SMW
Established in 1871

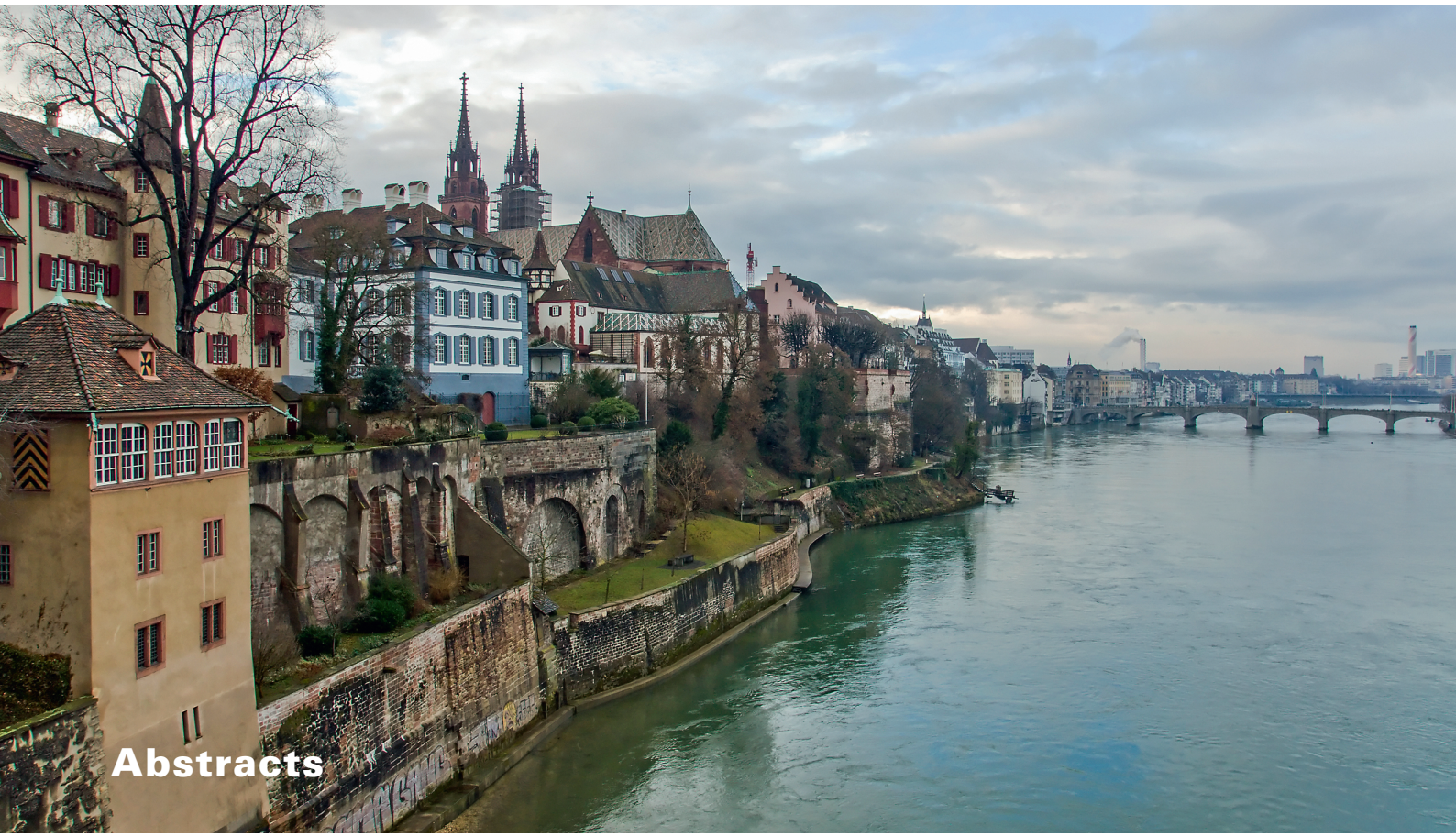
Swiss Medical Weekly

Formerly: Schweizerische Medizinische Wochenschrift
An open access, online journal • www.smw.ch

Supplementum 220
ad Swiss Med Wkly
2016;146
October 19, 2016

Annual Meeting
Swiss Society for Anesthesiology and Resuscitation SGAR/SSAR

Basel (Switzerland), November 3–5, 2016



EMH Media
SCHWEIZERISCHER ÄRZTEVERLAG
EDITIONS MEDICALES SUISSES

Free communications

Posters

Index of first authors

Impressum

All communications to:
EMH Swiss Medical Publishers Ltd.
Swiss Medical Weekly
Farnsburgerstrassse 8
CH-4132 Muttenz, Switzerland
Phone +41 61 467 85 55
Fax +41 61 467 85 56
office@smw.ch

Cover photo:
© Elexneize | Dreamstime.com

Listed in:
Index Medicus / MEDLINE
Web of science
Current Contents
Science Citation Index
EMBASE

Guidelines for authors
The Guidelines for authors are published on our website www.smw.ch
Submission to this journal proceeds totally on-line: www.smw.ch

ISSN printed version: 1424-7860
ISSN online version: 1424–3997

printed in switzerland

FM 1

Three unchannelled videolaryngoscopes and the Macintosh laryngoscope in patients with a simulated difficult airway – a randomised controlled trial involving 480 patients

Nabecker S.[1], Greif R.[1], Kleine-Brueggeney M.[1,2], Riggenbach C.[1], Theiler L.[1]
[1] Inselspital, University Hospital Bern and University of Bern, Department of Anaesthesiology and Pain Therapy; [2] Barts NHS Health Trust, Department of Perioperative Medicine

Background: Little is known about the impact of tracheal tube-guiding channels of different videolaryngoscopes (VLS) on their performance. In a previous study (1) we showed that VLS with a tube-guiding channel might perform inferiorly compared to unguided VLS in patients with a small mouth opening. In the current study we evaluated the performance of the Macintosh laryngoscope and three unchannelled versions of the VLS already evaluated in that prior study in patients with a simulated difficult airway.
Methods: This prospective RCT evaluated three unchannelled VLS (KingVision™, Airtraq™, A.P.Advance™ MAC) and the standard Macintosh laryngoscope during orotracheal intubation. Permission was obtained from the local ethics committee. We simulated a difficult airway using a cervical collar resulting in limited mouth opening and neck movement. Our primary outcome parameter was first attempt intubation success rate. Secondary outcome parameters included overall success rate, intubation time and percentage of glottic opening visible.
Results: After written informed consent 480 patients were included. First attempt intubation success rates varied significantly among the groups: KingVision™ 90%, Airtraq™ 82%, A.P.Advance™ 49% and the standard Macintosh laryngoscope 44% (p <0.01). For all devices, the 95% confidence interval of the first attempt success rate was below 90%. The overall success rate and the percentage of glottic opening visible were better for the KingVision™ and the Airtraq™ compared with the A.P.Advance™ and the standard Macintosh laryngoscope. We also found differences in intubation time (median 50–57 s, p 0.01), which were clinically irrelevant.
Discussion: All devices studied failed to reach a first attempt success rate above 90% in this simulated difficult airway setting. The KingVision™ and the Airtraq™ performed better compared with the standard Macintosh laryngoscope and the A.P.Advance™. We found no difference between the performance of the KingVision™ and the Airtraq™ in this study and the performance of the guided versions evaluated in our prior study. This suggests that the influence of the guiding channel is of lower importance compared with the general design of the devices.

Reference
1 Kleine-Brueggeney M, et al. Evaluation of six videolaryngoscopes in 720 patients with a simulated difficult airway: a multicentre randomized controlled trial. Br J Anaesth. 2016;116(5):670–9.

FM 2

S-Guide® versus Gliderite® for videolaryngoscopic intubation of patients with simulated difficult airways

Nkoulou C.[1], Bathory I.[1], Fournier N.[1], Schoettker P.[1]
[1] Service d'Anesthésiologie, Centre Hospitalier Universitaire Vaudois, Lausanne, Switzerland

Introduction: Non-channeled videolaryngoscopy requires the use of a stylet in order to allow intubation. Studies and clinical practice have shown that Gliderite®, a specifically designed stylet to assist intubation with the Glidescope®, can cause injury. The S-Guide® is a new flexible multifunction intubating guide. Its hollow lumen allows oxygenation while being malleable and its soft tip is designed to prevent trauma during intubation.We aimed at comparing times, ease of intubation and post-operative status between the two devices using the D-blade® C-Mac® in a prospective randomized study in patients with simulated difficult airways.
Methods: 50 patients, ASA physical status 1 to 3, scheduled for elective surgery with oro-tracheal intubation, were included and randomly assigned to the Gliderite (G) or the S-Guide (S) group. Difficult airways were simulated using a neck collar to reduce mouth opening and head movements. Success and number of attempts necessary were recorded, as well as times (expressed as median seconds [25th;75th]) necessary for glottis identification, blocking of the cuff, ventilation and total procedure. Ventilation was defined as the observation of end-expiratory CO_2 curve on capnography, procedure time as the time from touching the C-mac to ventilation. Subjective ease of intubation was assessed on a scale from 1 to 5 and post-operative discomfort (sore throat, hoarseness, dysphagia) evaluated 24h after intubation.
Results: Demographics and anatomical characteristics were identical in both groups and one patient could not be intubated according to study protocol in the G group. No difference in times for glottis identification nor cuff blocking were measured. (17.5 [12.2–25.6] vs. 14.9 [11.7.–18.6]; p = 0.289 and (55.2 [38.1.–66.5] vs. 43.5 [32.7–52.8], p = 0.072). Time to obtain CO2 was significantly shorter in the S-Guide group, (74.4 [57.9–85.1] vs. 58.3 [50.2–62.6], p = 0.011) in favor of the S-Guide. Significantly less arytenoid contact was observed with the s-guide (p = 0.032). There was no significant difference in post-operative airway discomfort for any of the variables assessed although less patients complained of any single item in the S-Guide group.
Conclusion: Intubation was possible in all patients with the S-Guide. Although non significant, the S-Guide led to shorter intubation times, less airway discomfort and was the preferred device to assist videolaryngoscopic intubation.

FM 3

Why is there an underreporting of critical incidents in airway management: a qualitative study

Pedersen T.H.[1], Meuli J.[1], Kleine-Brüggeney M.[1], Greif R.[1], Theiler L.[1]
[1] Department of Anaesthesiology and Pain Therapy, Inselspital, Bern University Hospital, University of Bern, Bern, Switzerland

Background: Airway incidents are a leading cause of anaesthesia related morbidity and mortality [1], and little is known about the detection of structural or systemic weaknesses of airway management in anaesthesia departments [2]. The anonymous reporting of near-misses to a departmental Critical Incident Reporting System (CIRS) is a good method to identify, structure, and address weaknesses, hereby improving quality. This study investigates what motivate or impede anaesthesia providers in reporting critical incidents (CI) to a departmental CIRS.
Materials and Methods: 1) Prospectively recording of all airway events occurring in airway management over a period of two months. 2) Screening of these events to identify potential CIs to be reported to the CIRS. 3) Semi-structured interviews with the anaesthesia providers responsible when the CI occurred, in order to clarify the reasons for reporting or not reporting the CI. The interviews were analysed with the framework method [3].
Results and Discussion: In 3,670 airway management cases, 574 cases with one or more airway events occurred (15.6%). Of these, we identified 102 airway related CIs, while only one CI was reported to the departmental CIRS in the same period (<1%). The interviews uncovered different conceptions about the aim of CIRS and a lack of feedback. When asked about criteria for a CI, individual mistakes were often exclusively mentioned. Providers onlyreported CIs when they felt that the reporting could prevent future incidents or illustrate a learning point. It was repeatedly unclear who should report a CI within a team.
Conclusions: Screening all airway events showed significant underreporting of CIs to the departmental CIRS. If people only report when a mistake is made or when they feel others can learn from the report, then this introduces a high reporting threshold. We identified a need to improve feedback from the CIRS group to highlight its benefits for the anaesthesia providers, and also a need to make the criteria for reporting CIs more clear to the anaesthesia providers. We are convinced that the CIRS may contribute to identifying structural weaknesses, but if reporting to the CIRS does not embrace all relevant cases, very little will be learned to improve patient care.
These results were presented at ESA 2016 in London.

References
1 Peterson, et al. Anesthesiology. 2005;103(1):33–9.
2 Cook, et al. Br J Anaesth. 2011;106(5):617–31.
3 Gale NK, et al. BMC medical research methodology. 2013;13:117.

FM 4

Cost-effectiveness analysis of pharmacological pre- and post-conditioning with the volatile anesthetic sevoflurane in liver surgery

Urner M.[1], Eichler K.[2], Twerenbold C.[2], Kern S.[1], Brügger U.[2], Spahn D.R.[2], Beck-Schimmer B.[2], Ganter M.T.[3]
[1] Institute of Anesthesiology, University Hospital Zurich, Zurich, Switzerland; [2] Winterthur Institute of Health Economics, Zurich University of Applied Sciences, Winterthur, Switzerland; [3] Institute of Anesthesiology and Pain Medicine, Kantonsspital Winterthur, Winterthur, Switzerland

Background: In two recent randomized controlled trials, lower complication rates in patients undergoing elective liver resection have been observed after pharmacological pre- and post-conditioning with sevoflurane compared to total intravenous anesthesia [1, 2]. The

potential health economic consequences of this approach have as hitherto not been assessed.
Methods: An ex-post cost-effectiveness analysis of these two trials has been performed in a total of 129 patients treated between 2006 and 2010. We compared the clinical outcome to direct medical costs for in-hospital stay from the perspective of a Swiss university hospital. Costs, converted to US dollars ($), were derived from hospital cost accounting data and compared with a multivariable regression analysis, adjusting for relevant co- variables. Costs with negative prefix indicate savings and costs with positive prefix represent higher spending in our analysis.
Results: Beside the clinical benefits of the intervention (relative risk for major complications: 0.27 [95%-CI: 0.10 to 0.73; p <0.01]; absolute risk reduction, ARR: 18% [95%-CI: 4 to 30]; NNT: 6), treatment-related costs per patient showed a non-significant decrease by $ –11,041 (95%-CI: 9,527 to –31,610; p = 0.29) with pre-conditioning and by $ –5,338 (95%-CI: 5,846 to –16,522; p = 0.35) with post-conditioning compared to the control group. Major complications led to a significant increase in costs by $ 74,798 (95%-CI: 12,034 to 137,563; p = 0.02) per patient, compared to patients with no major complications.
Conclusions: In these two randomized controlled trials, improved patient outcome by pharmacological pre- and post-conditioning with sevoflurane in patients undergoing liver resection was paralleled with reduced in-hospital costs. As the cost savings add up to a substantial sum after repeated treatments, our economic analysis gives important additional information to clinicians and health service leaders providing elective liver surgery.

References
1 Beck-Schimmer B, et al. Ann Surg. 2008;248:909–18.
2 Beck-Schimmer B, et al. Ann Surg. 2012;256:837–44.

