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SASA 2022 VIRTUAL CONFERENCE ABSTRACTS

Petroleum jelly as an alternative coupling medium in focus assessed transthoracic echocardiography

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Background: Ultrasound gel as a coupling medium has been the standard of practice for all ultrasound studies performed at most hospitals worldwide. This study aimed to introduce petroleum jelly (petrolatum) as an alternative coupling agent, specifically with regard to focus assessed transthoracic echocardiography (FATE) by comparing its use to conventional ultrasound gel.

Methods: A crossover, double-blinded, non-inferiority study was conducted to ascertain whether petroleum jelly scores equal to ultrasound gel in terms of image quality (depth, penetration, detail, and overall quality) and user experience (pressure applied, amount of gel used, user-friendliness, and patient tolerance) using a General Electric (GE) Vscan Extend handheld ultrasound (HHU) device. The automated ejection fraction calculation was also noted and statistically compared.

Results: There was no significant difference between image quality or user experience in FATE scans performed with the conventional ultrasound gel and petroleum jelly. The automated ejection fraction calculation results obtained from scans with petroleum jelly showed minimal inter-user variability. Blinded sonographic review also did not rate differences between the images to be clinically important on any measure. Finally, petroleum jelly is more cost-effective than conventional ultrasound gel.

Conclusion: Petroleum jelly produces images of comparable quality to that obtained using conventional gel. The use of petroleum jelly as an alternative coupling medium could increase the practice of ultrasound in settings with resource limitations.

Keywords: ultrasound, echocardiography, point-of-care, critical care

Perspectives on desflurane

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Background: There has been much discussion lately about the environmental impacts of anaesthesia. The global healthcare industry is the 5th largest producer of CO_2 emissions. Due to its high global warming potential, desflurane has been singled out as an agent to avoid. But there are benefits to desflurane, especially when used ethically and economically.

Discussion: Desflurane is proven to be superior to other vapours and propofol with traditional recovery measures like time to obey commands. It is beneficial with airway reflex recovery in obese patients and reduces recovery time in elderly patients. It may hold benefit in patient-reported outcomes measures.

Desflurane contributes to Scope1 (direct) emissions. Like other anaesthetic vapours, it is a greenhouse gas, blocking infrared radiation from leaving the atmosphere. Only 17% of all healthcare emissions are direct, 71% of emissions are from Scope3 (indirect) sources. Globally, there are approximately 1 000 tons of CO_2 equivalent emissions per year from desflurane. This is 0.00006% of all healthcare emissions. Compare this with emissions from minimally invasive surgery – direct emissions from CO_2 use equals 300 tons/year in the USA alone, indirect emissions are 355 924 tons/year in the USA. Propofol has a lesser impact on emissions, but consider it is mobile in groundwater, is destroyed only at 1 000°C, and is toxic to aquatic environments.

Desflurane should be used with a minimal, or even basal flow technique, aiming to use 10 ml/hr. This reduces emissions significantly from 130 CDE100 kg/hr to 30 kg/hr. End-users should consider the efforts of suppliers in reducing Scope3 emissions. Consider avoiding nitrous oxide.

Conclusion: It is possible to use desflurane efficiently and ethically. Keeping things in perspective, it is clear that desflurane has a small impact in the context of overall healthcare emissions.

Use of high-flow nasal oxygenation outside COVID-19: a rural hospital experience

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Background: Before the COVID-19 pandemic, there was an increasing interest in the use of high-flow nasal oxygenation (HFNO) due to the way it delivers oxygen and because of its impact on respiratory mechanics. Its use extends from the operating room, e.g. pre-oxygenation, apnoeic oxygenation in ENT surgery, electroconvulsive therapy, to the emergency room and intensive care unit, e.g. acute respiratory failure, cardiogenic shock in adults and paediatrics. It has also been advocated as

a useful method to prevent reintubation. However, it has not always shown to be a superior approach to other oxygenation methods. Currently, the medical literature is inundated with the use of HFNO in the management of COVID-19. Yet, the picture may differ outside this ambit.

Methods: We describe two complex cases in which this therapy was used and was decisive toward a positive outcome.

Results: We describe two complex cases in which HFNO therapy was used and was decisive toward a positive outcome. In our first described case, it was an effective tool to bypass the need of endotracheal intubation in a high-risk OSA patient. In the second case the traditional epidural with invasive or non-invasive ventilation was challenged. The higher tolerability of HFNO, absence of sedation, better mobility and easier access to enteral nutrition resulted in the quick, successful recovery of the patient despite the combination of chronic restrictive pulmonary disease and severe thoracic-abdominal trauma.

Conclusion: In our opinion, both cases may illustrate a significant potential for the use of HFNO in different clinical scenarios.

The effect of caregiver's recorded voice on emergence delirium in children undergoing dental surgery

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Background: Emergence delirium (ED) is a distressing and harmful postoperative complication. Within the South African context, a cost-effective non-pharmacological ED intervention is desirable. This study aimed to compare the ED incidence in children listening to a recording of their caregiver's voice or a stranger's voice, while emerging from general anaesthesia for dental surgery at Rahima Moosa Mother and Child Hospital (RMMCH).

