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ABSTRACTS OF THE JOINT ANNUAL CONGRESS 2024

INTERLAKEN, NOVEMBER 7–9, 2024

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ORAL PRESENTATIONS

OP 1

Application of 4D Flow Imaging to Quantify Changes in Intracardiac Haemodynamics Before and After the Induction of General Anaesthesia

Soldini Jacopo[1], Grob Leonard[1], Friess Jan O[1], Schweizer Thilo[1], Gerber Daniel[1], Holthof Niels[1], Huber Adrian T[2], Jung Bernd[2], Guensch Dominik P[1,2], Fischer Kady[1]

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Background: The induction of general anaesthesia (GA) is known to have considerable haemodynamic effects, which can lead to perioperative complications. These effects are often assessed by arterial blood pressure or ejection fraction, but these measures do not provide a complete picture of what occurs across the heart. While the aorta, pulmonary artery, and left and right atria and ventricles form an integrative unit, they all have different underlying haemodynamics. Yet the impact of GA on each of the chambers and great vessels is rarely investigated at the same time due to limitations in measuring techniques. Therefore, to comprehensively understand this effect, we applied advanced cardiovascular magnetic resonance (CMR) 4D flow imaging to simultaneously and non-invasively quantify whole heart haemodynamics at both an awake baseline state and after the induction of GA.

Methods: Six patients (ASA I-III), scheduled for elective surgery were enrolled to undergo GA induction in an MRI. A 4D flow image of the thoracic cavity was acquired pre-induction and repeated 15minutes after the induction of GA maintained by sevoflurane. Images were blinded and analysed for whole-heart haemodynamics.

Results: Induction of GA decreased mean arterial pressure (98 ± 6 vs 66 ± 2 mmHg, p <0.01). Pre-load defined by end-diastolic volume dropped in the left ventricle (-16%, 148 ± 12 vs 125 ± 11ml, p <0.01), with a non-significant drop in the right ventricle (-7%, 176 ± 18 vs 165 ± 20ml, p = 0.08). Reflecting afterload, systemic resistance dropped by -32% (28 ± 5 vs 19 ± 3dynes*cm-5, p = 0.03) while resistance in the pulmonary system did not change (23%, 13 ± 1 vs 16 ± 3dynes*cm-5, p = 0.29). Transmitral blood flow velocity decreased by -24% (80 ± 17 vs 58+12 cm/s, p = 0.05) during early diastole and by -32% (62 ± 33 vs 43 ± 25 cm/s, p = 0.02) during the atrial kick in late diastole. Conversely, for the right side of the heart tricuspid blood flow velocity did not change for early (-14%, 63 ± 23 vs 49 ± 9 cm/s, p = 0.24) or late diastole (-14%, 51 ± 14 43 ± 16 cm/s, p = 0.23).

Conclusion: This novel approach of applying 4D flow CMR in a perioperative environment provides new insights into how GA influences haemodynamics uniquely across the cardiovascular chambers and vessels. By understanding which individual cardiovascular structures are more susceptible to significant haemodynamic fluctuations, anaesthetists may be able to target therapies to mitigate perioperative complications associated with GA haemodynamic instabilities.

OP 2

First Time Visualization of Acute Myocardial Injury after Non-Cardiac Surgery – It's actually there!

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Objective: Myocardial injury after non-cardiac surgery (MINS) is associated with increased mortality. The diagnosis is made by an increase in serum troponin. However, there is a debate about whether MINS is a genuine myocardial insult or merely a subtle increase in biomarkers. Therefore, we performed cardiac magnetic resonance imaging (CMR) in patients after major non-cardiac surgery to assess if there is an association between MINS and myocardial injury detected by CMR.

Methods: We included six patients from a clinical MINS trial. All patients were considered to have a high risk for perioperative cardiovascular complications. High-sensitivity troponin T (hsTnT) was obtained preoperatively, as well as 2h and 24h post-surgery. A CMR scan was acquired postoperatively, including myocardial T2 mapping. A T2 relaxation time <41ms delineates a normal myocardial water content. A T2 >41ms indicates oedema and consequently acute myocardial injury.

Results: Six patients, all male and aged between 60-84 years scheduled for aortic surgery, were included. Two patients had perioperative hsTnT levels that did not meet the MINS definition, while four patients were diagnosed with MINS. Subsequent CMR imaging was performed a median of six days postoperatively (IQR: 6-13). The patients without MINS had a global T2 lower than the 41ms cut-off. In contrast, all patients with MINS had a higher global T2 indicating acute myocardial injury with oedema. A significant correlation was observed between the T2 and the increase in hsTnT from the preoperative baseline (r = 0.84, p = 0.04). The regional differences in T2 alterations could be impressively visualized in colour-graded cardiac maps. Subsequently, one patient underwent a coronary angiography exam revealing significant stenoses of coronary arteries in the territory with the highest T2 in the preceding myocardial T2 maps.

Conclusion: To our knowledge, this is the first time that CMR imaging has been used to visualise and quantify acute myocardial injury in the form of MINS. Substantial myocardial oedema was discovered to be present in association with MINS. We aim to provide further imaging insights into the pathophysiology of MINS, its correlation to biomarkers, and factors contributing to MINS with further studies and more patients undergoing postoperative CMR imaging.

OP 3

Perioperative copeptin: predictive value and risk stratification in patients undergoing major noncardiac surgery – a prospective observational cohort study

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Purpose: Biomarkers can aid in perioperative risk stratification. While preoperative copeptin has been associated with adverse events, intraoperative information is lacking and this association may rather reflect a baseline risk. Knowledge about correlations between postoperative copeptin measurements and clinically relevant outcomes is scarce. We examined the association of perioperative copeptin concentrations with postoperative all-cause mortality and/or major adverse cardiac and cerebrovascular events (MACCE) at 12 months and 30 days as well as with perioperative myocardial injury (PMI).

Methods: We conducted a prospective observational cohort study of adults undergoing noncardiac surgery with intermediate to high surgical risk in Basel, Switzerland, and Düsseldorf, Germany from February 2016 to December 2020. We measured copeptin and cardiac troponin before surgery, immediately after surgery (0 hr) and once between the second and fourth postoperative day (POD 2–4).

Results: A primary outcome event of a composite of all-cause mortality and/or MACCE at 12 months occurred in 48/502 patients (9.6%). Elevated preoperative copeptin (>14 pmol·L−1), immediate postoperative copeptin (>90 pmol·L−1), and copeptin on POD 2–4 (>14 pmol·L−1) were associated with lower one-year MACCE-free and/or mortality-free survival (hazard ratio [HR], 2.89; 95% confidence interval [CI], 1.62 to 5.2; HR, 2.07; 95% CI, 1.17 to 3.66; and HR, 2.47; 95% CI, 1.36 to 4.46, respectively). Multivariable analysis continued to show an association for preoperative and postoperative copeptin on POD 2–4. Furthermore, elevated copeptin on POD 2–4 showed an association with 30-day MACCE-free survival (HR, 2.15; 95% CI, 1.18 to 3.91). A total of 64 of 489 patients showed PMI (13.1%). Elevated preoperative copeptin was not associated with PMI, while immediate postoperative copeptin was modestly associated with PMI.

Conclusion: The results of the present prospective observational cohort study suggest that perioperative copeptin concentrations can help identify patients at risk for all-cause mortality and/or MACCE. Other identified risk factors were revised cardiac risk index, body mass index, surgical risk, and preoperative hemoglobin.

OP 4

A Novel 3D Base of the Heart transesophageal Echocardiography View for Identifying Valve Pathology: A Preliminary Comparison with a Gold Standard 2D transesophageal Echocardiography Exam

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Objective: A complete TEE-2D examination requires several different views and is time-consuming. Furthermore, some views may not be attainable or desirable in some situations (e.g., transgastric views in the presence of gastric pathology). 3D images are increasingly being used for the communication and assessment of valvular disease, in some cases allowing for a more accurate identification of valvular lesions.