FM 5

Impact of perioperative administration of a chloride-depleted glucose 5% and potassium enriched crystalloid solution on gastrointestinal recovery, electrolyte balance and renal function after radical cystectomy: Results of a randomized controlled trial

Löffel L.M.[1,4], Burkhard F.C.[2], Takala J.[3], Wuethrich P.Y.[1]
[1] Department of Anaesthesiology and Pain Medicine, Inselspital, Bern University Hospital, Switzerland; [2] Department of Urology, Inselspital, Bern University Hospital, Switzerland; [3] Department of Intensive Care Medicine, Inselspital, Bern University Hospital, Switzerland; [4] Department of Anaesthesia, Kantonsspital, Luzern, Switzerland

Background and Goal of Study: Open radical cystectomy (ORC) is known to have a high complication rate and a high risk of delayed return of normal gastrointestinal (GI) function postoperatively. The goal of this study is to determine if perioperative administration of a chloride-depleted glucose 5% and potassium enriched crystalloid maintenance solution accelerates return of normal bowel function.
Materials and Methods: Randomized, parallel-group single-centre double-blind trial including 44 consecutive patients undergoing ORC with urinary diversion receiving either a glucose 5% potassium based crystalloid solution (G5K group) or a balanced crystalloid solution (Ringerfundin® control group) perioperatively in the setting of a fluid management aiming for a zero balance. Endpoints were the return to normal defecation, renal dysfunction and need for electrolyte substitution. Data were analysed using non-parametric statistical models. Multiple linear regression analysis was conducted.
Results and Discussion: The groups were comparable regarding surgical characteristics, length of stay, intraoperative parameters and fluid administration (G5K group: 750 ml [500–1700 ml] vs. control group 975 ml [400–1600 ml], *P* = 0.185) and amount of fluid administered postoperatively (G5K group: 4750 ml [4000–6000 ml] vs. control group 5250 ml [4000–6000 ml], *P* = 0.941). Normal defecation occurred significantly faster in the G5K group (138h [54–261] than in the control group (169h [108-318]; *P* <0.001). This was confirmed by multiple linear regression analysis (regression coefficient: –47.3 SE: 15.4; *P* = 0.004). As a safety endpoint, the incidence of renal dysfunction at discharge was similar for the G5K (9.1%) and control group (4.5%) staged as RIFLE "risk"; *P* = 1.000, while the need for substitution of magnesium and potassium was significantly lower in the G5K group (13.6% and 18.2%, respectively) than in the control group (54.5% and 77.3%, respectively; *P* = 0.010 and *P* <0.001). The limitation of this study is realisation in a high caseload centre. Whether the results are reproducible in other centres needs to be shown.
Conclusions: Perioperative administration of a chloride-depleted glucose 5% and potassium enriched crystalloid solution accelerates recovery of bowel function after ORC with superior safety by reducing the need for potassium or magnesium substitution without affecting renal function.

FM 6

Sevoflurane supports cell-differentiation of NK-cells towards mature cells in patients undergoing breast cancer surgery

Schläpfer M.[1, 2], Piegeler T.[3], Eugster P.[1], Beck-Schimmer B.[1, 2], [1] Institute of Anesthesiology, University Hospital Zurich; [2] Institute of Physiology, University Zurich; [3] Institute of Anesthesiology, Cantonal Hospital Münsterlingen; [4] Department of Anesthesiology, University of Illinois at Chicago, Chicago, USA

Introduction: Natural killer cells (NK-cells) are involved in fighting malignoma. A recent trial suggests, that NK cell differentiation of healthy donors is influenced by treatment with sera from patients undergoing various types of anesthesia for breast cancer surgery [1]. We were interested whether the patient's own NK-differentiation is influenced by the type of anesthesia in women undergoing breast cancer surgery.
Material and Methods: We analyzed 30 patients included into a study investigating the effect of anesthesia on the amount of circulating tumor cells (NCT02005770). Patients were randomly assigned to propofol or sevoflurane anesthesia. NK-cells were extracted of the patient's blood at 4 timepoints. T1: before resection, T2: immediately after resection of the malignoma, T3: at postoperative day 2, T4: at postoperative day 4. Three NK-cell-subsets were determined by flowcytometry: mature (CD56dim&CD16bright), intermediate (CD56bright&CD16) and immature NK-cells (CD56bright&CD16neg). Cytoxic activity of NK-cells was assessed by co-incubation of the cells with K562 cells, a human breast cancer cell line, for 2h. Statistical testing was performed by two-way ANOVA, multiple comparisons were corrected for by Sidak correction, p <0.05 was considered significant.
Results: At T2 we found significantly more mature NK-cells (93 ± 5 vs 84 ± 13%, p = 0.02) and less immature NK-cells (4 ± 3 vs 10 ± 8%, p = 0.005) in patients anesthetized with sevoflurane compared to propofol. The fraction of intermediately mature NK-cells was not different (4 ± 3 vs. 7 ± 6%, p = 0.29). No differences were detected at the other time- points. NK-cell activity against a human breast cancer cell line was not different under sevoflurane vs. propofol treatment.
Conclusions: Our study demonstrates that the type of anesthesia may influence differentiation of NK-cells towards more mature NK-cells under the influence of sevoflurane. According to the current literature, mature NK-cells are believed to exert more cytotoxic effects as compared to immature cells that are more important for cytokine production [2]. Our NK-activity assay could however not reveal more cytotoxic activity on an allogenic breast cancer cell line, this could be different on autologous cells, possibly resulting in more cytotoxic effects on malignant tumors under the influence of sevoflurane.

References
1 Buckley A, et al. Br J Anaesth. 2014;113(Suppl 1):i56–62.
2 Poly A, et al. Immunology. 2009;126(4):458–65.

FM 7

Identification of ethics committees based on authors' disclosures. A cross- sectional analysis of articles published in the European Journal of Anaesthesiology (EJA)

Zoccatelli D.[1], Tramèr M.[1,2], Elia N.[1,2,3]
[1] Division of Anaesthesiology, University Hospitals of Geneva; [2] European Journal of Anaesthesiology, Editorial Board; [3] Institute of Global Health, University of Geneva Switzerland

Background: Scientific journals require that articles reporting on human experimentation report ethical approval (EA) by a competent ethics committee (EC). Since 2010, the European Journal of Anesthesiology (EJA) specifically requires that five items related to the EC are mentioned: 1) EC's name, 2) EC's address, 3) name of the chair of the EC, 4) protocol number, and 5) date of approval. One year later, we set out to check the adherence to these requirements, and whether more complete information facilitated the identification of the relevant ECs.
Methods: All articles published in the EJA in 2011 and requiring EA were identified. For each included article, we checked how many of the required items were reported and attempted to identify the relevant EC based on the reported information using a systematic web search strategy. For each EC identified, we contacted the committee, by e-mail or letter, to verify whether the EC could confirm having given approval for the respective study.
Results: We screened 193 articles published in 2011, of which 76 required EA. Two articles (2.6%) did not report on any EA. Of the remaining 74 articles, 34 (46%) reported on all 5 items. We were able to identify 44 EC (59%); 25 from the 34 articles reporting on all 5 items (73%), and 19 from the 40 articles reporting on <5 items (48%) (p = 0.023). Of the 44 identified EC, 36 (82%) answered our inquiry;

18 (50%) from articles reporting on 5 items and 18 from articles reporting on <5 items (50%). Of the 36 EC who answered our inquiry, 24 (67%) confirmed having given their EA for the study, and 12 (33%) couldn't. Of the 18 EC that answered our inquiry and reported on 5 items, 15 confirmed EA (83%); so did 9 (50%) of the 18 EC reporting on <5 items (p = 0.027)
Conclusions: In 2011, only 46% of articles requiring EA published in the EJA reported on all five requested items. We were able to identify only 59% of EC based on the published information. Reporting of the five items significantly increased the chance of identification of the competent EC, although did not impact on the response rate of the identified ECs. Reporting the 5 items was significantly associated with confirmation of EA. Research is needed to determine the information needed to ease the identification of EC.

FM 8

Preoperative predictors of disturbed coagulation during orthotopic liver transplantation

Modini S.[1], Bonvini J.M.[1], Ganter M.T.[2], Breitesten S.[3], Schadde E.[3,4], Graber S.[5], Schläpfer M.[1,6], Beck Schimmer B.[1,6,7]
[1] Institut für Anästhesiologie, Universitäts Spital Zürich; [2] Institut für Anästhesiologie, Kantonsspital Winterthur; [3] Departement für Chirurgie, Kantonsspital Winterthur; [4] Transplant Surgery, Rush University Medical Center, Chicago, IL, USA; [5] Anthropologisches Institut, University Zurich; [6] Physiologisches Institut der Universität Zürich; [7] Department of Anesthesiology, University of Illinois at Chicago, Chiago, IL, USA

Background: Patients scheduled for orthotopic liver transplantation (OLT) due to end- stage liver disease often present with normal hemostasis, but reduced pro- and anti- hemostatic drivers. Upon pro-coagulant consumption, this equilibrium is prone to drift towards severe bleeding. We aimed to identify predictors of disturbed coagulation parameters defined by classical and ROTEM analysis during the critical phase of OLT, defined as end of anhepatic phase until end of surgery, focusing on recipient, donor and procedure factors. At the same time the impact of the presence of a malignant tumor was evaluated. We hypothesized that predictors for deteriorated coagulation would mainly imply ROTEM data.
Material and Methods: Data from patients transplanted in Zurich and previously included in a randomized controlled trial (NCT00913276; impact of sevoflurane for OLT on postoperative transaminases) were analyzed. Conventional laboratory tests (INR, aPTT, platelet count) as well as ROTEM analyses (α-EXTEM, clotting time (CT)-EXTEM, α-INTEM, CT-INTEM) were performed during OLT. For the prediction two patient groups were designed: 1) 'plasmatic coagulation cohort'; patients receiving coagulation factors were excluded and 2) 'platelet group'; patients with platelet transfusions were excluded. Linear mixed models were used for identification of predictors, p <0.05 was considered significant.
Results: In total, 66 patients were transplanted whereas 41 remained for the assessment of plasmatic coagulation and 39 in the platelet group. Of the recipient factors preoperative INR and model for end-stage liver disease (MELD; value only based on laboratory parameters without additional tumor score points) predicted intraoperative INR values (positive correlations, both p = 0.004), this effect was less pronounced in patients with a tumor (p = 0.006). Of note is that the mean MELD value was 18.9 ± 8.0 for non-tumor patients while 9.3 ± 2.7 for patients with tumor. Of the *donor factors* cold ischemia time (CIT) influenced INR (p = 0.020), while donor risk index (DRI) were identified as predictors for pathologic aPTT (p = 0.043) and CT-EXTEM values (p = 0.006, positive correlations). No *procedure factors* could be identified.
Conclusion: This is the first analysis of data from a prospective study systemically evaluating predictors of coagulation during OLT. Results suggest that the ROTEM data play a minor role in the prediction of coagulation disorders in the critical phase of OLT.

FM 9

Efficacy of an innovative biological glue containing fibrinogen and activated factor VII (FVIIa) to reduce traumatic bleeding in a rabbit model

Bonhomme Fanny[1], Plantier Jean-Luc[2], Duretz Véronique[2], Chtourou Sami[2], Mondon Philippe[2]
[1] Department of Anesthesiology, Pharmacology and Intensive Care, Geneva University Hospitals, Geneva, Switzerland; [2] Direction of Innovative Therapeutic, LFB Biotechnologies, Loos, France

Introduction: A novel biological glue containing fibrinogen (10 mg/ml) and recombinant FVIIa (2 µg/ml) was developed. The deposition of such a mixture in a wound will allow the contact of FVIIa with endogenous tissue-factor and traces of blood to ultimately clot fibrinogen. The efficacy of this mixture in limiting blood loss was evaluated in a rabbit model of traumatic bleeding.
Methods: The experimental protocol was conducted according to the guidelines of the Swiss Federal Veterinary Office and was approved by the Animal Welfare Committee of the Canton of Geneva. Twenty anesthetized rabbits were randomly assigned into four groups: placebo, control (Tisseel®), Glue LFB1 (plasmatic fibrinogen and FVIIa) and Glue LFB2 (recombinant fibrinogen and FVIIa). The carotid arteries were exposed and the treatment was applied on the vessel to evaluate the adhesive strength (the following scores were applied: 0 = absence, 1 = weak, 2 = strong, and compiled). Then haemorrhage was induced by standardized hepatic sections: blood loss was quantified for 15 minutes after the application of the glue and the adhesive strength was evaluated. The primary endpoint was the hepatic bleeding; adhesive strength was a secondary endpoint.
Results: Glue LFB1 and LFB2 significantly decreased hepatic bleeding (median [min-max]: 0.93 g [0.77–1.40] and 1.10 g [0.64–1.28] respectively) compared to placebo (4.40 g [2.73–8.57], p <0.01), while control glue did not (2.40 g [1.01–3.99]). At 15 min, adhesive strength on hepatic sections was yet greater in control group (10/10) compared to other groups (0/10 in placebo, 3/10 in Glue 1, 5/10 in Glue 2). At the carotids, in the absence of bleeding, Glue 1 and 2 had the same adhesive strength (18/20 and 17/20) compared to control glue (19/20); no adhesion was observed in placebo group.
Conclusions: This breakthrough formulation possesses an adhesive potential and is efficient to limit blood loss from hepatic sections. It is provided as a recombinant formulation and remained liquid and stable during the experimental procedure.

FM 10

"Give the patient some more dexamethasone": Molecular implications of Dexamethasone for glioblastoma patients

Luedi M.M.[1,2,3], Colen R.R.[3], Lippuner C.[1,2], Singh S.K.[3], Stueber F.[1,2], Zinn P.O.[3,4]
[1] Bern University Hospital Inselspital, Department of Anaesthesiology and Pain Medicine, University of Bern, Bern, Switzerland; [2] Bern University Hospital Inselspital, Department of Clinical Research, University of Bern, Bern, Switzerland; [3] The University of Texas MD Anderson Cancer Center, Department of Cancer Systems Imaging, Houston TX, USA; [4] Baylor College of Medicine, Department of Neurosurgery, Houston TX, USA

Background: Dexamethasone is commonly used in neuro-anaesthesiology to treat cerebral oedema in glioblastoma (GBM) patients. Previous clinical studies suggested a disatvantegous effect of the steroid on GBM patient survival; however, the molecular reason remained unclear. We aimed to investigate on the effect of dexamethasone on gene expression profiles and to determine their biological functions in glioblastoma stem cells (GSCs), a reliable model for GBM research.
Methods: We isolated two GSC lines from samples obtained from patients at The Univeristy of Texas MD Anderson Cancer Center. GSC in vitro cultures and GSC derived orthotopic tumours in mice were exposed to dexamethasone. The steroid's impact on GSC transcriptome expression including microRNA was analysed and profiled by microarray assays and network analyses. Immunohistochemical stainings for endothelial cells with anti-CD31 antibodies were used to assess vascular properties. Risk scores for genes most affected by dexamethasone and their associations with GBM patient survival were analysed in "The Cancer Genome Atlas" (TCGA) cohort (479 patients). Isolation of human GSCs and all animal work was approved by IRB at MD Anderson Cancer Center.
Results: Pathway analysis of dexamethasone-treated GSCs predicted an activation of vasculogenesis in both, in vitro (z-scores >2.0, p <0.001) and in orthotopic GSCs derived tumours in dexamethasone-treated mice (z-scores >2.0, p = 0.002). Immunohistochemical staining in GSCs derived orthotopic tumours confirmed the predicted activation of vasculogenesis: Microvascular proliferation increased significantly from 5.7 to 10.7 and from 0.7 to 7.0 vessels / field (p = 0.0150) respectively in both GSC lines. Kaplan-Meier analysis of the TCGA GBM cohort (n = 479) showed a significantly shorter median survival of 13.8 months for patients with high risk scores for dexamethasone-induced genes vs. 14.5 months for those with low risk scores (p <0.001).
Conclusion: Our study is the first to reveal that dexamethasone induces MVP in GBM. The results also show that a dexamethasone-induced gene signature appears to be responsible for significantly worse prognosis in GBM patients. It appears problematic for neuro-anaesthesiologists to "just give a GBM patient some more dexamethasone". Additional therapeutics to counter this side effects are urgently needed.