Methods: A prospective, randomised and contextual study design was implemented. Convenience sampling was used to include children between 2–6 years of age, who were randomly assigned to caregiver voice group (Group C) or stranger voice group (Group S).

Results: The ED incidence within the total sample was 11 (16.9%). In Group C, seven (25%) children had ED, whereas, in Group S, four (15.4%) children had ED ($p = 0.475$). There was no significant difference in Pediatric Anesthesia Emergence Delirium (PAED) scale and the Face, Legs, Activity, Cry and Consolability (FLACC) scores between the two groups. The time from completion of surgery to first purposeful movement and tracheal extubation was similar in Groups C and S ($p = 0.595$, $p = 0.992$, respectively). ED management and duration in the recovery room were also similar ($p = 0.300$, $p = 0.326$, respectively). There was an overall strong positive correlation between the highest FLACC and highest PAED scale scores ($r = 0.827$, $p < 0\ .0001$).

Conclusion: In this study, the PAED scale scores and the ED incidence were similar in children who listened to a recording of their caregiver's voice or a stranger's voice. However, this study was based on the protocol of a previous study at RMMCH, in which the incidence of ED was 51.6%. Therefore, compared to the previous study, there is a notable reduction in ED. This difference may be due to the use of noise-cancelling headphones or the use of a supportive voice, but further investigation is required.

Fitness for purpose of South African anaesthesiologists

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Background: Anaesthesiologists should be able to function independently and appropriately to benefit those they serve. However, difficulties have been experienced with the transition from trainee to specialist, posing potential adverse effects to the patient and the practitioner. To avoid such occurrences, it is necessary to ensure that graduates are well prepared for their specialist roles and are fit for purpose (FFP). Specialist practice incorporates various clinical and non-clinical roles, such as medical expertise, scholarship, communication, collaboration, management and leadership, professionalism, and health advocacy. Graduates have reported feeling better prepared for some and less prepared for others, with deficiencies noted particularly in non-technical roles. In anaesthesiology, there is a paucity of evidence with respect to fitness for purpose (FnFP), and no assessment of whether anaesthesiologists internationally or in the South African (SA) context are FFP.

Methods: This step-wise study aimed to develop and define the concept of FnFP and explore its nature in the SA anaesthesiology context. The first step provides a literature review, and proposes how FnFP relates to current terminologies. Step two attempts to define FnFP in the South African anaesthesiology context, culminating in a list of defining competencies useful as a tool to conceptualise and gauge FnFP henceforth. The next step establishes whether local graduates are considered FFP using the derived criteria. This is undertaken by exploring opinions of FnFP by teachers, examiners and graduates. The final step assesses the temporal nature of graduate self-assessment of FnFP.

Conclusion: This study explores and highlights contemporary terminologies in postgraduate medical education and proposes refinements for consideration, and inclusion, of the concept of FnFP as a means to enhance graduate readiness for practice. FnFP in the South African anaesthesiology context is explored to ultimately address and minimise graduate deficiencies in specialist practice.

Perioperative outcomes of mitral valve surgery at Charlotte Maxeke Johannesburg Academic Hospital

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Background: The distribution and determinants of heart disease vary greatly between developed countries and sub-Saharan Africa, where rheumatic heart disease (RHD) remains a major public health issue. Studies from across Africa show that RHD, specifically of the mitral valve, is the leading cause of morbidity and mortality from valvular heart surgery. However, data on mitral valve surgery outcomes in South Africa are limited. This study aimed to describe the perioperative outcomes of patients that have undergone mitral valve surgery at the Charlotte Maxeke Johannesburg Academic Hospital (CMJAH).

Methods: All patients above the age of 18 years who underwent mitral valve surgery at CMJAH between 1 January 2015 and 31 December 2018 were retrospectively included in the study. Cardiac Intensive Care Unit files, including anaesthesia charts, were assessed to describe each patient's preoperative, intraoperative, and postoperative data. Preoperative data included patient demographic information and comorbidities. Intraoperative data included aortic clamp and bypass times. Postoperative variables included outcomes such as sepsis, bleeding, re-operation and the development of acute kidney injury (AKI). The preoperative, intraoperative, and postoperative outcomes were then compared to determine each variable's effect on postoperative mortality.

Results: Two hundred and seventeen patients underwent mitral valve surgery at CMJAH within the study period. Four of the patients had incomplete files. RHD was the predominant primary aetiology for mitral valve surgery. The mortality rate in this study was 6.10%. Preoperative findings that contributed to mortality were: EuroSCORE II > 2%, preoperative ventilation, dialysis dependence, preoperative inotropic support, chronic obstructive pulmonary disease, congestive cardiac failure, renal insufficiency, low ejection fraction % and New York Heart Association ≥ III. Postoperative findings that contributed to increased mortality were prolonged mechanical ventilation, pneumonia, re-operation, AKI, sepsis, bleeding and transfusion. Increased aortic clamping and cardio-pulmonary bypass times increased the risk of prolonged mechanical ventilation, re-operations, use of pacemakers, AKI and bleeding.

Conclusion: RHD was found to be the primary aetiology for mitral valve surgery at CMJAH with a mortality rate of 6.1%. Preoperative, intraoperative and postoperative predictors of outcomes in the study confirm observations made in other parts of the world.

