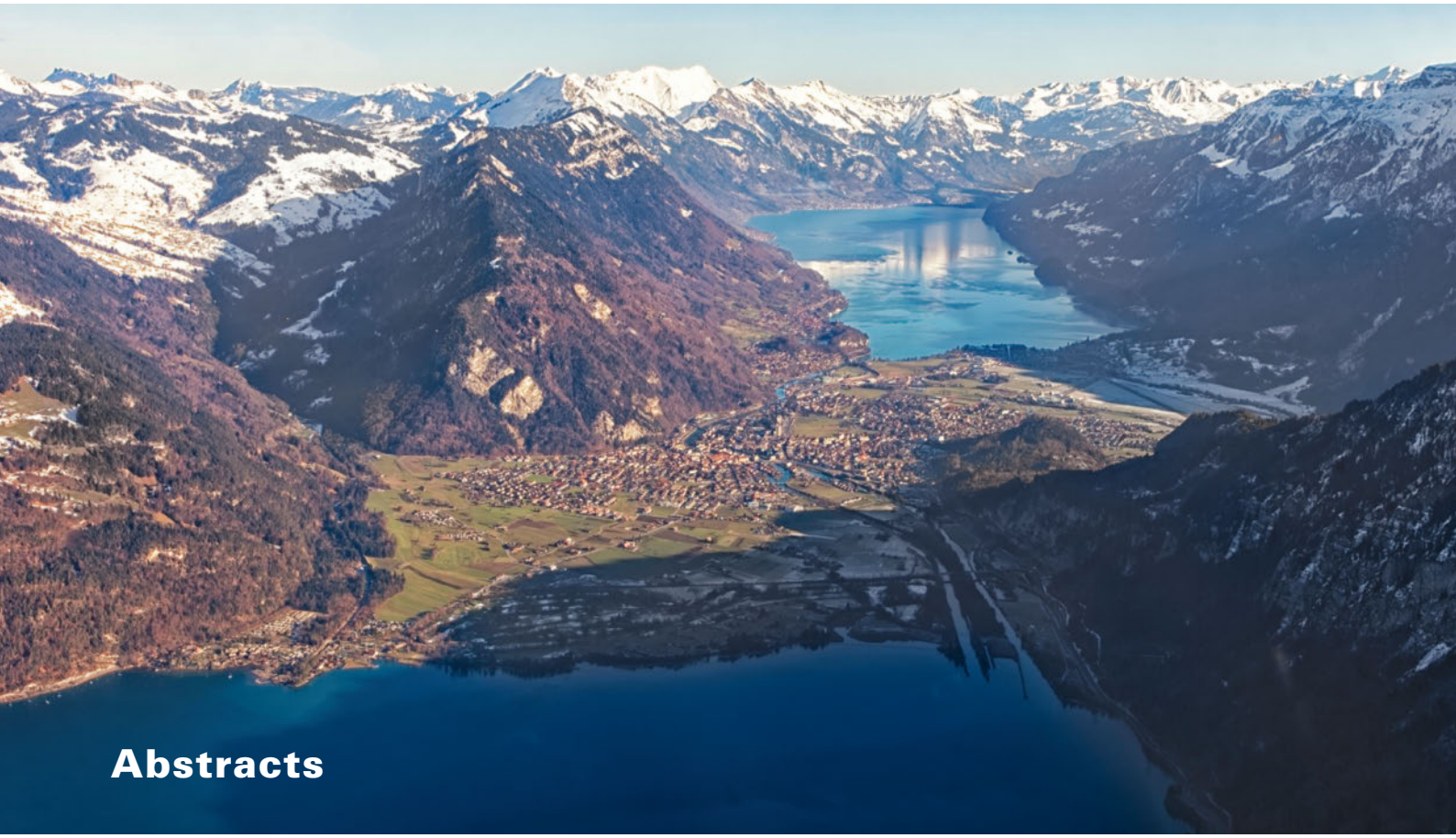

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FM 1

Extrafascial catheter tip placement for continuous interscalene brachial plexus block reduces hemidiaphragmatic paresis compared with a conventional intrafascial tip placement: a randomized controlled, double-blind trial

Albrecht Eric[1], Fournier Nicolas[2], Farron Alain[3], Bathory Istvan[1]
[1]Department of Anaesthesia, Lausanne University Hospital, Switzerland; [2]Institute of Social and Preventive Medicine, Lausanne University Hospital, Switzerland; [3]Department of Orthopaedics, Lausanne University Hospital, Switzerland

Background: The rate of hemidiaphragmatic paresis at 24h postoperatively after continuous interscalene brachial plexus block (CISB) is reported to be as high as 71%. We tested the hypothesis that an extrafascial placement of the catheter tip would reduce the rate of hemidiaphragmatic paresis compared to intrafascial tip placement for CISB while providing effective analgesia.
Methods: Seventy patients scheduled for elective major shoulder surgery were randomised to receive an ultrasound-guided CISB plexus block for analgesia, with a catheter tip placed between the levels of C5 and C6 and either within (intrafascial group) or outwith (extrafascial group) the brachial plexus sheath. Catheters were bolused with 20 mL ropivacaine 0.5% followed by a 4 ml.h-1 infusion rate of ropivacaine 0.2%. The primary outcome was rate of hemidiaphragmatic paresis (diaphragmatic excursion reduction >75%), measured by M-mode ultrasonography, before and 24h after the procedure. Secondary outcomes included forced vital capacity, forced expiratory volume in 1 second, pain score at rest (numeric rating scale, 0–10) and intravenous morphine equivalent consumption at 24h postoperatively.
Results: The rate of hemidiaphragmatic paresis at 24h postoperatively was significantly reduced in the extrafascial group (intrafascial: 41% [95%CI:25–59%]; extrafascial: 15% [95%CI: 5–32%]; p = 0.01), while other respiratory functional outcomes were similar. At 24h postoperatively, we found no differences in pain scores at rest (intrafascial:3 [95%CI: 2–3]; extrafascial:3 [95%CI: 2–4]; p = 0.93), or cumulative intravenous morphine equivalent consumption (intrafascial:7 [95%CI: 5–9]; extrafascial:6 [95%CI: 3–9]; p = 0.75).
Conclusions: Placement of the catheter tip immediately outside of the brachial plexus sheath reduces the rate of hemidiaphragmatic paresis associated with US-guided CISB on postoperative day 1 while providing effective analgesia following major shoulder surgery. Our results do not support the routine placement of the catheter tip within the brachial plexus sheath.

FM 2

The analgesic efficacy of local infiltration analgesia versus peripheral nerve block after anterior cruciate ligament reconstruction: a systematic review and meta-analysis

Grape Sina[1], Albrecht Eric[2]
[1]Department of Anaesthesia, Hôpital de Sion, Sion, Switzerland; [2]Department of Anaesthesia, Lausanne University Hospital, Lausanne, Switzerland

Background: Many authors consider blockade of the femoral nerve distribution the gold standard analgesic treatment after anterior cruciate ligament reconstruction. However, some argue an alternative approach of local infiltration analgesia, using local anaesthetics injection into the surgical site has similar efficacy. The objectives of this meta-analysis were to compare the analgesia and functional outcomes of both treatments following anterior ligament reconstruction.
Methods: The methodology followed the PRISMA statement guidelines. The primary outcomes were pain scores at rest (analogue scale, 0–10) in the early (0–2 postoperative hours), intermediate (3–12 postoperative hours), and late postoperative periods (13–24 postoperative hours). Secondary outcomes included range of motion, quadriceps muscle strength, and complication rates (neurologic events, cardiovascular events, falls, knee infections).
Results and discussion: Ten trials, including 588 patients were identified. Pain scores in the early (mean difference: 1.6; 95%CI: 0.2, 2.9 mg; I2 = 97%; p = 0.02), intermediate (mean difference: 1.2; 95%CI: 0.4, 1.5; I2 = 85%; p = 0.002) and late (mean difference: 0.7; 95%CI: 0.1, 1.4; I2 = 82%; p = 0.03) postoperative periods were significantly lower in patients who received a femoral nerve block. The qualities of evidence for our primary outcomes were moderate to high according to the GRADE system. Regarding the functional outcomes, only one trial reported similar range of motion between groups at 48 postoperative hours. No trials sought to record complications.
Conclusion: In conclusion, femoral nerve block provides superior postoperative analgesia after anterior cruciate ligament reconstruction when compared to local infiltration analgesia. The impact of improved analgesia on function remains unanswered due to the lack of functional outcomes reported in existing literature.

FM 3

Managing pain after Caesarean Section: clinical practice and patients' outcome

Stamer U.M.[1], Kobel B.[1], Tornare F.[1], Meissner W.[2], Zaslasnky R.[2]
[1]Department of Anaesthesiology and Pain Medicine, Inselspital, University of Bern; [2]Department of Anaesthesiology and Intensive Care, University Hospital Jena

Background: Caesarean Section (CS) is a common surgical procedure. On average, 25% of all deliveries in Europe are performed via CS.1 Sufficient pain control after CS is crucial for recovery and positive long-term outcome for mother and baby, however, quality of routine perioperative pain management after CS is rarely assessed.
Methods: Women filled in a questionnaire on pain related outcome on the first postoperative day. Clinical data and management of pain were retrieved from the patients' charts. Data were entered in the international pain registry PAIN OUT. Six quality indicators recommended by the Royal College of Anaesthetists (UK) 2 were used to evaluate care and patients' outcome.
Results: Clinicians from 16 hospitals enrolled 4,082 women in Europe, Asia and Africa. Recommendation 1: Assess and document pain in all patients. On average, pain was assessed in 16.5% of the patients. In 6 hospitals a 100% coverage was achieved, in 5 hospitals it was <10%. Recommendation 2: Moderate to severe pain is reported by <5% of the patients. None of the wards met this criterion. On average, 70.4 (range 19–91)% of the women reported worst pain of ≥6 (NRS 0–10). Recommendation 3: There are no consecutive events of moderate to severe pain in a 24 hour period. None of the wards achieved this criterion. 90% of the patients spent 20–100% of the first 24 hours after CS in severe pain. Recommendation 4: >95% of women are satisfied. On average, 52 (47–79)% of the women reported high satisfaction with NRS ≥8. In contrast, 47 (8–60)% of the women wished to have received more pain treatment. Recommendation 5: 100% women receive neuraxial opioids if CS is performed by regional anaesthesia. 91% of the women received spinal or epidural analgesia; in 96% of these patients an opioid was administered, in most cases fentanyl. Recommendation 6: Unless contraindicated, 100% women are prescribed a non-opioid. 85 (67–100)% of the women enrolled in the different hospitals received a non-opioid analgesic; typically, not on a regular basis.
Conclusions: Using quality indicators recommended by the Royal College of Anaesthetists, analysis of a large cohort of women indicated that pain management after CS vary widely between hospitals. For a high proportion of women pain control was insufficient. There is considerable room for improvement.

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FM 4

Risk factors for recurrence of post-dural puncture headache following blood patch in obstetric patients

Tomala Simon[1], Boeuf Christophe[2], Haller Guy[3]
[1]Department of Anesthesia, University Hospital of Geneva,Switzerland

Introduction: The blood patch technique (BP) is currently the reference method in the treatment of postdural puncture headache (PPDH) after failure of conservative treatment. However, the demonstration of its efficacy is only fairly recent (1, 2, 3) and many questions remain as to the optimal waiting period before performing the procedure (4), its true efficacy (5, 6, 7, 8), and the number of patients requiring a second or third blood patch following the initial procedure. (3.9). The study purpose was to assess the failure rate of blood patch performed to treat PDPH and identify risk factors associated with it. Failure was defined as the persistence of symptoms of PDPH (attenuated or not) at 1 week after the initial blood patch and requiring additional treatment (second blood patch or conservative therapy).
Methods: The study was performed at the Geneva University Maternity Hospital. We retrieved from our patient information system for the period between 2001 and 2015, all data (pre, per and postpartum) of parturients having PDPH treated with a blood patch following neuraxial anesthesia or analgesia (spinal, epidural, spinal-epidural). These data are part of our quality improvement program and information on anesthesia, maternal satisfaction and complications are collected and recorded on a daily basis in our information system. For the study purpose, we compared all patients and procedures characteristics of patients with and without recurring symptoms after the initial BP. We used Chi-square, T-test and OR with 95% CI to compare groups.

Results: In our cohort of 40379 parturients, we identified 196 patients (0.48%) with PDPH requiring a BP. Of these, 87 (44.4%) had persisting symptoms after the initial blood patch and 32 (16.6%) required a second blood patch. Risk factors for symptom persistence were: migraine OR 8.0 95% Ci [1.0–67.7] P = 0.02, PDPH with a pulsatile feature OR 3 95% CI [1.3–8.4] P = 0.08 and the presence of photophobia OR 2.9 95% CI [0.9–8.9] P = 0.04.
Conclusion: Persistence of PDPH following an initial blood patch is not unusual. Particular attention should be drawn to patients with migraine, PDPH with a pulsatile feature or associated with photophobia. In the presence of these risk factors careful monitoring and clear information on the greater likelihood of failure of the initial BP should be provided to patients.