We sought to examine the diagnostic accuracy of a novel 3D base of the heart view for identifying valvular lesions using the TEE protocol as the gold standard.

Design and Method: In this retrospective pilot study 3D base of the heart images were acquired in addition to a standard 2D TEE examination in patients undergoing any cardiac surgery. Patients without a regular heart rate were excluded. 3D base of the heart images were acquired using a 3D zoom mode on a Philips TEE machine and an X8-2 probe. ECG-gating with 4-6 beats was employed and the gain and compression adjusted as needed. First a grayscale image was acquired and in a second step color Doppler was added increasing the wall filters top better visualize jets.

Valvular stenoses and regurgitations were examined for the aortic, mitral and tricuspid valves and were graded for severity as none, minimal/mild, moderate, and severe.

Results: A total of 130 patients were included exhibiting 31 aortic stenoses, 51 aortic regurgitations, 2 mitral stenoses, 98 mitral regurgitations, and 65 tricuspid regurgitations. In 2 patients 3D base of the heart images were of poor quality and these were excluded.

Aortic stenosis ± 1 grade was identified in 33/35 times, aortic regurgitation ± 1 grade was identified in 125/130 times, mitral regurgitation ± 1 grade was identified 127/130 times, and tricuspid regurgitation ± 1 grade 129/130 times. Of severe lesions as defined by the protocol, the 3D base of the heart view only missed 3/21 aortic stenosis, 0/6 aortic regurgitations, 1/23 mitral regurgitations, and 0/1 tricuspid regurgitations.

Conclusion: The novel 3D base of the heart view is a feasible view potentially offering a quick overview of valve pathology. Identification of valvular pathology was generally good, with very few missed severe grades. Special mention should be made of aortic valve regurgitation because this is the most difficult to see and to identify. For better informative value more and larger studies are needed.

OP 5

Estimation of global systolic and diastolic left ventricular blood flow from derivatives of transoesophageal echocardiographic 3D volume curves in cardiac surgery patients: a proof-of-concept study

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Objectives: To investigate whether estimates of peak global systolic (S') and diastolic (E') left ventricular (LV) flow rates based on 3D echocardiographic volumes are feasible and match expected physiology.

Methods: In this retrospective feasibility study, we included Patients undergoing major cardiac surgery. S' and E' were derived from 190 patients by taking the first derivative of the volume-time relationship of 3D ecg-gated transesophageal echocardiography (TEE) intraoperative images which generated the ventricular output flow (Figure 1). To examine the quality of images upon which the estimates of flow were based we correlated intraoperative 3D TEE and preoperative 2D transthoracic echocardiography (TTE) volumes. As a proof-of-concept, we then correlated S' flow with stroke volume and S' and E' were compared by valve pathology.

Results: In each of the 190 images, S' and E' could be derived. There was good correlation between 1) the EF of 3D LV images obtained intraoperatively by TEE and preoperatively by TTE (Pearson's r = 0.65) and also 2) S' and stroke volume (Pearson's r = 0.73). Patients with aortic or mitral regurgitation showed higher S' than patients without valve pathologies (–315 ml/s [95% CI –388 ml/s to –264 ml/s] p = 0.001, –319 ml/s [95% CI –397 ml/s to –246 ml/s] p = 0.001 vs. –242 ml/s [95% CI –300 ml/s to –196ml/s]).

Conclusions: We found that 3D images can be used to derive global flow into and out of the ventricle. These measurements are not only feasible and reliable, but they also match expected valve pathology.

As a proof-of-concept study describing a novel measurement, clinical utility remains to be determined. However, a few points merit comment. First, the fact that flows match those expected from valve pathologies suggests a high level of quality in tracking and an acceptable volume rate of image acquisition. Second, in addition to systolic information, diastolic information may be obtained, resulting in a global filling rate. This may enable conclusions regarding not only valve pathology (AR, retrograde filling; MR, higher transmitral gradient), but potentially also diastolic function. For example, measuring lateral, basal E' by tissue Doppler in patients with coronary artery disease may be difficult as this is a regional marker with possible regional wall motion abnormalities; a global marker may be better suited.

In conclusion, estimates of global peak systolic and diastolic LV flow based on 3D TEE are feasible, promising, and match valve pathologies.

OP 6

Risks factors and association of impostor syndrome and burnout in Latin Switzerland trainees in anesthesiology: results from a cross-sectional survey

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Background: Impostor syndrome (IS) describes the tendency to doubt one's accomplishments and attribute success to external factors like luck or errors, leading to feelings of being a fraud. Such self-doubt can harm well-being and may lead to burnout. Our prior European study suggested that female anaesthesiologists and those with less clinical experience are more susceptible to IS, while greater experience might offer protection. However, the link between IS and burnout in anaesthesiology remains unexplored. This study aims to assess the prevalence of IS, identify predictive demographic factors, and explore the association between IS and burnout among anaesthesiology residents and chief residents in Latin Switzerland.

Methods: This study is a cross-sectional web-based survey study among anaesthesiology residents and chief residents in Latin Switzerland. After ethical approval, the survey was conducted on a secure, European General Data Protection Regulation compliant platform ensuring voluntary and anonymous participation. The survey included a demographic questionnaire, the Clance Impostor Phenomenon Scale (CIPS), and the Maslach Burnout Inventory for Medical Personnel (MBI-HSS-MP). IS was indicated by a CIPS score over 60. Descriptive statistics were applied to identify predictors of IS and its relationship with burnout.

Results: Of the 136 participants (42.8% response rate) who completed the CIPS, 55% were female, 45% male, and 59% were Swiss nationals. IS prevalence was 56%, with 8% experiencing severe IS. Burnout was reported by 10% of participants. IS was significantly associated with female gender (p = 0.05) and Swiss nationality (p = 0.028), and was correlated with higher burnout levels (p = 0.04).

Conclusion: Anaesthesiology residents and chief residents, particularly females and Swiss nationals, are more prone to IS, which is linked to an increased likelihood of burnout. It remains unclear whether IS is a direct risk factor for burnout or if both syndromes share common traits such as impaired job satisfaction, perfectionism, and workaholism. The high prevalence of IS and burnout among anaesthesiology residents in Switzerland is alarming. Future research should incorporate qualitative methods to gain deeper insights into IS and develop tailored interventions to foster a supportive institutional culture for residents.

OP 7

First-attempt success of endotracheal intubation using hyper- angulated videolaryngoscopy versus conventional direct laryngoscopy: a randomized multiple cross-over cluster trial

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Introduction: Endotracheal tubes are usually inserted with direct laryngoscopy, but patients sometimes require multiple attempts which can provoke morbidity. Videolaryngoscopy improves airway visualization, but endotracheal tubes are nonetheless sometimes difficult to pass through the vocal cords. Whether improved glottis visualization facilitates intubation and reduces intubation attempts remains unclear.

Objectives: We therefore tested the primary hypothesis that fewer intubation attempts are required when initial laryngoscopy is performed with videolaryngoscopy than with direct laryngoscopy in surgical patients.

Methods: We conducted a cluster-randomized multiple crossover trial in patients having cardiothoracic or vascular surgery at the Cleveland Clinic Main Campus, Cleveland, OH. Patients were randomized to either hyperangulated videolaryngoscopy or direct laryngoscopy for the initial intubation attempt. The primary outcome was number of intubation attempts. Secondary outcomes were intubation failure and a composite of airway and dental injuries. The trial was registered with clinicaltrials.gov (identifier NCT04701762), current trial status closed for enrollment.