Comparison of a novel low-cost hyperangulated optic intubation stylet with the Bonfils fiberscope: a simulated difficult airway manikin study

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Background: Optic stylets are safe, efficient airway tools, with improved intubation success rates compared to direct laryngoscopy. Economical constraints often limit access to costly, difficult airway equipment. The hyperangulated optic intubation stylet (HOIS) is a novel, low-cost, stainless-steel stylet with a Wi-Fi camera connecting to a smartphone. We aim to demonstrate that performance of the HOIS (cost ~ R1 000.00), as an alternative low-cost device, is non-inferior to the Bonfils (cost ~ R30 000.00).

Methods: We performed a randomised, crossover non-inferiority study following institutional and ethics approval (UCT HREC 816/2020). Randomised participants received training (instructional video and practice intubations on a Laerdal airway manikin™) and subsequently intubated a Trucorp AirSim manikin™ simulating a difficult airway with the Bonfils and HOIS alternately. Our primary outcome was time-to-intubation with a pre-specified non-inferiority margin of 5 seconds. Secondary outcomes were best laryngeal view, airway trauma, and number of attempts. Participants completed a questionnaire regarding device preference and overall satisfaction.

Results: Thirty doctors participated: 33% interns and 54% medical officers from various specialities. Sixty-three per cent performed ≤ 1 intubation per week, and 10% had optical stylet experience. Both devices had 100% first-pass intubation success: 10.4 seconds Bonfils vs 11.2 seconds HOIS ($p < 0.0001$). The mean difference in time-to-intubation was 0.8 seconds (90% CI -0.4; 2.1). All Bonfils intubations had a grade 1 laryngeal view compared to 83% of HOIS intubations (27% grade 2). The Bonfils had the only incident of airway trauma. Two-thirds of participants preferred HOIS, with similar user satisfaction scores for both devices.

Conclusion: The HOIS is non-inferior to Bonfils in a single attempt difficult airway manikin simulation with predominantly novice, non-anaesthesia users. The HOIS could be a cost-effective tool for difficult airway management in resource-constrained settings.

The awareness of local anaesthetic systemic toxicity amongst registrars from surgical disciplines in a tertiary hospital, South Africa

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Background: The use of local anaesthetic (LA) agents has transformed medicine and enhanced the development of surgery. Local anaesthetic systemic toxicity (LAST) is a life-

threatening adverse event that may occur following the administration of LAs. Sound knowledge of LAST and its treatment is vital for patient safety. Surveys in many hospitals demonstrated a lack of knowledge about LAST and its management by non-anaesthetists. The study aimed to assess knowledge and awareness of LAST amongst registrars from various surgical disciplines at Tygerberg Hospital (TBH).

Method: We performed a descriptive cross-sectional study. An online questionnaire was sent to 201 registrars of different surgical disciplines of TBH. The results were analysed using descriptive statistics.

Results: We received 102 responses (response rate of 51%). The mean knowledge score was 67.9%, standard deviation (SD) 15.2, with a range of 20–100%. Only 18.6% of the registrars had encountered a case of LAST in their practice. Approximately half of the registrars knew the maximum recommended dose of bupivacaine, and 54% indicated that they had previous training in the management of LAST. Only 40.2% of the registrars knew that lipid emulsion is the specific treatment of LAST. The mean knowledge score was higher in those who had previous training about LAST with a mean of 73 (SD 13.7). A statistical difference (*p*-value 0.045) between the years of training and the knowledge about LAST was demonstrated.

Conclusion: Registrars' knowledge and awareness of LAST and safe use of LAs were concerning; it was shown to improve with years of training and in those with previous training about LAST. A lack of knowledge was found in identifying lipid emulsion as the specific treatment of LAST. These are factors that can be improved by training and awareness campaigns.

Keywords: local anaesthetics, lipid emulsion, local anaesthetic systemic toxicity awareness

SARS-CoV-2 infection prevalence in healthcare workers, administrative and support staff: the first wave experience at three academic hospitals in the Tshwane District of Gauteng

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Background: Healthcare workers (HCWs) have been identified as being at an increased risk for acquisition of SARS-CoV-2 infections, but there is a paucity of data pertaining to South African HCW related infection rates. Global and provincial disparities in these numbers necessitate local data in order to mitigate risks. We sought to ascertain the SARS-CoV-2 infection rates and outcomes among all hospital staff and further determined associations for the development of severe COVID-19 disease.

Methods: This retrospective audit was conducted across three academic hospitals in the Tshwane District for the period from 1 June 2020 to 31 August 2020. De-identified data from Occupational Health and Safety Department (OHSD) was used to calculate infection rates. A more detailed analysis of one of the three hospitals included evaluation of demographics, work description, possible source of SARS-CoV-2 exposure (community or hospital), comorbidities and outcomes.