FM 5

Framing side effects positively leads to more symptoms reporting, without enhanced analgesia

Noël L.[1], Fernandez A.[1,2], Decosterd I.[1,2], Kaptchuk T.[3], Kirsch I.[3], Suter M.R.[1,2], Berna C.[1,2,3]
[1]Faculty of biology and medicine, Lausanne University, Switzerland; [2]Pain Center, Department of anesthesiology, Lausanne University Hospital, Lausanne, Switzerland; [3]Program in Placebo Studies, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, USA

Background and aims: A model of an analgesic randomized controlled trial showed that the perception of side effects can affect beliefs that one has received the active treatment, thereby enhancing analgesia. Consequently, could side effects be framed positively in a therapeutic interaction, and lead to enhanced therapeutic effects? Our aim was to study side effects perception and analgesia, when participants of a modelized analgesic treatment with induced side effects received either a positive vs. neutral standardized information regarding side effects.
Methods: Sixty-six healthy males (mean age = 24.3, range 18–38 years) were randomized double-blind to a positive ("you might take side-effects as a reminder that the analgesic medication is active in your body") vs. neutral information ("do not hesitate to inform our onsite staff, we will do our best to ensure your comfort"). Heat stimuli applied to the forearm were graded on a VAS scale. The same stimuli were repeated 1h after intake of diclofenac and atropine (deceptively presented as an analgesic, but used as a side effects inducer).
Results: The positive information group reported more side effects than the neutral one (p = .012). Analgesia was observed in both groups (treatment effect: F (1,64) = 35.7, p <0.0001), without a significant difference according to information type (information effect: F (1,64) = 0.39, p >0.5), nor a significant interaction between treatment and information.
Conclusions: Previous studies have shown that discussing side effects can lead to nocebo effects. Our data indicate that positive framing can exacerbate those effects, without enhancing analgesia.

FM 6

Infant Transnasal Humidified Rapid Insufflation Ventilatory Exchange (i-THRIVE) – a single-centre, prospective, randomised controlled trial

Riva T.[1], Pedersen T.[1], Kasper N.[1], Kleine-Brueggeney M.[1], Seiler S.[1], Theiler L.[1], Greif R.[1]
[1]Department of Anaesthesiology and Pain Therapy, Bern University Hospital, Inselspital, Bern University, Bern, Switzerland

Background: Transnasal Humidified Rapid Insufflation Ventilatory Exchange (THRIVE) is a new concept of high-flow nasal cannula therapy providing heated, humidified, oxygen at rates >2 L/kg/min. It was recently introduced in paediatric anaesthesia practice. Our study aimed to evaluate prolonged apnoea time, comparing administration of low-flow oxygen with high-flow and two different oxygen concentrations during i-THRIVE.
Methods: After ethic approval and informed consent, 60 children, ASA 1–2, 10–20 kg, undergoing elective surgery requiring general anaesthesia, were included in our RCT and randomly assigned to: low-flow (0.2 L/kg/min) FiO_2 1.0; high-flow (2 L/kg/min) FiO_2 1.0; or high-flow FiO_2 0.3. Standardised anaesthesia was induced including neuromuscular blockade and neuromonitoring. When proper mask ventilation was assured and transcutaneous (tc) CO_2 levels of 30–40 mm Hg were obtained, all patients underwent apnoeic oxygenation according to randomisation. Primary outcome was time from apnoea start until desaturation to 95% (or if break-up criteria were fulfilled: $tcCO_2$ rising to 65 mm Hg or 10 min duration). High-flow side effects (pneumothorax, gastric insufflation) were evaluated by ultrasound. Data are presented as median and IQR. Non-parametric statistics compared the 3 groups. A p <0.05 was considered significant.
Results: All patients with high-flow 30%O_2 desaturated to SpO295%. Only 3 patients with low-flow 100%O_2 did so and no patients with high-flow 100%O_2. Using low-flow 100%O_2, 13 patients reached $tcCO_2$ of 65 mm Hg and for 2 patients the study terminated after 10 min. Two patients dropped out because of protocol violation. For high-flow 100%O_2, 16 patients reached the CO_2 threshold and 4 reached the 10 min time limit. The apnoea time was 6.9 min (5.7–7.8) for low-flow 100%O_2, 7.6 min (6.2–9.1) for high-flow 100%O_2, and 3.0 min (2.4–3.7) for high-flow 30%O_2 (p <0.001). Pairwise comparisons showed no difference between apnoea time for the two 100%O_2 groups (p = 0.147), whereas significantly shorter apnoea time in the 30%O_2 group compared to both 100%O_2 groups (p <0.001). No differences were found between groups for demographics and anaesthesia related data. No side effects from high-flow were detected.
Discussion: We found no difference between apnoea times for children weighing 10–20 kg when using low or high-flow with 100%O_2 nasal cannula. However, substantially shorter apnoea durations occurred with high-flow and FiO_2 of 0.3. No side effects of i-THRIVE were found.

FM 7

Long-term ventilation of normal lungs with physiologically variable breathing pattern

Walesa Magali[1], Bayat Sam[1], Albu Gergely[1], Baudat Aurélie[1], Petak Ferenc[1,2], Habre Walid[1,3]
[1]Unit for Anaesthesiological Investigations, Dept. of Anesthesiology, Pharmacology and Intensive Care, University of Geneva, Geneva, Switzerland; [2]Dept. of Medical Physics and Informatics, University of Szeged, Szeged, Hungary; [3]Paediatric Anaesthesia Unit, Dept. of Anesthesiology, Pharmacology and Intensive Care, University Hospitals of Geneva, Geneva, Switzerland

Various ventilation strategies have been promoted to reduce ventilation induced lung injury that occurs even in individuals with healthy lungs. We compared new modalities based on individualized physiological variable ventilation to conventional pressure-controlled mode. Rabbits were anaesthetized and ventilated for 7 hours by using pressure-controlled ventilation without (Group PC, n = 10) and with regular sighs (Group PCS, n = 10). Variable ventilation in the other 2 groups was achieved based on either pre-recorded spontaneous breathing pattern (Group NV, n = 10) or on the electrical activity of the diaphragm (Group NAVA, n = 9). Respiratory elastance (H), haemodynamics and gas exchange were assessed throughout the ventilation period. Cellular profile, cytokines contents of the bronchoalveolar lavage fluid and wet-to-dry lung weight ratio (W/D) were determined at the end of the protocol. Lung injury score was obtained from histology. Deteriorations in H were observed in Group PC (48.6 ± 22% [median ± 95%CI]), which were blunted uniformly in Groups PCS (3.6 ± 8.1%), NV (18.7 ± 13.2%) and NAVA (1.4 ± 12.2%) (p <0.05 for all). However, lung injury score and W/D were the lowest in Group NV (0.36 ± 0.05 and 0.29 ± 0.02 for Groups PC and NV, respectively, p <0.05). No evidence for a difference was obtained in blood gas, haemodynamic parameters and inflammatory markers between groups. Individualized physiologically variable ventilation based on the spontaneous breathing pattern provides the best possible gas exchange with a modest lung injury. This ventilation modality may be considered during long-term anaesthesia, where assisted ventilation cannot be realized in the absence of respiratory drive.

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FM 8

Assessment of end-expiratory lung volume by capnodynamic and Helium wash-out during pneumoperitoneum in rabbits

Rocha A.D.S.[1], Karlsson J.[2], Fodor G.H.[1], Lin N.[1], Lönnqvist P.A.[2], Habre W.[1,3]
[1]Unit for Anaesthesiological Investigations, Dept. of Anesthesiology, Pharmacology and Intensive Care, University of Geneva, Geneva, Switzerland; [2]Paediatric Anaesthesia & Intensive Care, Astrid Lindgrens Children's Hospital, Karolinska University Hospital, Stockholm, Sweden; [3]Pediatric Anesthesia Unit, Geneva Children's Hospital, Geneva, Switzerland

Carbon dioxide (CO_2) pneumoperitoneum is used routinely to assist laparoscopic surgery. The subsequent increases in abdominal pressure as well as the CO_2 retention lead to respiratory and haemodynamic changes particularly in infants with specific lung

pathophysiological characteristics. Hence, loss of lung volume with hypoxaemia is often encountered during pneumoperitoneum in infants. The new capnodynamic method for determination of effective lung volume has the promise to estimate continuously end-expiratory lung volume and pulmonary blood flow and assist the clinician in the haemodynamic and ventilation strategies during anaesthesia. However, the accuracy of the capnodynamic technique during CO_2 pneumoperitoneum has not been elucidated. Therefore, we aimed at evaluating the accuracy of the capnodynamic technique in a model of laparoscopy in rabbits. Eight chinchilla rabbits (3.55–3.82 kg) were anaesthetised and ventilated with a volume-controlled mode. Lung volume was assessed via two different techniques: i) gold standard Helium (He) wash-out (EELV), and ii) breath-by-breath analysis of the exhaled CO_2 variation after a cyclic alteration of the inspiratory pattern, based on the differential Fick's method (ELV). Heart rate, mean arterial pressure (MAP) and cardiac output(CO) determined by thermodilution (PiCCO), were recorded simultaneously. Abdominal pressures (IAP) of 0-6-12 mm Hg were obtained by CO_2 insufflation. Values were recorded at each IAP step while applying various PEEP levels of 3-6-9 cmH_2O. During the application of PEEP3, although marked decreases of EELV were recorded in response to increased IAP, ELV exhibited only minimal changes. With increased levels of PEEP, the correlation between the changes of ELV and EELV improved, with reasonably good correlation at PEEP9. When using a higher PEEP, the capnodynamic method provides a good estimation of lung volume changes during laparoscopic surgery. This capnodynamic method – in contrast to the intermittent He wash-out method which is hard to perform in an intraoperative setting– is a continuous and effortless indicator of lung volume loss. Although the accuracy of this method is dependent on the applied level of PEEP, it demonstrates an ability to monitor the changes in lung volume induced by the pneumoperitoneum during laparoscopic surgery.

FM 9

How realistic are low cost, low fidelity bronchoscopy simulators?

Wegmann A.[1], Pedersen T.H.[1], Gysin J.[1], Theiler L.[1], Greif R.[1]
[1]Department of Anaesthesiology and Pain Therapy, Bern University Hospital, Inselspital, Bern University, Bern, Switzerland

Background and Goal of Study: Anaesthetists and pulmonologists need to train bronchoscopy before performing this procedure. We developed a cost-effective bronchial tree simulator based on human thorax CT-scans, using rapid prototyping (3D-Print) (Shapeways, Eindhoven, Netherland). This randomised, single-blinded study evaluated how realistic our 3D-printed simulator would mimic human anatomy compared to two commercially available simulators.
Material and Methods: Thirty-one experienced anaesthesiologists and pulmonologists (Bern University Hospital) rated on a visual analogue scale (VAS), where 0 mm = completely unrealistic anatomy and 100 mm = indistinguishable from real patient, the three simulators on: 1) Localisation of the right upper lobe bronchial lumen, 2) Placement of a bronchial blocker in the left main bronchus, 3) Aspiration of fluids from the right lower lobe, 4) Overall realism. The commercial simulators compared were: Laerdal Airway Management Trainer with Bronchial Tree (Laerdal, Stavanger, Norway) and the AirSim Advance Bronchi (TruCorp® Ltd, Belfast, Northern Ireland).
Results and Discussion: The 3D-printed simulator was rated most realistic for the localisation of the right upper lobe bronchial lumen with median (interquartile range) VAS scores of 77 mm (65–88) for 3D-printed, 68 mm (32–76) for TruCorp, and 65mm (43-80) for Laerdal ($p = 0.002$, Friedman's test). No differences were found in placement of a bronchial blocker or for aspiration of fluid ($p = 0.792$ and $p = 0.057$, Friedman's test) between the 3D-printed and the commercially available simulators. In the overall rating of realism the 3D-printed simulator was rated most realistic ($p = 0.021$). That suggests the 3D-printed simulator performs equally well or even better compared to the two other simulators. Given the different costs of approximately 1.000 € for Laerdal, 3.500 € for TruCorp versus only 100 € for the 3D-printed simulator, superiority of the 3D-printed simulator was reached with less than 10% of the costs.
Conclusion: The 3D-printed bronchial tree is at least non-inferior compared to substantially more expensive commercially available simulators. Thus, a CT-based printed simulator is an inexpensive alternative for training basic bronchoscopy skills.