Results: We enrolled 8,429 surgeries from March 2021 to December 2022. 4,413 (52%) surgeries were randomized to videolaryngoscopy, and 4,016 (48%) to direct laryngoscopy. About 70% of initial intubations were performed by nurse anesthetists or residents, supervised by attending anesthesiologists. Videolaryngoscopy reduced the need for multiple intubations by about a factor-of-four from 7.6% to 1.7%. and reduced the number of intubation attempts compared to direct laryngoscopy [(OR 0.19 (95% CI: 0.13, 0.28; P <0.001)]. Intubation failed in 0.27% with videolaryngoscopy vs. 4% with direct laryngoscopy [RR 0.05 (95% CI: 0.02, 0.12; p <0.001)]. Airway and dental injuries did not differ between videolaryngoscopy (41 injuries, 0.93%) vs. direct laryngoscopy (42 injuries, 1.1%), RR 0.85 (95% CI: 0.53, 1.39; P = 0.376)].

Conclusions: Videolaryngoscopy is a preferable initial approach for intubating surgical patients.

Grant acknowledgment: This trial was supported by departmental and institutional support only. The GlideScope video laryngoscopes and GlideRite stylets were provided by Verathon Inc.

OP 8

Pulsed radiofrequency therapy on peripheral nerves: a retrospective series analysis

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Introduction: Pulsed radiofrequency (PRF) evolves as a promising neuromodulative technique. Initially used for treating spinal ganglia, it seems that it might also positively affect peripheral nerves. However, evidence of its effect on peripheral nerves remains scarce. We report the results of PRF on peripheral nerves in chronic pain patients who were requiring repetitive nerve blocks.

Methods: In this retrospective pilot study, we included patients with therapy-refractory chronic pain, who received PRF treatment of peripheral nerves during an 11-month period in the pain center of a tertiary hospital in Zurich, Switzerland. A total of 17 treatments were analyzed. Pain score, global impact of change (GIC), reduction of medication and time to next infiltration up to 3 months after PRF were documented.

Results: Nine different peripheral nerves were treated. Pain scores were statistically lower at 2 weeks, 1 and 3 months after therapy. Overall, 47% and 29% of patients reported at least a 50% decrease in pain at 1 and 3 months, respectively. Of all patients, 71% reported an improvement in GIC at 1 and 3 months, while 67% could reduce or cease pain medications. PRF resulted in 82% of patients not requiring a new infiltration for at least 3 months. However, in the presence of a psychiatric diagnosis, results were poorer.

Conclusion: Using PRF on peripheral nerves provided promising results in terms of pain and impact of change in therapy-refractory cases. The role of PRF in treating peripheral nerves in patients with chronic pain should become more elucidated in future research.

OP 9

Effect of a 2–4 week home-based prehabilitation intervention on objectively measured preoperative physical activity

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Background: Low functional capacity in patients undergoing major elective surgery is associated with postoperative complications. Prehabilitation aims to increase functional capacity by increasing physical activity. Data regarding the effectiveness of a home-based prehabilitation intervention to increase accelerometry derived physical activity before surgery is limited. We hypothesize that home-based prehabilitation leads to an increase in physical activity in patients undergoing major cardiac and noncardiac surgery.

Materials and methods: Patients were randomized to either standard of care or prehabilitation. The intervention group received a home-based prehabilitation intervention 2-4 weeks before scheduled surgery. As part of this intervention, patients were prescribed a walking regimen. Patients were followed up with weekly telephone calls. To measure physical activity, euclidean norm minus one (ENMO) was extracted from accelerometry data. P-values were assessed by a two-sided t-test.

Results and discussion: 62 patients scheduled for noncardiac and 37 for cardiac surgery were included. Home-based prehabilitation led to an increase in physical activity levels in patients undergoing noncardiac surgery (ENMO mean difference 3.01 mg, p = 0.03) but not in patients undergoing cardiac surgery (ENMO mean difference 0.27mg, p = 0.95). Patients undergoing cardiac surgery had higher activity levels compared to noncardiac and prehabilitation did not lead to further increase. Higher activity levels may be explained by previous recommendations in routine cardiac follow-up.

OP 10

Role of nuclear factor-κB in the regulation of nociceptin and the nociceptin receptor

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Introduction: The nociceptin system has been described as a therapeutic target for the treatment of pain and inflammatory diseases, however, much remains unknown about the regulation of nociceptin and its receptor (NOP).1-3 The aim of this study is to investigate the modulating effects of cytokines on the nociceptin system and a possible contribution of nuclear factor-κB (NFκB)

Methods: Dose-response experiments were performed to evaluate effects of cytokines on NOP and prepronociceptin (ppNOC) mRNA in human monocytic THP-1 cells. NOP and ppNOC mRNA was quantified by RT-qPCR. NOP and nociceptin protein levels were measured using flow cytometry, NFκB p65 translocation by ImageStream. To investigate effects of cytokines on NOP and ppNOC, cells were cultured with/without phorbol myristate acetate (PMA) 5 ng/ml, tumor necrosis factor-α (TNFα) 10 ng/ml, interleukin (IL)-1β 10 ng/ml, or PMA+cytokines for 24h. To examine the role of NFκB signaling in the regulation of NOP and ppNOC, inhibition experiments using specific NFκB inhibitors (BAY 11-7082, JSH-23, anacardic acid (AA)) were conducted. Cells were stimulated with/without PMA for 24h, then treated with/without different NFκB inhibitors for 1h prior to culturing with/without TNFα or IL-1β for 6h and 12h.

Results: NOP was constitutively expressed at mRNA and protein levels in THP-1 cells. The combination of PMA+TNFα suppressed NOP mRNA, compared to the cells treated with PMA alone ($p < 0.05$). No changes in NOP levels were observed in PMA+IL-1β samples. ppNOC mRNA was below the detection limit in untreated cells, whereas intracellular nociceptin protein could be detected. PMA significantly induced ppNOC ($p < 0.05$), TNFα and IL-1β attenuated PMA's upregulating effect on ppNOC (both $p < 0.05$). IL-10 had no impact on NOP and ppNOC levels. BAY 11-7082 as well as JSH-23 reversed the PMA+TNFα induced repression of NOP mRNA after 6h (both $p < 0.05$). A similar trend was observed in PMA+AA+TNFα samples after 12h ($p = 0.06$). None of the NFκB inhibitors had an antagonistic effect on the suppression of ppNOC caused by PMA+TNFα and by PMA+IL-1β. Whereas TNFα strongly induced NFκB/p65 nuclear translocation in PMA-treated THP-1, IL-1β did not.

Conclusions: Proinflammatory cytokines suppressed NOP and ppNOC mRNA in PMA-induced THP-1. NFκB seems to be an important regulator controlling NOP.

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POSTERS

P 1

Functional residual capacity under apnoeic oxygenation with different flow rates in children: A single-centre prospective randomised controlled trial

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Background: Apnoeic oxygenation with high-flow nasal oxygen in paediatric patients can prolong safe apnoea time. The underlying mechanisms and ideal flow rates are still unclear. Possibly, a positive subglottic pressure is generated. We investigated changes in lung volume under apnoeic oxygenation with different flow rates in children, using variations of poorly ventilated lung units (i.e. silent spaces) as a surrogate, measured by electrical impedance tomography (EIT).

Methods: We conducted a single-centre randomised controlled non-inferiority trial. After Ethics Committee approval and informed consent, we recruited 81 paediatric patients (ASA 1-2, 10-20kg) scheduled for elective procedures requiring general anaesthesia. The primary endpoint was the normalised reduction in lung volume in relation to body weight (mL/kg) from start to end of a 5 minute apnoea measured with EIT under nasal apnoeic oxygenation. Patients under FiO2 1.0 were randomised into three groups:

1. low-flow 0.2 L/kg/min

2. high-flow 2 L/kg/min

3. very high-flow 4 L/kg/min (control group)

After standardised anaesthesia and neuromuscular blockade, all patients were left apnoeic for 5 minutes receiving oxygen according to the randomisation with continuous jaw thrust. Then the study terminated and the airway was secured, followed by a standardised recruitment manoeuvre. Changes in lung impedance during apnoea were continuously recorded. After normalisation of impedance change to 6-8mL/kg in relation to body weight, changes in lung volume from start to end of apnoea were measured.