Results: The period prevalence of SARS-CoV-2 infections ranged from 6.1% to 15.4% between the three hospitals, with the average period prevalence being 11.1%. The highest incidence of SARS-CoV-2 infections was observed among administrative staff (2.8 cases per 1 000 staff days), with medical doctors displaying the lowest incidence of 1.1 cases per 1 000 staff days. SARS-CoV-2 infections were either 'probable' community or healthcare facility acquired for 26.6% and 73.4% of the infections, respectively. Community acquisition was highest for the administrative group (41.8%) and lowest for doctors (6.1%). The mean age for mild and severe disease was 41 and 46.1 years, respectively ($p = 0.004$). The presence of comorbidities was significantly associated with the severity of the disease ($p = 0.002$).

Conclusion: The period prevalence of 11.1% was comparable to similar international studies. This study highlights that hospitals staff, including the administrative staff, are clearly at a high risk of acquiring SARS-CoV-2 infections during a surge.

Carbon footprint of 1 000 hours of general anaesthesia at a regional hospital

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Background: Climate change is the most significant global health threat facing the world in the 21st century. The health industry is a major contributor to greenhouse gas emission, ranking 7th in the world, and if considered as a country, would contribute ~ 8% of a country's carbon emissions. Theatre generates proportionally higher carbon footprint than other areas (5% of hospital's carbon emission), with volatile anaesthetic agents contributing > 50%. George Regional Hospital is part of Global Green Health Hospital. This audit is part of several initiatives to understand and reduce our hospital's carbon footprint, focusing on the environmental impact of volatile anaesthesia use during general anaesthesia (GA).

Methods: After institutional approval, we performed an electronic theatre and ventilator data review of 1 000 consecutive GA hours during a 3-month period. Inclusion criteria: GA cases. Exclusion criteria: Total intravenous anaesthesia (TIVA) and regional/local anaesthesia. Data collected included number of theatre cases; duration of anaesthesia (min); medical gas (oxygen

[O_2], air, nitrous oxide [N_2O]) used (l); type and amount of volatile used (ml).

Results: A total of 713 GA cases were performed during this period; 76% (543/713) between 07:30–16:30 on weekdays. One-third of cases were less than 1-hour, 53% between 1–2 hours and 17% longer than 2 hours. Paediatric patients (< 6 years) accounted for 6% of hours but contributed 14% of anaesthetic gas usage. There was no difference between office- and after-hours average gas consumption. Volatile consumption was 1 0429 ml isoflurane and 4 664 ml sevoflurane. Medical gas consumption was 155.9 kl O_2, 440.2 kl air, and 3 032 l N_2O.

Conclusion: N_2O > desflurane > isoflurane > sevoflurane are the biggest greenhouse gas contributors. 1 000 consecutive GA hours produced 10 712 kg carbon dioxide equivalent (CO_2e). This is equivalent to driving around the world once plus a round trip from Cape Town to Johannesburg (42 990 km) in South Africa's most popular car, a 1.6 l VW Polo.

Knowledge and practice of surgical antimicrobial prophylaxis at Tygerberg Hospital, South Africa

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Background: Surgical site infection (SSI) remains a top cause of hospital-acquired infections globally. Surgical antimicrobial prophylaxis (SAP) effectively reduces the incidence of SSI and forms a key component in the World Health Organization (WHO) surgical safety checklist and enhanced recovery after surgery (ERAS) bundle.

Objectives: To assess the knowledge and practice of South African anaesthesiologists and surgeons compared to local and international guidelines and their awareness of available SAP guidelines.

Methods: A cross-sectional peer-reviewed survey study on the knowledge, practice and awareness of SAP guidelines was conducted over a 6 week period. The study population included anaesthesiologists and surgeons at Tygerberg Hospital, a tertiary academic hospital in South Africa.

Results: Two hundred and seventy-three invites were sent out. One hundred and sixty-two responses were received, of which 153 were complete for analysis. The mean (SD) score on knowledge was 72.5% (8) but knowledge on dosage, timing and redosing were poor. SAP practices amongst participants were adequate, except for procedures that are controversial or require complex antimicrobial cover. Registrars and specialists scored significantly higher mean knowledge scores compared to medical officers. There was no statistically significant difference in the mean knowledge scores between different disciplines. Only 50% of participants reported using an SAP guideline. More than 80% of the participants agreed that their practice would improve if guidelines were readily accessible in the operating theatre and an effective SSI surveillance system was in place.

Conclusion: This study demonstrates that the overall SAP knowledge and practice were adequate, but certain SAP principles and specific procedures need training and enforcement. Our recommendation is an institutional guideline with interdepartmental expert collaboration and a reliable surveillance system for regular audits.

Experiential learning styles of medical trainees at the University of Pretoria as determined by the Kolb learning style inventory

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Background: Experiential learning has been well researched in various fields, including medicine, and is beneficial to learning outcomes. Although many South African institutions currently use aspects of experiential learning, there is little known about specific experiential learning style prevalence and its implication on current curriculums. Determining the experiential learning styles at an academic institution will empower the trainees by understanding their own learning strengths and weaknesses and allowing educators to tailor training and implement strategies to improve learning outcomes. This descriptive observational survey aimed to determine individual undergraduate medical students' learning styles and the study group's predominant learning style.