FM 11

Internet use for patient information before anaesthesia. A single-centre survey of 815 patients in Switzerland

Wieser T.[1], Steurer M.P.[2], Dullenkopf A.[1]
[1] Department of Anaesthesia and Intensive Care Medicine, Kantonsspital Frauenfeld, Frauenfeld, Switzerland; [2] Department of Anesthesia and Perioperative Care, UCSF, San Francisco, USA

Background: The Internet has become an important source of information. But it remains unclear to what extent patients utilise it with regards to an upcoming anaesthetic. This study was done to quantify how many patients use the internet to find information about their upcoming surgery and anaesthesia.
Methods: With Ethics committee approval, one thousand consecutive patients seen before elective surgery in the anaesthesia preoperative clinic of a Swiss Level 2 hospital were asked to complete a questionnaire. Main interest was the percentage of patients having used the internet to obtain information about their surgery and anaesthesia. Data are descriptive (n; %).
Results: Out of the 1000 patients, 815 (82%) were willing to participate. 97% of those were ASA physical status 1 or 2; 676 (83%) had experience with previous anaesthetics, 700 (86%) reported to use the Internet in general. Overall, about one-third of the participants used the Internet to learn more about their medical condition, 26% explored information regarding their upcoming surgical procedure. Only 55 participants (7%) obtained information about the anaesthetic. Of those who did not use the Internet to learn about their anaesthetic, 34% indicated that they would have visited a trusted website.
Conclusion: Only a few patients had used the Internet in order to obtain information about their upcoming procedure and the anaesthetic part played an even smaller role. However, many patients indicated that they would have very much appreciated guidance to help find trustworthy Internet sites.

FM 12

Comparison of four epidural puncture training devices – which is best to feel the "loss of resistance"?

Pedersen T.H.[1], Seidl C.[1], Kleine-Brüggeney M.[1], Theiler L.[1], Greif R.[1]
[1] Department of Anaesthesiology and Pain Therapy, Inselspital, Bern University Hospital, University of Bern, Bern, Switzerland

Background: Epidural anaesthesia is a difficult skill to learn, with a success rate of barely 80% after 90 attempts [1]. The feeling of the "Loss of Resistance" (LOR) can be trained either with high-fidelity devices that cost in excess of 2'000 CHF, or with the "Greengrocer's Model", which simply requires a banana [2]. While it has been shown that the epidural puncture skill can be achieved with a banana [3] and that the banana is the best fruit for simulating the feel of LOR [4], there are no studies directly comparing the banana to high-fidelity devices.
Materials and Methods: This blinded randomized controlled study tests the difference to detect LOR in four epidural puncture training devices: 1., Lumbar Puncture Simulator II (Kyoto Kagaku, Kyoto, Japan); 2., Epidural-Injektions-Trainer (Erler-Zimmer, Lauf, Germany); 3., Lumbar Puncture Epidural Training Package (Simulab Corp., Seattle, WA, USA); and 4., a banana. 55 consultant anaesthesiologists participated in the study. The participants were asked to perform an epidural puncture and insert an epidural catheter. The devices were placed in identical wooden boxes. The primary outcome of this study was the feel of LOR rated on a 100 mm Visual Analogue Scale (VAS), where "0" represented "completely unrealistic feel" and "100" represented "indistinguishable from a real patient".
Results and Discussion: The mean of the four models were statistically significantly different: 1: 60 mm (Standard Deviation 25 mm), 2: 50 mm (SD 29 mm), 3: 64 mm (SD 25 mm) and 4: 49 mm (SD 32 mm), p = 0.013, ANOVA. However, pairwise comparison showed only a difference between device 3 and 2 and 3 and 4 (both p <0.01).
Conclusion: Only the Simulab (number 3) performed significantly better than the banana (number 4) and the Epidural-Trainer (number 2). In short, practising with a banana instead of a high-fidelity device is a very cost-efficient way to acquire the skills of feeling LOR. Only one of three commercial high-fidelity devices demonstrates a more realistic feeling of LOR compared with a simple banana.

References

1 Konrad C, et al. Anesthesia and analgesia. 1998;86(3):635–9.
2 Leighton BL. Anesthesiology. 1989;70(2):368–9.
3 Friedman Z et al. Regional anesthesia and pain medicine. 2009;34(3):229–32.
4 Raj D et al. European journal of anaesthesiology. 2013;30(7):405–8.

FM 13

The impact of continuous femoral nerve block on postoperative neural functions for total knee arthroplasty: a prospective blinded, randomized study

Aguirre José[1], Brada Muriel[1], Borgeat Alain[1], Blumenthal Stephan[2]
[1] Division of Anesthesiology, Balgrist University Hospital; [2]Institute of Anesthesiology, Intensive Care and Pain Therapy, Stadtspital Triemli Zürich

Background and Aims: Continuous femoral nerve block for total knee arthroplasty is associated with the risk of femoral nerve damage after total knee arthroplasty. However, there is no evidence that a described neural damage of 2–4% is due to regional anaesthesia and not to other factors like prolonged ischemia and mechanical traction of the nerve.
Methods: Seventy patients scheduled for elective total knee arthroplasty were prospectively randomized into a group with a continuous femoral nerve block for 48h or a group with a postoperative morphine PCA. Both groups got a spinal anesthesia for surgery. Preoperatively a clinical neurological exam, an electromyography (EMG) and a nerve conduction velocity test (NCV) were performed by a neurologist blinded to group allocation. The clinical neurological examination was repeated prior to discharge and the EMG and NCV test 6 weeks after surgery. The primary outcome was the indicence of femoral nerve deficits. Secondary outcomes were pain, functional recovery and side effects of analgesia management.
Results: Both groups were similiar concerning surgical and non-surgical data. There was no difference in the nerve conduction tests 6 weeks after surgery compared to baseline measurements in both groups and clinically no difference in muscle function or sensitivity was registered. Pain management was significantly better in the femoral nerve group with less pain and morphine consumtion at 12 / 24 and 48h (p <0.05) leading to less side effects like PONV (p <0.05).
Conclusions: Continuous femoral nerve block offers better postoperative pain control without an increased risk of femoral nerve damage.

FM 14

Benefit and harm of adding adrenaline to local anaesthetic for loco-regional anaesthesia: a meta-analysis of randomised controlled trials

Tschopp C.[1], Schneider A.[1], Zaarour M.[1], Tramèr M.[1], Elia N.[1,2]
[1] Division of Anaesthesiology, Geneva University Hospitals, Switzerland; [2] Institute of Global Health, University of Geneva, Switzerland!

Background and goals of the study: Adrenaline is commonly used as an adjuvant to local anaesthetics (LA) for regional anaesthesia. The benefit and harm of this adjunction remains poorly characterised. This systematic review aims to assess the impact of adding adrenaline to a LA for epidural anaesthesia, intrathecal anaesthesia, and peripheral nerve or plexus blocks. (PROSPERO 2015: CRD42015026148)
Methods: We searched CENTRAL, EMBASE, Google Scholar and PubMed (no language restriction) to October 2015 for all randomised controlled trials comparing any regimen of any LA combined with any regimen of adrenaline (experimental intervention) to the same LA regimen without adrenaline (control intervention). Trials testing LA infiltration (for instance, subcutaneously) were not considered. Trials in which an additional adjuvant was used (for example, an opioid or clonidine) were considered if the same regimen of the adjuvant was used in both groups. In order to be included, a trial had to report on the duration of analgesia, time to 2 segments regression, LA consumption, or adverse effects. Reports were not considered if adrenaline was added to regional anaesthesia in absence of a LA.
Results: We identified 66 randomised trials (3529 patients): 35 trials (1783 patients) testing adrenaline for epidural anaesthesia, 25 (1543) for intrathecal anaesthesia, and six (203) for peripheral nerve or plexus blocks. Adrenaline increased the duration of analgesia of spinal anaesthesia (weighted mean difference [WMD] 34 minutes, 95%CI [13 to 55]), and of peripheral nerve and plexus blocks (WMD 66 minutes, [37 to 95]). The duration of motor block and the time to 2 segments regression were prolonged with adrenaline in spinal anaesthesia (WMD 65 minutes, [41 to 89] and WMD 16 minutes, [9 to 23] respectively). Intrathecal adrenaline in combined spinal-epidural (CSE) decreased epidural bupivacain consumption in parturients. Epidural adrenaline did not show any benefits. There was no evidence of an impact of adrenaline on the incidences of PONV, sedation, urinary retention, pruritus, bradycardia, motor block or hypotension, or on the incidence of caesarean section or instrumentation for delivery, umbilical arterial pH, or foetal bradycardia.

Conclusions: Adding adrenaline to LA increases the duration of analgesia for spinal and peripheral nerve block anaesthesia and allows a LA sparing effect for the CSE technique without increasing the incidence of adverse effects.

FM 15

Prospective assessment project about cardiac arrest resuscitation

Käser D.[1], Plazikowski E.[1], Theiler L.[1], Greif R.[1], Kleine-Brueggeney M.[1], Riggenbach C.[1]
[1] Inselspital, University Hospital Bern, Dept of Anaesthesiology & Pain Medicine

Background: Incidence rates of cardiopulmonary reanimations in medical institutions are rare but survival rates low. In most hospitals trained emergency teams can be called in cases of acute life threatening conditions such as cardiac arrest or acute airway problems. In this study, we evaluated reanimation alarms at the Inselspital Bern to analyze and improve procedures and to increase patient safety.
Methods: From February 2015 until February 2016, every reanimation alarm for which the emergency team was called was documented and later analyzed. According to the Utstein Style, we timed the tasks and noted peri- and postreanimation data, such as alerting reason, whether collapse was observed, first rhythm observed and survival rates. If the patient survived the event, a prospective observation was made after 30 days using the Glasgow Outcome Scale. Patients who arrived under cardiopulmonary reanimation to the emergency department and reanimations in the emergency room/coronary lab/ operational tracts or in the pediatric clinic were excluded.
Results: 118 alarms were released during this period. In only 49% of these alarms, patients suffered from an immediately life threatening condition. 78% of these alarms were because of cardiac arrest, 18% because of an acute airway problem and 5% because of a hemodynamic instability. False alarms were triggered because of unspecific syncopes (42%), general malaise (20%), epileptic seizures (11%) or others (27%), including mistakenly pressing the alarm button (5 cases). In the central building of the hospital, mean time until reaching the patient was 2 min 46 sec (SD 1.03 min) vs. 5 min 34 sec (SD 2.57 min) in a periphery located building. The 30-day overall survival rate for cardiac arrest victims was 33%. 79% of these arrests were witnessed. If witnessed, 30-day survival rate was 38%, whilst unobserved it was 22%.
Conclusion(s): In only 49% of triggered alarms the indication to call the emergency team was given, but once raised, alarms could not be cancelled if triggered by an automatic alarm button. Most false alarms were initiated because of an unspecific syncope. The time reaching the patient was shorter in the central building and the chance to survive a cardiac arrest was higher there than in a periphery location. Patients with a witnessed cardiac arrest had a higher 30-day survival rate than unobserved arrest victims. Dispatcher-guided CPR and triage would need to be discussed and introduced.

FM 16

Ketamine for chronic postoperative pain in patients undergoing major back surgery. A Randomized Clinical Trial

Czarnetzki C.[1], Desmeules J.[4,6], Cedraschi C.[4], Daali Y.[4], Tessitore E.[2], Dupuis Lozeron E.[5], Faundez A.[3], Fournier R.[1], Lysakowski C.[1], Tramèr M.[1,6]
[1] Division of Anaesthesiology Geneva University Hospitals, Geneva, Switzerland; [2] Division of Neurosurgery, Geneva University Hospitals, Geneva, Switzerland; [3] Division of Orthopedics and Trauma surgery, Geneva University Hospitals, Geneva, Switzerland; [4] Division of Clinical Pharmacology and Toxicology; [5] Institute of Clinical Epidemiology, Geneva University Hospitals and University of Geneva, Geneva, Switzerland; [6] Faculty of Medicine, University of Geneva, Geneva, Switzerland

Importance: Patients undergoing back surgery may develop chronic pain. Ketamine, an N-methyl-D-aspartate receptor antagonist, may reduce the risk of chronic postoperative pain.
Objective: To evaluate the efficacy of perioperative intravenous ketamine to reduce pain at 6 and 12 months after major lumbar back surgery.
Design, setting, and participants: This was a single center, randomised, double-blind, placebo-controlled trial. We randomised 160 patients between 10.2007 and 01.2012. Last 12 months visit was end 01.2013. In 137 patients the results at 6 months and in 127 patients the results at 12 month could be analysed. We performed an intention to treat analysis.
Interventions: Patients were randomised to an intravenous bolus of ketamine 0.25 mg kg^{-1} or matching placebo at induction of anaesthesia followed by a perfusion of 0.25 mg kg^{-1} h^{-1}, reduced to 0.1 mg kg^{-1} h^{-1} one hour before the end of surgery and maintained until the end of recovery room stay.
Main outcomes and measures: Primary outcome was leg or back pain (worst pain score during the preceeding week) at 12 months. Secondary outcome was the core outcome measures index (COMI). Additional outcomes were beck depression index (BDI) and quantitative sensory testing, measuring peri-incisional and distant hyperalgesia. All measurements were conducted preoperatively and 6 and 12 months postoperatively. We also measured at 24 and 48 hours pain at rest and mobilisation, cumulative morphine consumption and adverse effects (sedation, hallucination, postoperative nausea and vomiting).
Results: At baseline , pain scores [0–10 VNRS, mean with 95%CI] were 7.0 [6.5–7.4] in the ketamine group and 7.2 [6.7–7.6] in the placebo group, p = 0.500. At 6 months, pain scores were 4.0 [3.5–4.6] with ketamine and were 4.2 [3.5–4.8] with placebo, p = 0.823. At 12months, pain scores were 4.1 [3.4–4.8] with ketamine and were 3.9 [3.1–4.7] with placebo, p = 0.712. COMI total scores were not different at baseline, 6 months and 12 months. There was no difference in additional outcomes (BDI, quantitative sensory testing), in perioperative outcomes (pain at rest and mobilisation, morphine consumption), and in the incidence of adverse effects.
Conclusions: In patients with a high incidence of severe chronic pain at baseline undergoing lower back surgery, ketamine, in a widely recommended perioperative regimen, had no effect on postoperative pain scores at 6 and 12 month. There were no short term benefits and no adverse effects.

FM 17

Benefit and harm of adding ketamine to an opioid in a PCA device for the control of postoperative pain Systematic review and meta-analyses of randomised-controlled trials with trial sequential analyses

Assouline Benjamin[1], Tramèr Martin R.[1], Kreienbühl Lukas[1], Elia Nadia[1,2]
[1] Division of Anaesthesiology, Geneva University Hospitals, Geneva, Switzerland (Dr Assouline, Prof Tramèr, Dr Kreienbühl, Dr Elia); [2] Institute of Global Health, University of Geneva, Geneva, Switzerland (Dr Elia)

Context: Ketamine is often added to an opioid in a patient-controlled analgesia (PCA) device for the control of postoperative pain. Benefits and adverse effects of this adjunction remain unclear.
Objectives: To test whether, 24 hours after surgery, adding ketamine to an opioid in a PCA device could decrease postoperative pain intensity by ≥25% and decrease cumulative opioid use by ≥30% and whether it could, during hospital stay, decrease the risk of postoperative nausea and vomiting (PONV) by ≥30%, decrease the risk of respiratory adverse effects by ≥50%, and increase the risk of hallucinations by less than twofold.
Data sources: Comprehensive search in electronic databases (MEDLINE, Cochrane, EMBASE) until April 2016, and bibliographies.
Method: We included randomised trials comparing postoperative IV opioid PCA with and without ketamine, in adults or children, following surgery with general or regional anaesthesia. To compensate for multiple primary outcomes testing, alpha level was set at 2% and 98% confidence intervals were computed. Trial sequential analysis was used to further control the risk of type I error.
Results: We included 19 trials (1349 adults, 104 children). In nine trials (595 patients), pain intensity at rest at 24 hours was decreased with ketamine (weighted mean difference [WMD] –1.1 cm on the 0–10 cm visual analogue scale, 98% CI [–1.8 to –0.39], p <0.001). In seven trials (495 patients), cumulative 24 hours morphine consumption was decreased with ketamine (WMD -12.9 mg [–22.4 to –3.35], p = 0.002). In seven trials (435 patients), the incidence of PONV was decreased with ketamine (risk ratio [RR] 0.56 [0.40 to 0.78], p <0.001). There was no significant difference in the incidences of respiratory adverse events (nine trials, 871 patients; 9.7% vs 5.5%; RR 0.31 [0.06 to 1.51], p = 0.08) or hallucinations (seven trials, 690 patients; 4% vs 4.6%; Peto odds ratio 1.16 [0.47 to 2.79], p = 0.70). Trial sequential analyses confirmed the significant benefit of ketamine on pain intensity, cumulative morphine consumption and PONV and its safety regarding the risk of hallucinations. The available data did not allow establishing dose-responsiveness.
Conclusions: Adding ketamine to an opioid-based PCA decreased postoperative pain intensity, opioid consumption, and the incidence of PONV. The risk of hallucinations was not increased in these trials. No definite conclusion could be drawn regarding the impact of this adjunction on respiratory adverse events.