Results: 65 out of 81 planned patients were analysed (low-flow n = 20, high-flow n = 24, very high-flow n = 21). Median [IQR] normalised reduction in lung volume was: low-flow 5.4mL/kg [4.7 – 8.1]; high-flow 6.3mL/kg [4.8 – 8.6]; and very high-flow (control) 5.3mL/kg [4.1– 6.3].Non-inferiority of low- and high-flow compared to very high-flow, using the non-inferiority margin of 1.9mL/kg (35% of control), could not be demonstrated.

Conclusions: Apnoeic oxygenation with low-flow or high-flow cannot be considered non-inferior to very high-flow comparing loss of normalized lung volume during apnoea in children. Very high flow rates of apnoeic oxygenation may lead to a reduction of lung volume loss during apnoea, but this is clinically insignificant.

P 2

The Association of New Onset Postoperative Atrial Fibrillation and Abnormal P-Terminal Force in Lead V1 After On-Pump Cardiac Surgery

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Introduction: Postoperative atrial fibrillation (POAF) after cardiac surgery is associated with higher morbidity and mortality. The presence of an aberrant p-terminal force vector in lead V1 (PTFV1) has been identified as a significant predictor of atrial fibrillation in the non-surgical population. It is uncertain whether or not there is an association of PTFV1 and new-onset POAF in patients after cardiac surgery.

Methods: In this secondary analysis, adult patients undergoing on-pump cardiac surgery for aortocoronary bypasses, valve surgery, combined bypass, and valve surgery were analyzed from 12/2018 to 08/2020. Patients who had a previous occurrence of atrial fibrillation or atrial flutter, patients with pacemakers and/or Implantable Cardioverter-Defibrillators (ICDs), and those who did not have an electrocardiogram (ECG) performed within the 3 months before surgery were excluded. In addition, ECGs that were considered to be of low quality were also removed. Preoperative 12-lead ECGs were examined and the PTFV1 was measured. Secondarily, we examined the P-wave length in lead II, the area under the P-wave in lead II, PR interval, and QRS duration in lead V1 and II. The occurrence of POAF was extracted from the hospital record.

Results: Out of a total of 252 patients, 62 patients (24.6%) developed new onset POAF during their hospital stay. POAF occurred primarily in older patients, with poor renal function, and exhibited larger left atria. Analysis of ORs (odds ratios) revealed that age, creatinine clearance, valve surgery, and left atrial volume index (LAVI) were associated with POAF. In the context of the multivariable analysis, it was demonstrated that only age presented a significant correlation with postoperative atrial fibrillation (POAF). There was no observed relationship between any of the parameters based on ECG and the occurrence of POAF.

Conclusion: No association was found between PTFV1 or other ECG based measurements and new onset POAF in cardiac surgery patients. Age was the only independent predictor of POAF.

KEYWORDS: cardiac surgery, postoperative atrial fibrillation, p-terminal force vector in lead V1, cardiopulmonary bypass, electrocardiography

P 3

A multidimensional pain scale can be useful in the evaluation of pain tolerability by patients with acute or chronic pain

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Background: The reliance on unidimensional scales for pain assessment has been criticised. In the context of a transcultural validation of a French version of the multi-dimensional "Defence and Veterans pain rating scale DVPRS", we included questions about the tolerability of the current pain intensity and the maximum pain intensity deemed tolerable. The aim was to validate the DVPRS for patients with acute and chronic pain, and to investigate differences in pain tolerance. The DVPRS contains a primary numeric rating scale with visual aids and phrases linking pain intensity to the ability to perform activities, and questions about the impact of pain on activities, sleep, mood, and stress.

Methods: Secondary analysis of a prospective observational study in two French-speaking Swiss hospitals. Inclusion criteria were patients (>18 years) with acute or chronic pain and able to speak and understand French. The French translation of the DVPRS, named "functional pain scale (FPS)" and a customized evaluation questionnaire was completed by patients after an explanation by the investigator.

Results: A total of 232 patients were included (132 patients with acute and 98 with chronic pain). Mean pain intensity was 5.3 (SD 2.3) for chronic and 3.4 (SD 2.4) for acute pain on the 0-10 FPS. Only 6.7% of patients with acute, but 25.5% of patients with chronic pain claimed that their current pain intensity was inacceptable. "Impact on activities" was only significant factor explaining whether current pain intensity was acceptable or not for patient with acute pain. For patients with chronic pain, the only significant factor was "impact on mood". Regarding the maximum tolerable pain intensity, patients with acute pain indicated a median level of 6.0 (mean 6.1, SD 1.7), patients with chronic pain a median of 5.0 (mean 5.5, SD 1.9). The difference was significant.

Conclusions: Compared to patients with acute pain, patients with chronic pain consider lower pain levels as tolerable but indicate higher levels of current pain, and in consequence more often judge the current pain level as inacceptable. During pain evaluation, the supplemental questions of the DVPRS/FPS about pain impact on activities and mood, can clarify pain tolerability for patients with both acute and chronic pain, and offer the possibility to discuss specific treatment goals with each patient.

P 4

MicroRNA Regulated Expression of Monocytic HLA-DR in an Ex Vivo Whole Blood Model

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In post-traumatic septic conditions, decreased HLA-DR expression on monocytes has been reported. The monocytic HLA-DR levels frequently correlate with probability of infectious complications and mortality but the underlying mechanism of this downregulation remains largely unknown. Recently, there has been an increasing exploration into the role of RNA interference in cellular immune regulation. To investigate the role of microRNAs (miRNAs) in the regulation of HLA-DR expression, we developed an ex vivo transfection model using whole blood.

Peripheral blood was collected in hirudin-coated tubes from healthy donors and transfection was performed within one hour of collection. Cell viability, transfection efficiency, immune activation, and assay functionality were assessed 72 hours post-transfection using spectral flow cytometry. To study effects of miRNA on HLA-DR, whole blood was transfected with miRNA mimics, which had significant up- or downregulating effects on HLA-DR expression in human monocytic THP-1 cells. HLA-DR surface expression was quantified by spectral flow cytometry.

Viability experiments revealed low toxicity for cells transfected with Lipofectamine RNAiMAX (>85% viable cells). Transfection efficiency, measured using a fluorescent-labelled scramble miRNA, was high in granulocytes and monocytes, and showed dose-dependent efficiency up to 65% in granulocytes and 96% in monocytes. To evaluate unintended immune stimulation, specific activation markers CD66b (granulocytes) and HLA-DR (monocytes) were measured post-transfection with a mock miRNA. No significant activation was observed in either cell type. Using a specific small interfering RNA against CIITA, the master regulator of MHC-II gene transcription, we confirmed a working transfection model by demonstrating a dose-dependent reduction in HLA-DR expression. Upon transfection with miRNA mimics, an increase of HLA-DR expression was detected in monocytes after blood cells were transfected with hsa-let-7f-2-3p as well as hsa-mir-5693.

MiRNAs may play an important role in the regulation of HLA-DR expression. Hsa-let-7f-2-3p and hsa-mir-5693 significantly upregulated HLA-DR expression in primary human monocytes in an ex vivo whole blood model. To understand the underlying mechanisms of this upregulation, additional in silico experiments for target prediction/validation are necessary and expression levels of these miRNAs in both healthy and pathological conditions need to be further determined.

P 5

Functional residual capacity under apnoeic oxygenation with two different high-flow nasal cannulas in children: A single-centre prospective randomized controlled trial

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Background: Apnoeic oxygenation in paediatric patients prolongs the time to desaturation, but little is known about the pressure generated in the airway. The time to install the high-flow nasal cannulas after facemask ventilation might contribute to atelectasis formation due to loss of positive pressure. The use of new Optiflow Switch™ cannula might avoid this problem. We aimed to investigate the changes in lung impedance as a surrogate for airway pressure in the airway leading to changes in functional residual capacity measured by electrical impedance tomography (EIT) under apnoeic oxygenation with two different nasal cannulas.