FM 10

The clinical impact of pre-operative exercise therapy on respiratory complications after major surgery: a meta- analysis

Cools E.[1], Assouline B.[1], Elia N.[1], Licker M.[1]
[1]Departement of Anaesthesia, University Hospital Geneva, Switzerland

Background: Postoperative respiratory complications are associated with a longer hospital stay, a higher mortality rate and an increased admission rate in the intensive care unit (ICU). The health benefits of exercises are well known in terms of prolonged survival and quality of life. A growing interest has emerged to implement rehabilitation programs before surgery with the aim to reduce postoperative complications by improving aerobic fitness and muscular strength.
Objective: The aim of this meta- analysis is to analyze the functional changes and clinical outcome associated with preoperative rehabilitation in patients undergoing major surgery (abdominal, thoracic, cardiac, vascular & urologic). The main study endpoints will be VO2max, anaerobic threshold, muscular strength (measured pre-surgery, after performing exercises), mortality and postoperative pulmonary complications (PPC). Secondary endpoints will be postoperative cardiovascular complications, hospital length of stay (LOS), admission in ICU and duration of mechanical ventilation.
Methods: Medline, Embase and the Cochrane library were used as databases. We included published Randomised Control Trials, concerning adults undergoing major surgery and performing preoperative exercises.
Results: 15 articles were included. In the prehabilitation group, the maximum inspiratory pressure (P 0.009) and Peak Work Ratio (VO2 max) ($P < 0.00001$) were higher than in the control group. Postoperative, there was less atelectasis ($P < 0.0001$) and pneumonia ($P < 0.008$) in the intervention group. In addition, the duration of mechanical ventilation ($P = 0.16$), length of stay in the ICU ($P = 0.01$) and hospital ($P < 0.0001$), were shorter. No adverse effect due to prehabilitation was reported.
Discussion: Patients who performed preoperative exercises did better than their controls. For some outcomes, there are no sufficient data available to examine the effect. Future research has to point out the impact of preoperative exercises on the anaerobic threshold and postoperative cardiovascular complications.
Conclusions: Patients undergoing major surgery and performing preoperative exercises, had preoperative a higher peak work rate and inspiratory pressure. Postoperative, they experienced less pulmonary complications and the duration of mechanical ventilation, stay in ICU and hospital were shorter.

FM 11

Nociceptin modulates toll-like receptor 2 expression in human peripheral blood leukocytes

Zhang Lan[1], Stüber Frank[1], Stamer Ulrike M.[1]
[1]Department of Anaesthesiology and Pain Medicine, Inselspital and Department of BioMedical Research, University of Bern

Introduction: Nociceptin, an opioid-related neuropeptide, may play a role in peripheral blood during pain and inflammation [1, 2]. Toll-like receptor 2 (TLR2) is a key element during immune response. Cross-talk between opioids and TLR2 has been discussed [3, 4]. However, no data on the interaction between nociceptin and TLR2 are available up to date. In this study the influence of nociceptin on TLR2 expression in human peripheral blood leukocytes was investigated.
Methods: Healthy blood donors were enrolled in this ex vivo study with approval of the ethics committee and written informed consent. Peripheral blood was cultured with or without nocicpetin 10-9 M or phorbol-12-myristate-13-acetate (PMA) 10 ng/ml for 6 and 24 hrs. mRNA expression of nociceptin precursor (PNoc) and TLR2 were detected by RT-qPCR. To investigate possible influences of nociceptin on TLR2 mRNA, blood was pretreated with UFP-101 100 nM, a specific antagonist of the nociceptin receptor, for 1 hour prior to co-culture with PMA for 24 hrs. Nociceptin concentrations in culture supernatants were measured using fluorescent-enzyme immunoassay. Membrane TLR2 levels in CD15+, CD14+, CD4+, CD8+, CD19+ and CD56+ cells were detected by flow cytometry. Statistics: Median (95% CI), Kruskal-Wallis test and Wilcoxon signed rank test.
Results: Nociceptin enhanced TLR2 mRNA in human blood leukocytes after 6 hrs compared to the control without any stimuli (normalized ratio: 1.0 (0.6/2.3) vs. 0.7 (0.3/2.3), $p = 0.007$). PMA upregulated PNoc and TLR2 mRNA in blood cells after 24 hrs compared to the respective controls (PNoc: 1.7 (0.5/10.5) vs. 0.2 (0.0/0.7); TLR2: 1.3 (0.7/4.8) vs 0.7 (0.3/1.6), both $p < 0.0001$). Nociceptin concentrations were increased in supernatants of blood

cultured with PMA compared to the controls (8.3 (4.1/24.0) vs. 5.0 (2.5/9.1) pg/ml, p = 0.02). UFP-101 partially prevented the upregulating effects of PMA on TLR2 with its mRNA declining to 81.8 (36.8/135.0)% in blood treated with PMA only (p <0.001). An upregulation of TLR2 protein levels was detected on the membrane of monocytes and granulocytes in nociceptin-treated blood samples after 24 hrs compared to the controls (both p <0.05).
Conclusions: Activation of the nociceptin system enhances TLR2 mRNA expression in human peripheral blood leukocytes. Nociceptin upregulates TLR2 protein levels in peripheral blood monocytes and granulocytes. Mechanisms contributing to the modulation of nociceptin on TLR2 expression need to be further elucidated.

FM 12

A serotonin transporter polymorphism and clinical variables as risk factor for PONV: An association study in two different cohorts

Stamer U.M.[1,2], Schmutz M.[1], Wen T.[1,2], Lippuner C.[1,2], Zhang L.[1,2], Steffens M.[3], Stüber F.[1]
[1]Department of Anaesthesiology and Pain Medicine, Inselspital, University of Bern, Switzerland; [2]Department of BioMedical Research, University of Bern, Switzerland; [3]Research Division, Federal Institute for Drugs and Medical Devices, Bonn, Germany

Background: PONV (postoperative nausea and vomiting) is the most unpleasant side effect of anaesthesia prolonging the stay in the post-anaesthesia care unit of patients suffering from distress for hours. 1–2 Clinical risk factors for PONV are well described, whereas genetic findings are conflicting.3 The aim of this prospective association study was to investigate the impact of clinical and genetic variables on PONV.
Methods: Two independent patient cohorts differing in surgical procedures were enrolled in two hospitals. After approval of the local ethics committee, eligible patients scheduled for elective surgery gave written informed consent. EDTA blood was drawn for genotyping and clinical data collected up to 24 hours after surgery. Depending on the occurrence and severity of PONV patients were allocated to the groups no, intermediate and severe PONV. Clinical variables and 13 genetic variants located in 7 candidate genes of neurotransmitter pathways were evaluated for association with the primary outcome PONV. The two cohorts and in a second step males and females were analyzed separately by ordinal logistic regression analysis treating PONV as dependent, ordinal three-stage factor. Odds ratios (OR (95%-CI)) were calculated for the most significant predictors.
Results: 918 and 1663 patients of Hospital A and B were analysed. In Hospital A, female sex (OR (95%-CI): 3.6 (2.7–4.8); p <0.0001), non-smoking status (1.8 (1.3–2.5); p <0.001), the bi-allelic S/L polymorphism in the promoter region of the serotonin transporter (5-HTTLPR, rs4795541; OR: 1.5 (1.1–2.1); p = 0.019) and patients' age (0.99 (0.98–0.99); p = 0.013) showed highest predictive values for PONV. Data of Hospital B were in line with this: an OR of 1.8 (1.4–2.3) (p <0.00001) for 5-HTTLPR with an additional association of PONV prophylaxis and laparoscopic surgery. Sex-specific regression models consistently confirmed this promoter polymorphism as a predictor for females (1.61 (1.21–2.15) and males (1.72 (1.30–2.27).
Conclusion: In two independent cohorts the S/L polymorphism of 5-HTTLRP in the serotonin transporter was associated with PONV, in addition to the well-known clinical factors. Identification of candidate genes and the differential susceptibility of specific genotypes might help to develop future individualized preventive and therapeutic strategies for PONV.

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FM 13

Microparticles from stored red blood cells enhance procoagulant and proinflammatory activity

Fischer D.[1], Büssow J.[1], Meybohm P.[1], Weber C.F.[1], Zacharowski K.[1], Urbschat A.[2], Müller M.M.[3], Jennewein C.[1]
[1]Department of Anesthesiology, Intensive Care Medicine, and Pain Therapy; University Hospital Frankfurt; Frankfurt/Main, Germany; [2]Department of Urology and Pediatric Urology; University Hospital of Marburg; Philipps-University; Marburg, Germany; [3]German Red Cross Blood Transfusion Service of Baden-Wuerttemberg – Hessen; Institute of Transfusion Medicine and Immunohematology; University Hospital of Frankfurt; Frankfurt/Main, Germany

Background: The pathomechanisms of morbidity due to blood transfusions are not yet entirely understood. Elevated levels of red-cell derived microparticles (RMPs) are found in coagulation-related pathologies and also in stored blood. Previous research has shown that RMPs mediate transfusion-related complications by the intrinsic pathway. We hypothesized that RMPs might play a role in post-transfusion thrombotic complications by enhancing pro-coagulant activity also via the extrinsic pathway of coagulation.
Study Design and Methods: In this laboratory study, blood from 18 healthy volunteers was stimulated with microparticles from expired stored red blood cells. Various clotting parameters were recorded. Flow cytometry, ELISA, and real-time PCR were used to investigate possible mediating mechanisms.
Results: The addition of RMPs shortened the clotting time from 194 to 161 sec (p <0.001). After incubation with RMPs, there was an increased expression of TF on monocytes and in the plasma. TF mRNA expression increased in a time-dependent and concentration-dependent manner. There was a significant induction of IL-1β and IL-6. After stimulation with RMPs, there was a significant increase in the number of activated platelets, an increased percentage of PAC-1/CD62P double-positive platelets, and an increased number of platelet-neutrophil duplets and platelet-monocyte duplets, indicating enhanced interaction of platelets with neutrophils and monocytes. CXCL-8 and IL-6 were both significantly higher following RMP treatment.
Conclusion: Our results imply that RMPs trigger coagulation via TF signaling, induce secretion of proinflammatory cytokines, and induce cell-cell interaction between platelets and neutrophils. Thus, under certain conditions, RMPs could play a role in post-transfusion complications, via these mechanisms.

FM 14

Potassium currents are modified in dorsal horn microglial cells after spared nerve injury

Deftu A.F.[2,1], Gattlen C.[1,2], Suter M.R.[1,2]
[1]Pain Center, Department of anesthesiology, Lausanne University Hospital, Lausanne, Switzerland; [2]Department of Anatomy, Animal Physiology and Biophysics, Faculty of Biology, University of Bucharest, Romania; [3]Faculty of biology and medicine, Lausanne University, Switzerland

Introduction: Nerve injury induces peripheral hyperexcitability leading to central sensitization at the spinal cord level. Microglial cells react during this sensitization process and enhance it by the release of cytokines and chemokines. As a result, the nociceptive inputs are amplified, leading to hypersensitivity and allodynia. In this study we investigate how potassium currents from microglial cells are modified in culture and spinal cord (SC) slices after the spared nerve injury (SNI) model of neuropathic pain in mice.
Materials and Methods: Adult male CX3CR1-GFP transgenic mice (expressing a green marker in microglial cell) were sacrificed at 2, 4, 7 days after SNI and lumbar SC was incubated in the presence of papain for 30 min at 30 °C and microglia cells were kept in culture until experiment. Otherwise, the SC was kept in ice-cold oxygenated solution and 200 µm slices were cut. Patch-clamp experiments were performed at a holding potential of 20 mV in culture and 60 mV in slice. Microglia were patched in the ipsilateral dorsal horn.
Results: Two days after SNI the resting membrane potential (RMP) becomes significantly hyperpolarized (–29.73 ± 2.96 mV, n = 37) compared to naive conditions (–16.77 ± 1.89 mV, n = 45, P <0.001). The current densities at a step of –160 mV increased from –43.86 ± 6.19 pA/pF, n = 21, in naive conditions, to –88.86 ± 12.82 pA/pF, n = 29, P <0.01, two days after SNI. In SC slices, the current densities at a step of –160 mV increased, but not significantly, from –7.14 ± 1.48 mV, n = 5, in sham conditions, to –17.37 ± 6.47 mV, n = 13, P >0.05, two days after SNI. The RMP 2 days after SNI become more hyperpolarized (–40.37 ± 6.34 mV, n = 13) compared to sham conditions (–15.96 ± 2.499 mV, n = 6, P <0.05). These currents increase with increased concentration of extracellular potassium, and are blocked by barium and cesium. The qPCR experiments indicate that the level of mRNA for the inward rectifying potassium channel Kir2.1 increases 7 days after SNI.
Conclusions: The RMP increases two days after SNI in microglial cells both in culture and SC slices. The potassium currents were significantly increased after SNI in cultured microglia. This indicates a possible change in potassium channels after SNI, which might lead to further changes in microglial reactivity.