FM 18

Sevoflurane potentiates LPS-induced iNOS expression but attenuates pro-inflammatory cytokine expression and secretion from mouse macrophages

Gerber T.[1,2,3], Oliveira S.D.[3], Chen Z.[3], Bonini M.G.[4], Beck-Schimmer B.[1,2,3], Minshall R.D.[3,5]
[1] Institute of Anesthesiology, University Hospital Zurich, Zurich, Switzerland; [2] Institute of Physiology and Zurich Center for Integrative Human Physiology (ZIHP), University of Zurich, Zurich, Switzerland; [3] Department of Anesthesiology, University of Illinois at Chicago, Chicago, USA; [4] Department of Medicine, University of Illinois at Chicago, Chicago, USA; [5] Department of Pharmacology, University of Illinois at Chicago, Chicago, USA

Background: Sevoflurane improves survival in mice suffering from severe sepsis (1) and reduces lipopolysaccharide (LPS)-induced TNF-α, CINC-1, MIP-2 and MCP-1 secretion by alveolar macrophages (2). However, the underlying mechanism responsible for these effects remains unclear. The aim of this study was to evaluate whether sevoflurane uniformly affects LPS-induced pro-inflammatory responses of macrophages *in vitro.*
Material and Methods: Murine bone marrow-derived macrophages (BMDM) were isolated from C57BL/6 mice and differentiated as previously described (3). F4/80 positive macrophages were stimulated with 100 ng/ml LPS for 1–24h in the presence or absence of 2% sevoflurane. To determine the macrophage inflammatory profile, the concentration of IL-1β and IL-6 in the supernatant was measured by ELISA and whole cell lysate was used to assess iNOS expression by Western blot. RNA was also isolated and expression of TNF-α, IL-1β, IL-6, and iNOS was measured by qPCR.
Results: Preliminary data showed a LPS-induced time-dependent increase of IL-1β and IL-6 secretion, which peaked at 24h. IL-1β levels at 4h (19 ± 8 ng/ml [mean ± SD]), 8h (61 ± 14 ng/ml), and 24h (478 ± 413 ng/ml) were significantly reduced, when BMDMs were co-exposed to 2% sevoflurane (7 ± 4 ng/ml), (17 ± 7 ng/ml), and (48 ± 39 ng/ml), respectively ($p < 0.05$). IL-6 release after 4h LPS stimulation (548 ± 164 ng/ml) was also reduced, when BMDM were co-exposed to sevoflurane (248 ± 99 ng/ml). In addition, qPCR results showed that sevoflurane decreases LPS-induced expression of these pro-inflammatory cytokines in macrophages. To our surprise, data indicated that sevoflurane potentiated LPS-induced iNOS protein expression by 39% at 8h compared with LPS alone ($p < 0.01$; $n = 3$), suggesting sevoflurane differentially regulates LPS- induced pro-inflammatory genes in mouse BMDMs.
Conclusion: A clinically relevant concentration of sevoflurane attenuated LPS-induced expression of the pro-inflammatory cytokines IL-1β and IL-6, but potentiated LPS- induced upregulation of iNOS protein in mouse macrophages. These data indicate that macrophage-specific effects of volatile anesthetic agents such as sevoflurane may account in part for their beneficial immunomodulatory and anti-inflammatory effects.

References
1 Hermann et al. Anesthesiology. 2013;119:901–6.
2 Steurer et al. Clin Exp Immunol. 2009;155:224–30.
3 Baig et al. J Exp Med. 2015;212(10):1725–38.

FM 19

Sevoflurane sedation in a rat model of sepsis: systemic and neuro-inflammation

Baumann L.[1], Schläpfer M.[1, 2], Eugster P.[2], Hasler M.[2], Booy C.[1], Beck-Schimmer B.[1, 2, 3]
[1] Institute of Physiology, University Zurich, Zurich; [2] Institute of Anesthesiology, University Hospital Zurich, Zurich; [3] Department of Anesthesiology, University of Illinois at Chicago, Chicago, USA

Background: Volatile anesthetics such as sevoflurane have shown anti-inflammatory properties in various organs and settings [1]. We were interested in evaluating the safety profile and the potential of sevoflurane to reduce neuro-inflammation in sepsis.
Methods: Adult male Wistar rats (329 ± 21 g) were subjected to intravenous injection of 1 mg/kg lipopolysaccharides (LPS) or sham procedure (phosphate-buffered saline, PBS) and randomly assigned to sedation with propofol or sevoflurane for 12h. Blood samples were taken every 3 hours. The inflammatory mediators cytokine-induced neutrophil chemoattractant protein-1 (CINC-1) and monocyte chemotactic protein-1 (MCP-1) were evaluated in serum and brain tissue. Brain damage marker mRNA s100B, transforming growth factor β (TGF-β) and glial fibrillary acidic protein (GFAP) as well as wet-to-dry ratio were assessed. Statistical analysis was performed using one way analysis of variance, $p < 0.05$ was considered significant.
Results: There was no difference with regard to ventilation or mean arterial blood pressure in the two sedation groups. Pro-inflammatory cytokines in serum were upregulated with two peaks at 3h and at 12h in the propofol and sevoflurane sepsis group (12h CINC-1: 401 ± 305 vs 96 ± 44 ng/ml; 12h MCP-1 4.82 ± 1.92 vs. 2.51 ± 0.54 µg/ml; both $p < 0.001$), values were higher in the propofol compared to the sevoflurane group.
Also in brain tissue CINC-1 and MCP-1 protein was increased upon LPS injection, however, with similar values in both sedation groups. Brain damage marker mRNA s100B, TGF-β and GFAP were decreased by 2%, by 25% and increased by 43% by sevoflurane, but without reaching statistical significance ($p = 0.99$, 0.35 and 0.42). Wet to dry ratio was not affected by the sedative regimen in septic animals (4.89 ± 0.07 vs. 4.80 ± 0.07, $p = 0.23$).
Conclusion: Sevoflurane seems to be safe in a rat sepsis model with regard to neuro- inflammation and offering the benefit of attenuating the systemic inflammatory reaction.

Reference
1 Lee YM, et al. Biomed Res Int. 2015.

FM 20

Beneficial effects of sevoflurane in a rat model of subarachnoid hemorrhage

Restin T.[1,2], Beck-Schimmer B.[1,2,3], Schläpfer M.[1,2]
[1] Institute of Anesthesiology, University Hospital Zurich, Zurich, Switzerland; [2] Institute of Physiology and Zurich Center of Integrative Human Physiology, University Zurich Irchel, Zurich, Switzerland; [3] Department of Anesthesiology, University of Illinois at Chicago, Chicago, IL, USA

Introduction: Volatile anesthetics are hardly used in brain-injured patients, because they are suspected to increase intracranial pressure (ICP). Current data, however, is contradictory. We could recently show that sevoflurane positively affects endothelial barrier function *in vitro* (unpublished data) and also reduces mortality in sepsis *in vivo* [1]. We now hypothesize that sevoflurane at a sedative concentration does not change intracranial pressure after SAH and that it has the potential to reduce brain edema in rats.
Material and Methods: Adult male Wistar rats were randomly assigned to SAH or sham-operation, mechanically ventilated and monitored. SAH was induced by perforation of the medial cerebral artery. A 4h exposure to either 0.5 MAC of sevoflurane (post-conditioning) or 5 mg/kg/h propofol was then initiated. Half of the animals were sacrificed after 4h, half of the animals were allowed to wake up and were observed for 24h in order to assess their neurological function (modified Garcia score). At the end of the experiment sera and brains were harvested. Brain water content and IgG extravasation were determined and tight junction proteins were stained to get an idea of the potentially disrupted blood-brain-barrier. Data was either evaluated by t-test (two groups) or by ANOVA (more than two groups).
Results: The type of sedation did not impact on hemodynamic stability. Upon induction of SAH rats showed an ICP increased from mean values of 9.4 ± 3.9 mm Hg to 33 ± 14.5 mm Hg without any intergroup difference ($p = 0.6$). During the 4h post- conditioning ICP stabilized at 14.7 ± 5.2 mm Hg and 16.2 ± 7.5 mm Hg ($p = 0.6$) with propofol and sevoflurane, respectively. Brain water content after 4h-post-conditioning was higher in animals sedated with propofol than with sevoflurane: 79.8 ± 0.5% vs. 78.5 ± 0.2% ($p = 0.047$). Garcia scores did not show any significant intergroup difference. Preliminary data on IgG extravasation showed a more pronounced accumulation in the propofol-SAH group after 4h. Moreover, staining of tight junction proteins indicate that these structural proteins are disrupted after SAH, but so far no certain impact of the type of sedation could be identified.
Conclusion: The use of 0.5 MAC sevoflurane appears to be safe with respect to hemodynamic stability, ICP and neurology in a rat model of severe brain injury. Our data suggests that early brain edema formation and vessel leakage is reduced under sevoflurane sedation compared to propofol.

Reference
1 Crit Care. 2015;19:45.

P 1

Improving patient safety through optimisation of airway management strategies

Nabecker S.[1], Greif R.[1], Kleine-Brueggeney M.[1,2], Riggenbach C.[1], Theiler L.[1]
[1] Inselspital, University Hospital Bern and University of Bern, Department of Anaesthesiology and Pain Therapy; [2] Barts NHS Health Trust, Department of Perioperative Medicine

Background: An UK Audit (NAP4) (1) estimated severe airway management-related complications in 1 of 5.500 anaesthesia cases. The incidence of minor complications remains unclear. Nonetheless, minor incidents have the potential to accumulate and lead to fatal events (2). Our goal is to improve patient safety through optimisation of airway management strategies. For this reason, we first obtained a baseline to estimate the incidence and nature of minor and major airway related events, followed by an intervention phase, and finally the re-analysis as a before and after cohort study to decrease severe and minor airway management-related complications.
Methods: As a baseline benchmark, all general anaesthesia cases at the University Hospital of Bern, Switzerland were closely monitored during two months. Based on these results, 5 interventions were implemented in the 10 months until the next evaluation phase. The interventions were: 1. To not check proper facemask ventilation before inducing neuromuscular blockade. 2. To preoxygenate optimally. 3. To perform a standardised compulsory pre-anaesthesia check. 4. To change operator (to most experienced) after 2 unsuccessful attempts to secure the airway. 5. To use videolaryngoscopy whenever possible. This was followed by the re-analysis. Our primary outcome parameter was the incidence of airway management-related events.
Results: During baseline analysis, 3.681 general anaesthesia cases were closely monitored over a 2-months period. Airway management-related events occurred in 574 cases (15.6%). Most frequent problems included: difficult bag-valve-mask ventilation (16.9%), several attempts needed to secure the airway (14.5%), Cormack & Lehane Score >2 (12.7%) and hypoxia or desaturation <95% (12.3%). The re-analysis after the implementation of the interventions listed above started on May 1st 2016 and will continue until June 30th 2016.
Discussion: The baseline analysis revealed a surprisingly high number of desaturations. At the congress, we will be able to demonstrate whether the easy to apply interventions were effective in reducing the number of events occurring during airway management.

References
1 Cook TM, et al. Major complications of airway management in the UK. Br J Anaesth. 2011;106(5):617–31.
2 Reason J. Human error: models and management. BMJ. 2000;320(7237):768–70.

P 2

Is advanced airway management feasible in isolated patients? A comparison of personal protective equipment (PPE), Patient isolation Units (PIU) and standard protection measures, using manikins

Käser D.[1], Plazikowski E.[1], Albrecht R.[2], Greif R.[1], Theiler L.[1]
[1] Inselspital, University Hospital Bern, Dept of Anaesthesiology & Pain Medicine, Switzerland; [2] Swiss Air Rescue, REGA, Zürich, Switzerland

Background: Incidence rates of highly infectious diseases are rising and treating patients suffering from diseases, such as Ebola or Tuberculosis, is challenging for emergency personnel. Wearing personal protective equipment (PPE) negatively affects medical performance. Alternatively, portable isolation units (PIU) may be used but their influence on tasks such as airway management is unknown. For that reason we compared six airway skills on manikins in three different isolation settings.
Materials and methods: With IRB approval, 30 anaesthetists, working in emergency services performed airway management on manikins in three settings: 1)manikin isolated in PIU, 2) participants wearing PPE, 3) standard setting. Six devices were used in each setting: Macintosh laryngoscope, Airtraq SP™ videolaryngoscope, i-gel™, ILMA Fastrach™, Ambu® fibreoptic aScope™, Cook Melker cricothyrotomy Set™. Order of settings and devices was randomized. We timed tasks and asked participants to rate their subjective difficulty on a VAS-Score.
Results: In 77% of attempts, regardless of setting or device, participants were able to secure ventilation in under 60s. Time-until-ventilation was shorter than 60s in 86% of attempts in standard setting, 84% whilst wearing PPE and 61% whilst the manikin was isolated in the PIU. Taking each individual device into consideration, the time-until- ventilation differed significantly comparing the PIU-setting to the others (p <0.01). In the standard setting mean time-until-ventilation was 30 ± 25sec (95%CI: 27–34sec), although time varied considerably between the devices: From fastest (i-gel, 8 ± 2sec (95%CI: 8–10sec)) to longest [Cricothyrotomy 58 ± 18sec (95%CI: 52–65sec)]. Longer times-until-ventilation were observed in the PIU-Setting: 68 ± 67sec (95%CI: 58–78sec). In the PPE-Setting it was 34 ± 30sec (95%CI: 30-39sec). The overall level of difficulty (VAS-Score) was significantly different between each setting (p <0.01). It was highest for the PIU (76 ± 13) compared with standard-setting (10 ± 8) and PPE-Setting (39 ± 17).
Conclusion(s): Excluding the cricothyrotomy and the fibreoptic scope, advanced airway management was possible even in a PIU setting with success rates of 85% under 60sec albeit with overall longer time-until-ventilation (35 ± 33sec) (standard-setting (19 ± 15) PPE-Setting (21 ± 16)). Supraglottic airway devices with overall mean time- until-ventilation of 11sec (i-gel™) and 12sec (ILMA™) proved to be reliable tools and can be recommended in a PIU setting.

P 3

Assessment of simulated emergency scenarios: Are trained observers necessary?