Methods: After Ethics Committee approval and informed consent, this single-centre randomised controlled non-inferiority trial recruited 48 patients (ASA 1&2, 10-20kg, elective procedures) requiring general anaesthesia. The primary outcome of this analysis is the reduction in lung impedance normalised to tidal volume in relation to bodyweight (ml/kg) from start to end of apnoea measured with EIT under nasal apnoeic oxygenation. Our null hypothesis postulates a reduction in normalised lung impedance of more than -35% (non-inferiority margin). Patients were randomised into the following two groups:

- 2 L/kg/min FiO2 1.0 with the conventional cannula (control group)
- 2 L/kg/min FiO2 1.0 with the Optiflow Switch™ cannula

After standardised anaesthesia induction, including a neuromuscular blocking agent, patients were left apnoeic for 5 minutes, receiving oxygen according to the randomisation with continuous jaw thrust. After study termination, airway management was performed, and a standardised recruitment manoeuvre was applied. Changes in lung impedance during apnoea were continuously recorded, normalised to a tidal volume of 6-8ml/kg and used to estimate changes in lung volume.

Results: EIT-measurements were obtained in 48 patients (conventional cannula n = 24, switch cannula n = 24). Mean [SD] normalised estimated reduction in lung volume in relation to bodyweight (mL/kg) was: conventional cannula 6.70mL/kg [3.14] and Switch cannula 6.63 mL/kg [3.68]. The mean difference [95% CI] was -0.07 [-2.06 to 1.92], thus non-inferior.

Conclusions: These data show that the intervention group is non-inferior to the control group during apnoea in children when comparing changes in estimated lung volumes. The Optiflow Switch™ can't avoid atelectasis formation but allows for better condition for facemask ventilation even with the installed nasal cannula.

P 6

Comparison of left and right ventricular strain measured by Philips aCMQ and Tomtec using transoesophageal echocardiography

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Objectives: To investigate how left and right ventricular strain measured by two different vendors compare to each other and in terms of interrater and intrarater reliability.

Methods: In this secondary analysis, we examined transesophageal images acquired after induction of patients undergoing cardiac surgery during a period of hemodynamic stability. The same images were analyzed using Philps aCMQ and Tomtec analysis programs by two assessors. Specifically, global and segmental strain of the left ventricular (LV) was measured by two assessors in the midesophageal 4 chamber view (ME4C), the midesophageal 3 chamber view (ME4C), and midesophageal 2 chamber view (ME4C). Additionally, strain of the free wall (FW), septum (S), and segments were measured in the right ventricle (RV) in an RV focused ME4C. Correlation and agreement were examined between vendors in addition to interrater and intrarater reliability for each software.

Results: In a convenience sample of 50 patients, strain in a total of 181 views was examined. Median [interquartile range] strain values for aCMQ and TomTec for the ME4C, ME2C, ME3C, RVFW, and RVS were ME4C: -15.9% [-8.9% to -18.4%] vs -15.1% [-11.3% to -17.8%] p = 0.83, ME2C: -14.0% [-11.9% to -17.0%] vs -16.7% [-12.2% to -18.6%] p = 0.13, ME3C: -15.1% [-11.2% to -15.7%] vs -14.9% [-12.2% to -18.1%] p = 0.39, RVFW: -18.3% [-14.1% to -21.2%] vs -24.9% [-21.5% to -29.3%] p <0.01, -17.1% [-11.7% to -19.8%] vs -19.8% [-16.2% to -22.8%] p = 0.03, respectively. Correlation (Pearsons r = 0.79, 0.72, 0.91) and agreement (mean differences of -1%, -1%, -2%) were similar for LV views, while significant differences were found for the RV with correlation (Pearsons r = 0.62 and 0.73) and agreement (mean differences of -6% and -3%). On a segmental level, correlation was poorer for the basal, mid, and apical segments of the LV (Pearsons r = 0.37, 0.67, and 0.72). Interrater reliability (Pearsons r) for the ME4C, ME2C, ME3C, RVFW, and RVS were 0.91, 0.86, 0.81, 0.77, and 0.83 as well as 0.85, 0.89, 0.77, 0.88, and 0.89, for TomTec and Philips aCMQ respectively.

Conclusions: Relevant differences in strain were found between the Philips aCMQ and TomTec Software tools for the RV, but not the LV. Segmental correlation between the two softwares was poorest in the basal segments. Similarly interrater reliability was observed. Clinicians should exercise caution in comparing strain measurements for the RV and on a segmental level; vendor-based systematic variation may exist.

P 7

Learning Curve for Intubation with a Hyper-angulated Video Laryngoscope: A Sub Analysis of a large alternating intervention trial

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Background: Traditional direct laryngoscopy (DL) has been the cornerstone of airway management for decades. The introduction of video laryngoscopy (VL) has offered advantages in visualization and intubation success. However, the optimal approach and the comparative effectiveness between these techniques remain a matter of debate. Recent trials have shown the superiority of VL compared to DL regarding the first-attempt success rate. However, while VL with hyper-angulated blades improves visualization of laryngeal anatomy, handling and insertion of the endotracheal tube might be challenging, especially for inexperienced users. Thus, our study evaluated the learning curve associated with first-attempt success rate using hyper-angulated VL.

Methods: This was an a-priori planned sub-analysis of the recently published clinical trial "Video Laryngoscopy vs Direct Laryngoscopy for Endotracheal Intubation in the Operating Room: A Cluster Randomized Clinical Trial" by Ruetzler et al. We utilized the cumulative sum method for plotting learning curves. The chart was created by plotting the cumulative sum values over time for each individual alongside the fixed horizontal decision limits. Crossing the upper decision limit indicates that the clinician's failure rate is significantly higher than the acceptable failure rate. Similarly, crossing the lower decision limit indicates that the clinician's failure rate is significantly lower than the acceptable failure rate. If the line remains between the two decision limits, no inference can be made. The acceptable and unacceptable failure rates for this study were set at 15% and 30%, respectively.

Results: We plotted learning curves for 4,312 intubations across 223 unique providers (anesthesiologists, n = 25; CRNAs, n = 35; SRNAs, n = 36; fellows, n = 46; residents, n = 81). The median number of procedures per provider was 15. The overall first attempt failure rate was low (72 out of 4,213 procedures), and the failure rates were comparable across provider groups. Sixty percent of the providers crossed the acceptance boundary, while the other 40% did not cross any of the boundaries. No provider crossed the unacceptable failure rate boundary. On average, it took 12 procedures to cross the acceptable failure rate boundary.

Conclusion: On average, it took health care providers 12 procedures to achieve acceptable failure rates for first-attempt intubation success rates using hyper-angulated VL.

P 8

Paediatric tubeless laryngotracheal surgery: A retrospective case series describing two different airway management strategies

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Objectives: In paediatric tubeless laryngotracheal surgery airway management remains challenging as conventional strategies cannot be used. Desaturation during the procedure remains a significant problem that might interrupt and prolong the intervention. This may result in early termination of surgery and lead to subpar surgical outcomes. Two common airway approaches are apneic oxygenation via nasal high-flow oxygen (HFO) and supraglottic jet ventilation (SJV). It remains unclear which technique provides successful anaesthesia without interruption of the procedure due to hypoxaemia.

Methods: We included paediatric patients under 16 years with general consent undergoing tubeless procedures from May 2023 until March 2024. Following monitoring of vital parameters according to the local standard operating procedures, anaesthesia, including a neuromuscular blocking agent, was inducted. After testing possible facemask ventilation, patients received nasal HFO (2 L/kg/min, FiO2 1.0) or SJV (AF 200 BMP, PIP 1.5 bar, I:E = 1:2, FiO2 1.0;). The FiO2 was reduced to 0.5 and 0.3 during laser surgery, respectively. The primary endpoint was successful anaesthesia without interruption of the procedure for rescue ventilation. Secondary endpoints were the total interruptions and quantity of desaturation, the deepest SpO2 values, and the duration of the surgical intervention.