FM 15

Mutations affecting glycinergic neurotransmission in hyperekplexia increases pain sensitivity

Vuilleumier P.H.[1], Fritsche R.[2], Schliessbach J.[1], Schmitt B.[3], Zeilhofer H.U.[4], Curatolo M.[5]
[1]Department of Anesthesiology and Pain Medicine, Bern University Hospital, University of Bern, Switzerland; [2]Department of Ophthalmology, Canton Hospital of Lucerne, Switzerland; [3]Department of Child Neurology, Children's Hospital, University of Zurich, Switzerland; [4]Institute of Pharmacology and Toxicology, University of Zurich, and Institute of Pharmaceutical Sciences, Swiss Federal Institute of Technology (ETH) Zurich, Switzerland; [5]Department of Anaesthesiology and Pain Medicine, University of Washington, Seattle, USA

Background and aims: Inhibitory interneurons in the spinal cord use glycine and GABA for fast inhibitory neurotransmission. While there is abundant research on these inhibitory pain pathways in animal models, their relevance in humans remains unclear, largely due to the limited possibility to manipulate these pathways in humans. Hyperekplexia is a rare human disease caused by loss-of-function mutations in genes encoding for glycine receptors or glycine transporters. In the present study, we tested whether hyperekplexia patients display altered pain perception or central pain modulation, compared to healthy subjects.
Methods: Seven genetically and clinically confirmed hyperekplexia patients were compared to 14 healthy age and sex-matched controls (HC). The following quantitative sensory tests (QST) were performed: pressure pain detection threshold (primary outcome, PPDT), ice water tolerance (IWT), single and repeated electrical pain detection thresholds (ESPD/ERPD, respectively), nociceptive withdrawal reflex threshold (NWR), and conditioned pain modulation (CPM). Statistical analysis was performed by linear mixed models.
Results: Hyperekplexia patients displayed lower pain thresholds compared to HC for all the QST (means (SD)): PPDT (273(170) vs. 475 (115) kPa, p = 0.003), IWT (49.2 (36.5) vs. 85.7 (35.0) sec, p = 0.015), ESPD (5.42 (2.64) vs. 7.47 (2.62) mA, p = 0.012), ERPD (3.76 (1.41) vs. 5.8 (1.73) mA, p = 0.003), and NWR (7.42 (3.63) vs. 14.1 (6.9) mA, p = 0.015). CPM was significantly lower in hyperekplexia (increase to baseline: 53.2(63.7) vs. 105(57) kPa, p = 0.030.
Conclusions: Our data demonstrate increased pain sensitivity and impaired central pain modulation in hyperekplexia patients, supporting the importance of glycinergic neurotransmission for central pain modulation in humans.

FM 16

Intravenous dexamethasone for the prophylaxis of postoperative nausea and vomiting after neuraxial administration of long-acting opioids: a systematic review and meta-analysis

Grape S.[1,2], Usmanova I.[1], Albrecht E.[2]
[1]Hopital de Sion, Service d'Anesthésiologie et Réanimation, Sion, Switzerland; [2]Lausanne University Hospital, Service d'Anesthésiologie, Lausanne, Switzerland

Background: Neuraxial administration of long-acting opioids provides effective analgesia but is associated with postoperative nausea and vomiting (PONV). Intravenous (IV) dexamethasone has been reported to prevent this side-effect, but with conflicting results. We performed a systematic review to assess the prophylactic effect of IV dexamethasone on PONV in patients receiving neuraxial long-acting opioids.
Methods: We searched the electronic databases MEDLINE, EMBASE, the Cochrane Central Register of Controlled Trials, the Web of Science and LILACS. We followed the PRISMA statement guidelines. Our primary outcome was the rate of PONV at 24 postoperative hours (PO h), analysed according to the type of comparator: IV dexamethasone versus placebo or IV dexamethasone versus IV dopamine receptor antagonists. Secondary outcomes were pain scores (converted to an analogue scale, 0–10) and need for rescue analgesics, all measured at 24 PO h. Meta-analyses were performed with "Review Manager" software (RevMan_version_5.1.6).
Results and discussion: We included 11 randomized controlled trials with a total of 908 patients. In 7 trials opioids were injected intrathecally and in 4 trials epidurally. Authors used morphine in 9 trials, meperidine in 1 trial and pethidine in 1 trial. At 24 PO h patients receiving dexamethasone had a significantly reduced rate of PONV compared to placebo [risk ratio = 0.4; 95%CI: 0.35; 0.64; p <0.00001; figure 1]. Compared to placebo, the dexamethasone group had a reduction in pain scores at 24 PO h [mean difference –0.7; 95%CI: –1.2; –0.1; p = 0.02] and in need for rescue analgesics [risk ratio = 0.7; 95%CI: 0.6; 0.9; p = 0.003]. Neither PONV, pain scores nor the need for rescue analgesics differed significantly between patients who received dexamethasone or dopamine receptor antagonists.
Conclusion: Compared to placebo but not to dopamine receptor antagonists, IV dexamethasone reduces PONV, pain scores and the need for rescue analgesics at 24 PO h after neuraxial administration of long-acting opioids.

FM 17

Bronchodilation potentials of inotropic drugs: comparison of dopamine, dobutamine, milrinone, adrenaline and levosimendan

Fodor G.H.[1], Petak F.[1,2], Babik B.[3], Bayat S.[1], Habre W.[1,4]
[1]Unit for Anaesthesiological Investigations, Dept. of Anesthesiology, Pharmacology and Intensive Care, University of Geneva, Geneva, Switzerland; [2]Dept. of Medical Physics and Informatics, University of Szeged, Szeged, Hungary; [3]Dept. of Anaesthesiology and Intensive Care, University of Szeged, Szeged, Hungary; [4]Pediatric Anesthesia Unit, Geneva Children's Hospital, Geneva, Switzerland

Positive inotropic drugs are routinely used to elevate cardiac output; however, their potential to diminish an elevated airway tone have not been fully characterized. Therefore, we aimed at comparing the bronchodilator properties of inotropes commonly used in clinical practice to reduce an elevated airway tone. To exclude confounding systemic and neurological bias due to cardiopulmonary interactions, experiments were performed on isolated perfused rat lungs. Airway resistance (Raw) was measured by forced oscillations under the baseline conditions, during steady-state bronchoconstriction induced by acetylcholine (ACh) alone, and following saline vehicle (n = 8) or increasing doses of adrenaline (n = 8), dopamine (n = 7), dobutamine (n = 7), milrinone (n = 8) and levosimendan (n = 6) added to the whole blood perfusate. No changes in Raw were evidenced after administering the saline vehicle (1.1 ± 4.5[SE]%), and at any doses of milrinone (change at the highest dose of –0.2 ± 12% relative to the ACh level) and dobutamine (–4.0 ± 6.3%). Conversely, Raw decreased significantly following the highest two doses of dopamine (–23 ± 4%, p <0.05), and levosimendan (–53 ± 13%, p <0.001) and at all doses of adrenaline (–35 ± 4.1%, p <0.01). These findings demonstrate the lack of effect of dobutamine and milrinone on an elevated bronchial smooth muscle tone. While different pathways are involved in the bronchodilation affinities of adrenaline, dopamine and levosimendan, this potential is of particular importance in patients with increased bronchial smooth muscle tone, where the choice of the circulatory support may be considered in view of the respiratory condition.

FM 18

Transcranial Doppler in the diagnosis of cerebral vasospasm. An updated meta-analyses

Lysakowski Ch.[1,4], Mastantuono J.-M.[1], Combescure Ch.[2,4], Elia N.[2,4], Tramèr M.R.[1,4]
[1]Division of Anaesthesiology, Department Anaesthesiology, Pharmacology & Intensive Care Medicine, Geneva University Hospitals, Switzerland; [2]Clinical Trials Centre & Division of Clinical Epidemiology, Department of Health and Community Medicine, University of Geneva & Geneva University Hospitals, Switzerland; [3]Institute of Global Health, Medical Faculty, University of Geneva, Switzerland; [4]Faculty of Medicine, University of Geneva, Switzerland

Background and Purpose: The aim of this meta-analysis was to evaluate the diagnostic and screening accuracy of Transcranial Doppler (TCD) and Transcranial Color-Coded Duplex Doppler (TCCD) in patients with cerebral vasospasm due to aneurysm rupture.
Methods: We updated a previously published systematic review, searching for reports of comparisons of TCD or TCCD with angiography in adults in MEDLINE, EMBASE, and CENTRAL (to 07.2016, without language restriction). QUADAS2 was used for quality assessment. Summary ROC curves and pooled estimates of sensitivity and specificity were obtained using a bivariate random effects model. Heterogeneity of included trials was also assessed.
Results: Sixteen studies tested TCD. For the middle cerebral artery (11 studies, 1426 tests), sensitivity was 68% (95%CI, 58 to 77), specificity was 89% (80 to 95). For an estimated prevalence of vasospasm of 70%, positive predictive value (PPV) was 95% (91 to 97), negative predictive value (NPV) was 56% (49 to 63). These studies showed significant heterogeneity. Publication year, source of analyses (patient or artery), or variation of threshold velocities did not modify the pooled estimates. Five of these studies had a low risk of bias; their pooled sensitivity and specificity was similar to the pooled estimates of all studies. For the anterior cerebral artery (4 studies,

207 tests), sensitivity was 33% (11 to 66), specificity was 90% (48 to 99). For the basilar artery (2 studies, 186 tests), sensitivity was 62% (33 to 84), specificity was 84% (71 to 92). One study tested TCCD for the middle cerebral artery (222 tests). Sensitivity was 76% (61 to 88), and specificity was 97% (94 to 99). For an estimated prevalence of vasospasm of 70%, PPV was 98% (95 to 100); NPV was 64% (45 to 82).
Conclusions: TCD is likely to detect cerebral vasospasm of the middle cerebral artery in most cases, but is not useful as a screening method. For other arteries, the use of TCD cannot be recommended. Only one randomized trial compared TCCD with angiography; there was no evidence that accuracy was improved compared with the conventional Doppler technique.

FM 19

Patient discomfort caused by pre-induction checklists

Nabecker S.[1], Pedersen T.[1], Theiler L.[1], Riggenbach C.[1], Greif R.[1]
[1]Department of Anaesthesiology and Pain Therapy, Bern University Hospital, University of Bern

Background: Since the WHO released their Safe Surgery Saves Lives Program in 2008, perioperative checklists were introduced worldwide to minimize errors and to improve patient safety. Implementation of checklists is not easy and anaesthesia personnel often remain reluctant. The argument against using checklists is the presence of patients and possible discomfort for them. We investigated how patients and anaesthesia personnel perceived discomfort when a pre-induction checklist was used.
Materials and Methods: Anaesthesia health care professionals were asked 1) If they should go through checklists while the patient is present; 2) If checklists before anaesthesia induction cause patient discomfort; and 3) If checklists before induction of anaesthesia reduce the risk of errors. In-hospital patients were asked the same questions prior to the use of the Surgical Safety Checklist before entering the OR, and on the 1st postoperative day. Primary outcome was the level of patient discomfort. We rated all questions on a 100 mm Visual Analogue Scale (VAS), where 100 was total agreement. Wilcoxon rank sum test and Mann-Whitney u-test were applied as appropriate.
Results: 148 anaesthesia health care professionals and 123 patients were included. 118 patients completed the survey on the first postoperative day. For question 1 patients rated a median VAS of 100 before induction of anaesthesia and on the 1st postoperative day, whereas anaesthesia personnel rated a median VAS of 84 (p-value <0.01). For question 2 patients rated before induction of anaesthesia a median VAS score of 7, on the 1st postoperative day 0.5; in contrast anaesthesia personnel 30 (p <0.01). Patients and anaesthesia personnel rated the median VAS of question 3 high: personnel 93, patients 97 before induction of anaesthesia and 100 on the first postoperative day (p <0.01).
Discussion: The results show significant differences in the perception of discomfort. Patients strongly agree that health care professionals should go through checklists while the patient is present. Interestingly, anaesthesia personnel rated the potential discomfort much higher than actually perceived by patients. In contrast, both groups rated the possibility of reducing risks of errors high.
Conclusion: Patients experience far less discomfort observing the use of pre-induction checklists while present than anaesthesia personnel expect. Patients value potential safety benefits significantly higher than anaesthesia personnel.