Methods: Following research ethics approval, data was collected through a self-administered survey on the Research Electronic Data Capture (REDCap) platform. The Kolb learning style inventory (LSI) is a validated, standardised questionnaire consisting of 12 questions to which the participant ranks their responses from "most like me" to "least like me". Responses were collected from the electronic application, and the specific learning style was determined with a preprogrammed mathematical algorithm.

Results: There was no statistically significant difference in the demographic distribution of participants. Contrary to what was expected, the learning styles of the study participants were evenly distributed across all four groups (Assimilating n = 12; Converging n = 14; Accommodating n = 12; Diverging n = 12). Interestingly 98% (n = 49) of study participants requested feedback on their individual learning styles.

Conclusion: The benefits of experiential learning are clear, but one must be wary of assumptions about specific populations' presumed learning styles. Instead, the emphasis should be on incorporating various experiential learning activities during instruction and guiding trainees through all phases of the experiential learning cycle. In addition, attention should be given to assisting trainees in developing a balanced learning style to better navigate different learning situations and improve learning outcomes.

Curriculum development for the Essential Steps in Managing Obstetric Emergencies (ESMOE) anaesthesiology training programme – a Delphi study

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Background: The health of mothers is fundamental as females play a critical role in human progress and the development of socio-economics of society, as reflected in the Sustainable Development Goals (SDG) for 2030. The Saving Mothers report 2014–2016 states a high number of anaesthetic-related maternal mortality in district hospitals, with the majority being deemed preventable. The Essential Steps in Managing Obstetric Emergencies (ESMOE) training programme was introduced in 2008 to reduce maternal deaths in South Africa. Adequate training of this anaesthetic module does not take place in all intern-training institutions and it has not recently been updated. This study aimed to make recommendations to the ESMOE anaesthesiology training programme committee to aid their curriculum review. The objective was to achieve consensus among a panel of expert obstetric anaesthetists on the learning outcomes and pedagogy for a revised training programme.

Method: A three-round consensus-seeking Delphi technique was used. Experts were asked to score the appropriateness of the current and proposed ESMOE training programme objectives in an anonymous, online, Likert-scale questionnaire. Consensus was defined as ≥ 70% agreement.

Results: Of 30 invited specialist anaesthesiologists with an interest in obstetric anaesthesia, 24 agreed to participate. A total of 17/24 completed Round 1 (70.83% response rate), 16/17 completed Round 2 (94.12% response rate) and 15/16 completed Round 3 (93.75% response rate). Consensus was reached on 50 of the 52 statements (96%).

Conclusion: The experts concluded that the 'current' ESMOE anaesthesiology training programme should be updated to a blended learning programme to adequately educate the current digital native intern generation. They also agreed on several other subjects that should be included in the learning outcomes of this training programme to improve intern education and thereby contribute to reaching the reduced maternal mortality SDG for 2030.

Prevalence and predisposing factors of post-traumatic stress symptoms in anaesthetists during the COVID-19 outbreak in South Africa: a cross-sectional survey

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Background: Post-traumatic stress symptoms (PTSSs) have been described in healthcare workers after disease outbreaks. Anaesthetists are at high risk of exposure to COVID-19 due to the nature of the airway procedures they perform. Anaesthetists are also at increased risk of mental health disorders, substance abuse and suicidality. When PTSSs are sufficiently high in number and severity, they become the key elements of the diagnostic criteria for post-traumatic stress disorder (PTSD). This study sought to explore the prevalence and predisposing factors of PTSSs in anaesthetists during the COVID-19 outbreak in South Africa.

Methods: Members of the South African Society of Anaesthesiologists (SASA) completed an electronic survey including sociodemographic information and information regarding COVID-19 exposure. The PTSD Checklist for DSM-5 (PCL-5) was used to measure PTSSs. The resultant score indicated symptom severity, with a score of 33 or higher indicating a provisional diagnosis of PTSD.

Results: A total of 483 participants completed the survey (23.8% response rate). Three hundred and ninety-one respondents were included in the study, of which 17.6% received a provisional PTSD diagnosis. Younger anaesthetists with less experience, females, single participants and those without children exhibited a greater prevalence of PTSD. Anaesthetists with pre-existing mental health conditions (p = 0.009) and those who reported loneliness (p = <0.001) and poor social support (p = 0.018) were more likely to receive a provisional PTSD diagnosis. Personal protective equipment (PPE) shortages were also associated with the development of PTSD (p = 0.009).

Conclusion: The prevalence of PTSSs is unacceptably high amongst South African anaesthesia providers, especially those with pre-existing mental health conditions and poor social support. Findings from this study indicate the importance of supporting susceptible healthcare workers through interventions aimed at positive mental health promotion and PTSD prevention.

Ultrasound-assisted versus landmark-based spinal block performance in emergency caesarean delivery in obese patients at a central hospital

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Background: An ultrasound-assisted spinal block technique for obstetric anaesthesia has not been studied in an African population or during emergency caesarean delivery (CD). This study aimed to assess the effect of preprocedural neuraxial ultrasound on the performance of spinal blockade in obese parturients undergoing spinal block for emergency CD in a central hospital in Johannesburg, South Africa.