Results: We included eight procedures (n = 4 HFO, n = 4 SJV) with a median [Q1;Q3] age of 8.5 [4;68] months and ASA physical status II (n = 6; 75%) and III (n = 2; 25%). Successful anaesthesia without interruption was achieved in 50% (n = 2) with nasal HFO and in 75% (n = 3) with SJV, respectively. During nasal HFO, a total of 6 desaturation events required rescue ventilation performed with tracheal intubation (lowest SpO2 58%), while with SJV, one (25%) desaturation event (lowest SpO2 76%) required interruption of laser surgery (FiO2 = 0.3) and increase of FiO2 to 1.0. The median [Q1;Q3] surgical duration with nasal HFO was 23.5 [19;28] minutes and 21 [16.5;21.5] minutes with SJV.

Conclusion: In this case series, procedures with SJV had more often successful anaesthesia with fewer and less severe desaturation events than nasal HFO. Furthermore, with SJV no repeated tracheal intubation for rescue ventilation had to be performed. Further randomised controlled trials with appropriate sample sizes are needed to confirm our retrospective findings.

P 9

Gastric Ultrasound performed by inexperienced examiners (medical students) is highly sensitive but not specific for the detection of gastric content

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Background: Aspiration of gastric content in patients with a full stomach is a serious complication of anesthesia, associated with high mortality and morbidity. Recent studies demonstrated that fasting status can be assessed accurately by gastric ultrasound. However, there is still a lack of evidence regarding the application of this technique by inexperienced examiners. We aimed to determine the accuracy of gastric ultrasound performed by medical students after a standardized training sequence.

Methods: In this prospective, randomized, examiner-blinded study, five medical students performed 80 gastric ultrasound examinations on healthy, normal weight volunteers (ethics committee approval: Project-ID 2022-00795). The study was conducted from July to September 2022 at the University Hospital Basel. Standardized training consisted of blended online training, one lecture and 2h of hands-on-training. Volunteers were randomized in a 1:1 ratio to "fasted" or "not fasted". Sensitivity, specificity, positive and negative predictive values were calculated from the acquired data.

Results: Data from 80 individuals were analyzed. All “not fasted” volunteers were correctly identified (sensitivity 1.00, 95% CI: 0.91-1.00). 15 out of 40 “fasted” volunteers were wrongly classified as “non-fasted” (specificity 0.63, 95% CI: 0.46-0.77). Positive predictive value was 0.73 (95% CI: 0.59-0.84) and negative predictive value 1.00 (95% CI: 0.86-1.00).

Conclusions: Examiners with limited experience in ultrasound diagnostics may accurately identify a full stomach in normal weight volunteers after a standardized training sequence. However, the detected specificity of 0.63 was low, and more focused training on the ultrasound anatomy of an empty stomach may be needed to rule out gastric content in a clinical scenario.

P 10

A prospective observational study to validate the HEAVEN criteria for prediction of difficulties during airway management for in-hospital emergency rapid sequence intubation

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Background: Difficulties during airway management are common in emergency intubations. Existing difficult airway prediction tools need patients’ cooperation and perform rather poor. The HEAVEN Criteria were developed, validated, and found to be helpful in predicting out-of-hospital difficult airway. The acronym HEAVEN stands for Hypoxemia, Extremes of size, Anatomic abnormalities, Vomit/blood/fluid, Exsanguination/anaemia, and Neck mobility issues and does not need patients’ cooperation. We aimed to validate the HEAVEN criteria as a predictor for difficult airways during in-hospital emergency rapid sequence intubation (RSI) at a university hospital.

Methods: After Ethics Committee approval (ID: 2020-2458), with general consent, we prospectively recruited all consecutive patients undergoing in-hospital RSI from 01-12-2021 to 06-12-2022. We recorded the HEAVEN criteria, the percentage of glottic opening (POGO) score, and intubation was classified as "easy", "difficult" or "not possible" by the airway operator. Primary endpoint was the predictive capacity of the HEAVEN criteria for difficulties during airway management, assessed as a prognostic test and within prediction modelling.

Results: This study included a total of 1,500 emergency patients, aged 56 [31-73] years median [IQR], BMI was 25 [22-29] kg/m2, and ASA physical status classification n(%) was: ASA1: 177(12), ASA2: 388(26), ASA3: 422(28), ASA4: 437(29), ASA5: 76(5). No HEAVEN criteria were found in 46.0% of the patients, 39.9% had 1 criterion; 11.5% had 2 criteria, 3.2% had 3 or more criteria. The specificity/ sensitivity of HEAVEN-criteria in patients with 1 criterion was 0.89 (95%-CI: 0.80-0.94)/ 0.48 (95%-CI: 0.46-0.51), with 2 criteria was 0.46 (95%-CI:0.36-0.56)/ 0.87 (95%-CI: 0.86-0.89) and with 3 or more criteria was 0.24 (95%-CI: 0.16-0.34)/0.98 (95%-CI: 0.97-0.99). As a prediction model, the cumulative HEAVEN criteria resulted in an AUROC of 0.81 (95%-CI: 0.76-0.86). Adding the POGO to the HEAVEN criteria results in a higher AUROC of 0.90 (95%-CI: 0.86-0.94).

Conclusions: Although very rare, the presence of 3 or more HEAVEN criteria strongly predicts difficulties during airway management for in-hospital RSI. For improved risk assessment to reveal possible difficulties during airway management, the superior predictive value of adding POGO suggests performing a nasal flexible endoscopy of the upper airway before the start of airway management.

P 11

Continuous and single-injection peripheral nerve blocks for pain management in total knee arthroplasty

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Introduction: Total knee arthroplasty (TKA) is a common orthopaedic procedure that necessitates effective perioperative pain management to facilitate early mobilization and reduce the risk of chronic postsurgical pain and prolonged opioid use. This study aimed to compare patient-reported pain composite scores (PCS) and postoperative opioid requirements between continuous peripheral nerve block (PNBc) and single-injection peripheral nerve block (PNBs) techniques for TKA.

Methods: After approval of the local ethics committee and obtaining patients' written informed consent, data from the PAIN OUT registry were analyzed. The study included 4,328 adults who underwent TKA between 2010 and 2020. Patients were categorized based on anaesthesia type: general anaesthesia only (GA-o), spinal anaesthesia only (SA-o), GA with single-injection PNB (GA&PNBs), GA with continuous PNB via catheter (GA&PNBc), SA with single-injection PNB (SA&PNBs), and SA with continuous PNB via catheter (SA&PNBc). The primary endpoint was the PCS (NRS 0-10), summarizing pain intensity and duration in the first 24 hours postoperatively. A multivariable regression model adjusted for confounders such as age, sex, weight, and preoperative opioid use. Secondary endpoints included postoperative opioid requirements and a composite score of patient-reported outcomes (PROS) as median NRS (Q1-Q3).

Results: The GA&PNBc group reported higher PCS compared to GA&PNBs (mean difference (95% CI): +0.5 (0.0-0.9); p = 0.035). No significant difference was observed between SA&PNBc and SA&PNBs. Postoperative opioid requirements were 20.3% (8.4-32.2) higher in the GA&PNBc group compared to GA&PNBs (p <0.001) and 50.8% (41.3-60.4) higher in the SA&PNBc group compared to SA&PNBs (p <0.001). The least favourable PROS were observed in the PNBc groups, with NRS of 3.2 (1.8-5.2) for GA&PNBc and 3.2 (1.6-4.9) for SA&PNBc (p <0.001).