FM 20

Characterization of metabolic signatures associated with early response to supportive therapy in patients with septic shock

Bollen Pinto B.[1], Cambiaghi A.[2], Brunelli L.[3], Falcetta F.[3], Baselli G.[2], Bendjelid K.[1], Aletti F.[2], Pastorelli R.[3], Ferrario M.[2]
[1]Department of Anaesthesiology, Pharmacology and Intensive Care, Geneva University Hospitals, Geneva, Switzerland; [2]Dipartimento di Elettronica, Informazione e Bioingegneria (DEIB), Politecnico di Milano, Milan, Italy; [3]IRCCS-Istituto di Ricerche Farmacologiche Mario Negri, Milan, Italy

Introduction: Elucidation of early metabolic signatures associated with the progression of septic shock and responsiveness to supportive therapy could be useful in the development of a new therapeutic strategies.
Objectives: The primary aim of this study was to verify whether a different response to therapy was associated to a particular trajectory in metabolite patterns.
Methods: We examined the plasma metabolome of 21 septic shock patients (pts) enrolled in the Shockomics clinical trial (NCT02141607). Responsiveness to therapy was assessed as change in organ dysfunction assessed by SOFA score, measured at admission (T1, acute phase) and 48 hours after (T2, post-resuscitation). A patient was judged as non-responder if both SOFAT2 was >8 and Δ = SOFAT1-SOFAT2 <5 (NR, 7 pts); the remaining as responsive (R, 14 pts). We combined untargeted and targeted mass spectrometry-based metabolomics strategies to cover as much as possible the plasma metabolites repertoire.
Results: At T1, plasma metabolome was similar between R and NR. In univariate analysis, NR presented less variation in metabolite concentration between T1 and T2. Different classification models using targeted metabolomics to predict NR status reproducibly reveled the presence of phosphatidylcholines (PCs) (e.g. lysoPC), alanine and Kynurenine (a metabolite of tryptophan). We then combined untargeted metabolomics with those metabolites, and the set of features selected from these integrated models was consistent in showing the importance of PCs and alanine. All models had good performance (AUC >0.9). The MNs showed that the two groups were characterized by different dependencies among metabolites, and the main differences were represented by PCs, kynurenine and alanine.
Conclusions: These findings support the emerging evidence that lipidome alteration plays an important role in individual patient response to infection. In addition, the identification of alanine as a consistent marker of NR to therapy could represent a possible shift in glucose-alanine cycle in the liver thus providing a more detailed characterization of liver dysfunction than clinically available tests. These results were strengthened by the explorative analyses performed by MNs suggesting that lipid species and alanine are important regulatory nodes.

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P 1

Basic Life Support training of novices using a commercially available self-learning video kit with or without instructor support – a randomised controlled trial

Kasper N.[1], Pedersen T.[1], Marx D.[1], Egloff M.[1], Schenker C.[1], Hari R.[2], Nabecker S.[1], Greif R.[1]
[1]Department of Anaesthesiology and Pain Therapy, University Hospital of Bern, Inselspital, University of Bern, Bern, Switzerland; [2]Bern Institute of Primary Health Care (BIHAM), Bern University, Bern, Switzerland

Introduction: The 2015 "International Consensus on Cardiopulmonary Resuscitation and Emergency Care Science with Treatment Recommendations" (Finn, Resuscitation. 2015;95:e203–24) stated that there was a knowledge gap regarding the skill performance in actual resuscitations of students doing self-learning when compared to those doing traditional courses. Therefore, this trial was planned to find out whether self-learning is equally effective as instructor-led BLS training regarding BLS competencies.
Materials and methods: We recruited first year medical students to participate and randomised them instructor-led BLS-training or BLS self-learning without supervision. In both groups we used the same commercially available self-learning video kit, the Mini-Anne kit (Laerdal Medical, Stavanger, Norway) in German. Training time and training environment were the same for both groups. We assessed the BLS competencies of the medical students directly after the training and 3 months later using the Resusci-Anne SkillReporterTM (Laerdal Medical, Stavanger, Norway) in a simulated scenario. For our primary outcome we chose the percentage of correct cardiac compressions. In addition, all BLS parameters recorded by the SkillReporter were assessed, as well as parameters from a BLS-competence rating form. Mann Whitney tested the non-parametric data, which are presented as median (IQR).
Results: 240 first year medical students participated in the study, and so far 44 students have participated in the 3-month follow-up. Directly after BLS training, the percentage of correct cardiac compressions was 48% (10–83) in the instructor-led group, compared to 40% (12–80) in the self-learning group (p = 0.875). The preliminary results for the 3-month follow up showed a median percentage of correct cardiac compressions of 27% (1–59) in the instructor-led group versus 49% (22–75) in the self-learning group (p = 0.060). There was no difference when comparing the results directly after training and the follow-up results for each group (p = 0.109 and p = 0.505). At the conference we will present the final data.
Discussion and Conclusion: Self-learning with a commercially available BLS training kit is equally effective as instructor-led BLS training regarding percentage of correct cardiac compressions, when tested directly after training. In the 3-month follow up we found a non-significant difference between the two groups, however, this result should be judged with caution until the follow-up is completed.

P 2

The medical relevance of the spiritual dimension during the pre-surgical period

Wüthrich-Grossenbacher U.[1], Sailer Schramm M.C.[2], Zeilhofer H.F.[1]
[1]Faculty of Medicine, University of Basel; [2]Directorate of Nursing, Medical-Technical and Medical-Therapeutic Areas, Inselspital Bern

Background: Anaesthetists and other healthcare professionals witness how some patients experience the days and hours of the pre-surgical period (pp) as a time of crisis and distress. It is widely acknowledged that spirituality and religion (S/R) play an important role in medicine, particularly in such times of crisis. Nevertheless, there is hardly any information and only very few studies focus on the spiritual dimension of the pp. Thus, the purpose of this study was to find out, how S/R influence the pp and whether there is a need for more consideration of the spiritual dimension.
Methods: For this qualitative study, six semi-structured interviews were conducted in spring 2016. The interviewed professionals, who regularly work with patients during the pp, included a surgeon, an anaesthetist doctor and nurse, a surgical nurse, an attendant for surgical positioning and a hospital chaplain. The interview questions focussed on the spiritual dimension of the pp and were based on experience, as well as relevant theory, such as the theory of religious coping. The interviews were transcribed and thematically analysed. The findings were then compared with current literature and the discussion about spiritual care in Switzerland.
Findings: The interviewed professionals unanimously said, that the spiritual dimension may influence patients and healthcare professionals during the pp. They observed general religious needs of patients (e.g. wearing of amulets, respect lunar cycle). They also described how S/R may influence the way patients deal with the stress of the pp. Trust in God or a "Higher Power" seems to play a significant role in coping with the situation. However, belief in miracles can lead patients to refuse necessary treatment. Further, the professionals identified spiritual concerns of patients that might be medically relevant. Among them, existential concerns were most prominent. Thoughts about death, especially the fear of not awaking from the anaesthesia, were observed regularly. Dealing with grief/loss and questions of identity were other important issues noticed. The professionals also described personal examples of how they include the spiritual dimension into their work. However, these examples are exceptional in Swiss hospitals.
Conclusion: This study illustrates the important influence S/R can have during the pp. This influence has hardly been considered until now. The findings are supported by current literature.

P 3

Comparison of physiologically and mathematically variable ventilations in an animal model of acute lung injury

Albu G.[1], Fodor G.H.[1], Lin N.[1], Petak F.[1,2], Bayat S.[1], Habre W.[1,3]
[1]Unit for Anaesthesiological Investigations, Dept. of Anesthesiology, Pharmacology and Intensive Care, University of Geneva, Geneva, Switzerland; [2]Dept. of Medical Physics and Informatics, University of Szeged, Szeged, Hungary; [3]Pediatric Anesthesia Unit, Geneva Children's Hospital, Geneva, Switzerland

Evidence is emerging that in contrast to the monotonous pressure control ventilation, adding variability is beneficial in long-term ventilation, particularly in acute lung injury (ALI). We compared variable ventilation modes based on the pre-recorded breathing pattern of healthy animals (VV-P) to a mathematical distribution of VT (VV-M [1]) at two different levels of PEEP in the presence of ALI. ALI (PaO_2/FIO_2 ≤200 mm Hg) was induced in anaesthetised rabbits by applying a combination of iv endotoxin (300 µg/kg), whole lung lavage (100 ml/kg) and 30-min injurious ventilation (VT = 10 ml/kg, no PEEP). Airway resistance (Raw), tissue damping (G) and tissue elastance (H) were determined by forced oscillations at baseline and hourly for 5 hours of mechanical ventilation at 2 levels of PEEP 6 (n = 5 and 4 for groups VV-P and VV-M respectively) and 9 cmH_2O (n = 4 and 5 for groups VV-P and VV-M respectively). No differences between VV-P and VV-M were observed in the mechanical parameters after 5 hours at the higher PEEP (Raw: –5 ± 10 [SE]% vs. 1 ± 9.7%, G: 2.4 ± 6.6% vs –11.5 ± 5.9%, H: 2.6 ± 6.2% vs. –2.7 ± 5.5%). Conversely, there was a difference between the two groups on PEEP 6 cmH2O (G: 44 ± 15% vs. 99 ± 16%, H: 63 ± 12% vs 107 ± 13%, p <0.03 in VV-P and VV-M respectively). Oxygenation (PaO_2/FiO_2) was not influenced by PEEP, while lactate levels increased in both groups with PEEP 6, but only in group VV-M with PEEP 9. Long-term ventilation with a physiological breathing pattern pre-recorded in sedated healthy animals seems superior to mathematically distributed variation ventilation in a model of ALI.

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1 Thammanomai A, et al. J Appl Physiol. 2008;104:1329–40

P 4

Physiological stress responses of helicopter emergency medicine physicians. A pilot feasibility study at the Swiss Air-Rescue (Rega)

Erb S.[1], Nabecker S.[1], Greif R.[1], Petrowski K.[3], Albrecht R.[2], Theiler L.[1, 2]
[1]Department of Anaesthesiology and Pain Therapy, Inselspital, Bern University Hospital, University of Bern, Bern, Switzerland; [2]Swiss Air-Rescue Rega, Zurich, Switzerland; [3]Department of Psychology, Technical University Dresden, Germany

Background: High-level performance of Helicopter Emergency Medical Services (HEMS) crewmembers is necessary to prevent errors harming patients. The personal stress level during treatment and transport in a helicopter might influence this performance. The physiological stress response in humans includes changes in heart rate variability (HRV), reflecting the activity of the autonomous nervous system. This pilot study correlates HRV with the rating of subjective stress experienced by the emergency physician during duty. The aim of the study was to find out whether it is possible to measure physiological stress response using HRV during HEMS duty; verified by using a standardized stress questionnaire.
Materials and Methods: Physiological stress response, measured by HRV, was continuously recorded by telemetry (Zephyrä Bioharness, Medtronicä, Minneapolis, MN, USA) in emergency physicians at Swiss Air-Rescue (Rega) in Bern and Interlaken during 6 days: 2 days of HEMS duty, 2 days in-hospital duty and 2 days off duty. Additionally,

each participant filled out a set of questionnaires (SCL-90-R, PASA, VAS, PDS, TICS, ERQ, all Technical University of Dresden, Germany) on the first day of investigation to quantify the subjective stress level as a baseline. After each study day, questionnaires recorded the experienced stress level of that day. Both the evaluations of the questionnaires and the HRV were analyzed by the Technical University of Dresden, using Matlab (MathWorks, Natick, MA, USA).
Results: Preliminary data from five emergency physicians could be gathered from March until May 2017 and are currently analyzed. At the annual conference we will present the final data of this pilot study.
Discussion and Conclusion: This pilot study demonstrates the feasibility of the methods used in the HEMS setting. In addition we will quantify the hormonal stress level using the cortisol-awakening-response (CAR) as objective stress response measurement. The combined data of the HEMS physicians obtained during HEMS duty can then be compared to clinical days and days off duty to estimate subjective experienced stress level and physiological stress responses depending on the type of work or leisure time.