Methods: A two-armed, prospective comparative contextual study design was used. Adult women booked for emergency CD

under spinal block had a preprocedural ultrasound performed before being randomised to either a landmark-based group (LMG) or an ultrasound-assisted group (USG). The USG had identified landmarks marked to assist the anaesthetist. The primary end-points were first-pass success rate, difficult spinal block rate, procedure time, number of needle punctures and needle passes. Secondary end-points include the intervertebral spaces attempted, the predicted ultrasound distance and actual needle depth.

Results: Thirty-six participants were recruited between January and February 2020. The USG was associated with a shorter procedure time (48s vs 97s, $p < 0.05$) and fewer needle passes (3 vs 5.5, $p < 0.05$). The LMG had a greater percentage of blocks performed at higher intervertebral spaces (L1/2 or L2/3) compared to the USG (66.7% vs 11.1%, $p < 0.05$). The predicted ultrasound distance correlated well with the actual needle depth ($r = 0.86$, 95% CI 0.65–0.95) with a mean difference of 10 mm (range 0–25 mm).

Conclusion: Preprocedural ultrasound was associated with a statistically significant improvement in some technical measures of spinal block performance when used for emergency CD in an African population.

Hocus pocus – trick or treat? The evolution of ultrasound in anaesthesia

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The evolution of ultrasound in medicine has seen its utility spread from the radiology unit to the bedside of the acutely ill, with the incorporation of ultrasound modules on anaesthetic workstations. From humble beginnings and niche uses by 'sonar zealots', perioperative ultrasound has become an integral part of the modern anaesthetist's diagnostic and therapeutic armamentarium.

"High peak pressures – let's check if maybe there is a pneumo."

"The patient says they fasted, but ward notes say they ate lunch. Maybe we should do a gastric ultrasound before we proceed?"

"I wonder if the catheter is blocked or are they just not producing urine?"

The expansion of this field has been exponential, with thousands of articles published on the topic annually. Many national and international professional societies are incorporating ultrasound into their speciality examination curricula, and although the local College of Anaesthetists exam documents say little about ultrasound, few exams in recent memory have lacked perioperative ultrasound-based questions.

This talk will explore the evolving science and guidelines in this space, and show how ultrasound has gone from an esoteric interest to a crucial tool for the South African anaesthesiologist.

Tiny batteries... big danger

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Foreign body ingestion is common in the paediatric population, especially in children under five years of age. The most commonly ingested objects are coins, with batteries accounting for approximately 5% of ingestions. Most ingested batteries pass spontaneously through the gastrointestinal tract; however, those lodged in the oesophagus may lead to dangerous complications, such as oesophageal perforation and aorto-oesophageal fistula.

There has been a dramatic increase in morbidity and mortality after battery ingestion worldwide in recent years. This is related to the wider use and easier availability of electronic devices and the growing popularity of more powerful 20 mm lithium button batteries, which are more likely to get impacted in the paediatric oesophagus, leading to serious injury if not promptly removed. Ingestion of these larger batteries resulted in death or serious complications in 12.6% of children. An increased incidence of battery ingestion has also been seen during the COVID-19 pandemic due to lockdown restrictions, with children spending more time at home.

The main mechanism of injury is the generation of electric current between the poles of the battery. This is facilitated by the oesophagal mucosa being in contact with them and completing the circuit. The resultant caustic reaction leads to liquefactive necrosis of surrounding tissues, with clinically significant damage being reported as early as 2 hours after impaction.

The time-sensitive nature of button-battery ingestion requires fast mobilisation of a multidisciplinary team and urgent removal. Clinicians must be able to recognise and manage button battery ingestion as per the latest guidelines. These patients often require anaesthesia for endoscopic battery removal; therefore, anaesthetists must familiarise themselves with the management of battery ingestion and be aware of its potential complications.

This review focuses on the anaesthetic considerations and immediate management of ingested button batteries.

SUPraclavicular Regional Anaesthesia affecting Bispectral Index as Level Of Consciousness monitor (SUPRABLOC): a pilot randomised controlled trial

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Background: Recent renewed interest in regional anaesthesia during the COVID-19 pandemic has inspired the application of

neuraxial anaesthesia for previously unconventional indications, such as awake abdominal surgeries. These patients needed little sedation, since studies demonstrate that neuraxial anaesthesia causes sedation as measured by Bispectral Index (BIS). In contrast, no studies have investigated the possible sedative effects of non-neuraxial regional anaesthesia.

Aim: This pilot randomised controlled trial (RCT) was designed as a template for, and to test the feasibility of performing a definitive RCT to establish if non-neuraxial regional anaesthesia has any sedative effect.

Methods: Forty patients presenting for forearm surgery were randomly allocated to two treatment arms (supraclavicular block and control). Their level of sedation was quantitatively monitored before surgery for 60 minutes. Specific feasibility outcomes were planned and data collected according to CONSORT 2010 recommendations.

Results: Out of 48 patients screened, 41 (85.42%) were invited to participate, 40 (97.56%) consented and 100% completed the study. Four (10.00%) BIS electrodes needed replacement, inadequate contact was shown in three patients (7.50%), data collection and form completion were deemed "easy", and block success rate was 100%. Differences in mean BIS between groups were < 5, and a difference of 10% between groups in the incidence of BIS < 80 (85% block group, 75% control group) was shown.