Noveanu J.[1], Amsler F.[2], Ummenhofer W.[1], von Wyl T.[1], Zuercher M.[1]
[1] Department of Anaesthesia, University Hospital Basel, Switzerland; [2] Amsler Consulting, Basel, Switzerland

Objectives: Simulation-based medical training is associated with superior educational outcomes and improved cost efficiency compared with non-interventional approaches or non-simulation training. Assessing the accuracy of trainees remains challenging, and implementation of specific evaluation techniques is cost-intensive. Self-evaluation has been demonstrated to be an efficient alternative to instructor-led debriefing in simulated crisis scenarios.The aim of the current study was to compare the accuracy self and external assessment of untrained raters using basic evaluation tools to expert assessment using advanced validation tools including validated questionnaires and post hoc video-based analysis.
Methods: 28 emergency airway management scenarios using a SimMan2-Simulator were video recorded for further evaluation. Participants consisted of 28 emergency physicians (EP) who were involved in four different scenarios with different roles: One scenario as a team leader, one as an assisting team member, and two as observer. Non-technical skills (NTS) and technical skills (TS) were analyzed by three independent groups: The performing team (PT) consisted of the two EP acting either in the role of team leader or team member. The observing team (OT) consisted of two of the participating EP not involved in the current clinical scenario. The expert team (ET) involved two specifically trained external observers (one psychologist and one EP) using video-assisted objective assessment combined with standardized questionnaires.
Results: Intragroup reliability demonstrated by intra-class correlation (ICC) was moderate to good for TS (ICC 0.42, p = 0.011) and NTS (ICC 0.55, p = 0.001) in PT and moderate to good for TS (ICC 0.41, p = 0.034) or poor for NTS (ICC 0.27, p = 0.119) in OT. ET showed an excellent intragroup reliability for both TS (ICC 0.78, p <0.001) and NTS (ICC 0.81, p <0.001). Interrater reliability was different between ET and PT (p = 0.017 for TS; p = 0.036) and between ET and OT (p = 0.026 for TS; p = 0.003 for NTS). There was no difference between OT and PT (p = 0.485 for TS, p = 0.139 for NTS).
Conclusions: Expert assessment of simulation-based medical training scenarios using validated checklists and performance of *post hoc* video-based analysis was superior to self-assessment or live analysis of untrained observers for both, TS and NTS. Therefore, in order to increase feedback quality or assessment grade, training of observers is mandatory. Experience alone is not enough.

P 4

Establishing a model of germ-free endotracheal intubation and desflurane anaesthesia in mice

Wenger Stefanie[1,2], Lippuner Christoph[1,2], Stüber Frank[1,2]
[1] Bern University Hospital Insel, Department of Anaesthesiology and Pain Medicine, University of Bern, Bern, Switzerland; [2] Department of Clinical Research, University of Bern, Bern, Switzerland

Introduction: The gut, and its associated microbiota, has been suggested as a possible cause or initiator of perioperative inflammatory responses such as SIRS (systemic inflammatory response system) or sepsis. It has been hypothesized that anaesthetic treatment lead to an impaired mucosal barrier permeability, which then allows translocation of bacteria to systemic sites. Translocated bacteria (or increased dissemination of bacterial products) may activate the inflammasome, a multiprotein oligomer expressed in myeloid and

epithelial cells that is a key innate immune sensor. Despite the proposed involvement of the intestinal microbiota in perioperative inflammatory responses, there are very few studies investigating the effect of anaesthetics on the immune system of the gut.
Objectives: Due to the lack of mechanistic information and the difficulty of performing precisely controlled experiments in humans we aimed to generate a mouse model of anaesthetic administration that is as close as possible to that used in humans to address the important question if anaesthetic concepts have an influence of the immune system of the gut. Therefore, the establishment of the technology to intubate mice under germ- free conditions in a tissue culture hood and the development of a stable desflurane anaesthesia in mice is needed.
Results: A mouse model for germ-free endotracheal intubation in a tissue culture hood was successfully established. To our best knowledge, desflurane was for the first time used for mouse anaesthesia. Mice were induced in an induction chamber for two to five minutes and thereafter intubated using a fiberoptic tool. 85% of intubations have been successful with the first attempt. Mice were ventilated and successfully kept under general anaesthesia for 60 minutes. Vital functions as e.g. body temperature, ECG, heart rate etc. were recorded using a mouse monitor and will be presented. Desflurane was very well tolerated by the mice and wake-up / recovering time was 20 to 45 s. This was much shorter if compared with sevoflurane (2 to 5 min).
Outlook: A system for germ-free endotracheal intubation of mice and desflurane anaesthesia was established successfully. This model can now be used to evaluate the impact of different anaesthetics on the intestinal immune system.

P 5

Preoperative copeptin concentrations in patients undergoing elevated risk vascular surgery

Kamber F.[1], Mauermann E.[1], Mueller C.[2], Laurati Buse G.[1]
[1] Department for Anesthesia, Surgical Intensive Care, Prehospital Emergency Medicin and Pain Therapy, University Hospital of Basel; [2] Department for Cardiology, University Hospital of Basel

Background: Copeptin has been shown to reliably rule-out myocardial infarction in troponin negative patients presenting to the emergency room with a suspected acute coronary syndrome [1]. This has led to the endorsement of a dual biomarker strategy to rule out myocardial infarction in this population, based on the earlier, but much less specific, rise in copeptin in physiological stress [2].
Methods: The study is a prospective cohort study examining 30 patients undergoing elevated-risk vascular surgery. Copeptin concentrations were measured immediately prior to induction of anesthesia, upon arrival on the ICU, at 2h, 4h, 6h, and 8h after arrival, as well as on the 1st and 2nd postoperative day. Troponin was measured at analogous time points. ECGs were conducted preoperatively, at 4h, and between postoperative day 2 and 4. Our primary endpoint was a description of the time course of copeptin. Secondary endpoints were the association of copeptin concentrations at various timepoints with the occurrence of myocardial injury (defined as troponin T concentrations >30 ng/L) within 48h and ECG changes indicative of myocardial injury.
Results: Until now we have included 20 patients of which we have copeptin concentrations for the first 12 patients. Troponin concentrations are currently outstanding, but we expect all biomarker measurements to be available shortly. Preoperative copeptin concentrations were median 9,05 pmol/L (interquartile range 7,375 to 11,8 pmol/L). The copeptin peak was found immediately after surgery 57 pmol/L (interquartile range 29,15 to 229,65 pmol/L) and normalized by the second postoperative day.
Conclusion: These very preliminary results indicate that copeptin concentrations greatly increase immediately following surgery and appear to return to presurgical concentrations by the second postoperative day. This implies that the currently propagated cut-offs for the rule-out of myocardial infarction in the non-surgical population (14p mol/L) may not be very useful in detecting postoperative myocardial injury.

References
1 Khan SQ, et al. C-terminal provasopressin as a novel and prognostic marker in acute myocardial infarction: Leicester Acute Myocardial Infarction Peptide (LAMP) study. Circulation. 2007;115:2103–10.
2 Roffi M, et al. ESC Guidelines for the management of ACS in patients presenting without persistent ST-segment elevation: Task Force for the Management of ACS in Patients Presenting without Persistent ST-Segment Elevation of the ESC. Eur Heart J. 2015.

P 6

Confounders of NT-pro-BNP and BNP as a pre-operative cardiac risk marker in a University Anaesthesiology Clinic – a Pilot Study

Lehmann Lutz[1,2], Book Malte, Rieder Heinz, Lippuner Christoph, Stüber Frank
[1] Bern University Hospital Insel, Department of Anaesthesiology and Pain Medicine, University of Bern, Bern, Switzerland; [2] Department of Clinical Research, University of Bern, Bern, Switzerland

Introduction: Pro Brain Natriuretic Peptide (proBNP) is secreted by ventricular cardiomyocytes into the blood in response to atrial or ventricular wall stretch or myocardial ischemia. It is cleaved into two fragments: the active BNP and the inactive NT-pro-BNP. Recent investigations showed that BNP and NT-pro-BNP are powerful predictors of death/major adverse cardiovascular events in patients with stable coronary artery disease, acute coronary symptoms, and congestive heart failure. The preoperative BNP or NT-pro-BNP plasma concentration is a good predictor of cardiovascular events in the first 30 days after noncardiac surgery. The measurement of BNP plasma levels preoperatively should be considered especially in cardiac patients undergoing noncardic surgery to assess the perioperative cardiac risk. Different Single Nucleotide Polymorphisms (SNPs) were detected and are partly associated with de- or increased BNP/ NT-pro-BNP plasma levels.
Objectives: This pilot study evaluates the haplotype organization of the BNP gene in a Suisse cohort of preoperative patients. Preoperative BNP and NT-pro-BNP plasma levels will be correlated with SNPs.
Methods: The analysis of the prospective cohort study includes 207 patients with ASA I/II and 219 with ASA II/IV classification. A blood sample was withdrawn after signed informed consent during induction of anaesthesia and NT-Pro-BNP and BNP plasma concentrations were measured in the clinical chemistry laboratory. Blood samples were genotyped for eight described SNPs: rs198389, rs198358, rs5063, rs5068, rs6676300, rs11079028, rs632793 and 12502952.
Results: Preoperative BNP respectively NT-pro-BNP levels were significantly different (p >0.0001) between ASAI/II (15 ± 18 pg/ml resp. 39 ± 44 pg/ml) and the ASAIII/IV group (47 ± 132 pg/ml resp. 146 ± 778 pg/ml).
Allele frequencies for the Swiss population were as expected from data in the HapMap database for the European Population (n = 226). For the ASA I and II group, only the SNP rs198398 has an association with altered BNP concentration. rs632793 is associated with BNP alterations and rs5068 with changes on BNP and NT-pro-BNP levels in the ASA III and IV group.
Overall patients, rs198358 has an impact on NT-pro-BNP concentrations. SNPs rs198398, rs632793 and rs6676300 are associated with altered BNP and NT-pro-BNP concentration.
Conclusion: In a Swiss Cohort, SNPs are observed to alter BNP and NT-pro-BNP plasma levels. This finding may have an impact on future cut-off level definition.

P 7

Impact of perioperative dehydration on postoperative nausea and vomiting in patients undergoing radical cystectomy and urinary diversion: a secondary analysis of a randomized controlled trial

Löffel L.M.[1], Burkhard F.C.[2], Wuethrich P.Y.[1]
[1] Department of Anaesthesiology and Pain Medicine, Inselspital, Bern University Hospital, Switzerland; [2] Department of Urology, Inselspital, Bern University Hospital, Switzerland

Background & Goal of Study: Postoperative nausea and vomiting (PONV) may affect 25–80% of patients after surgery. It can augment healthcare costs by delaying recovery including return of gastrointestinal function. Open radical cystectomy (ORC) has a high gastrointestinal complication rate. It has been suggested that preoperative dehydration may exacerbate PONV. However, the impact of postoperative dehydration on PONV is unknown. The goal of this analysis was to determine if early postoperative dehydration is related to PONV in patients after ORC.
Materials & Methods: Secondary analysis from a randomized, parallel-group single-centre trial including 44 patients undergoing ORC with urinary diversion receiving either a chloride-depleted glucose 5% potassium enriched crystalloid (G5K group) or a balanced crystalloid (control group) perioperatively in the setting of a fluid management aiming for a zero balance. Urinary analysis (osmolality (U_{osm}), chloride (UCl), sodium (U_{Na})) was performed on the urine taken just before surgery started and then 6 h postoperatively. Dehydration was defined as urine osmolality U_{osm}>600mOsmol/kg. Data were analysed using

non-parametric statistical models. Multiple logistic regression analysis was conducted.
Results & Discussion: The groups were comparable regarding surgical characteristics, intraoperative parameters and fluid administration. Preoperative dehydration was found in 36% (n_{total} = 16/44) with no difference between the groups. Preoperative dehydration was not associated with early postoperative nausea (P = 1.000) or early postoperative dehydration (P = 0.756). Dehydration 6 h postoperatively was present in 8/22 patients (36%) in the control group and in 4/22 patients in the G5K group (18%), P = 0.310. Two patients in the G5K group and 2 patients in the control group experienced nausea (n_{total} = 4/44, 9%) during the first 6 h postoperatively. The patients with nausea had significantly elevated U_{osm} 685mOsmol/kg [range: 647–735] vs. 582mOsmol/kg [215-934], P = 0.008. Multiple logistic regression analysis detected U_{osm} (adjusted OR 0.984 [95% CI 0.974-0.994]; P = 0.002) and U_{Cl} (adjusted OR 1.021 [95% CI 1.001–1.042]; P = 0.039) as predictors for early postoperative nausea. The choice of crystalloids did not predict postoperative nausea within 6 h after surgery.
Conclusions: Perioperative dehydration was neither common nor severe in this setting. Elevated urine osmolality during the early postoperative period was associated with nausea.

P 8

Effectiveness of adding morphine to epidural anesthesia after cesarean section before catheter removal

Zettl A.[1,3], Auf der Maur P.[1], Fischer T.[2], Filipovic M.[1]
[1] Klinik für Anästhesiologie, Intensiv-, Rettungs- und Schmerzmedizin, Kantonsspital St. Gallen, Schweiz; [2] Frauenklink, Kantonsspital St. Gallen, Schweiz; [3] Departement für Anästhesie, Operative Intensivbehandlung, präklinische Notfallmedizin und Schmerztherapie, Universitätsspital Basel, Schweiz

Introduction: Based on evidence suggesting better postoperative pain control after cesaren (C)-section by adding morphine before removal of an epidural catheter we changed our clinical practice.
Objectives and outcome measures: The aim was to establish effectiveness and safety of epidural morphine administration after C-section in comparison to former practice. Primary outcome measures were the proportion of women free from postoperative iv opioid medication, secondary outcome measures were the total amount of postoperative opioid administered and pain control (visual analog scale, VAS) on postoperative day 1 and 2. Safety endpoints were the occurrence of pruritus or postoperative nausea and vomiting, and signs of respiratory depression.
Patients and Methods: After IRB approval, data from women undergoing C-section before and after introduction of epidural morphine into clinical practice were collected. For secondary C-section, lidocaine 2%CO_2 (8–26 mg), fentanyl (2.5 µg/ml) and adrenaline (5 µg/ml) were given through the preexisting epidural catheter after excluding intrathecal position. Before removal of the catheter at the end of the procedure and after assuring that the sensory anesthetic level was below segment Th 4, 2 mg morphine in 5 ml NaCl 0.9% were injected through the epidural catheter (03/2015–08/2015). In the control group, the catheter was removed immediately after C-section (03/2014–08/2014). Charts of 149 consecutive patients were screened from which 78 had to be excluded (lack of consent [51], incomplete documentation [18], spinal anesthesia [9]). Dichotomous data were compared by χ^2test, continuous data by non-parametric tests. Analyses were performed by SPSS for windows.
Results: The groups consisted of 28 and 43 women in the morphine and control group. There were no differences in baseline characteristics. In the morphine group, 21 out of 28 women did not receive iv opioids postoperatively compared with 6 out of 43 in the control group (p <0.0001). The mean postoperative iv morphine consumption during the first 24h was 1.1 mg (95% confidence interval (CI) 0.2–2.1 mg) and 5.9 mg (95% CI 4.6–7.1 mg) (p <0.0001), the median maximal VAS at rest during the first 24h was 3.5 (interquartile range (IQR) 2) vs. 6 (IQR 3) (p <0.0001), respectively. There was no difference in safety endpoints.
Conclusion: We successfully implemented a change in epidural anesthesia for C-section and proved that the expected effectiveness is reproduced in our clinical setting.