P 5

International multicentre cohort study for the validation of CLASSIC – classification of intraoperative complications

Dell-Kuster S.[1,2], Kirchhoff P.[3], Schumacher P.[4], Brandt C.[4], Blanc C.[5], Hahnloser D.[6], Bruppacher H.[7], Flury M.[8], Erb T.[9], Schuster B.[10], Burkhart C.[11], Perren T.[12], Steiner L.A.[1], Rosenthal R.[13], on behalf of the CLASSIC study group [14]
[1]Department of Anaesthesiology, University Hospital Basel, Switzerland; [2]Basel Institute for Clinical Epidemiology and Biostatistics, University Hospital Basel, Switzerland; [3]Department of Surgery, University Hospital Basel, Switzerland; [4]Department of Anaesthesiology, Bürgerspital Solothurn, Switzerland; [5]Department of Anaesthesiology, University Hospital Lausanne, Switzerland; [6]Department of Visceral Surgery, University Hospital Lausanne, Switzerland; [7]Department of Anaesthesiology, Schulthess Clinic Zurich, Switzerland; [8]Department of Surgery, Schulthess Clinic Zurich, Switzerland; [9]Department of Anaesthesiology, University Children's Hospital Basel, Switzerland; [10]Department of Surgery, University Children's Hospital Basel, Switzerland; [11]Department of Anaesthesiology, Cantonal Hospital Graubünden, Switzerland; [12]Department of Surgery, Cantonal Hospital Graubünden, Switzerland; [13]University Basel, Switzerland

Objective: This prospective international multicentre cohort study intends to validate a classification of intraoperative complications (CLASSIC).
Background: While there are several validated systems for reporting postoperative complications, there are only few and not prospectively validated systems for reporting intraoperative complications. We previously developed CLASSIC in an international Delphi and piloted it using a retrospective sample. Any deviation from the ideal intraoperative course occurring between skin incision and skin closure is considered as intraoperative complication. CLASSIC foresees 5 grades depending on the invasiveness of the correcting treatment (no need, grade I; need for minor, moderate, major treatment, grade II to IV) and the severity of the complication (life-threatening/permanent disability, grade IV; death, grade V).
Methods: This cohort study is conducted in six national and 14 international centres. A total of 2500 patients undergoing surgery involving various surgical disciplines will be enrolled. Intraoperative complications are assessed using CLASSIC and postoperative complications using the Clavien-Dindo classification including 30-day mortality. The primary endpoint investigates the association between intra- and postoperative complications, adjusting for all relevant confounders. Additionally, a questionnaire including 10 fictitious cases describing intraoperative complications is sent to surgeons and anaesthetists to assess their agreement in the grading of the intraoperative complications. The study was approved by the Ethics committee for all Swiss centres and registered on ClinicalTrials.gov (NCT03009929).
Results: Recruitment started in all Swiss centres, the international centres are currently applying for Ethical approval. The majority of the first 159 patients were ASA I or II (21% and 47%), and only 29% and 3% were ASA III and IV. Thirty-four intraoperative complications were recorded in 30 patients (7 grade I, 24 grade II, 2 grade III, 1 grade IV). No intraoperative death was observed.
Discussion: These preliminary results show recording of intraoperative complications according to CLASSIC to be feasible and plausible compared to the pilot study. Validation results will be presented with more mature data. A better understanding of the quantity and nature of intraoperative complications is not only essential to improve quality of healthcare and patient safety, but also to guide efforts to reduce costs.

P 6

Motivation of laypersons to work as First Responders: a qualitative, focus group interview study

Kasper N.[1], Nabecker S.[1], Twerenbold G.[2], Gurtner S.[2], Greif R.[1]
[1]Department of Anaesthesiology and Pain Therapy, Bern University Hospital, Inselspital, University of Bern, Bern, Switzerland; [2]Emergency Service Hospital STS AG, Spiez, Switzerland

Purpose of the study: Crucial for the improvement of outcome after cardiac arrest is the immediate delivery of high-quality cardiopulmonary resuscitation (CPR). The ambulance response time in the canton of Bern, Switzerland is about 13–15 minutes. Local emergency services initiated the First Responder (FR) project in the canton of Bern. Laypersons, already trained in Basic Life Support (BLS), were organized in groups after receiving FR-training. Initially FRs were alarmed by SMS to start high-quality CPR and ensure use of automated external defibrillators until the ambulance service arrives. After implementation of an app-based alarming systems individual FRs are trained rather than organized groups of volunteers. In this explorative observational study we want to deepen our understanding of motivation and reasons for FR commitment comparing individual FRs and FRs organized in groups.
Materials and methods: After a brief introduction about the study and obtaining written informed consent for analysis and anonymized publication of the qualitative data, trained interviewers perform 6 semi-structured focus group interviews. Three with 5–6 FRs still organized in FR-groups and three with 5–6 individual FRs. Each focus group interview lasted approximately one hour, was recorded, transcribed and analyzed with the framework method. For the primary outcome we assessed the reasons for ongoing FR commitment as well as factors, which keep these volunteers active as FRs.
Results: So far we present preliminary data from two focus group interviews with FRs organized in groups and one with individual FRs. The remaining interviews will be performed in June 2017 and the entire results will be presented at the conference. First insights indicate that defined roles within a group as well as a designated leader and yearly educational meetings are important to keep groups of FR working. Long ambulance response times are also a motivating factor for laypersons to work as FRs.
Conclusions: Our preliminary results already show some important factors for ongoing FR commitment and possibly supporting interventions to ensure the growth of the FR movement. A dedicated leader within the FR group and yearly educational meetings seems to be beneficial for FR-group success. Organizing FRs in groups to keep them motivated might be beneficial to improve survival after out-of-hospital cardiac arrest in remote areas with limited access to public health services and long ambulance response times.

P 7

Well tolerable low-dose Camptothecin has the potential to reduce Dexamethasone-promoted angiogenesis in glioblastoma

Marchon Florian[1], Lippuner Christoph[1], Jaggi Stephanie[1], Singh Sanjay K.[2], Colen Rivka R.[2], Zinn Pascal O.[2,3,4], Andereggen Lukas[5], Stueber Frank[1,6], Luedi Markus M.[1,2,6]
[1]Department of Biomedical Research, Bern University Hospital Inselspital, University of Bern, Bern, Switzerland; [2]Department of Cancer Systems Imaging, The University of Texas MD Anderson Cancer Center, Houston TX, USA; [3]Department of Cancer Biology, The University of Texas MD Anderson Cancer Center, Houston TX, USA; [4]Department of Neurosurgery, Baylor College of Medicine, Houston TX, USA; [5]Department of Neurosurgery, Bern University Hospital Inselspital, University of Bern, Bern, Switzerland; [6]Department of Anaesthesiology, Bern University Hospital Inselspital, University of Bern, Bern, Switzerland

Background: Dexamethasone is commonly used to treat cerebral edema in glioblastoma (GBM) patients perioperatively. However, as we showed previously, Dexamethasone induces a gene network that is associated with poor survival. Additionally, our in vivo model derived from glioblastoma stem cells (GSC) shows that the drug also promotes angiogenesis. In-silico-connectivity map analyses predict Camptothecin to inhibit this Dexamethasone-induced gene network. This study aims to prove this potential in vitro and in vivo.
Methods: We exposed GBM patients derived GSC lines to different subaptototic doses of Camptothecin in vitro while under the influence of Dexamethasone alike. Dexamethasone-induced proangiogenic networks were studied with whole genome-expression profiling. After animal research approval, we created orthotopic mouse models (nu/nu, Charles River) using different patient derived GSC-lines. We determined a non-apoptotic dose of Camptothecin in an in vivo pre-

trial. With the thereby established dose of Camptothecin, mice were exposed to Dexamethasone, Camptothecin only, and Camptothecin combined with Dexamethasone for four weeks. Orthotopic tumor samples were assessed with immunohistochemical stainings and genome expression profiling.
Results: In vitro experiments established 10 uM Camptothecin as non-apoptotic dose in GSC. Accordingly treated GSCs showed a significant reduction of networks coding hallmarks of cancer such as angiogenesis. Both immunohistochemistry and genome expression profiling of the respective xenograft models confirmed a significant reduction of vascular proliferation and other hallmarks of cancer in GBM exposed to Camptothecin in vivo.
Conclusion: A subaptototic, well tolerable dose of Camptothecin appears to significantly reduce angiogenesis and other hallmarks of cancer in GSCs both in vitro and in orthotopic xenograft models. Our findings suggest that low-dose Camptothecin has theh potential to counter Dexamethasone-induced tumor-proliferation in patients with glioblastoma and thereby reduce neurologic symptoms and increase survival time.

P 8

Virtual anesthesia visit – an online tool for the preanesthesia visit at the Centre Hospitalier du Valais Romand (CHVR)

Zurrón N.[1,2], Rudaz D.[2], Michaeli Burkhard[2], Poidevin G.[2], Faiss J.[2], Gurtner C.[2]
[1]Klinik für Anästhesie und Schmerztherapie, Inselspital, Bern, Switzerland; [2]Service d'Anesthésie et Reanimation, Hôpital du Valais, Sion, Switzerland

Introduction: Safety is an important issue in anesthesia. Preoperative risk managing strategies include the designation of an ASA score and a preanesthesia visit (PAV) in order to reduce anesthesia and surgery related risk. Logistical, geographical and linguistic difficulties can be obstacles to a PAV. Computer based assessment and patient video-information to overcome some of these obstacles have been investigated. The aim of the present project was to develop an electronic alternative to the conventional PAV visit in the CHVR.
Methods: After a preliminary study based on data extracted from the Clinical Information System to delimit the target population, a group composed of senior anesthetists, a trainee anesthetist, a photographer and a computer scientist created a new online preanaesthesia assessment tool. A feasibility test was conducted with a random sample of patients.
Results: The 2015 patient cohort study showed a median age of 57 years, with a predominant ASA 2 status. 23.6% of the patients reside in the German speaking Upper Valais. The maximal distance for a PAV was 103 km. These results were the basis for the design of the electronic alternative called VAV, composed of 3 elements: 1) a selection tool of the surgical procedure linked to a surgical risk category, and one out of four information videos about the proposed anesthesia technique; 2) an electronic patient assessment questionnaire; 3) two algorithms: one concealing a computerized ASA score (cASA) and one assigning patients at risk for a standard visit. The data of the VAV will be imported in the patient's CIS after completion and deleted on the server. VAV is intended to be used by any adult patient scheduled for non-cardiac surgery. The VAV includes a video dedicated to pregnant woman in order to inform them at distance from the delivery about the analgesic procedures and anesthesia techniques for surgical delivery procedures.
Conclusion: The VAV was designed for the CHVR patient population. It is adapted with contemporary web-connectivity as it combines elements of patient assessment, patient information and informed consent in one single on-line tool. The aim of the VAV is to lead to a better assessment through a standardized tool, specially for vulnerable patients in order to triage them better, and increase safety.

P 9

Predictors of postoperative delirium in patients undergoing cardiac surgery

Goettel N.[1,2], Cereghetti C.[3], Schaedelin S.[2], Siegemund M.[1,2], Fassl J.[1], Seeberger M.D.[4], Eckstein F.S.[5], Steiner L.A.[1,2]
[1]Department of Anesthesia, Surgical Intensive Care, Prehospital Emergency Medicine and Pain Therapy, University Hospital Basel, Switzerland; [2]Department of Clinical Research, University of Basel, Switzerland; [3]Department of Anesthesia, Kantonsspital Aarau, Switzerland; [4]Institute for Anesthesiology and Intensive Care, Clinic Hirslanden Zurich, Switzerland; [5]Department of Cardiac Surgery, University Hospital Basel, Switzerland

Background: Postoperative delirium (POD) is a frequent complication after cardiac surgery and is associated with increased patient morbidity and mortality. We conducted a one-year single-center retrospective observational cohort study to identify risk factors for the duration and overall burden of POD after cardiac surgery.
Methods: All adult patients undergoing cardiac surgery with cardiopulmonary bypass in 2013 were screened for POD using the Intensive Care Delirium Screening Checklist (ICDSC). Primary outcome measure was the incidence of POD. Secondary outcome measures were the duration of POD and the area under the curve (AUC) determined by the ICDSC score over time. Independent predictors of POD were estimated in multivariable logistic regression models. Hospital length of stay, medications, and outcome data were also analyzed.
Results: Among the 656 patients included in the cohort, 618 were analyzed. The overall incidence of POD was 39%. Older patient age [OR (95% CI); 1.06 (1.04–1.09) for an increase of 1 year, P <0.001], low preoperative serum albumin [1.08 (1.03–1.13) for a decrease of 1 g/L, P <0.001], a history of atrial fibrillation [2.30 (1.30–4.09), P = 0.004], perioperative stroke [6.27 (1.54–43.64), P = 0.008], ascending aortic replacement surgery [2.99 (1.50–6.05), P = 0.002], longer duration of procedure [1.37 (1.16–1.63) for an increase of 1 hour, P <0.001], and increased postoperative C-reactive protein (CRP) concentration [2.16 (1.49–3.16) for a two-fold increase, P <0.001] were associated with higher odds of POD. Among patients affected by POD, older age, perioperative stroke, longer procedure time, and increased postoperative CRP were consistently predictive of longer duration of POD and greater AUC.
Conclusions: Known risk factors for the development of POD after cardiac surgery are also predictive of prolonged duration and high overall burden of POD.