Conclusions: Continuous PNB via catheter did not demonstrate superior outcomes in PCS, postoperative opioid use, or PROS compared to single-injection PNB within the first 24 hours after TKA. Future research should focus on prospective trials and long-term follow-up to assess the broader implications of these findings. Incorporating comprehensive patient-reported outcomes into clinical practice may enhance the evaluation of analgesic techniques.

P 12

Evaluating How Swiss Anaesthesiologists View Cardiovascular Magnetic Resonance Imaging as a Tool for Peri-Operative Risk Evaluations – a National Survey

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Background: Anaesthesiologists are seeing a rising number of patients with cardiac risk factors who are at a higher risk for perioperative complications. Although cardiovascular magnetic resonance (CMR) imaging comprehensively quantifies cardiovascular function, its key advantage is quantifying myocardial tissue abnormalities. The number of diagnostic CMR scans is rapidly growing, yet it is unknown how anaesthesiologists use this data. We investigated how anaesthesiologists currently view CMR and if the findings in clinical CMR reports influence their decision making when risk-stratifying a patient for anaesthesia.

Methods: An anonymous voluntary online survey endorsed by SSAPM was distributed to anaesthesiologists in Switzerland. The survey consisted of 42 multiple choice questions focused on the anaesthesiologists general understanding and implementation of diagnostic CMR parameters. An interim analysis of the first 188 surveys was performed.

Results: Responders were primarily board-certified anaesthesiologists (82%), and 53% indicated they work in cardiac-/vascular-/thoracic anaesthesiology. Interestingly, most responded, that if CMR reports were available in patients' medical history, they incorporated this data into evaluations (76%). The majority understood and implemented anatomical and functional measurements of the valves (69%) and left (70%) and right ventricles (68%). For myocardial tissue features, 62% utilized findings from inducible ischaemia (myocardial hypoperfusion under stress), and 47% used the presence of myocardial scar. These have been included in CMR exams for 25 years, however fewer anaesthesiologists knew and implemented modern CMR techniques characterizing diffuse myocardial fibrosis (24%) and oedema (21%). Most think that CMR holds potential for perioperative risk evaluation (80%) and would like to include it more into clinical practice (53%). Yet, 67% responded that at the present time they do not know of, or there is not enough evidence linking CMR to perioperative outcomes.

Conclusions: CMR findings are often utilized for peri-operative cardiac risk evaluation by Swiss anaesthesiologists. However, this is primarily limited to traditional measures, while modern tissue characterization techniques are not well understood. Therefore, the full potential of advanced CMR markers remains untapped. Further research is needed to evaluate if there is a benefit of including advanced CMR markers in peri-operative risk evaluation.

P 13

Cross-cultural Adaptation and Psychometric Validation of the French Version of the "Defense and Veterans pain rating scale" for acute and chronic pain: a prospective clinical study

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Background and goal of study: Pain assessment and proper evaluation of pain is a prerequisite for treatment of acute and chronic pain. Until now, most pain evaluations use only a unidimensional scale, although multidimensional pain assessment and especially assessment of functional pain impact on activities is recommended. A new functional pain scale, the "Defence and Veterans Pain Rating Scale (DVPRS)" permits this multidimensional assessment and adds visual aids and phrases linking pain and impact on activities. The goal of this study was to create and validate a French translation of the DVPRS, called functional pain scale.

Materials and methods: Prospective observational study in two large hospitals of the French-speaking region of Switzerland. Patients with acute or chronic pain in different settings received a paper questionnaire with both the NRS and the functional pain scale (FPS) and a customized evaluation questionnaire.

Analysis of correlation of FPS with NRS, psychometric properties and patient preferences were planned also for subgroups (acute and chronic pain, patients >75 years).

Results and discussion: For the whole group of 232 patients and all subgroups, correlation with the NRS was high (ICCs all 0.88). The study showed excellent internal consistency

(Cronbach's alpha 0.89) and a two-factor structure with activities- and emotions-related items. Patients in all subgroups preferred the functional pain scale over NRS and confirmed ease of use. In a subgroup of 30 patients an excellent concordance of patient's ranking of the phrases with the scale values was shown (Kendall's W 0.98).

Conclusions: The study confirms that the French translation of the DVPRS (= functional pain scale) is a valid measurement instrument for acute and chronic pain evaluation in a wide range of patient groups, easy to use by patients.

P 14

Reliability and validity of a new postoperative track assessment tool – a prospective observational study

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Background: Postoperative instruments supporting decision-making for optimal level of care are lacking. This study tested reliability and validity of the postoperative track assessment tool (PoTra-tool) in a post-anaesthesia care unit (PACU) and a specialised perioperative intermediate care unit (IMC-U).

Method: Prospective observational study in a tertiary Swiss university hospital. Raters were nurses and physicians with 3 levels of competency (non-certified, certified, consultant). The PoTra-tool, consists of two visual analog scales that rate estimated indication (VASi) and benefit (VASb) of care in an IMC-U. The tool was tested at day 0 in the PACU and the IMC-U, and at day 1 in the IMC-U. Reliability, between raters and across days, was assessed using intraclass correlation coefficient (ICC) or weighted kappas. Validity was evaluated with validated scores (severity of illness, nurse workload and predicted mortality). Statistical analysis was carried out using ANOVA or Kruskal-Wallis tests.

Results: Healthcare professionals performed 4206 ratings for 879 patients (median age 72 years [IQR 61, 81], median ASA PS 4 [IQR 4, 4]. Median VASi was 12 [2, 30] for PACU patients and 76 [57, 89] for IMC-U patients. Median VASb was 7 [1, 19] for PACU patients and 66 [43, 84] for IMC-U patients. Internal consistency between VASi and VASb was high (Pearson correlation: 0.90). For each type of rater, reliability of VASi and VASb was acceptable to moderate for inter-rater reliability (weighted kappas: 0.59–0.67) but weak for test-retest reliability (weighted kappas: 0.28–0.53). The associations tested for construct validity were consistent with expected patterns, although the effect sizes were small.

Discussion: The PoTra-tool may support the decision-making process in deciding the appropriate care for a patient: PACU or a specialised perioperative IMC-U stay.

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Assessing neuropathic pain 6 and 12 months after surgery: Comparison of the DN4 versus the DN2 questionnaire

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Background: Chronic neuropathic pain (NeuP) after surgery is often overlooked and inadequately treated. Screening questionnaires can be used to evaluate whether a patient has possible NeuP according to the NeuP grading system.

Methods: After approval of the ethics committee and written informed consent, patients were prospectively enrolled. The participants completed the Brief Pain Inventory and the Douleur Neuropathique en 4 Questions (DN4) via telephone interviews 6 and 12 months (M6/M12) after surgery. The DN4 screening was positive with 4/10 symptoms/signs (patient self-examination). The same questionnaire was evaluated as the shorter version DN2 with only 7 symptoms (positive 3/7). Statistics: descriptive, $\chi 2$ test.

Endpoint: Percent of patients with DN4 vs. DN2 positive screening; comparison of their pain-related patient-reported outcomes, a possible influence of sex, surgical procedure and type of NeuP either CPSP (chronic postsurgical pain meeting the ICD-11 definition) or other pain at the surgical site (RELATED but not meeting the ICD-11 criteria) or UNRELATED to surgery.

Results: Of 1099 questionnaires, 632 patients responded at M6 and M12. The DN4 had more positive screenings than the DN2 (M6: 11% vs. 7.5%; M12: 10.5% vs. 8.9% of patients; $p < 0.001$). More women had a positive NeuP screening than men (M6 DN4 13% vs. 7%; $p = 0.01$), e.g., after orthopaedic surgery (M6 women 36%, men 16%; M12: 30% vs. 20%; $p = 0,02$). Over a third of DN4-positive respondents had a negative DN2 at M6; at M12 these were 23% ($p < 0.001$). This was particularly frequent among women after orthopaedic (M6 DN4 vs. DN2: 36% vs. 26%; $p < 0.001$) and gynaecological surgeries (13.3% vs. 5.6%; $p < 0.001$).