Conclusion: We propose that progression to formal RCT is feasible with modifications.

Decrease in BIS value from baseline should be measured per patient, and clinically significant decrease should be estimated (we suggest a decrease of 10 or more), exclusion of emergency patients (starved for longer, more anxious, may affect BIS), the sample size should be 500 patients and multi-site involvement implemented.

Qualitative platelet defects associated with high plasma urea in chronic kidney disease, is there cause for concern?

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Background: Patients with chronic kidney disease (CKD) may develop platelet dysfunction attributed to high serum urea concentrations. Platelet dysfunction is expected with serum urea concentrations between 21–35 mmol/L, an arbitrary range. This study examined the possible association between the severity of renal dysfunction and the prevalence of platelet dysfunction, measured by light transmission aggregometry. Secondary outcomes considered the predictive value of CKD biochemical indices to describe platelet dysfunction.

Methods: An analytical cross-sectional study was conducted on 82 Nephrology outpatients with high serum urea concentrations. They were divided into two groups, depending on their serum glomerular filtration rate ([GFR] 60-15 $ml.min^{-1}.1.73m^{-2}$ and GFR < 15 $ml.min^{-1}.1.73m^{-2}$; low-grade [LU] and high-grade [HU] renal failure groups, respectively), in- and exclusion criteria were applied, and platelet function was tested on the eligible CKD patients. After our interim analysis, a control group of 41 healthy individuals were added.

Results: Platelet dysfunction amongst CKD patients was 10/41 (24.3%) in the HU group and 8/41 (19.5%) in the LU group. The difference between proportions with platelet dysfunction in the groups was not significant (95% confidence interval [CI] -13.0–22.5%; $p = 0.584$), therefore a control group was added. Platelet dysfunction was 1/41 (2.4% prevalence; 95% CI 6.2–12.9%) amongst the control group participants, a difference of 19.6% from participants with CKD (95% CI 6.9–29.9%; Fisher's exact test $p = 0.003$). The relative risk was 9.0, and the number needed to treat (harm) was 5.

Conclusion: CKD patients with elevated serum urea concentrations had a higher likelihood to have platelet dysfunction than the general population. No exact serum urea value could predict platelet dysfunction.

Keywords: urea, platelets, bleeding, chronic, kidney

Mostly harmless? A survey of South African anaesthetists' knowledge and attitudes regarding environmental sustainability in the operating theatre

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Background: The healthcare industry has been shown to have a large negative environmental impact – producing vast amounts of waste and CO_2 emissions. Operating theatres demonstrate a disproportionately high waste production to floor space ratio, producing up to 33% of hospital waste. Furthermore, anaesthesia is responsible for 25% of operating theatre waste production.

Methods: This study assesses the opinions and knowledge of South African anaesthetists regarding the environmental impact of anaesthetic practice. A validated questionnaire was developed using an online survey tool, SurveyMonkey. The survey link requesting participation was published once in the South African Society of Anaesthetists' weekly newsletter, and after that, snowballing was used to increase the sample size.

Results: The survey was completed by 222 South African anaesthesia providers. Ninety-two per cent of respondents (189/205; CI 87.4–95.3%) agreed that environmental impact is an important factor to consider when conducting anaesthesia

practice. However, only 35.0% of South African anaesthetists felt that their knowledge was sufficient to guide such practice (72/206; CI 28.5–41.9). Although 65.2% of South African anaesthetists recycled at home (133/204; CI 58.2–71.6%), and 90.7% were keen to recycle at work (185/204; CI 85.6–94.1%); a mere 11.8% of respondents reported recycling at work (24/204; CI 7.8–17.2%). The most significant perceived barriers to recycling in South African operating theatres were lack of information, lack of recycling facilities and staff attitudes.

Conclusion: South African anaesthetists appear keen to adopt environmentally friendly practices in the operating theatre. However, several barriers prevent implementation. Further, anaesthetists lack the knowledge and education necessary to guide sustainable practice. This requires redress in national curricula.

Keywords: environmental sustainability, operating theatre, recycling

A new device to secure endotracheal tubes: The secure airway clamp

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Background: To address the limitations of zinc plasters, a secure airway clamp (SAC) was developed to secure the endotracheal tube without plaster or binding and which also protects teeth and prevents biting down on the endotracheal tube. The SAC is inserted, pre-induction, with a fixating gel onto the lower teeth and has a clamp just outside the mouth that secures the endotracheal tube. This proof-of-concept study examines the SAC used in patients

Methods: Permission was granted by the institutional ethics committee and provincial research committee. Each of ten doctors (who previously inserted the device in their own mouth) guided ten random patients (after written informed consent) on their routine lists to insert the device pre-anaesthesia (or they did it themselves if patients could not). They then continued with induction, intubation and anaesthesia. The doctors and patients completed questionnaires of effectiveness and side effects. Vital signs were recorded pre-and post-placement of the device, after intubation, before and after removal of the device.