P 10

Non-technical skills training of helicopter emergency medical services – a comprehensive simulation program

Nabecker S.[1], Lötscher S.[1,2], Albrecht R.[2], Balmer Y.[1], Greif R.[1], Theiler L.[1,2]
[1]Department of Anaesthesiology and Pain Therapy, Inselspital, Bern University Hospital, University of Bern; [2]Swiss Air-Rescue Rega, Zurich, Switzerland

Background: In aviation, mandatory in-flight simulation training for crew resource management is established. In pre-hospital medicine, simulation trainings were introduced only in the last decade. The Swiss Air-Rescue Services (Rega) started in 2015 a comprehensive simulation program to improve the technical and non-technical competencies in emergency medicine of their crews.
Materials and Methods: Simulations in 3 centers were evaluated: Bern Simulation and CPR Center (BeSiC) – Bern University Hospital; Swiss Institute for Emergency Medicine (SIRMED) – Nottwil, Switzerland and the Maquet training center in Rastatt, Germany. The two Swiss simulation centers provide a 1-day critical resource management simulation on high-fidelity manikins focusing on team performance. Structured video-assisted debriefings give further inputs for improvement. Crewmembers (paramedics and physicians) participate once per year in teams of 8–10 participants. The center in Germany offers a 1-day simulation training of critical incidents in ECMO and IABP use during helicopter transport. Furthermore, the entire crew (including pilot) trains at least 4 times per year basic and advanced life support on selected scenarios at their helicopter bases. The course was assessed using anonymous evaluation forms (Numeric Rating Scale 1–5). Statistical analysis was performed using Kruskal-Wallis test.
Results: In 23 training sessions, 193 anonymous evaluation forms were collected. In the BeSIC center 93 evaluation forms were completed, at the SIRMED center 65 and at the Maquet center 35. In all 3 centers the mood of the group was rated very good (p-value 0.77) and the practicability of the course content was also rated very good (p-value 0.12). The overall course rating, the applicability of the course content and a recommendation to colleagues to participate was also rated very high, however there were some statistical differences between the groups (all p-value <0.01).
Prospect: The current scenario training focused on the interfaces between preclinical setting and hospital or between hospital and transfer setting. During the next 2 years we will add scenarios taking place within the helicopter, the jet airplane and the ambulance vehicle.
Conclusion: Overall course satisfaction amongst participants was very high. The open question remains whether these simulations are capable to transfer non-technical skills into clinical practice and eventually improve patient care.

P 11

Standardization of a novel self-administered screening tool for postoperative delirium: a prospective observational study

Monsch R.[1], Berres M.[2], Thomann A.[1,3], Ehrensberger M.[3], Steiner L.A.[1,4], Goettel N.[1,4]
[1]Department of Anesthesia, Surgical Intensive Care, Prehospital Emergency Medicine and Pain Therapy, University Hospital Basel, Switzerland; [2]Department of Mathematics and Technology, University of Applied Sciences Koblenz, Germany; [3]Memory Clinic, University Center for Medicine of Aging Basel, Felix Platter Hospital Basel, Switzerland; [4]Department of Clinical Research, University of Basel, Switzerland

Background: Postoperative delirium (POD) is a considerable complication of surgery, especially in elderly patients. Previous research has shown that prevention of POD may be achieved using different risk intervention strategies. Preventive measures are best targeted at high-risk populations. Clinical risk stratification tools are not routinely used preoperatively, as their implication in daily anesthesiologic practice is time- and resource-intensive. To bridge this gap, we developed a self-administered screening tool to evaluate the individual risk for POD in a tablet computer application. The present study was aimed to provide normative data for this application.
Design: This is a prospective cohort study conducted at the University Hospital Basel in collaboration with the Felix Platter-Hospital Basel.
Participants: Healthy nonsurgical volunteers aged ≥65 years.
Methods: After providing written informed consent and completing a medical questionnaire, each participant was assessed by the tablet computer application, Mini-Mental State Examination (MMSE), Geriatric Depression Scale (GDS), and the Consortium to Establish a Registry for Alzheimer's Disease-Neuropsychological Assessment Battery (CERAD-NAB). Primary outcome was the performance in the studied tablet computer application. The application comprises 15 question items and 7 cognitive tasks. Regression models were built for each endpoint with the covariates age, gender, and education. Demographically-corrected standard scores were computed for each endpoint.
Results: Three hundred and thirty-four participants were included in the study from December 2016 to April 2017; 283 subjects were included in the final analysis. Mean participant age was 73.8 ± 5.2 years (range: 65–91 years), gender ratio was 128/155 (male/female), and the average level of education was 13.6 ± 2.9 years (range: 7–20 years). Mean MMSE score was 29.2 ± 0.9 points, mean GDS score was 0.4 ± 0.7 points, and the mean CERAD-NAB total score was 98.7 ± 5.7 points. The average time necessary to complete the test application was 22 minutes.
Conclusions: Our study provides normative data for the tablet computer application designed to preoperatively evaluate the individual risk for POD. Further research is needed to demonstrate the potential benefits of the tablet computer application in clinical practice.

P 12

Interfascial plane injection in children – block of median and ulnar nerves at forearm

Sylvain Tosetti[1], Marie-Pierre Malenfant[2], François-Pierrick Desgranges[3]
[1]Department of Anesthesia, University Hospital of Lausanne (CHUV), Switzerland; [2]The Montreal Children's Hospital, McGill University, Montreal, Canada; [3]Mother and Child University Hospital, Claude-Bernard University, Lyon, France

Aims: Regional nerve blockade is common in children as part of a multimodal perioperative analgesic plan. However, certain safety concerns arise as the waste majority of neural blockades in children are performed under general anesthesia or deep sedation potentially masking the signs and symptoms of intraneural injections. Ultrasound-guided nerve blockade is part of the solution but the ideal needle tip position to achieve a safe and efficient blockade of targeted nerves is not yet determined.
Method: We report a case of median and ulnar nerve USG blockade for hand surgery (burn revision of 4 + 5th fingers), at the mid-forearm level, on a 1 year old child. Needle tip was positioned at a distance from the median and ulnar nerves, at the mid-forearm level, with injection between the fascia of the flexor digitorum profundis (FDP) and superficialis (FDS) or carpi ulnaris (FCU) and dynamic spread tracking of 4 ml of ropivacaïne 0.2% (0.04 ml/kg) without needle tip repositioning. Patient didn't receive rescue analgesia in the recovery room and no complications, at short or long term, were described.
Conclusion: Positioning the needle tip in the fascial plane between surrounding muscles, provides an interfascial plane block. This technique enhances safety during regional blockade under general anaesthesia or deep sedation, avoiding any needle to nerve contact, and is easily transferable to a multitude of other blocks. Moreover, the dilated interfascial plane acted as a elastic reservoir of LA.

Keywords: Interfascial spread; Needle tip positioning; ecurity; Needle to nerve distance; Pediatric locoregional

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P 13

The value of capnogram parameters in the detection of acute lung injury

Fodor G.H.[1], Tolnai J.[2], Albu G.[1], Petak F.[2], Bayat S.[1], Babik B.[3], Habre W.[1,4]
[1]Unit for Anaesthesiological Investigations, Dept. of Anesthesiology, Pharmacology and Intensive Care, University of Geneva, Geneva, Switzerland; [2]Dept. of Medical Physics and Informatics, University of Szeged, Szeged, Hungary; [3]Dept. of Anaesthesiology and Intensive Care, University of Szeged, Szeged, Hungary; [4]Pediatric Anesthesia Unit, Geneva Children's Hospital, Geneva, Switzerland

Capnogram phase II slope (SII) is related to lung elastic recoil and phase III slope (SIII) reflects ventilation heterogeneities and ventilation/perfusion mismatch. Since increased lung stiffness and inhomogeneous ventilation/perfusion is one of the main characteristics of acute lung injury (ALI), we aimed at characterizing the ability of SII and SIII to detect ALI. Adult NZW rabbits (n = 8) were anaesthetised and mechanically ventilated. ALI (PaO_2/FiO_2 ≤200 mm Hg) was induced by applying iv lipopolysaccharide (300 µg/kg), whole lung lavage (100 ml/kg) and 30-min injurious ventilation (PEEP = 0, VT = 10 ml/kg). Arterial oxygen tension (PaO_2) was recorded, while mechanical changes were assessed by measuring forced oscillatory airway resistance (Raw), tissue damping (G) and elastance (H). Mainstream time capnography was performed to assess SII and SIII normalized to the $ETCO_2$ (SnIIT, SnIIIT). The PaO_2/FiO_2 (ALI vs baseline 74.3 ± 9.3 [SEM] vs 451.3 ± 11.5, P <0.05) and all mechanical parameters significantly deteriorated following ALI (13.2 ± 1.4 vs 8.3 ± 0.43 $cmH_2O.s/l$, 182.4 ± 11.9 vs 86.3 ± 4 cmH_2O/l and 713.9 ± 60.3 vs 248 ± 15.3 cmH_2O/l for Raw, G and H, respectively, P <0.05). While SnIIT increased (13 ± 0.82 vs 10.6 ± 0.21 1/s, P <0.05), no evidence was found for a change in SnIIIT (0.07 ± 0.024 vs 0.04 ± 0.01 1/s, P = 0.29). These findings indicate that the capnogram may only reflect the lung areas participating in the gas exchange. The elevated SII may be related to the increased respiratory elastance of the ventilated lung units associated with ALI. The invariable SIII in the presence of ALI demonstrates the fairly homogeneous emptying of the communicating alveoli.

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P 14

Recruiting medical students for a first responder project

Marx D.[1], Egloff M.[1], Harder M.[2], Balmer Y.[1], Nabecker S.[1], Greif R.[1]
[1]Department of Anaesthesiology and Pain Therapy, Bern University Hospital, Inselspital, University of Bern, Bern, Switzerland; [2]Bern Ambulance Services, Bern, Switzerland

Purpose of the study: Laypersons, who are trained in CPR by local ambulance services and complete a technical first-responder training, are referred to as First Responders (FR). Trained FRs are notified via an app-based system if a cardiac arrest occurs. FRs then start high-quality cardiopulmonary resuscitation (CPR) using automated external defibrillators until the professional ambulance service arrives. The goal of this cantonal FR-project is to minimize the delay of basic life support (BLS) and eventually to improve patient outcome after cardiac arrest. Up to now, over 1000 citizens in the canton of Bern are registered as active FR. We performed this observational study to assess which media effectively motivates medical students to become FR.
Materials and methods: Medical students attended a didactic lecture introducing the FR-project at the University of Bern. After this lecture students were asked to participate in a FR-training. Bern university hospital based CPR-center BLS-trainers started to recruit other medical students via a Facebook enquiry to attend FR-training. All medical students attended a course introducing the app-based alarming system, the response duties, and the reporting and feedback of FR-tasks. FR-training also includes a CPR-refresher course to ensure proper BLS-competencies. Successful completion of these both courses qualifies the medical students to register as FR within the app-based alarming system. The primary outcome of this study is to

find out how medical students were recruited. Therefore, we performed an Internet survey to answer this question.
Results: The didactic lecture was attended by 150 medical students; 38 of them (25%) signed up for FR-training immediately afterwards; the other participants were recruited elsewhere. In the end, 65 (43%) of these students became FR (32% male, mean age 24 ± 1 years). Sixty-three (97%) medical students answered the Internet survey. The majority was recruited in the didactic lecture (60%), 16% by word-of-mouth (e.g. CPR course directors, friends), 14% via social media, 10% heard about it from other resources (e.g. newspaper) and none from posters or flyers.
Conclusions: Even though social media are widely used now, most medical students were recruited as FRs through personal contact with clinical experts either during traditional didactic lectures or advanced CPR courses. Second most important factor to increase recruitment of medical students as FRs is word-of-mouth.

P 15

Impact of sufentanil on Bispectral Index in the elderly – a randomised trial

Lysakowski Ch.[1,2], Czarnetzki Ch.[1], de Valence T.[1], Dumont L.[1,2], Elia N.[1,2,3], Tramèr M.R.[1,2]
[1]Division of Anaesthesiology, Geneva University Hospitals, Switzerland.; [2]Medical Faculty, University of Geneva,Switzerland.; [3]Institute of Global Health, Medical Faculty, University of Geneva, Switzerland

Background: Advanced age and concomitant administration of a strong opioid with propofol independently influence Bispectral Index (BIS) values. The impact of a combination of both factors on BIS remains unknown. We compared BIS values during propofol induction with or without sufentanil in elderly patients.
Methods: Patients aged 65 years or more, undergoing elective surgery were randomised to receive a target-controlled infusion of sufentanil (effect site concentration, 0.3 ng ml-1) or matching placebo. Thereafter an open, target-controlled infusion of propofol was started in both groups (initial effect site concentration, 0.5 µg ml-1 and stepwise increase by 0.5 µg ml-1 until loss of consciousness [LOC]). LOC was defined as an Observer's Assessment of Alertness/Sedation (OAA/S) score <2. BIS and OAAS values were recorded after each increase in propofol effect site concentration until LOC.
Results: Seventy-one patients (placebo 36, sufentanil 35) completed the study. Mean age was 72.3 years (SD 5.8), 41% were women. Mean BIS values at baseline were 96.9 (SD 2.6) in the sufentanil group, and were 96.7 (1.4) in the placebo group. At LOC, BIS values were higher in patients (males and females confounded) receiving propofol with sufentanil (mean 75.0 [SD 8.6]) compared with those receiving propofol alone (70.0 [SD 8.0]); mean difference, –5.0 (95%CI –8.9 to –1.1), p = 0.013. Post-hoc subgroup analysis suggested that the difference was significant in men only (–7.3 [–11.8 to –2.6], p = 0.003) but not in women (–2.1 [–4.8 to 9.0], p = 0.534).
Conclusions: In the elderly, concomitant administration of a strong opioid with propofol leads to significantly higher BIS values at loss of consciousness. This phenomenon seems to be more pronounced in men.