P 9

The effect of combined spinal-epidural versus epidural analgesia in laboring women on nonreassuring fetal heart rate tracings. Systematic review and meta-analysis

Hattler J.[1], Klimek M.[2], Rossaint R.[3], Heesen M.[1]
[1] Department of Anaesthesia, Kantonspital Baden, Im Ergel 1, 5404 Baden, Switzerland; [2] Department of Anaesthesiology, Erasmus University Medical Center,s-Gravendijkwal 230,3015 CE Rotterdam,The Netherlands; [3] Department of Anaesthesia, University Hospital RWTH Aachen, Pauwelsstr. 30,52074 Aachen, Germany

Background: Combined spinal-epidural labor analgesia has gained popularity but it is unclear whether this technique is associated with a higher incidence of nonreassuring fetal heart rate tracings compared to epidural analgesia. Our meta-analysis aimed at comparing the incidence of nonreassuring fetal heart rate tracings between the two neuraxial techniques.
Methods: Databases were searched to identify randomized controlled trials that compared the incidence of nonreassuring fetal heart rate tracings, as defined in the individual studies, after combined spinal-epidural versus epidural analgesia in laboring women. Risk ratios and 95% confidence intervals were calculated using the random effects model. We performed a subgroup analysis for studies using low-dose epidural bupivacaine concentrations (≤0.125%) for epidural analgesia.
Results: Seventeen trials including 3947 parturients were retrieved that compared the two neuraxial techniques. All trials used intrathecal opioids in one study arm. The pooled effect estimate of low- and high-dose epidural bupivacaine studies together showed a significantly increased risk of nonreassuring FHR tracings with the combined technique (risk ratio (RR) 1.31, 95% CI 1.02 to1.67, p = 0.03; I^2 = 18%). A subgroup analysis of 10 trials using low-dose epidural bupivacaine found a RR for nonreassuring fetal heart rate tracings between combined spinal-epidural and epidural analgesia of 1.12, 95% CI 0.93 to 1.34, p = 0.18. In a sensitivity analysis of those low-dose epidural bupivacaine studies that ensured blinding of the outcome assessor the RR was 1.41, 95% CI 0.99 to 2.02, p = 0.06.
Conclusions: Combined spinal-epidural labor analgesia was associated with a higher risk of nonreassuring fetal heart rate tracings than epidural analgesia alone. In the subgroup analysis comparing combined spinal-epidural with low-dose epidural labor analgesia the 95% CI contains a clinically significant difference between groups; moreover, the 95% CI overlaps with the 95% CI of the comparison of the combined low- and high-dose epidural techniques. Therefore, it cannot be concluded that there was no difference between combined spinal-epidural and low-dose epidural techniques.

P 10

Multiplate use during an emergency neurosurgical procedure followed by coronary artery bypass grafting: What did we learn?

Bambule Y.[1], Bonhomme F.[1], Pavlovic G.[1]
[1] Département d'Anesthésiologie, Pharmacologie et Soins intensifs, Hôpitaux Universitaires de Genève

Background: In the perioperative setting, impedance platelet aggregometry is increasingly used to evaluate the bleeding and thrombotic risks in patients treated with antiplatelet drugs. However, the use of point-of-care assays to guide platelet transfusion is controversial.
Case report: A 79 year-old man treated with aspirine plus clopidogrel was admitted for an NSTEMI.
The coronary angiography revealed a critical stenosis of the left main stem coronary artery, unfractionated heparin was initiated and coronary artery bypass surgery was planned within a few days.
The patient progressively developed tetraparesia, and the MRI showed a cervical epidural hematoma (C3 to D2) with medullary compression. We decided to perform an emergency hemilaminectomy in prone position, immediately followed by off-pump myocardial revascularization.
Before the neurosurgical procedure started, platelet function was assessed with the Multiplate® analyser (Roche Diagnostics, Basel, Switzerland) and showed a high level of platelet inhibition: ASPItest 0 U (norm 71–115), ADPtest 9 U (norm 57–113) and TRAPtest 25 U (norm 84–128). However, we did not administer platelet concentrates preventively before the neurosurgery began. No excessive bleeding occurred during the laminectomy, and off-pump triple bypass heart surgery was then performed using a small dose of unfractionated heparin (100 IU/kg). No abnormal bleeding was observed and platelet transfusion was not required. The patient was then transferred to the ICU. He gradually recovered from his neurological deficit and was discharged from ICU after 72 hours.

Discussion: The Multiplate® analysis was in favour of marked platelet inhibition which under normal circumstances would probably have been treated by the transfusion of one or more platelet concentrates. However, the risk of neurosurgical bleeding was counterbalanced by the risk of coronary artery occlusion. We therefore decided to correct platelet inhibition only if clinically significant bleeding occurred despite careful surgical haemostasis.
Learning points: Preventive transfusion should be avoided. Clinically significant bleeding should be the main criteria for implementing a platelet transfusion algorithm even if platelet function testing demonstrates a high level of platelet inhibition.

P 11

Incidence of preoperative haemoglobin rate on the hospitalization duration in the colorectal surgery

Benoliel Alan[1], Blaudzun Gergoire[1], Favre Mathieu[1], Legouis David[1], Assouline Benjamin[1], Pierre Guillon[1], Ris Frederique[2], Schiffer Eduardo[1]
[1] Anesthesiologie, Geneva University Hospitals; [2] Visceral surgery, Geneva University Hospitals

Introduction: Patients undergoing colorectal surgery have a high incidence of preoperative anaemia. Several studies suggest that preoperative anaemia is not only a comorbidity factor, but also an independent risk factor increasing risk of postoperative major complications. In this study we investigated the impact of preoperative haemoglobin levels over the duration of hospitalization in patients referred for colorectal surgery.
Materials and methods: We performed a retrospective study on 132 patients undergoing colectomy between 2014 and 2015. The indications for surgery were colonic cancer, diverticular and inflammatory diseases. Were included in the database, epidemiological parameters of patients, length of hospital stay, comorbidities, postoperative complications and available laboratory tests (preoperative, Day 1, Day 3, Day 5, Day 7) with among others: haematological, inflammatory, martial and renal function. Patient characteristics were analysed using Student's and X2 tests. The link between length of hospital stay and preoperative haemoglobin was analysed using multivariate linear regression. After univariate analysis, all parameters that have significant predictive value were included in a multivariate model. The final equation regression was obtained by a mixed step-by- step approach. The alpha significance threshold was set at 0.05.
Results: The preoperative haemoglobin rate average was 135 g/L ± 1,8. The duration of postoperative hospitalization average was 11 ± 7 days. Among all the variable include in the model (linear regression), only the preoperative haemoglobin rate, laparoscopic surgery and complication were signicantly (respectively: coef = –0,96 p = 0,002; coef = –7,1 p = 10–6; coef = 4,5 p = 10–6). In multivariate linear regression, we find that the duration of hospitalization increases of 1.6 days per g/L haemoglobin less during preoperative evaluation.
Conclusion: We note here that the preoperative haemoglobin directly influences the duration of hospitalization and potentially the onset of complications. If some surgeries like orthopaedic surgery have established protocols taken as expenses in the preoperative anaemia to reduce postoperative complications, there are little or no protocols for colic surgery. Such protocols should be implemented in colon surgery, and included in existing protocols of fast tracking and would probably reduce the length of hospitalization of patients in this setting.

P 12

Chronic ivabradine treatment attenuates sympathetically-mediated tachycardia in surgical patients – a retrospective study

Bollen Pinto Bernardo[1], Eduardo Schiffer[1], Marc Licker[1]
[1] Department of Anaesthesia, Geneva University Hospitals

Tachycardia-associated unbalanced myocardial oxygen supply-demand relationship is implicated in the pathophysiology of perioperative myocardial injury. Presently no current safe and efficient strategies exist to prevent it. In this preliminary study we hypothesized that patients under chonic ivabradine (IVA) treatment, a blocker of funny channels in the sinus node that produces selective heart rate (HR) reduction, had a blunted tachycardic response to orotracheal intubation (OTI) and surgical incision (SI) two fairly standardised examples of sympathetic-mediated stimulation. In this retrospective case-control study at the University Hospitals of Geneva, we screened patients chronically treated with IVA scheduled for non-cardiac surgery under general anaesthesia in 2013 and 2014. The IVA group was divided in 2 subgroups according to preoperative HR: those with a HR <76 bpm, reflecting effective blockade of cardiac pacemaker (IVA+) and those with a HR >75 bpm (IVA-), suggestive of inadequate treatment. The Control group included untreated patients matched to IVA patients by gender, age and weight. The primary endpoint was the maximal HR change following intubation OTI and SI. One-way or repeated measures (RM) ANOVA were used to compare differences within/between groups. Results are presented as median [95% confidence interval of the difference]. We identified 18 patients chronically treated with IVA, of which 8 (44%) presented a baseline HR <76 bpm (IVA+). Patients in the IVA+ group presented no significant change in HR following OTI (+3[-4-14] bpm) whereas HR acceleration was observed in IVA- (+15[7-23] bpm) and Control patients (+15[9-21] bpm) (p = 0.0197 for Group and p <0.0001 for Time effect). Anesthetic drug dosage before intubation did't differ among the three study groups (p = 0.184 for propofol and p = 0.642 for sufentanyl). Following SI, patients in IVA+ group showed no change in HR (+2[-7-12] bpm) while significant tachycardia was observed in IVA- (+9[5-18] bpm) and Control (+7[1-13] bpm) groups (p = 0.0586 for Group and p = 0.0005 for Time effect). There was no significant change in blood pressure associated with OTI or SI (p = 0.33 and p = 0.0657 for Time effect, respectively). These findings suggest that effective IVA treatment prevents sympathetically-mediated tachycardia following OTI and SI. Further studies should focus on potential cardioprotective effect of IVA in high-risk surgical patients.

P 13

The new medical training platform in organ donation and transplantation for healthcare professionals. A project from Swisstransplant and the CNDO

Martinolli L.[1], Not I.[1], Mädler S.[2], Lussmann R.[2], Delalay C.[2], Bischoff P.[2], Regenscheit S.[2], Immer Franz[1]
[1] Swisstransplant; [2] CNDO (Comité National du don d'organes)

Aims: Switzerland detects a high rate of failure to consent to organ donation. In the last few years, a number of causes have been identified as well as the lack of health professional training at the hospital level have been pointed out as determining factors. This has motivated the idea to create a training concept to be implemented nationwide.
Material: Thanks to the support of a firm specialized in e-learning, 10 training modules have been elaborated. Modules have the following contents: basic information about organ donation, organ harvesting, brain death diagnosis, medical and health professional communication, breaking bad news, communication during the process of organ donation (part I + II), processes and quality, recognition of a donor, donor processing. Each module ends with a final test and participant must have 80% of correct answers to pass the module. After e-learning courses, two formal education sessions are planned with practical exercises.
Methods: After enrollment, professionals involved in the process of organ donation will receive access to undergo the different modules. Each module conclusion will guarantee a number of credits and processing all modules including formal education sessions will allow a national certification.
Conclusions and Acknowledgements: The training platform will serve to provide specific, standardized and high-quality training to healthcare professionals involved in the process of organ donation.

P 14

"Give the surgeon the right anaesthesiologists": Significance of anaesthesiologist- surgeon team performance for operating room management

Luedi M.M.[1], Kauf P.[2,3], Wieferich K.[4], Schiffer R.[5], Doll D.[4]
[1] Bern University Hospital Inselspital, Department of Anaesthesiology and Pain Medicine, University of Bern, Bern, Switzerland; [2] PrognosiX AG, Zurich, Switzerland; [3] Institute of Applied Simulation, Zurich University of Applied Sciences ZHAW, Waedenswil, Switzerland; [4] Department of Surgery, St. Marienhospital Vechta, Academic Teaching Hospital of the Medical School Hannover, Vechta, Germany; [5] Department of Finances and Controlling, St. Marienhospital Vechta, Academic Teaching Hospital of the Medical School Hannover, Vechta, Germany

Background: Performance of anaesthesiologists and surgeons has been studied previously, often respecting only quantitative dimensions and isolated from each other. The managerial significance of the interactions of anaesthesiologists and surgeons remains unclear. We aimed to study the interplay between anaesthesiologists and surgeons and its significance for operating room management.
Methods: 13,632 surgical procedures at the in Vechta were analysed. 64 surgeons and 48 anaesthesiologists were involved. Data for potential confounders including ASA physical status, age, and surgical

list (scheduled cases of specific surgical specialties) were detrended and corrected. Surgical lists were categorized as general surgery, trauma surgery, ear, nose, and throat surgery, and gynaecology. The effects of assignment of different anaesthesiologists to specific surgeons on turnaround times were analysed with a Monte Carlo simulation.
Results: Interprofessional team performances among the different surgical lists were significantly different. No team learning effects were observed over time. We constructed decision tables for the assignment of anaesthesiologists to specific surgeons at the studied St. Marienhospital and defined a decision algorithm based on these tables. Median turnaround times would have a reduction potential of 6.8% ([6.3%, 7.1%] 95% CI), had our algorithm been employed in staffing the operating room for the procedures represented in our data.
Conclusion: Beside quantitative measures, assigning the best fitting anaesthesiologist to a list and to a surgeon can impact perioperative team performance; thus, such assignments have managerial implications to make operating rooms more efficient and potentially reducing over-utilized times of surgical lists. Additionally, our results suggest that, on days with predicted under-utilized OR time, it might not be particularly useful to assign less efficient teams for training purposes without specific training programs because no learning effect over time was found to occur.

P 15

Shoulder surgery in the beach chair position for high risk patients: the impact of regional anaesthesia compared to a near-infrared spectroscopy-based general anaesthesia protocol

Aguirre Jose A.[1], Brada Muriel[1], Bühler Philipp[1], Guzzella Sandra[2], Borgeat Alain[1]
[1] Division of Anesthesiology Balgrist University Hospital Zurich;
[2] Institute of Anesthesiology and Pain Therapy, Kantonsspital Winterthur

Background: Shoulder surgery in the beach chair position is hemodynamic challenging. Near-infrared spectroscopy (NIRS) offers additional monitoring possibilities. However, the impact on neurocognitive and hemodynamic outcome remains unclear comparing regional anaesthesia to a NIRS-based general anaesthesia protocol for shoulder surgery.
Methods: Eighty ASA II-IV patients sheduled for elective shoulder surgery were prospectively allocated into this assessor-blinded study according to clinical standard into a regional anaesthesia or a intravenous general anesthesia group using a NIRS-based protocol. Controlled hypotension was used for all operations. Baseline values included hemodynamic parameters, baseline cerebral oxygenation and cognitive function tests prior to surgery. The general anesthesia patients were guided according to an estabished protocol with optimization of oxygenation, blood pressure, CO_2, hemoglobin and head position. Postoperative cognitive function was evaluated and compared as primary outcome to regional anesthesia patients prior to discharge.
Results: There were no differences between the groups concerning surgical and non-surgical parameters. Peroperative cognitive function was comparable between the groups as were preoperative cerebral saturation. Hemodynamic stability after beach chair positioning was significant ($p < 0.05$) better in the regional anesthesia group. Therer were less cerebral desaturation events in the regional anaesthesia groups. Intraoperatively the established NIRS protocol had to be used in 80% of patients to avoid cerebral desaturation. Postoperative PACU stay was higher in the general anaethesia group ($p < 0.05$) and in some cognitive function tests the regional anesthesia group showed better results ($p < 0.05$).
Conclusions: Regional anesthesia shows a positive impact on hemodynamic and cognitive function compared to a NIRS-based general anesthesia protocol.