Results: In most cases, both doctors and patients found the SAC easy and not time-consuming to position and remove, and effective in preventing movement or displacement and obstruction of the endotracheal tube. In the majority of cases, the device was comfortable and did not hurt or damage the mouth, jaw or throat. In a small number of cases, both doctors and patients found the SAC uncomfortable and allowing minor movement. In the majority of cases, doctors would use the device if available, while the majority of patients would advise other patients to use the device. Vital signs of patients remained stable during insertion and removal of the device.

Conclusion: The device seems effective and acceptable to most doctors and patients. Some further minor adjustments and availability in different sizes will improve smooth insertion.

Erector spinae plane block: snake oil or super block?

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The erector spinae plane block (ESPB) has been a very contentious topic since first being described by Forero et al. in 2016. After initially being used in the upper thoracic area for neuropathic pain, its use soon spread to all levels, including lower thoracic and lumbar levels for a wide variety of procedures. The ESPB still faces a lot of criticism. The exact mechanism of action is still not clear. One of the questions that remain to be answered is, can it provide visceral pain relief consistently?

Several case reports and small, single-centre randomised controlled trials point towards the ability of the ESPB to provide visceral pain relief. This has suggested a safer alternative to the thoracic epidural and paravertebral blocks. With a lower risk of spinal haematomas, neuronal damage, and a much simpler technique to perform with similar benefits, this is undoubtedly a silver bullet! Unfortunately, the ESPB seems to be a hit and miss procedure for visceral pain relief. Why do so many report poor success with the ESPB when it comes to visceral pain control and why the big variation in the extent of craniocaudal spread?

Anatomical studies give the answer to this wide variation in clinical success. Of 18 cadaver studies, five showed epidural spread and 12 studies had spread to the paravertebral space. The ventral and dorsal rami were stained in almost all the studies. Craniocaudal spread is variable, with a spread of up to 12 vertebral levels reached in one study.

What would then be the reason for this wide distribution of anatomical findings? Besides the obvious answers like volume of injectate, drug concentration, patient position, and injection level, the author would like to allude to some salient points that might explain poor results for practitioners.

The ESPB block involves the dissection of the ventral wall of the thoracolumbar fascia off its attachment on the transverse processes to create a plane for the injectate. This requires quite a pressure gradient to open the plane up. The needle type and calibre could play a major role if viewed through the lens of Poiseuille's law.

Apart from needle choice, the precise definition of "tip of the transverse process" and "below the erector spinae muscle" is very important. Is the tip 3 cm lateral from midline, like described in Forero's original block or is it the most lateral visible part in the sagittal plane (easy to misjudge) or transverse plane (more precise)?

The original ESPB was described as a cranial to caudal approach. This is to best navigate the superior costotransverse ligament to

attain anterior penetration and diffusion via the costotransverse foramen. Despite this seemingly insignificant change in approach to the block, the outcomes can vary greatly.

When reviewing the finer detail in published reports on the variations in approach to this block, it starts to make sense as to why the findings are so different between clinicians. Perhaps the ESPB is not such an easy and forgiving block if not executed perfectly.

A prospective observational cohort study of blood transfusion risk and incidence associated with caesarean delivery

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Background: Maternal mortality is 50-fold higher in Africa following caesarean delivery (CD) compared to high-income countries (HIC), and peripartum haemorrhage is the main driver. Blood transfusion (BT) may be lifesaving, and identification of preoperative risks may improve outcomes, especially in resource-limited settings. We hypothesised a higher incidence of BT but similar risks compared to HIC.

Methods: We conducted a prospective, multi-centre cohort study of all consecutive patients undergoing CD at three government-funded hospitals in KwaZulu-Natal. The primary outcome variable was BT. Multivariable binary logistic regression analysis was used to identify risk factors independently associated with BT.

Results: We recruited 1 533 patients between January 2021 to May 2021. The mean age was 28.4 years (±standard deviation [SD] 6.7), mean previous CD was 0.68 (±SD 0.83), and median gestation was 38.0 (range 26–43). A majority of patients presented for urgent/emergent CD (1 195/1 533; 78.1%) and 360 /1 516 (23.7%) underwent preterm CD. Human immunodeficiency virus (HIV) infection and hypertensive disorders of pregnancy were present in 38.6% and 23.4% of patients, respectively. Placental abruption or placenta praevia was present in 5.2% of patients. Seventy-one patients received a BT (4.6%; 95% confidence interval [CI] 3.6–5.7). The incidence of preoperative anaemia was 36.7% (558/1 520; 95% CI 34.3–39.1). The incidence of postpartum haemorrhage was 6% (92/1 533; 95% CI 4.8–7.2). Risks independently associated with BT were placental abnormalities (OR = 6.86 [2.83–16.58]; $p < 0.001$), preoperative anaemia (OR = 23.56 [10.76–51.61]; $p < 0.001$), emergency/urgent CD (OR = 2.23 [0.65–5.36]; $p = 0.074$), platelet count < 100 000 cells/mm^3 (OR = 6.54 [0.53–80.21]; $p = 0.142$), and two or more previous CDs (OR = 2.91 [1.48–5.75]; $p = 0.002$).

Conclusion: We confirmed a higher incidence of BT compared to HIC. Antenatal screening for anaemia and placental abnormalities should be prioritised. We have also identified that even mild thrombocytopaenia increases the risk of BT.