P 16

Detection of severe leg hypoperfusion during robotic-assisted laparoscopic surgery: use of near-infrared spectroscopy (NIRS)

Turciansky M.[1], Suhner M.[1], Zollinger A.[1]
[1]Institut für Anästhesiologie und Intensivmedizin, Stadtspital Triemli, Zürich, Switzerland

A 66-years old ASA class II patient was scheduled for robotic-assisted radical cystectomy with ileal conduit diversion. Because of the well-known increased incidence of low extremity compartment syndromes associated with this operation we decided to monitor tissue oxygenation (StO_2) using NIRS (near-infrared spectroscopy; INVOS™). During the operation a significant drop in StO_2 was observed, which was caused by inadvertent compression of the iliacal vessels by one of the robot arms (DaVinci™). The surgeon was promptly informed and identified a compression of right iliacal vessels by one of the robot arms. After correcting the position, compression release resulted in supranormal StO_2 values (hyperemia) before the previous normal readings were reached again. Robotic-assisted laparoscopic surgery may be regarded as a risk factor for some specific complications: Increased risk of patient injury may arise by the robotic arms obscuring the surgeon's view to the patient as a whole, by extreme tilting positions of the patient for a prolonged period of time and by inadvertent intraabdominal compression of vessels as well as nerves by these "non-sensible" robotic arms. The latter was identified as the cause of leg hypoperfusion in our patient. Early detection of this complication by NIRS prevented further injury to the patient.

P 17

Involvement of miRNAs in HLA-DR cell surface expression

Kunath Paul[1], Houseman Maja[1], Staiger Matthias[1], Phour Jaison[1], Schiff Marcel[1], Stüber Frank[1], Christoph Lippuner[1]
[1]Department of Anaesthesiology and Pain Medicine, Inselspital and Department of Biomedical Research, University of Bern, Bern, Switzerland

Introduction: MHC class II molecules are important to present antigens on the cell surface of antigen-presenting cells like e.g. dendritic cells or monocytes to CD4+ T-cells to enable immune responses. Cell surface expression of peptide-loaded MHC-II (HLA-DR) is manifold and not yet completely understood. HLA-DR cell surface expression is regulated by transcriptional regulators and intracellular transport. Clinical studies show that the number of HLA-DR molecules is downregulated on the cell surface of monocytes after surgery. The amount of HLA-DR molecules available for antigen presentation to CD4+ T-cells is associated with morbidity in the perioperative setting, i.e. nosocomial infections.
Objectives: A better understanding of the processes of HLA-DR surface expression is of importance for a potential treatment of perioperative HLA-DR downregulation. The importance of miRNAs for the regulation of peptide-loaded MHC-II cell surface expression shall be investigated.
Method: A flow cytometric based high throughput screen with miRNA mimics was done in a melanoma cell line (MelJuSo). A selection of the hits was verified in MelJuSo cells, primary monocytes and bone marrow derived dendritic cells. Therefore a transfection system for primary cells was established. The influence of these miRNA on the transcriptional regulation of the HLA-DR network was investigated by qPCR and the impact on the cellular localization of HLA-DR was determined by fluorescence microscopy.
Results: 52 miRNAs that influence miRNA surface expression were identified in the High Throughput Screen. 16 miRNAs with the strongest impact on HLA-DR surface expression were successfully verified in MelJuSo cells. These miRNAs are influencing the transcriptional network of HLA-DR and a transfection with certain miRNAs leads to a disturbed localization of HLA-DR molecules in the cell. A set of miRNAs has as well an influence on HLA-DR surface expression in human primary monocytes and monocyte derived dendritic cells.
Conclusion: miRNAs strongly impact HLA-DR surface expression in a model system and primary cells. The investigated miRNAs have an impact on the transcriptional network of the HLA-DR expression and as well on the cellular localization of HLA-DR. The results will lead to a better understanding of the mechanisms of antigen presentation and might long term help to define new possible methods to support the immune system in critically ill patients.

P 18

The impact of total intravenous propofol anesthesia versus isoflurane and sevoflurane anesthesia on the spontaneous recovery from rocuronium-induced neuromuscular block: a retrospective cohort study

Chaix E.[1], Tassonyi E.[2], Poncet A.[4], Lysakowski C.[3], Tramèr M.[3], Czarnetzki C.[3]
[1]Faculty of Medicine, University of Geneva, Geneva, Switzerland; [2]Department of Anesthesiology and Intensive Care, University of Debrecen, Debrecen, Hungary; [3]Division of Anesthesiology, Geneva University Hospitals, Geneva, Switzerland; [4]Clinical Trials Centre & Division of Clinical Epidemiology, Department of Health and Community Medicine, University of Geneva & Geneva University Hospitals, Geneva, Switzerland

Background: Dose-response studies have shown that volatile anesthetics increase the effects of non-depolarizing neuromuscular blocking agents. However, there are no studies quantifying this effect under conditions of daily clinical practice.
Methods: In this observational non-randomized study, we evaluated the recordings of the neuromuscular block of 323 patients who underwent general anesthesia for elective ENT surgery. Induction was with propofol and sufentanil, and maintenance was with target-controlled propofol or with inhaled isoflurane or sevoflurane. The target population was the patients who received a single intubation dose of rocuronium of 0.6 mg /kg. Monitoring of neuromuscular block was

performed by acceleromyography. The primary endpoint was the time from rocuronium injection to a train-of-four (TOF) ratio of 0.9 (total duration). Secondary endpoints were the time from rocuronium injection to re-appearance of the first twitch (deep block) and time from T1 25% to T1 75% (recovery index).
Results: Of the 323 patients, 235 had received a single dose of rocuronium of 0.6 mg /kg and had evaluable recordings. 148 (63%) had received propofol, 24 (10%) isoflurane and 63 (27%) sevoflurane anesthesia. The total duration of the neuromuscular block (mean ± sd) was 58 ± 17 minutes in the propofol group, 77 ± 20 min in the isoflurane group and 101 ± 46 min in the sevoflurane group (p-value <0.001). The duration of the deep block was 26 ± 7, 28 ± 7 and 33 ± 12 min under propofol, isoflurane and sevoflurane respectively (p-value <0.001). The recovery index was 12 ± 7 min under propofol, 19 ± 112 min under isoflurane and 26 ± 15 min under sevoflurane (p-value <0.001).
Conclusion: Compared to propofol, isoflurane and sevoflurane anesthesia significantly extended the duration of rocuronium-induced neuromuscular block. The effect was most pronounced under sevoflurane anesthesia with the highest variability. Both profound and superficial block were prolonged.

P 19

Respiratory end-tidal ethanol concentration to predict acute pulmonary hypertension during therapeutic ethanol embolization procedures

Schena M.[1], Pedersen T.[1], Baumgartner I.[2], Nabecker S.[1], Greif R.[1], Theiler L.[1]
[1]Department of Anaesthesiology and Pain Therapy, Inselspital, Bern University Hospital, University of Bern, Bern, Switzerland; [2]University Clinic of Angiology, Inselspital, Bern University Hospital, University of Bern, Bern, Switzerland

Background: An established therapy for congenital vascular malformations is ethanol (96% conc.) embolo-sclerotherapy. A rare, but life-threatening complication is acute pulmonary hypertension caused by sudden elevation of ethanol blood concentrations leading to pulmonary arterial vasospasms. Aim of this study is to test feasibility of repetitive measurements of the end-tidal ethanol (etC_2OH) concentration in order to non-invasively monitor systemic ethanol washout during embolo-sclerotherapy.
Materials and Methods: After ethic approval and with written informed consent, patients undergoing ethanol embolo-sclerotherapy are included in this ongoing prospective observational study. For each injection a maximum of 6 cc ethanol 96% is used. EtC_2OH concentrations are measured every 5 minutes and 1, 3 and 5 minutes after each ethanol injection. Measurements are continued in the recovery room at 15, 30, 45 and 60 minutes after extubation. The primary outcome parameter is the etC_2OH level over time in relation to the amount of ethanol injected. Any complications are noted. Values are presented as median (25th; 75th percentile).
Results and discussion: To date we included 37 patients. Patients received a median total of 15 (8; 25) cc ethanol 96%. Of these, 32 (86%) had measurable rise of etC_2OH levels, which led to adjustments of further ethanol injections until a decrease of measurable etC_2OH levels was noted. During embolo-sclerotherapy the median highest level of etC_2OH was 0.17‰ (0.11; 0.25) within 5 minutes of injection. Fifteen minutes after extubation it was 0.11‰ (0.09; 0.2). In 41% of patients, etC_2OH level increased even after the end of anaesthesia, indicating a delayed ethanol washout into the systemic circulation. So far, no major complications were observed. At the conference we will present the final results of the study.
Conclusion: Monitoring of systemic ethanol concentrations during ethanol embolo-sclerotherapy using continuous, non-invasive end-tidal ethanol measurements is feasible and might become an easy to use, non-invasive tool to establish safe timing of ethanol injections. Moreover, preliminary results have shown that close surveillance in the recovery room is needed because of a late rise in ethanol levels, which may put patients at risk of pulmonary hypertension.

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Difference of predicted (TCI) to measured propofol concentration after major surgery

Neumann L.[1], Steurer M.[2], Kraemer T.[3], Zueger M.[4], Mohler T.[1], Steurer M.P.[5], Dullenkopf A.[1]
[1]Institute of Anesthesia and Intensive Care, Kantonsspital Frauenfeld, Switzerland; [2]Department of Pediatrics, University of California, San Francisco, USA; [3]Institute of Forensic Medicine, University of Zurich, Switzerland; [4]Institute of Laboratory Medicine, Kantonsspital Frauenfeld, Switzerland; [5]Department of Anesthesia and Perioperative Care, University of California, San Francisco, USA

Background: Target controlled infusion (TCI) is a modern form of dosing propfol, which is a standard anesthetic. A pharmacokinetic model incorporates age, weight, height and gender of the patient and attempts to dose propfol to result in a chosen plasma level, which can be modified to the patient's need.
Methods: In this study, with Ethics committee approval and after obtaining written informed consent, arterial blood was taken in steady state after anesthesia induction and after major surgery (lasting >3h or resulting in >1000 ml blood loss) and the predicted TCI plasma level noted at each time point (TCIinitial and TCIpost). Propofol plasma level was determined using gas chromatography – mass spectrometry in single ion monitoring mode (plasmainitial and plasmapost). Propofol was quantified by comparison of its peak area ratio to calibration curves (accuracy better than 15%). For each time point, the mean value of the measurements, the bias (mean difference plasma-TCI), the standard deviation (SD) of the difference, and the limits of agreement (bias ± 1.96 SD) were calculated and Bland Altman plots were generated.
Results: Twenty-four patients were studied (17 female, aged 55 ± 12 years, BMI 26 ± 4 kg/m^2). Blood lactate level at the two time points did not differ (p = 0.66). After induction of anesthesia, the mean value for TCIinitial was 2.1 and for plasmainitial it was 2.0. The bias for this time point was –0.14 with a SD of 0.57 and a limit of agreement from –1.26 to 0.98. After surgery, the mean value for TCIfinal was 1.73 and for plasmafinal it was 1.14. The bias for this time point was –0.62 with a SD of 0.35 and a limit of agreement from –1.3 to 0.07. Additionally, at the end of surgery, there was a greater systematic error with general overestimation of propofol plasma concentration by TCI (Bland Altman plot).
Conclusion: TCI versus propfol plasma estimation had a smaller bias at the beginning of anesthetics than after major surgery, however after major surgery there was a smaller limit of agreement. TCI generally overestimated propofol plasma levels. This has to be taken into account when using this method of dosing propfol in such procedures.

The numbers refer to the pages of this supplement.