P 16

Continued multimodal monitoring for peripheral nerve blocks (PNB). A comparative, randomized, blinded analysed study

Coudray A., Choquet O., Ould-Chikh M., Bringuier S., Capdevila X. Department of Anesthesia and Reanimation, Lapeyronie University Hospital, Montpellier, France

By performing a PNB, a nerve injury can be responsible for a persistant neuropathy. With the ultrasouned-guided peripheral nerve blockade, the incidence of an involontary intra-epineural injection can reach up to 17%. The multimodal monitoring including the pressure measurement during the injection of the local anesthetic coupled with the neurostimulation and the ultrasonography is advocated for securing the peripheral nerve blockade. However, no comparative study with the standard procedure has validated this concept. The objective of this study was to evaluate the effect of this monitoring on the incidence of involontary intra-epineural injection.
This prospective, randomized, controlled study started in January 2016. The patients undergoing an ultrasounded PNB were randomized in the conventional procedure group (CONV: a mechanical device of the pressure B-smart BBraun, nerve stimulator set to sentinel mode, 0.2 mA) or in the continued multimodal monitoring (CMM: continued measurement of injection pressure with a stop for hyperpressure (Compuflo Millestone), nerve stimulator set to 1.2 mA and degressive until sentinel mode. All procedures were recorded and analysed, blinded, and later on confirmed by two Anaesthetitic observers. The primary objectively juged endpoint was defined by the >15% swelling of the nerve surface during the injection and/or with fascicular spacing. The secondary endpoints were the nerve punction without injection during the procedure, the deformation or rotation of the nerve, and the presence of paresthesia during the PNB procedure. $P < 0.05$ is considered as significant.
Eighteen patients (ultimately planed one hundred and twenty) were included. Forty five nerves were analysed (11 radial, 11 median, 11 ulnar, 6 femoral, 6 sciatic), 24 for the CONV group, 21 for the CMM group. Three significant nerve swelling (12%) in the CONV group vs 0 in the CMM group ($p = 0.023$) were founded. The evaluation of secondary endpoints showed 5 (20%) nerve punction without injection vs 0 ($p < 0.05$), 12 (50%) nerve deformation vs 3 (14%) ($p = 0.013$), 7 (29%) nerve rotations vs 1 (4%) ($p < 0.05$), repectively in the CONV and CMM groups. During the procedure there were 4 (16%) paresthesia in the CONV group vs 3 (14%) (not significant) in the CMM group.
The preliminary results suggest that the CMM procedure show significantly less nerve to needle contact and intra-epineural nerve injection. The CMM could in the future contribute to a more secure way of PNB.

P 18

Quality improvement in postoperative pain management in children

Stamer U.M.[1], Book M.[1], Lüscher S.[1], Wilhelm I.[1], Stüber F.[1]
[1] Department of Anaesthesiology and Pain Medicine, University Hospital Bern, Inselspital

Background: Postoperative pain impedes recovery, causes discomfort and suffering and increases health care costs. To improve clinical care data on pain related outcome after surgery in infants, children and adolescents can reveal possible deficits and give the opportunity to implement changes in clinical practice.
Methods: This registry for routine clinical data was implemented for quality improvement (CinicaTrials.gov Identifier NCT02083835). Written informed consent was obtained from parents of children (age >4 years). Demographic, surgery and analgesia related data were collected in a highly standardized procedure using the internet-based PAIN OUT infant CRF [1]. On the first postoperative day children (or children with the help of parents) answered the age adapted patient outcome questionnaire asking for pain related impairment and side effects of therapy (numeric rating scala NRS 0–10, and yes-no questions). A benchmarking tool allows a comparison of the own results to those of other hospitals. Additionally, administered non opioid analgesics administered during and after surgery were evaluated.
Results: 291 patients were enrolled (44% girls). The benchmarking procedure allowed the comparison to 16 other hospitals. For pain at rest (NRS median (IQR): 0 (0/2), pain at movement (2 (2/4)) and worst pain (6 (2/8)) our hospital is between the first third up to average in the benchmarking. Considering side effects, tiredness /fatigue were reported by 74% and nausea and vomiting by 52% of the participants. These were the most unfavorable benchmarking results of participating hospitals. Due to changes in PONV prophylaxis which were implemented five months ago, PONV rated could be decreased by half. During surgery 82% of the children received paracetamol alone or in combination, 29% diclofenac and 15% metamizole. Paracetamol (82%) was also preferred on the wards with metamizole (39%), ketorolac (32%), ibuprofen (26%) and diclofenac (8%) being used less frequently.
Conclusions: An analysis of the PAIN OUT infant registry data provided information on “real life data” from daily clinical practice. It identified areas to be improved, which could be addressed by introduction of a new regimen for PONV prophylaxis. Choice and dosing of analgesics have to be discussed.

Reference
1 Annual Meeting of theSwiss Society for Anesthesiology and Resuscitation SGAR/SSAR www.pain-out.eu

P 19

Development of a risk score for persistent pain after breast cancer surgery

Rehberg Benno[1], Mathivon Stanislas[1], Dereu Domitille[1], Savoldelli Georges[1]
[1] Service d'anesthésiologie, HUG

Persistent postoperative pain concerns 30–50% of patients following breast cancer surgery. Studies testing preventive measures have so far failed to produce consistent positive results. If preventive measures could be targeted to a subgroup of patients at high risk of persistent pain, positive results would be more likely. Therefore, we studied known risk factors for persistent pain in patients scheduled for breast cancer surgery in order to construct a risk score simple enough to select high-risk patients in future prevention studies.
Following ethics committee approval and written informed consent, 200 patients scheduled for breast cancer surgery were included. Preoperatively, patients completed STAI, BDI, and the pain sensitivity questionnaires, and underwent pain sensitivity testing.
At 4 months postoperatively, patients were contacted by mail or telephone to complete the BPI. Using multivariable analysis, factors significantly associated with clinically significant pain (defined as either resting pain >3/10, pain on movement >5/10, or pain necessitating analgesics) were identified and a risk score, based on a parsimonious logistic regression model, constructed. At 4 months, data from 127 patients were available. In univariate analysis, the following factors were significantly associated with "clinically significant pain": history of depression, pre-existing pain at the surgical site, high acute pain expectation, younger age, and state anxiety. Age and state anxiety score deviated from log-linearity. Age was consequently dichotomized in age groups of ≤50 or >50 years. State anxiety had no meaningful cut-off and was omitted. The coefficients of the logistic regression model were 2.42 for pre-existing pain, 1.32 for history of depression, 1.51 for high expected acute pain, and –1.22 for age above 50 years. The area under the curve of this model is 0.851, after correction for overfitting 0.816.
Using these parameters, a risk score was constructed. Pre-existing pain at the surgical site adds 2 points, and history of depression, high acute pain expectation (>6/10), and age ≤50 years each add 1 point to the score. Patients with a score of ≥2 points have a predicted risk of persistent pain of >30% (the actual risk in this group was 57.6%).
This simple score may allow to identify patients with high risk of persistent pain already before breast cancer surgery, and thus enable the study of targeted preventive interventions.

P 20

Which variables influence postoperative opioid consumption?

Stamer U.M.[1], Musshoff F.[2], Brockmöller J.[3], Stüber F.[1], Steffens M.[4], Tzvetkov M.[3]
[1] Department of Anaesthesiology and Pain Medicine and Department of Clinical Research, University of Bern; [2] Department of Forensic Medicine, University of Bonn; [3] Institute of Clinical Pharmacology, University Medical Center, Göttingen; [4] Research Division, Federal Institute for Drugs and Medical Devices, Bonn

Background: Postoperative opioid consumption is highly variable and several factors might influence analgesic needs. In addition to well describes demographic and surgery related variables, also the genetic background might play a role. Specifically differences in the pharmacokinetic of drugs have an influence on drug and metabolite concentrations and thus, are a source of variance of analgesic efficacy of opioids, e.g. tramadol. Non genetic and genetic variants will be analysed for their contribution to postoperative tramadol consumption.
Methods: After approval of the ethics committee and written informed consent patients' demographical, surgery related (extent/ duration of surgery, calculated mean of pains scores) and genetic data (CYP2D6 and OCT1 genotype1) were analysed for their association to the primary endpoint 24 hours tramadol consumption via PCA (t-test, Welch's t-test, ANOVA, Pearson's product moment correlation). A multiple linear regression analysis taking interactions into account with stepwise variable elimination for optimal model selection was performed (regression coefficients: standardized ß-coefficients; OR (95%-CI)).
Results: 190 patients were included. After stepwise variable selection the multiple regression model revealed a significant regression equation ($F(4,190) = 27.48$, $p < 0.001$, $R^2 = 0.367$). The following predictors were included in the fitted model: high pain scores at movement (ß = 0.540, p <0.001), which was the leading risk factor for increased tramadol consumption, CYPD6 (ß = –0.195, p = 0.001), OCT1 (ß = 0.125, p = 0.014), and the extent of surgery (ß = 0.124, p = 0.034). The model explains 36.9% of the variance in analgesic consumption. The genetic variants contributed 5.6% (CYP2D6 3.6%, OCT1 2.1%) of the total model variance. Overall, these results indicate that OCT1 effects were not due to confounding by CYP2D6 genotype and that both, CYP2D6 and OCT1 acted independently.
Conclusions: For prediction of postoperative tramadol consumption pain scores at movement were the key factors. In this patient cohort the pharmacogenetic background had more influence on tramadol consumption than some demographical variables like sex and thus, should be considered for future dose recommendations.

Reference
1 Tzvetkov MV, et al. Clin Pharmacol Ther. 2011;90:143–50.

P 21

Level of readiness of chronic pain patients to practice active self-care

Scala E.[1], Faouzi M.[2], Burnand B.[2], Decosterd I.[1], Rodondi P.-Y.[2]
[1] Pain Center, Lausanne University Hospital, Switzerland; [2] Institute for Social and Preventive Medicine, Lausanne, University Hospital, Switzerland

Chronic pain is a challenge for public health with major socioeconomic costs. Pain alleviation is often limited with conventional treatment. This highlights the need to redirect treatment strategy. Active self-care (ACT-SELF) (including complementary integrative medicine (ACT-CIM)) might supplement conventional strategies. Here we present the first survey on the level of readiness (LOR) to practice ACT-SELF in a patient population of a tertiary Pain Center.
Methods: A single-center quantitative cross-sectional postal survey was conducted after Ethics Committee approval. All chronic pain patients above 18 years old seeking care at the CHUV Pain Center (June 2013 to March 2015) were included. Socioeconomic data, pain characteristics (duration, frequency, NRS, localization, DN4-7items, Chronic Pain Grade (CPG)), HADS, treatments, and LOR to use ACT-SELF methods were investigated.
Results: Of the 1537 questionnaires sent, 639 patients were included (mean age: 59.3 (SD 15.3), 55.56% women). Median duration of pain was 8.5 years (IQR 9.6). Mean NRS for present, average and worst pain were 5.6 (SD 2.3), 6.1 (SD 2.0) and 8.2 (SD 1.7). Most frequent localizations were back (71.4%) and lower limb pain (68.4%). DN4 was positive in 51.2%. 63.7% reported a CPG with high disability (grade III/IV). Probable or possible mood disorder was present in 62.8%. 93.4% used pain killers and 64.6% opioids. Most patients had a high (44.1%) or moderate (24.6%) LOR to practice ACT-SELF. Mean LOR for ACT-CIM was the highest for physically oriented therapies (mean 6.2, SD 4.0), followed by mind-body therapies (mean 5.2, SD 4.1), movementtherapies (mean 5.1, SD 4.2) and sensory art therapies (mean 4.3, SD 4.1). Multivariable analysis showed a positive influence of middle or advanced level of education (p = 0.001), unemployed status due to medical conditions (p <0.001), use of herbal medicine (p = 0.05) and a positive DN4 score (p = 0.095).
Conclusion: Most chronic pain patients in our study had a high or moderate LOR to practice ACT-SELF even if they suffered from long-term pain with high disability. This suggests that the motivation to use active alternative treatment strategies is still present. Evidence is lacking to recommend ACT-CIM and RCT's are needed, with priority for methods that showed the highest LOR.

P 22

Influences of nociceptin on the nociceptin system in human peripheral blood cells

Zhang Lan[1], Stüber Frank[1], Lippuner Christoph[1], Schiff Marcel[1], Stamer Ulrike M.[1]
[1] Department of Anaesthesiology and Pain Medicine, Inselspital, University of Bern, Bern, Switzerland

Introduction: The nociceptin system comprises nociceptin and its receptor (NOP); both are expressed in human peripheral blood cells and are involved in pain and immune response. Interaction of nociceptin with the opioid system has been discussed. The aim of this study was to investigate possible influences of nocicepetin on the mRNA expression of nociceptin and its receptor in human peripheral blood cells.
Methods: After approval of the ethics committee and written informed consent healthy blood donors were enrolled in this *ex vivo* study. Whole peripheral blood was cultured with or without nociceptin 10-9 M or phorbol-12-myristate-13-acetate (PMA) 10 ng/ml for 6 and 24 hours. NOP and the nociceptin precursor (PNoc) mRNA were detected by quantitative RT-PCR. Nociceptin protein levels in culture supernatants

were measured using fluorescent-enzyme immunoassay. To investigate possible influences of nociceptin on NOP and PNoc expression, blood was pretreated with UFP-101 100 nM, a specific NOP antagonist, for 1 hour prior to co-culture with PMA 10 ng/ml for 24 hours. Statistics: Medians with interquartile ranges, Mann-Whitney U tests and Wilcoxon signed-rank tests.
Results: Nociceptin suppressed NOP mRNA expression in peripheral blood cells after 24 hours compared to the control without any stimuli (normalized ratio: 0.2 (0.1/0.4) vs. 0.3 (0.2/0.5), p <0.01). For PNoc, a trend of upregulation was observed in nociceptin treated blood after 6 hours. PMA upregulated PNoc and downregulated NOP in blood leukocytes after 24 hours compared to the respective controls (PNoc: 1.1 (0.5/3.0) vs. 0.0 (0.0/0.1); NOP: 0.1 (0.0/0.1) vs 0.3 (0.2/0.5), both p <0.001). Nociceptin concentrations were increased in supernatants of PMA-treated blood samples after 24 hours compared to controls (8.3 (4.7/15.9) vs. 5.0 (3.6/7.7) pg/ml, p = 0.02). Pretreatment with UFP-101 partially prevented PMA effects with PNoc mRNA expression declining to 76.1 (46.1/100.7)% and NOP mRNA increasing to 186.3 (101.2/250.2)% of the measures in blood cells treated with PMA only (both p <0.05).
Conclusions: Nociceptin affects both PNoc and NOP mRNA expression in human peripheral blood cells. An evaluation of the influence of nociceptin in blood leukocytes under inflammatory conditions could reveal new insights in the treatment of pain and inflammation.

P 23

Opioid use after propofol or sevoflurane anesthesia: a randomized trial

Windpassinger M.[1], Plattner O.[1], Gemeiner J.[1], Böhler K.[2], Klimscha W.[3], Mascha E.[4], Sessler D.[4]
[1] Department of Anaesthesiology and Intensive Care, Medical University of Vienna; [2] Department of Dermatology, Medical University of Vienna; [3] Department of Anaesthesiology and Intensive Care, Danube Hospital; [4] Department of OUTCOMES RESEARCH,Cleveland Clinic

Introduction: Postoperative pain might be ameliorated by substituting propofol for sevoflurane anesthesia. Support for this theory comes from human pain models in which propofol reduced hyperalgesia and allodynia in response to pinprick and electric stimulation [1]. Benefit may result from central and peripheral analgesic effects of sub-hypnotic doses of propofol, as well as suppression of spinal sensitization. Additional analgesic effects of propofol likely result from interactions with N-methyl-d-aspartate (NMDA), non-NMDA receptors, and via activation of gamma-aminobutyric acid A ($GABA_A$) receptors in the dorsal root ganglion nociceptor cells.Consistent with multiple analgesic mechanisms, some studies report that patients anesthetized with propofol have less postoperative pain than those anesthetized with volatile anesthestics. Other studies, though, do not support a postoperative analgesic effect of intraoperative propofol.
Objectives: Because it remains unclear whether intraoperative propofol analgesia ameliorates postoperative pain, we tested the primary hypothesis that postoperative opioid requirements are greater in patients anesthetized with sevoflurane than propofol.
Methods: Ninety patients having open vein stripping were randomized to either sevoflurane or propofol anesthesia. Pain was treated with bolus piritramid and patient-controlled morphine hydrochloride. The primary outcome was total opioid use from the end of surgery until the first postoperative morning. Pain scores (11-point Likert verbal response score) were recorded by a blinded investigator at 30-minute intervals for the initial 4 hours and on the first postoperative morning.
Results: Sevoflurane was not superior to propofol on postoperative opioid consumption, giving a ratio of means (95% interim-adjusted CI) of 0.91 (0.33, 2.4), P = 0.74. Medians [quartiles] of morphine sulfate equivalents were 9.8 mg [4, 19] in the sevoflurane group and 10 [6, 20] mg in the propofol group. In addition, no difference on pain score over time was found between two groups, with a mean difference on an 11-point scale of 0.20 (95% interim-adjusted CI: –0.36,0.73, P = 0.31).
Conclusions: Intraoperative sevoflurane did not reduce postoperative analgesia, which is consistent with most previous reports.