The proportion of positive DN2/DN4 increased with pain intensity. At M6, 34% of patients with mild pain (BPI Pain Composite Score NRS<3), 54% with moderate (NRS 3-6) and 63% with severe pain (NRS >6) had possible NeuP ($p < 0.001$). Patients with positive versus those with negative screening reported increased pain-related physical and affective functional impairment (all $p < 0.001$). At M12, 18.5% of the patients with possible NeuP had CPSP, and 45.7%/28.4% had other pain, either pain RELATED or UNRELATED to surgery.

Conclusions: The DN4 questionnaire identified more possible cases with NeuP than the DN2. Further anamnestic and clinical assessment is needed, particularly to rapidly initiate adequate treatment, if NeuP is confirmed.

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Comparing Erector Spinae Plane (ESP) and Thoracic Paravertebral (TPV) Block analgesic effect after elective Video Assisted Thoracic Surgery (VATS): a Single Center, Randomized, Multiple-blinded, Controlled, Non-Inferiority Trial

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Introduction: Video-assisted thoracic surgery (VATS) is the gold standard for minimally invasive lung resections, offering quicker recovery and less discomfort than open thoracotomy. However, postoperative pain from VATS can hinder breathing and increase complications. Thoracic epidural analgesia (TEA) is effective but invasive, with notable drawbacks. Less invasive options like thoracic paravertebral block (TPVB) and erector spinae plane (ESP) block are being explored. TPVB is effective but requires advanced skills, while ESP is simpler and safer, though its mechanism is unclear. This study compares ESP and TPVB in a randomized, non-inferiority trial, focusing on opioid consumption post-VATS.

Methods: This single-center, randomized, multiple-blinded, controlled, non-inferiority trial included 50 patients undergoing VATS at the Regional Hospital of Bellinzona and Valli. Patients were randomized to receive either an ESP block with local anesthetic and a TPV block with saline (ESP group) or a TPV block with local anesthetic and an ESP block with saline (TPV group). The primary outcome was the cumulative dose of rescue opioids at 24 and 48 hours postoperatively. Secondary outcomes included pain scores, cardiopulmonary complications, procedural time, need for anti-nausea medication, episodes of vomiting, urinary retention, and the need for an epidural catheter.

Results: Data from 47 patients were analyzed. There was no statistically significant difference in opioid consumption between the ESP and TPV groups at 24 hours ($p = 0.094$) and 48 hours ($p = 0.121$). In a sub-analysis by type of surgery, the NRS values were higher, as postulated, in major surgery. Eight patients in the ESP group and twelve in the TPV group required epidural catheters due to block failure or conversion to thoracotomy. Cardiopulmonary complications and procedural times were low and comparable between groups.

Conclusions: The study did not demonstrate the non-inferiority of the ESP block compared to the TPV block for postoperative analgesia following VATS. However, both blocks provided effective pain relief with no significant differences in outcomes. The findings suggest that both ESP and TPV blocks are viable alternatives to thoracic epidural analgesia, but further research is needed to optimize patient selection and procedural techniques.

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VASCALB: Blood volume expansion, hemodynamics and cardiovascular biomarkers during treatment of major hemorrhage with Ringer solution, 5% albumin, and 20% albumin. A single center randomized controlled trial.

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Background: Volume replacement with crystalloid fuid is the conventional treatment of hemorrhage. We challenged whether a standardized amount of 5% or 20% albumin could be a viable option to maintain the blood volume during surgery associated with major hemorrhage. Therefore, the aim of this study was to quantify and compare the plasma volume expansion and hemodynamic properties of 5% albumin, 20% albumin, and Ringer-lactate, when infused during major peri-operative hemorrhage.

Methods: In this single-center randomized controlled trial, fuid replacement therapy to combat hypovolemia during the hemorrhagic phase of cystectomy was randomly allocated in 42 patients to receive either 5% albumin (12 mL/ kg) or 20% albumin (3 mL/kg) over 30 min at the beginning of the hemorrhagic phase, both completed by a Ringer-lactate replacing blood loss in a 1:1 ratio, or Ringer-lactate alone to replace blood loss in a 3:1 ratio. Measurements of blood hemoglobin, hemodynamics and Guyton's parameters and cardiovascular biomarkers such as MR Pro-ANP, Pro-BNP, MR Pro-ADM and Copeptin were used to assess our fluid therapy effectiveness.

Results: The median hemorrhage was 848 mL [IQR: 615–1145]. The regression equation showed that the Ringer-lactate solution expanded the plasma volume by 0.18 times the infused volume while the corresponding power of 5% and 20% albumin was 0.74 and 2.09, respectively. The Ringer-lactate only fluid program resulted in slight hypovolemia (mean, – 313 mL). The 5% and 20% albumin programs were more efective in flling the vascular system; this was evidenced by blood volume changes of only+63 mL and – 44 mL, respectively, by long-lasting plasma volume expansion with median half time of 5.5 h and 4.8 h, respectively, and by an increase in the central venous pressure. The Ringer-only fluid program resulted in slight hypovolemia (mean, 313 mL), which decreased the mean arterial pressure (MAP) and increased PPV and the vasopressor requirement. The 5% and 20% albumin programs were more effective in filling the vascular system, as evidenced by higher mean circulatory filling pressure and unchanged or decreased PPV. The 20% albumin increased the systemic vascular resistance and the resistance to venous return.

Conclusion: Albumin is an effective therapy during severe bleeding situation.

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Acute Intraoperative Onset of Heparin-Induced Thrombocytopenia (HIT) During Off-pump Coronary Artery Bypass Grafting: A Case Report and Literature Review

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Introduction Heparin-induced Thrombocytopenia (HIT) is a severe immunemediated adverse reaction after Heparin administration and almost no literature on its occurrence during Cardiopulmonary Bypass exist.

Case A patient with intermittent angina pectoris receiving quadruple OPCAB showed anteroapikal akinesia and hemodynamic instability postoperatively. In the catheter lab bypass recanalization and stenting was performed and an Impella pump inserted and later a VA-ECMO was installed. A postop thrombocytopenia and presence of anti-PF4/heparin antibodies resulted in a suspicion of a HIT. Due to the patient's wish the treatment was discontinued. The assay for functional platelet activation activity confirmed a HIT.

Discussion Alternative intraoperative protocols generally include a non-heparin anticoagulant or heparin and an antiplatelet agent. IVIG may be useful for eliminating antibodies.

To the best of our knowledge only one case report of two patients suffering from intraoperative HIT exists. Our circuit did not clot, so we had no initial suspicion of HIT. Preoperatively, our patient did not exhibit thromboses or thrombocytopenia and the 4T score was 0. The first reasonable suspicion was visualization in the catheter lab that all bypasses had clotted after cardiopulmonary bypass.

Possible intraoperative strategies: Bivalirudine has been shown to be safe and efficient when used for cardiac surgery with CPB for CABG and/or valve replacement, albeit with significantly higher early postoperative bleeding. Intraoperative change from heparin to bivalirudin on a suspected HIT, the monitoring in presence of heparin and the moment of antagonizing heparin are challenges we face.

Another option is adding an adjunct "on top" of heparin. The effect of the synthetic prostacyclin analogon iloprost may be insufficient intraoperatively. Cangrelor – a P2Y12 -antagonist – has been propagated but only case reports exist. Although in vitro studies have shown a reduction in platelet aggregation by 91%, only 45% reached the suggested 95% reduction and may need pretreatment with IVIG. Third option is tirofiban – a GP IIb/IIIa antagonist has been shown to be feasible and safe in one study.

Conclusion: An intraoperative HIT should be considered in patients receiving heparin preop requiring repeated revisions of bypasses. An interdisciplinary back-up plan should be safe, quick to implement, and require as few changes as possible to the standard operating procedure.

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