References
1 Bandschapp O, Filitz J, Ihmsen H, et al. Analgesic and antihyperalgesic properties of propofol in a human pain model. Anesthesiology. 2010;113:421–8.

P 24

Repair of congenital penile malformations in an outpatient setting

Boos K.[1], Schwöbel M.[2]
[1] Dr. Karin Boos, narkose.ch, Deisrütistrasse 7, 83472 Seuzach; [2] PD. Dr. Marcus Schwöbel, Tagesklinik für Kinderchirurgie, Dübendorfstrasse 20, 8117 Fällanden

To date, penile malformations are commonly usually treated on an inpatient basis. This may cause psychological distress for both, children and parents and high costs. Here, we report on forty-three boys which were operated on an ambulatory basis at the Tokterhuus in Fällanden, between 09/2013 and 05/2015. Anesthesia was performed by narkose.ch
Of the 43 cases, 15 showed a distal penile hypospadias, which was treated with a TIP (Snodgrass) procedure. These patients were discharged leaving a transurethral bladder catheter in place. We refrained from using a bladder catheter in 8 cases where a glandular hypospadias. In two patients a fistula after hypospadias repair was closed with a catheter left in place. In 18 patients, other anomalies were corrected.
The boys were 13 months to 17 years old. Operations lasted between 30 and 175 min. In nineteen cases, anesthesia was applied via a laryngeal mask combined with caudal anesthesia and in another nineteen cases via a laryngeal mask plus penile root block. Four children were intubated and treated with caudal anesthesia. One boy was anesthetized with a mask and penile root block. Parents were given a designated schedule for analgesia which included an NSAR and Metamizol. Further, they received the emergency phone numbers of the anesthetist and the surgeon.
In the anesthetic recovery room 30 boys did not complain of any pain (70%). Thirteen children (30%) suffered from pain, requiring additional analgesia. Eleven of these 13 patients had received a penile root block and two a caudal anesthesia. Thus it was shown, that caudal anesthesia was the more efficient procedure.
Parents were called the evening of the operation for a checkup. One boy had vomited, two children complained about pain, one suffered from a stridor, and the rest of the children had no complaints.
Postoperative examination was scheduled the post-operation day for patients with bladder catheters. These patients showed no anesthesia-induced complications except for the one case with persisting stridor. Patients without bladder catheter were examined in the first week and a second time within six weeks after the operation, depending on the procedure. Also in these cases no anesthesia-induced complications occurred.
Our findings show that even a complex operation such as a correction of a penile malformation can be treated ambulatory if a designated proceeding is in place and the parents show the necessary duty of care.

P 25

Functional analysis of beta-defensin 2 gene copy number variations in monocytes

Wen Tingting[1,2], Zhang Xianghong[1,2], Stüber Frank[1,2], Lippuner Christoph[1,2]
[1] Bern University Hospital Insel, Department of Anaesthesiology and Pain Medicine, University of Bern, Bern, Switzerland; [2] Department of Clinical Research, University of Bern, Bern, Switzerland

Introduction: Beta-defensins are cationic antimicrobial peptides which also display immunomodulating effects by activating immune cells. Beta-defensins are mainly expressed in skin and mucosa and can be strongly induced by invasive pathogens. The 8p23 beta-defensin genes (DEFBs) are thought to be affected by copy number variations (CNVs). The gene copy number (CN) is variable from 2 to 12. This study is aimed at investigating the impact of beta-defensin 2 gene CNV on Defensin expression in primary monocytes.
Methods: The study is approved by the local ethical committee. DEFB CNs were screened in 862 healthy blood donors by paralog ratio test (PRT) and 64 donors with CNs from 2 to 9 were selected for the study. DEFB CNs for these 64 donors were accurately quantified by digital droplet PCR (ddPCR). Primary monocytes from these 64 donors were isolated and cultured with or without 100 ng/ml lipopolysaccharide (LPS). Beta-defensin 2 mRNA expression in monocytes after culturing for 6 hours was quantified by real-time PCR. Beta-defensin 2 protein concentration in cell lysates of monocytes after culturing for 48 hours was quantified by ELISA. The correlations between beta-defensin 2 gene CN and mRNA and protein levels were analyzed.

Results: Beta-defensin 2 mRNA is not detectable in monocytes without stimulation but can be induced by LPS. A weak positive correlation (r = 0.25, *P* = 0.046) between CN and mRNA level after stimulation can be observed. Beta-defensin 2 protein can be detected at low level in cell lysates after culturing for 48 hours without stimulation. This expression can be enhanced with LPS stimulation (*P* <0.001). The CN is not correlated with the protein level without (r = 0.04, *P* = 0.73) and with (r = –0.009, *P* = 0.94) stimulation.
Conclusion: Beta-defensin 2 gene CNVs have a weak impact on mRNAexpression in monocytes but no influence on protein expression.

P 26

Intra-operative use of Polymyxin-B hemoperfusion in a patient with septic choc and multiple organ failure undergoing emergent abdominal surgery

Pavlovic G.[1], Bonhomme F.[1], Pugin J.[1]
[1] Département d'Anesthésiologie, Pharmacologie et Soins Intensifs, Hôpitaux Universitaires de Genève

Background: Polymyxin-B hemoperfusion is deemed to improve outcome in intensive care septic patients1,2. However, when initiated within 12 hours after abdominal surgery, it failed to improve organ failure compared to conventional treatment of peritonitis-induced severe sepsis.
Case report: A 62 years old patient suffering from a severe septic shock with multiple organ failure due to a necrotising pancreatitis and colic necrosis (APACHE score 36, SAPS score 84) underwent emergent abdominal surgery. At anaesthesia induction, $Pa0_2/Fi0_2$ ratio was 58 mm Hg and noradrenalin requirement was 0,7 µ/kg/min. In addition to conventional management, we initiated a polymyxin-B hemoperfusion throughout the surgical procedure (147 min). Unfractionated heparin was used to ensure partial anticoagulation (3000 IU bolus + 20 IU/kg/h with an ACT around 190 sec). Per-operatively, 20 ml/kg crystalloids were infused and noradrenalin could be halved. Pa02/Fi02 ratio increased to 329 mm Hg. Inflammatory parameters rapidly decreased during the procedure (CRP from 454 to 255 U/l, PCT from 48 to 20 µg/l). The postoperative evolution was favourable with a withdrawal of noradrenalin within 72h, diuresis improvement at 24h extubation at 8 days.The patient could leave the ICU on day 15. He was alive and in good conditions on day 90.
Discussion: To our knowledge, this is the first report of polymyxin-B hemoperfusion used in the operating room (throughout the entire operative time). The rationale for initiating the polymyxin-B hemoperfusion during the operative time was to lower the quantity of endotoxin as early as possible, in order to block the initiation of various deleterious biological cascades.

References
1 Vincent JL, et al. Shock. 2005;23:400–5.
2 Cruz, et al. JAMA 2009.
3 Payen, et al. Intensive Care Med. 2015; 41:975–84.

Learning point: polymyxin-B hemoperfusion initiated at the time of surgery was effective in improving hemodynamic and respiratory parameters in this patient with a severe septic shock due to a colic necrosis.

P 27

Accurate quantification of 8p23 beta-defensin copy number by digital droplet PCR

Zhang Xianghong[1,2], Wen Tingting[1,2], Schiff Marcel[1,2], Stüber Frank[1,2], Lippuner Christoph[1,2]

[1] Bern University Hospital Insel, Department of Anaesthesiology and Pain Medicine, University of Bern, Bern, Switzerland; [2] Department of Clinical Research, University of Bern, Bern, Switzerland

Background: Beta-defensins are anti-microbial peptides which can also modulate the immune response. The genes coding for beta-defensins (DEFB) on 8p23 form a cluster which is affected by copy number variations (CNVs). The copy number (CN) varies from 2 to 12 in European population. 8p23 DEFB CNVs was reported to be associated with some inflammatory diseases. However, accurate quantification of CN is still a big technical challenge. We have established a multiplex ligation-dependent probe amplification (MLPA) based method before. It is reliable but very time-consuming and expensive. Therefore, we tried to improve the methodology by establishing a digital droplet PCR (ddPCR) assay.
Method: The target gene assay was designed by targeting *DEFB4* (Taqman probe with FAM labelling, designed by Bio-Rad), and the validated reference gene assay targeting RPP30 (Taqman probe with HEX labelling, Bio-Rad). Genomic DNA was digested using Mse I to form single copy template and around 20 ng was loaded to the ddPCR reaction. Reaction preparation, droplet generation, PCR and signal reading were performed by using a standard protocol of ddPCR from Bio-Rad. CN was calculated by QuantaSoft software. To validate the method, 283 DNA samples with known CN determined by MLPA were used. 7 of 283 DNA samples with CN from 2 to 9 were selected to test the suitable template DNA amount. 31 of 283 DNA samples with CN from 2 to 9 were also selected to evaluated inter- and intra- assay variability.
Results: The positive and negative droplets were clearly separated in both *DEFB4* and *RPP30* channels. Typically four populations of droplets in a 2-dimension plot were observed in this duplex ddPCR assay. 20 to 40 ng digested template DNA was found to be an optimal range for this assay. Concordant CN results were obtained among inter-assay repeats and among intra- assay repeats, and the coefficients of variation (CV) of the raw data were smaller than 4%. CNs of all 283 tested DNA samples determined by ddPCR were completely identical with those determined by MLPA.
Conclusion: ddPCR is an easy, cheap, reproducible and reliable high-throughput method for DEFB CN quantification. It is a superior tool for large scale association studies.

P 28

Impact of miRNAs on HLA-DR sell surface expression

Houseman Maja[1,2], Staiger Matthias[1,2], Stüber Frank[1,2], Lippuner Christoph[1,2]

[1] Bern University Hospital Insel, Department of Anaesthesiology and Pain Medicine, University of Bern, Bern, Switzerland; [2] Department of Clinical Research, University of Bern, Bern, Switzerland

Introduction: MHC class II molecules (MHC-II) are important to present antigenic fragments on the cell surface of antigen-presenting cells (APC's) like B-cells, dendritic cells, monocytes or macrophages to CD4+ T-cells to enable immune responses. MHC-II antigen presentation is as well strongly linked to autoimmune diseases. The process of cell surface expression of peptide-loaded MHC-II (HLA-DR) is not yet completely understood. It is regulated by transcriptional regulators and the intracellular storage and transport system that finally leads to cell surface expression. Clinical studies proof that cell surface-expression of HLA-DR is down-regulated in patients undergoing surgery. This is interpreted to indicate a suppression of the immune system. The amount of HLA-DR molecules available for antigen presentation to T-cells is thought to be a crucial factor for the probability of survival in critical conditions such as severe sepsis. It can be associated with morbidity in the perioperative setting, i.e. nosocomial infections.
Objectives: A better understanding of the mechanisms of HLA-DR surface expression is of importance for a potential treatment of perioperative HLA-DR downregulation. The impact of miRNAs on CLIP-loaded- and peptide-loaded MHC-II expression shall be unraveled.
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 primary bone marrow derived dendritic cells. Therefore a lentiviral system was established to express miRNAs in primary cells.
Results: No screened miRNA did change the amount of CLIP loaded MHC-II molecules on the cell surface. 52 miRNAs that influence miRNA surface expression were identified in the High Throughput Screen. 16 selected miRNAs with the strongest impact on HLA- DR surface expression were successfully verified in MelJuSo cells. A lentiviral based system was used to express these miRNAs in monocyte derived dendritic cells. Analysis thereof will be presented.
Conclusion: miRNAs seem to have no influence on incorrect peptide loading of MHC-II molecules. In contrast, miRNAs strongly impact HLA-DR surface expression. The results will lead to a better understanding of the mechanisms of antigen presentation. Long term it might help to define new possible methods to support the immune system in critically ill patients.

P 29

The CanMEDS Framework and the Competency-based IFNA Standards of Practice for Swiss Non-Physician Anesthesia Providers: A Validity Study

Herion Christian[1], Violato Claudio[2,3], Egger Lars[4]
[1] Department of Anesthesia, Cantonal Hospital Aarau, Switzerland, christian.herion@ksa.ch; [2] Department of Medical Education, University Ambrosiana, Free University of Milan, Milan, Italy; [3] Department of Internal Medicine, Wake Forest University School of Medicine, Winston-Salem, NC, USA; [4] medi | Centre for Medical Education, Bern, Switzerland

Purpose: Non-Physician Anesthesia Providers (NPAPs), such as specially trained nurses, perform anesthesia worldwide. The work of Swiss Nurse Anesthetists (NAs) in collaboration or delegation of anesthesiologists has a long tradition, but the NAs' competencies and scope of practice are not defined precisely, yet. The International Federation of Nurse Anesthetists' Standards of Practice (IFNA 2014), based on the CanMEDS roles (Frank 2005), could be a guiding framework for Swiss NAs' scope of practice. The purpose of the present research was conducting an empirical study to investigate the relevance, validity and significance of the CanMEDS and the graduate competencies as applied to Swiss NPAPs.
Methods: About 1200 NPAPs, accessible through the national association of NAs (SIGA/FSIA), were included. Participants were asked to rate 76 graduate competencies according the relevance for Swiss NAs' scope of practice on a Visual Analog Scale (VAS), ranging from "not applicable" (1) to "very relevant" (5).
Results: A total of 449 questionnaires were analyzed: 83.9% NAs with Swiss diploma, 8% NAs in education, 5.8% German NAs, 0.4% Austrian NAs, 0.2% Dutch NAs and 0.2% others. The relevance (mean) of the CanMEDS is very positive. Five roles reached ratings between relevant and very relevant: NA Expert, Communicator, Collaborator, Scholar and Professional. The roles of Manager and Health Advocate were rated in between moderately relevant and relevant. Overall 62 graduate competencies were rated between and relevant and very relevant in mean relating to the Swiss NPAPs' scope of practice. Fourteen graduate competencies were rated in between moderately relevant and relevant and derive remarkably from the Manager and Health Advocate roles. These competencies can be grouped in four categories: First, in anesthesiologists' area of accountability; second, in the accountability of managers or other specialists; third, concerning patient information and education; and fourth, relating to research.
Discussion: The relevance of the CanMEDS roles and the graduate competencies for Swiss NAs is very high. Minor adoptions of 14 graduate competencies, especially within the Manager and Health Advocate role, are recommended. The graduate competencies of the IFNA Standards have a high congruency with Swiss NAs' scope of practice. Therefore the CanMEDS and the competency-based IFNA Standards of Practice provide a valuable framework to define the Standards of Practice for Swiss NAs.

INDEX OF FIRST AUTHORS

The numbers refer to the pages of this supplement.